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Historical biogeography of Delphininae dolphins and related taxa (Artiodactyla: Delphinidae)*

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ABSTRACT

Delphinine dolphins arose via a recent, rapid radiation, probably within the last four million years. Although molecular phylogenies are increasingly well resolved, patterns of morphology-ecology-geography are hard to link to phylogeny or to translate into taxonomy. Such problems might be tackled through understanding the drivers of the delphinine radiation. Here, we examine delphinine historical biogeography using the phylogeny of McGowen et al. 2009 as our working hypothesis. We used the **"**Spatial Analysis of Vicariance" method to delimit modern distribution patterns, including disjunctions involving sister nodes in the Delphininae. The analysis identified disjunct sister nodes, allowing some interpretation of Delphininae biogeography. The Central American Seaway was probably an important gateway for early delphinids, but the succeeding "hard" barrier of the Panama Isthmus had little influence. Southern African waters form the Atlantic-Indo-Pacific gateway, which is sometimes considered a "soft" barrier because of the variation in the Benguela and Agulhas currents, in turn driven by tectonic changes and/or Pleistocene glacial and interglacial cycles. The latter cycles probably fragmented coastal habitats, allowing allopatric speciation. Geological patterns of turnover in Southern Ocean diatoms, which link to physical oceanic change, closely match the main cluster of delphinine divergences. The Eastern Pacific Barrier, and perhaps the associated Humboldt Current and equatorial "cold tongue", affect modern distributions, but cause and effect are poorly understood. Future research should involve molecular-morphological phylogenetics for all species, subspecies, and ecomorphs. Complete distributions must be known for all taxa to understand how vicariance and dispersal shaped the distribution of delphinines.

KEYWORDS: Distribution, disjunctions, oceanic barriers, vicariance, dispersal

INTRODUCTION

Research on marine organisms, mainly invertebrates and fishes, has revealed a biogeographical paradox: how speciation occurs in the face of apparently high dispersal capabilities and in a relatively homogenous environment (Palumbi 1992; Norris 2000; Bierne et al. 2003). Both planktic and nektic groups are involved. According to Palumbi (1992), diverse mechanisms, such as selection, distance, and behavior, can affect genetic structure in highly mobile species. Furthermore, genetic change may also be initiated by extrinsic geological factors (Palumbi 1992). Abiotic (physical) factors, such as changing ocean gateways, sea levels, temperatures, and current systems, have been implicated in cetacean evolution over deep time, beyond the origin of the Delphininae (e.g., Steeman et al. 2009; Marx and Fordyce 2015). Speciation processes depend on the length of time that a barrier is impermeable to gene flow and whether evolutionary changes in the allopatrically separated populations result from differential selection or drift alone (McCafferty et al. 2002). In this sense, the marine environment is more likely to offer a mosaic of divergent and dynamic conditions that can drive marked genetic change across surprisingly small spatial and temporal scales (Hauser and Carvalho 2008).

The clade Delphininae (Odontoceti: Delphinidae) is a widespread subfamily of dolphins that exemplifies the challenges of inferring species boundaries and phylogenetic relationships (Amaral et al. 2012b; Perrin et al. 2013). These dolphins are widespread in tropical, subtropical, and temperate regions, in both neritic and pelagic waters. Some species, such as *Delphinus delphis*, *Lagenodelphis hosei*, *Stenella coeruleoalba*, and *Tursiops truncatus*, can tolerate lower water temperatures and may occupy higher latitudes (Forcada 2009; Leduc 2009b). Some species are endemic to the Atlantic (e.g., *Stenella clymene, Stenella frontalis*) or Indo-Pacific basins (*Tursiops aduncus*) (Perrin et al. 1981, 2007; Fertl et al. 2003; Van Waerebeek et al. 2004; Moreno et al. 2005; Mendez et al. 2013), while other taxa are more localized. For example, some subspecies (e.g., *Stenella attenuata graffmani, Stenella longirostris centroamericana, Delphinus delphis ponticus*) or species (*Tursiops australis*) appear to be of restricted distribution (Perrin 1975, 1990, 2009; Charlton-Robb et al. 2011). Some species of *Sousa* have patterns similar to the aforementioned delphinines (e.g., *Sousa chinensis taiwanensis, Sousa sahulensis*) (Jefferson and Rosenbaum 2014; Wang et al. 2015). Distribution patterns necessarily depend on taxonomy, and we note that the Committee on Taxonomy (2016) has cautioned that the status of some named delphinine taxa, including species above, is uncertain.

The subfamily Delphininae was initially recognized in the Delphinidae on the basis of morphological characters, especially those described by Fraser and Purves (1960; see also Kasuya 1973; Mead 1975; Muizon 1988; Perrin 1989). Early molecular analyses of relationships amongst Odontoceti suggested that the genera *Delphinus*, *Lagenodelphis, Sousa, Stenella*, and *Tursiops* should be included in the delphinine clade (Leduc et al. 1999). Subsequent molecular studies basically differed in the proposed relationships between species, the inclusion or exception of *Sousa*, and the paraphyly of *Stenella* and *Tursiops* (Leduc et al. 1999; Caballero et al. 2008; Kingston et al. 2009; Amaral et al. 2012b; Perrin et al. 2013). In a recent review, Perrin et al. (2013) proposed that, until molecular and/or morphological analyses adequately sort out relationships, one possible solution would be to create a “clean state” by synonymizing all delphinine genera under *Delphinus*. This idea was later opposed, however, due to negative consequences for management decisions and conservation (Jefferson 2014; Wang 2014).

Delphininae are the product of a recent and rapid radiation event (Kingston et al. 2009). Molecular data suggest the group originated at the start of the Pliocene, between 5.3 Ma (Banguera-Hinestroza et al. 2014) and 3.5 Ma (McGowen et al. 2009; Cunha et al. 2011). Fossil evidence suggests that the minimum age for the origin of the crown Delphininae is about 4 Ma based on the extinct crown-delphinine *Etruridelphis giulli* dated with accuracy to be slightly older than 3.98 Ma (Bianucci et al. 2009; Bianucci 2013). Other Pliocene occurrences include reports of fossil *Stenella*, *Tursiops*, and *Delphinus* (Barnes 1990; Whitmore 1994; Bianucci 1996, 2013; Fitzgerald 2005). These examples are consistent with a rapid early Pliocene diversification, which likely continued through the Pleistocene (McGowen et al. 2009; Hassanin et al. 2012; Banguera-Hinestroza et al. 2014). There are no reliably identified, convincingly-dated fossil delphinines older than Pliocene, namely, older than 5.333 Ma; older reports of Delphinidae are discussed below.

The pioneering work of Davies (1963), influenced in turn by Ekman (1953), reviewed geological barriers affecting the evolution of distribution patterns amongst living cetaceans. The Isthmus of Panama, the Cape of Good Hope, and the island-free deep water belt of the East Pacific (Ekman 1953) could have been effective barriers at different times during the Pliocene-Pleistocene. According to Davies, Pleistocene cycles of glacial cooling and interglacial warming led to contraction or expansion of tropical waters, allowing mixing (in modern terms, gene flow) across the contracted tropics during cooling, or causing separation of northern and southern cetaceans during warmer intervals of expanded tropics.

Davies (1963) regarded the present as a time of mixing after the last glaciation some 15,000 years ago. Furthermore, cooling caused by the onset of Northern Hemisphere glaciations and the acceleration of glacial cycles in the Pleistocene, with concomitant sea level changes, periodic sea surface temperature changes of as much as two to six degrees, and fluctuations in upwelling, current strength, and wind patterns, have great impact on the marine biota (Palumbi 1992; Jackson 1994).

Research on modern and ancient oceanic patterns and processes has hugely expanded since the work of Davies (Fig. 1, caption), as discussed below. Patterns in the rock record reveal geological processes such as change in ocean currents, temperatures, and ocean gateways. Microfossils, particularly diatoms and foraminifera, are important proxies for paleoclimate, paleocirculation, and paleoproductivity. Inferences based on such geological materials are thus independent of the cetacean patterns and processes that we explore here.

Here, we apply the Spatial Analysis of Vicariance (SAV) method (Arias et al. 2011) to identify possible disjunctions between sister-taxa in Delphininae and related taxa, using the phylogeny of McGowen et al. (2009) and an extensive geographic distributional data. SAV has been used in biogeographical analysis of terrestrial organisms (Gaetano and Rougier 2012; Latinne et al. 2012; Molineri and Salles 2013; Teixeira et al. 2014), but this is the first attempt to apply the method to marine cetaceans. We seek to test SAV for a setting (the oceans) which generally lacks hard barriers, and a wide-ranging study taxon - Cetacea - which has high dispersal capabilities compared with organisms in terrestrial biomes.

In this study, we aim to: (1) carry out a thorough assessment of the geographic distribution for delphinines and related species; (2) implement a novel method in marine environments, SAV, to help address the marine speciation paradox; (3) integrate several lines of evidence (e.g., fossil record, morphological and molecular data, geographic distribution, climate trends, productivity proxies) to search for geological, climatic, and geographic conditions that have influenced the evolutionary history of the Delphininae.

MATERIAL AND METHODS

Biogeographical Analysis

The biogeographical analysis was conducted through the Spatial Analysis of Vicariance (SAV): a taxon history method that chooses a set of distributional reconstructions based on an optimality criterion to maximize cases of disjunction (i.e., barriers) for sister nodes. These disjunct distributions are displayed on a map that identifies the potential barrier localities (Arias et al. 2011). SAV is implemented in VIP (Vicariance Inference Program), a free computer program available online (Arias 2010). This taxon history method is based on Hovenkamp's procedures to identify events that correspond to dispersal barriers separating biotas (Hovenkamp 1997, 2001; Arias et al. 2011). Hovenkamp (1997) suggested that, to reconstruct the sequence of biogeographic events, one needs only geographical and historical information as presented in a cladistic analysis. Unlike other biogeographical methods (e.g., DIVA - Ronquist 1997; S- DIVA - Yu et al. 2010), SAV does not need a set of predefined areas, or assumptions of hierarchical relations between areas, and furthermore it allows researchers to ignore distributions linked to problematic nodes (e.g., widespread taxa).

The optimality criterion recovered by SAV is a measure to rank different reconstructions, and select the one that provides the best fit among the reconstruction and the data (i.e., lowest cost) based on a series of cost settings to different parameters. We performed a heuristic search of 1000 iterations (full sector search selected), with the cost of distribution removal and the cost of partial removal (activated) set to 1 and 0.75, respectively. In order to represent distributions as a grid of absence/presence data, a grid of 2°x2° was selected and maximum fill adjusted to 1 with a Von Neumann's neighborhood as filling algorithm. We assessed the effects of alternative settings by using different grid sizes (1°x1°), different maximum fills (2 and 3), and different costs to partial or total removal of terminals, but the results were similar to those obtained using the default settings noted above, or at least had higher scores.

Phylogeny

As basis for the biogeographical analysis, we used the topology of McGowen et al. (2009), pruned to include only Delphininae and their sister taxon, *Sotalia*, using the software Archaeopteryx (Han and Zmasek 2009).

The McGowen et al. (2009) phylogenetic hypothesis was chosen because: (1) it includes data from ten taxa of delphinine dolphins that represent 41.7% of taxa formally described (Table 1); (2) it includes both nuclear and mitochondrial data; (3) it provides an explicit estimate of the sequence of divergence among lineages; and (4) it shows branch support values (posterior probabilities) higher than 0.89.

Given the current taxonomic confusion within the genus *Delphinus*, we collapsed the *Delphinus* nodes on the McGowen et al. (2009) phylogeny and refer to them as *Delphinus* spp.

Geographical information

We performed an exhaustive review of the literature published after 1970, compiling records from population and case studies, sightings, incidental or intentional captures, and strandings. We then used this information to assign a minimum geographical range to each of the species present in the pruned phylogeny. Geographical coordinates were estimated using *Google Earth* where only locality information was available. Records containing misidentified species, dubious or incomplete information, and species extralimital records were ignored. Some of the reported species names may be of uncertain biological identity, according to the

Committee on Taxonomy (2016) (asterisked in Table 1).

All data generated or analysed during this study are included in this published article [Supplementary Information.docx].

RESULTS

Biogeographical Analysis

Currently, up to 24 taxa are included in the clade Delphininae (Table 1) (Charlton-Robb et al. 2011; Committee on Taxonomy 2016; Wickert et al. 2016). Pacific Ocean has the highest number of delphinine taxa (66.7%), followed by the Indian (54.2%) and Atlantic oceans (45.8%). Also, Pacific Ocean has the highest number of endemic species (20.8%), followed by the Atlantic (17%) and Indian oceans (8%).

Table 1. Genera described in Delphininae subfamily and reported distribution. Not all are included in the biogeographic analysis (see Table 2).

Taxon[†]	**Ocean Basin**			**Black Sea**	**References**
	Atlantic	**Indian**	**Pacific**		
Delphinus delphis Linnaeus, 1758	x	x	x		Jefferson and Van Waerebeek 2002; Natoli et al. 2008; Perrin 2009; Tavares et al. 2010; Amaral et al. 2012a; Cunha et al. 2015
D. d. ponticus Barabash-Nikiforov, 1935				x	
**Delphinus tropicalis* Van Bree, 1971		x			
D. t. capensis Gray, 1828	x	x	x		
Lagenodelphis hosei Fraser, 1956	x	x	x		Perrin 1973; Jefferson and Leatherwood 1994
Sousa chinensis (Osbeck, 1765)		x	x		Jefferson and Rosenbaum 2014; Wang et al. 2015
S. c. taiwanensis Wang et al. 2015			x		
S. plumbea (G. Cuvier, 1829)		x			
S. sahulensis Jefferson and Rosenbaum, 2014		x	x		
S. teuszii (Kükenthal, 1892)	x				
Stenella attenuata (Gray, 1846)	x	x	x		Perrin 1975,1990; Perrin et al. 1981, 1987, 1994, 1999; Fertl et al. 2003; Moreno et al. 2005
S. a. graffmani (Lönnberg, 1934)			x		
S. clymene (Gray, 1850)	x				
S. coeruleoalba (Meyen, 1833)	x	x	x		
S. frontalis (G. Cuvier, 1829)	x				
S. longirostris (Gray, 1828)	x	x	x		
S. l. centroamericana Perrin, 1990			x		
S. l. orientalis Perrin, 1990			x		
S. l. roseiventris (Wagner, 1846)			x		
Tursiops aduncus (Ehrenberg, 1833)		x	x		Perrin et al. 2007; Viaud-Martinez et al. 2008; Wang and Yang 2009; Wells and Scott 2009; Charlton-Robb et al. 2011; Wickert et al. 2016
**T. australis* Charlton-Robb et al., 2011		x	x		
**T. gephyreus* Lahille, 1908	x				
T. truncatus (Montagu, 1821)	x	x	x		
T. t. ponticus Barabash-Nikiforov, 1940				x	
Endemic total taxa	4	2	5	2	
Non-endemic taxa	7	11	11	-	
Total	**11**	**13**	**16**		

[†] Original descriptions for taxonomic names are cited either in References or in Rice (1998).

*Taxa not recognized as distinct by the Committee on Taxonomy (2016).

The comprehensive literature review returned thousands of records, from which 2,152 records were selected for biogeographical analysis (Table 2, Supplementary Information).

Table 2. Taxa considered in biogeographical analysis and their respective numbers of records compiled from literature.

Terminal taxon	**Number of records***
Delphinus spp.	337
Lagenodelphis hosei	141
Sotalia fluviatilis	18
S. guianensis	50
Sousa chinensis	5
Stenella attenuata	495
S. clymene	153
S. coeruleoalba	157
S. frontalis	172
S. longirostris	373
Tursiops aduncus	33
T. truncatus	218
TOTAL	**2,152**

*Detailed information from records utilized in the biogeographical analysis is in Supplementary Material.

Three reconstructions with the lowest cost, namely 7.75, were produced by SAV. In the consensus reconstruction, three disjunct sister pairs and one alternative disjunct sister pair were recovered (i.e., the event did not interfere in the final cost of reconstruction), and four nodes had the distribution of their terminal taxa removed (i.e., ignored data) (Fig. 1a). At node 1, an ancestral disjunction was recovered between the clade Delphininae and (*Sotalia fluviatilis* + *Sotalia guianensis*). A second disjunction at node 2 separates ((*Tursiops truncatus* + *Tursiops aduncus*) + (*Stenella coeruleoalba* + *Stenella clymene*)) from (*Stenella frontalis*). An alternative disjunction was recovered in node 3, which separates (*Tursiops truncatus* + *Tursiops aduncus*) from (*Stenella coeruleoalba* + *Stenella clymene*). In the outgroup, a disjunction was recovered between *Sotalia fluviatilis* and *Sotalia guianensis* in node 4. All disjunctions are represented in Fig. 2.

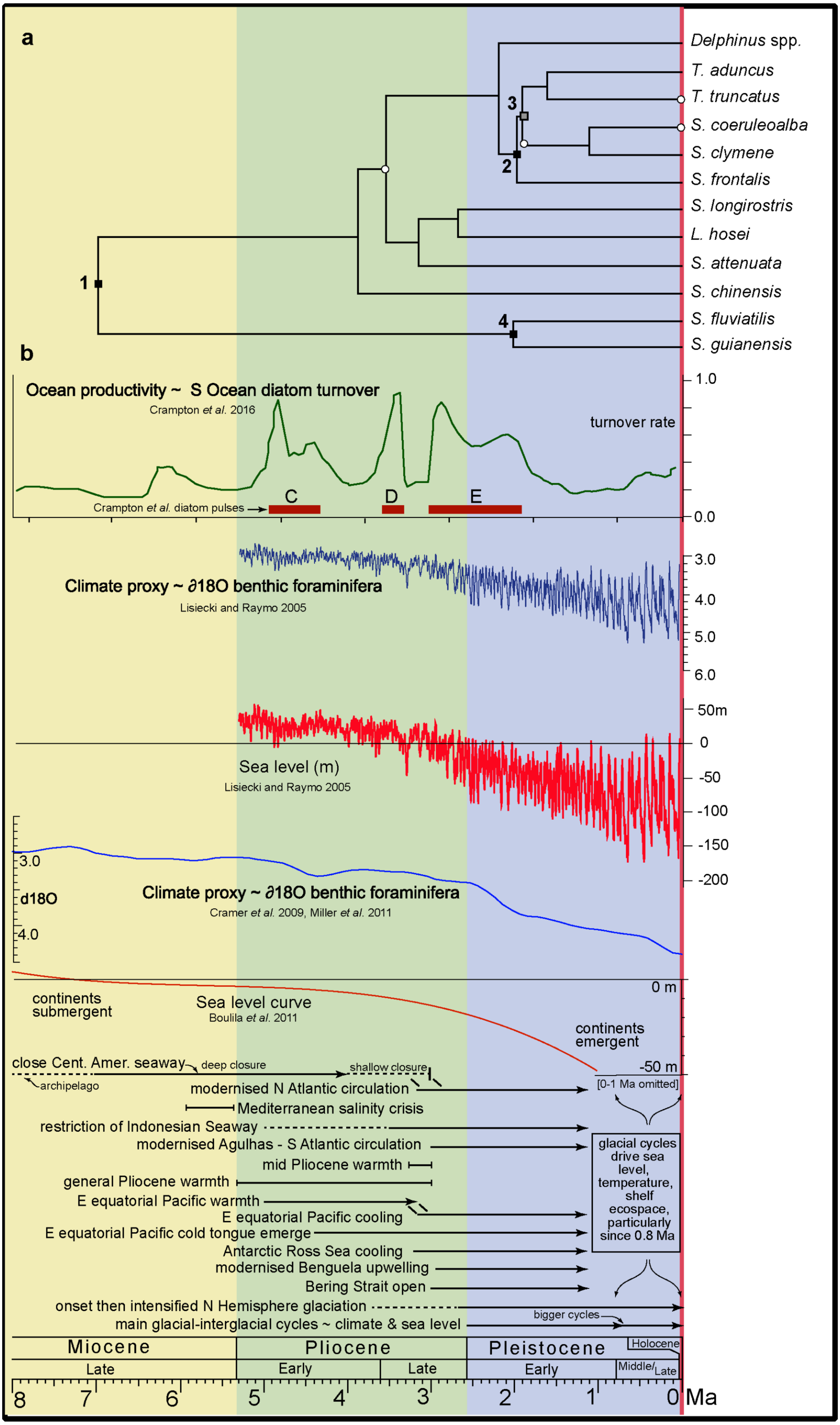
a
Delphinus spp.
T. aduncus
T. truncatus
S. coeruleoalba
S. clymene
S. frontalis
S. longirostris
L. hosei
S. attenuata
S. chinensis
S. fluviatilis
S. guianensis
1
2
3
4
b
Ocean productivity ~ S Ocean diatom turnover
Crampton et al. 2016
turnover rate
1.0
0.0
Crampton et al. diatom pulses
C
D
E
Climate proxy ~ ∂18O benthic foraminifera
Lisiecki and Raymo 2005
3.0
4.0
5.0
6.0
Sea level (m)
Lisiecki and Raymo 2005
50m
0
-50
-100
-150
-200
3.0
d18O
4.0
Climate proxy ~ ∂18O benthic foraminifera
Cramer et al. 2009, Miller et al. 2011
0 m
continents submergent
Sea level curve
Boulila et al. 2011
continents emergent
-50 m
[0-1 Ma omitted]
close Cent. Amer. seaway
deep closure
shallow closure
archipelago
modernised N Atlantic circulation
Mediterranean salinity crisis
restriction of Indonesian Seaway
modernised Agulhas - S Atlantic circulation
mid Pliocene warmth
general Pliocene warmth
E equatorial Pacific warmth
E equatorial Pacific cooling
E equatorial Pacific cold tongue emerge
Antarctic Ross Sea cooling
modernised Benguela upwelling
Bering Strait open
onset then intensified N Hemisphere glaciation
main glacial-interglacial cycles ~ climate & sea level
bigger cycles
glacial cycles drive sea level, temperature, shelf ecospace, particularly since 0.8 Ma
Miocene
Late
Pliocene
Early
Late
Pleistocene
Early
Middle/
Late
Holocene
8
7
6
5
4
3
2
1
0
Ma

Fig. 1 Delphininae phylogeny and paleoenvironmental events. a) Phylogeny modified from McGowen et al. (2009). The branch lengths follow the sequence of branching events provided by McGowen et al. (2009). Numbers identify phylogenetic nodes, where disjunctions were recovered by Spatial Analysis of Vicariance. Symbols are as follows: black square indicates a vicariance event; gray square indicates an alternative vicariance event; white circle indicates that the taxon has its distribution removed. b) Paleoenvironmental events plotted against geological time. Timescale (bottom) is after the International Union of Geological Sciences (Cohen et al. 2015); corresponding time intervals are coloured as follows: Miocene – light yellow; Pliocene – light green; Pleistocene – light blue; Holocene – a very thin column in red. Times and other details for paleoenvironmental events, reading from bottom up, are from these references: glaciation, Woodard et al. (2014), De Schepper et al. (2014 - 3.6 Ma onset and 2.7 Ma intensification of Northern Hemisphere), Bell et al. (2015); Bering Strait open (Brierly and Federov 2016, possibly before 3 Ma); Benguela upwelling, Krammer et al. (2006, upwelling established ~10 Ma), Dowsett et al. (2013), Karas et al. (2011), Petrick et al. (2015a); Ross Sea cooling, Riesselman and Dunbar (2013); eastern equatorial Pacific "cold tongue" emerged, Rousselle et al. (2013); eastern equatorial Pacific warmth then cooling, Martínez-Garcia et al. (2010), Zhang et al. (2014), Molnar and Cronin (2015); general Pliocene warmth, Dowsett et al. (2013); M2 glaciation followed by Late Pliocene (Late Piacenzian) warmth, Dowsett et al. (2013), Petrick et al. (2015a), Haywood et al. 2016; modernized Agulhas circulation, Flores et al. 1999; restriction of Indonesian seaway, Karas et al. (2011), Molnar and Cronin (2015); Mediterranean salinity crisis, Flecker et al. (2015); stepped closure (deep to archipelagic to shallow) of Central American Seaway, Jackson and O'Dea (2013), Coates and Stallard (2013), Osborne et al. (2014), Bacon et al. (2016), Brierly and Federov (2016); modernization of North Atlantic circulation following closure of Central American Seaway, Keigwin (1982), Mudelsee and Raymo (2005), Jackson and O'Dea (2013), Rousselle et al. (2013). Smoothed first-order sea-level curve, Boulila et al. (2011). Climate proxy of smoothed $^{\partial 18}$O curve from benthic foraminifera, Cramer et al. (2009), as interpreted by Miller et al. (2011). Sea-level curve and climate proxy $^{\partial 18}$O from benthic foraminifera, Lisiecki and Raymo (2005). Oceanic paleoproductivity change as indicated by Southern Ocean diatom turnover rate, Crampton et al. (2016).

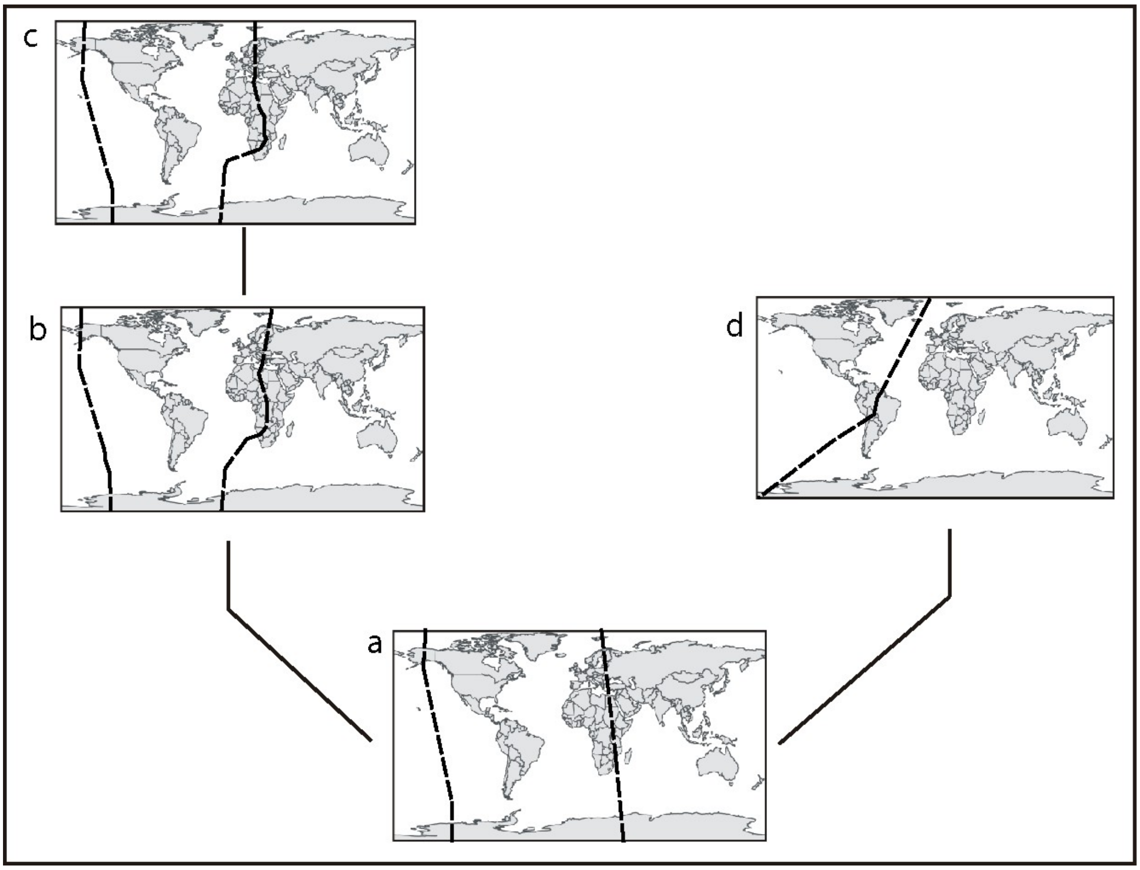

Fig. 2 Disjunctions recovered by Spatial Analysis of Vicariance from the phylogeny of McGowen et al. (2009). a) indicates the disjunction recovered at node 1; b) indicates disjunction recovered at node 2; c) indicates the disjunction recovered at node 3; and, d) indicates the disjunction recovered at node 4.

In summary, our results show:

1, time-calibrated branching patterns in phylogeny (Fig. 1a), which were established independently of geologically identified and geologically-dated paleoceanic events.

2, paleoceanic events (Fig. 1b), involving change in paleoclimate, paleocirculation, barriers and gateways, and paleoproductivity, all established independently of cetacean phylogeny.

3, biogeographical patterns (Fig. 2 a-d), based on biological distributions, and established independently of the history of ocean barriers and gateways. The biogeographic analysis revealed persistent disjunctions in the eastern Pacific and the between Atlantic and Indian ocean basins at the tip of South Africa (Figs. 1a, 2 a-c), as well as a further disjunction in the southwestern Atlantic Ocean (Figs. 1a, 2d).

DISCUSSION

A classic problem in biogeography is to explain why particular terrestrial and freshwater taxa have disjunct geographical distributions that are broken up, for example, by oceans (De Queiroz 2005), and what mix of dispersal and vicariance events might be involved. Vicariance, dispersal, speciation, and extinction operate in the oceans as much as they do on land, as do other factors such as changes in climate, tectonics, competition, dispersabilility, and habitat specialization (Vermeij 2005). Nevertheless, it is often more challenging to explain the distribution of marine species in their interconnected and highly 3-dimensional world. This is particularly true of cetaceans, which are large, highly mobile, endothermic, homeothermic and, presumably, eurythermic, and thus might be expected to be generally wide-ranging. Yet, in spite of such adaptations, many cetaceans have clearly delimited distributions, and few are cosmopolitan (e.g. Leduc 2009a).

Phylogenies help to understand the many levels of evolutionary processes that have shaped today´s biota (Davies et al. 2008). In general, phylogenies are based mainly on readily-collected molecular data, producing constant improvements in the accuracy and resolution of phylogenetic reconstructions. However, such approaches describe the history of fragments of the genome, rather than the history of a species (Szollösi et al. 2015). Further, morphological clues about the evolutionary history of a group are often omitted, as homologous molecular sequences are easier to recognize and code than most morphological characters and complexes (Szollösi et al. 2015). Yet, morphologically-based phylogenies that include well-preserved and well-dated fossils may indicate the age of high-level cladogenetic events, the history of morpho-functional complexes, and unsuspected past radiations not revealed by modern molecules (e.g., Marx and Fordyce 2015).

Several recent studies have considered the drivers of the extant cetacean radiation, using data based mainly on molecules (i.e., phylogenetic data, demographic data, diversification rates and times of divergence) (Hamilton et al. 2001, Pichler et al. 2001, Natoli et al. 2004, 2006; Harlin-Cognato et al. 2007; Pastene et al. 2007; Steeman et al. 2009; Amaral et al. 2012b; Hassanin et al. 2012, Moura et al. 2013; and Banguera-Hinestroza et al. 2014). Morphologically-based analyses with limited taxa have included fossils, which potentially provide absolute dates for nodes, while enforcing molecular constraints (Bianucci 2013; Murakami et al. 2014b). Marx and Fordyce (2015) used a total evidence approach (modern and fossil morphology, and molecules).

Fossil evidence and molecular data suggest a geologically young, Pliocene, origin of delphinines. The geological record for the last 5 Ma – particularly, the record of sediments, microfossils, and their contained geochemical signals – reveals many physical oceanic and geographic events that may have affected delphinine history (Fig. 1). Such events may be cyclic (e.g., global climate, ice, sea-level, shelf area), or long-term trends that are not necessarily cyclic (e.g., first-order sea-level, or first-order sea bottom temperature), or switch-like single events (e.g., tectonic changes in ocean gateways). Some biological patterns in fossil groups other than cetaceans (e.g., diatoms - Lazarus et al. 2014; Crampton et al. 2016; coccoliths - Krammer et al. 2006) are also recognized proxies for paleoenvironmental change likely to have influenced cetacean history (e.g., Marx and Fordyce 2015).

The objective of SAV is to identify disjunct distributions among sister groups. Vicariance is not the only process allowed by the analysis, because the SAV disjunction might equally imply a barrier to dispersal (Hovenkamp 1997; Arias et al.

2011). The analysis also helps to localize a barrier that separated sister taxa, which allows the researcher to identify possible underlying causes that keeps both distributions disjunct (Arias et al. 2011). The disjunct sister pairs recovered by our analysis were separated by non-terrestrial (i.e., soft marine) barriers, such as ocean currents and climate changes. Barriers for different nodes involved South African and eastern Pacific waters (Figs. 1a, 2). Although not recovered by SAV, we also consider that barriers established prior to the radiation of Delphininae, involving the closure of Central America Seaway and Tethys, had or have some impact on the biogeography of these dolphins. In summary, it is reasonable to suppose that the blocking of the tropical route between the Atlantic and the other ocean basins (Fig. 3) played a key role in the biogeographical history of the Delphininae.

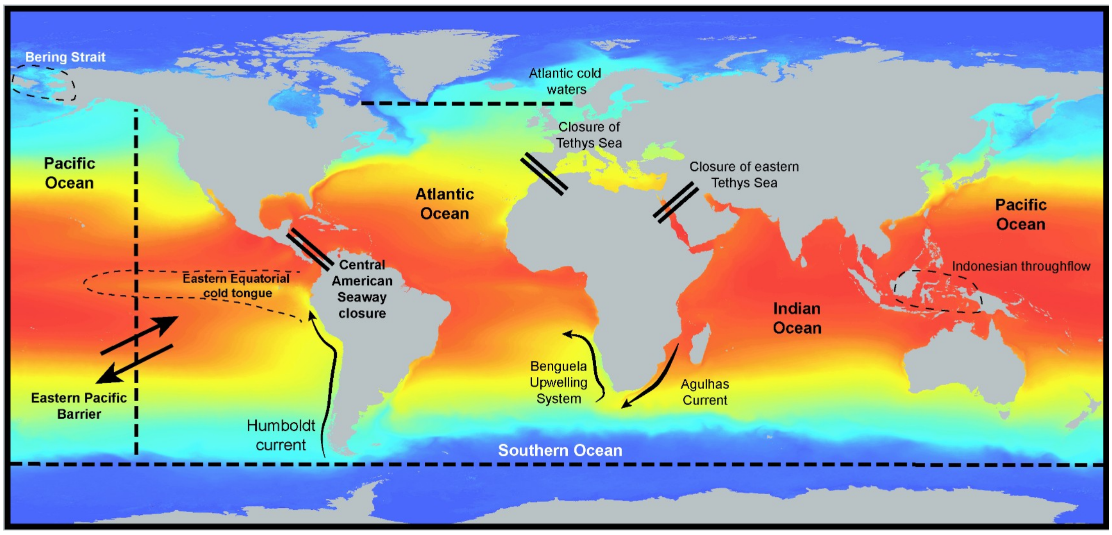

Fig. 3 Terrestrial and soft barriers established both before and during the delphinine radiation, and presumed to influence the larger radiation of Delphinidae. Modern Sea Surface Temperatures (SST) are represented as follows, red-orange = warm waters, blue colors = cold waters. Fonte: MARSPEC (Sbrocco and Barber 2013).

Soft barriers that were created by variation in flow and location of major currents were important: the Benguela Upwelling System, the Gulf Stream, the Agulhas Current, and the Indonesian through-flow. Of these, the Benguela, Agulhas, and Indonesian currents were established long before the delphinine radiation (e.g., Lazarus et al. 2006; Krammer et al. 2006; Uenzelmann-Neben et al. 2007; Karas et al. 2011; Dowsett et al. 2013; Petrick et al. 2015a). Climatic and tectonic events within the last 5 Ma, however (e.g., Caley et al. 2012, 2014; Simon et al. 2013; Petrick et al. 2015a, 2015b; Brierly and Federov 2016), caused variation in circulation that probably affected delphinids and other cetaceans. Pleistocene glacial-interglacial sea-level cycles (Berger et al. 2016) involved repeated, rapid, expansion, then contraction, of shelf habitats globally. At the local to regional level, such changes had the potential to affect distribution patterns and/or to separate coastal lineages (e.g., Fontaine et al. 2010; Pyenson and Lindberg 2011).

The Atlantic: Characteristics, History, Importance

The Atlantic Ocean harbors 11 species and subspecies of Delphininae, of which four are endemic (Table 1). (Further studies may identify other endemic cetaceans; see Tavares et al. 2010). Despite their proximity to each other, the Atlantic and Indian oceans have very different dolphin faunas, suggesting that the southern tip of Africa, in spite of extending only to 35°S, has acted as a barrier to separate lineages of tropical delphinines (Perrin 2007). It was suggested previously that the relatively higher proportion of endemic dolphins in the Atlantic, such as *Stenella clymene* and *Stenella frontalis,* is due to the isolation of tropical Atlantic from the Indo-Pacific during cold periods (e.g., Perrin et al. 1981; Leduc 2009a). Southern African waters can be viewed as an occasionally-open gate (i.e., soft barrier), where variation in the Benguela and Agulhas currents (Ansorge and Lutjeharms 2007) might affect movement of tropical cetaceans between the Atlantic and Indian oceans (Perrin 2007). We further discuss the modern and historical role of southern African waters below. The geological record indicates that there have been no other Atlantic conduits for delphinines in the Pleistocene (last ~2.5 Ma), apart from the Drake Passage and North

Atlantic-Nordic Sea - both high latitude and thus unlikely gateways (Fig. 3).

Central American Seaway. The biogeographical analysis does not recover a barrier directly related to the Central American Seaway closure, but we expect that this profound event influenced the early divergence of Delphininae lineages. The Central American Seaway, which was open for all but the latest Cenozoic, was the western part of two long-established pantropical oceans, matched in the east by the Tethys Ocean between Eurasia and Africa. The Tethys, which connected the Atlantic to the Indian Ocean, closed about 12 Ma, in the middle Miocene (Harzhauser and Piller 2007), before the radiation of the Delphininae, but the Central American Seaway closure was prolonged into the Pliocene, with potential impact on delphinines.

There is wide debate about the times of the shallowing, and then total closure, of the seaway (e.g., Woodburne 2010; Lessios 2015; Marko et al. 2015; Bacon et al. 2016). In summary, the docking of the Panama block to northwestern South America has been dated from 14.8–12.8 Ma, followed by the collision of the Central American Arc with South America at about 7 Ma (Montes et al. 2012). Patterns of isotopic, geochemical, and faunal changes in sedimentary rocks on the isthmus indicate progressive closing from ca. 7 to 3.5 Ma (Montes et al. 2012). Coates and Stallard (2013) proposed that, from about 15 Ma until its final closure, the Central American Arc was analogous to the Indonesian-Australian Archipelago, with narrow passages that allowed substantial current flow and marine interchange. The most radical effects of the closing of the isthmus only began to appear slightly over 4 Ma, when the Caribbean's primary productivity began to decline owing to the disappearance of upwelling (Leigh et al. 2014). In contrast with the Great American Interchange of terrestrial biota, the creation of the isthmus split the formerly continuous tropical Pacific-Caribbean marine biotas, fragmenting the ranges of marine species and starting them on independent evolutionary paths (Lessios 2008; Sexton and Norris 2008; O'Dea et al. 2012). Closure had other potential impacts on delphinines. Firstly, the Pliocene closure probably affected North Atlantic circulation and climate, by diverting warm, saline water to high latitudes, allowing late Pliocene Northern Hemisphere ice build-up (e.g., Keigwin 1982; Cronin and Dowsett 1996; De Schepper et al. 2014), and the development of North Atlantic Deep Water. Secondly, with the isthmus present, the southern tip of Africa provided the only possible warmer-water connection between the Atlantic and Indian-Pacific oceans during the later Pliocene and Pleistocene. By that time, other inter-oceanic connections, such as the Bering Strait-Arctic-North Atlantic, and the Drake Passage beyond South America, were cool (Sexton and Norris 2008).

South African gateway. The seas off southern Africa extend from the tropics to Antarctica, including the southwest Indian and the southeast Atlantic Oceans. These waters encompass circulatory regimes that affect cetacean distributions (e.g., currents, fronts, vertical stratification, biological productivity, and chemical and physical constituents of sea water) (Ansorge and Lutjeharms 2007). The interaction between the large Benguela and Agulhas currents of the Atlantic and Indian oceans respectively, and the westerly Antarctic Circumpolar Current of the Southern Ocean, results in a highly dynamic circulation system (Ruijter 1982).

The southerly Benguela Current brings cold, low-salinity water from the South Atlantic Current, in turn part of the larger Antarctic Circumpolar Current (Rommerskirchen et al. 2011), to upwell close to Africa. The Benguela Upwelling System is a globally major, cold, upwelling system, forming one of the most productive ecosystems in the world; it supports a large biomass of fish, crustaceans, sea birds, and marine mammals (Andrews and Hutchings 1980; Cohen et al. 1992;

Spalding et al. 2012).

The Agulhas Current marks the western boundary of the South Indian Ocean subtropical gyre (Flores et al. 1999; Ansorge and Lutjeharms 2007). This northeasterly current transports warm, salty water from the Indian Ocean to the Agulhas Bank, where the current mostly retroflects to the south and then back east (Ansorge and Lutjeharms 2007). Periodically, however, pulses of “Agulhas leakage” pass northwest into the Atlantic (Ansorge and Lutjeharms 2007), to mix with the cold, productive waters of the Benguela Current. During the Pleistocene, Agulhas leakage varied in intensity and north-south extent in response to glacial/interglacial cycles (Peeters et al. 2004; Simon et al. 2013; Caley et al. 2014; Rosell-Melé et al. 2014). Agulhas leakage probably formed a cyclically open gateway for interoceanic dispersal.

Sedimentological, paleontological, and geochemical evidence indicates that the Benguela Upwelling System originated in the early late Miocene (10-12 Ma), with progressive intensification of upwelling during the Pliocene and Pleistocene (Siesser 1980). Etourneau (2014) noted two intensification phases matched by two stages of cooling that spanned at least 10^{o}C: gradual from 12-5 Ma, and more intense from 5 Ma, roughly early Pliocene, to present. Benguela-related sea surface temperatures off southwestern Africa dropped by more than 10^{o}C from the early Pliocene to the middle Pleistocene (Rommerskirchen et al. 2011: fig. 1b), associated with increased upwelling. The later phase of a prolonged gradual cooling in Benguela System (3.2 to 2.1 Ma, late Pliocene) matches the initiation of Northern Hemisphere Glaciation (Fig. 1b). An apparent pause in the cooling trend is recorded at about 2.0 to 1.4 Ma. From ca 0.6 Ma onwards there is evidence of SST fluctuations resembling 100-ky glacial-interglacial cycles (Marlow et al. 2000).

The climatic changes in Benguela Upwelling System greatly affected the Atlantic tropics. The Atlantic fauna appears to have been isolated from the southern Indian Ocean by the Benguela Upwelling for at least 2 Ma (Floeter et al. 2008; Lessios 2008).

The Agulhas Current has been active since at least the early Miocene, perhaps 23 Ma (Martin 1981, as interpreted by Preu et al. 2011; Flores et al. 1999). Hutson (1980) indicated that, during glacial intervals, this current was not the strong year-round one that it is today. Apparently, in the summer a weak tropical current was present, but in the winter it was replaced by cool and high salinity waters. The flow of Indian Ocean water into the Atlantic Ocean via the Agulhas leakage thus varied substantially between past interglacials and glacials, being substantially reduced during glacials (Peeters et al. 2004), probably influenced by the northwards expansion of cool watermasses, but increased towards deglacials (Scussolini et al. 2013). Furthermore, increased Agulhas leakage seems to be a precursor to the re-establishment and maintence of full interglacial conditions (Peeters et al. 2004).

In summary, the Atlantic Ocean was isolated by the formation of the Panama Isthmus about 3 Ma, leaving the South African gateway as the only connection available to the tropical biota. Here, the combination of the Benguela Upwelling System and the Agulhas Current forms a cyclically permeable soft barrier to delphinine lineages where, during warm intervals (interglacials), tropical species might move between the Atlantic and Indo-Pacific oceans, whereas during cold intervals (glaciations) these fronts become impermeable barriers that help fragment widespread taxa, leading to allopatric speciation or local extinction. The South African gateway may have lead to diversification in other marine groups (reef fishes - Floeter et al. 2008; crabs - Teske et al. 2014), and has also been implicated in the dispersal of temperate dolphins, such as *Lagenorhynchus obscurus* (Harlin-Cognato et al. 2007) and *Delphinus delphis* (Amaral et al. 2012a).

Eastern Pacific

SAV recovered at different nodes a barrier localized in the eastern Pacific (Fig. 1a nodes 1, 2 and 3; Fig. 2a, b and c). We hypothesized that changes in sea-surface conditions in the equatorial Pacific along Pliocene and/or the Eastern Pacific Barrier may have influenced the actual distribution patterns of delphinines in the Pacific. Nowadays, the "equatorial cold tongue" and coastal waters in the eastern tropical Pacific have higher densities of delphinine species, such as *Stenella coeruleoalba*, *Stenella attenuata*, and *Tursiops truncatus*, than offshore waters in the northern and southern Pacific tropical gyres (Ferguson et al. 2006). The Eastern Pacific Barrier is a long-recognized oceanic feature (Darwin 1859: 348, 1876: 317; Ekman 1953; Davies 1963) separating the eastern and central Pacific. It has been regarded as the world's largest marine biogeographic soft barrier (Briggs 2003; Lessios 2008), and this barrier has been in place between Polynesia and the American continent throughout the Cenozoic (since 66 Ma; Lessios and Robertson 2006). Nevertheless, dispersal through the barrier is possible (Lessios 2008), thus making it a permeable filter for delphinine dolphins. Also in the tropical eastern Pacific, the geographically-related equatorial eastern Pacific "cold tongue" of La Niña developes periodically, sometimes over several years, when trade winds cause shallowing of the thermocline (Martínez-Garcia et al. 2010). Geological proxies suggest that this feature had developed by the early Pliocene (4.4-3.6 Ma, Rousselle et al. 2013). Lawrence et al. (2006) noted that the eastern tropical Pacific had cooled markedly since about 3 Ma. The cold, upwelling Humboldt Currrent, which is associated with the "cold tongue", has been a major oceanic feature since at least the Miocene (Sepulchre et al. 2009).

Glacial – interglacial cycles: species diversification at temporal and spatial fine – scale

Despite their often-high dispersal potential, and the apparent continuity of the marine environment, many marine species exhibit fine-scale population structure (Norris 2000; Bierne et al. 2003). Several studies have postulated the existence of dolphin morpho/ecotypes or subspecies in widely distributed species, probably related to specialized coastal habits, and resulting in well-structured populations within relatively small areas (Natoli et al. 2004, 2006; Escorza-Trevino et al. 2005; Adams and Rosel 2006; Möller et al. 2009; Morin et al. 2010; Charlton-Robb et al. 2011; Amaral et al. 2012a; Andrews et al. 2013; Mendez et al. 2013; Moura et al. 2013).

The disjunction recovered in the southwestern Atlantic (Fig. 2d) suggests fragmentation of coastal environments as consequence of marine regressions and transgressions during Pleistocene glacial-interglacial cycles. The glacial cycles caused repeated reduction or loss of shelf ecospace (Ludt and Rocha 2015; Marx and Fordyce 2015). Distribution ranges and gene flow of coastal marine species could have been interrupted by physical barriers (e.g., oscillations in sea level and sea temperature), thereby increasing the effect of evolutionary forces that drive speciation (e.g., genetic drift, selection and founder effects) (Hewitt 2000, 2004).

As an example, changing sea levels and fragmentation of the coastal environment may explain speciation in the delphinid genus *Sotalia* in eastern and northeastern South America. *Sotalia guianensis* occurs in coastal waters from southern Brazil to Honduras, while *Sotalia fluviatilis* inhabits the Amazon River in Brazil, Ecuador, Colombia, and Peru (Romero et al. 2001; Cunha et al. 2005; Caballero et al. 2007). The specific status of marine and riverine ecotypes of *Sotalia* was long uncertain (Monteiro-Filho et al. 2002; Cunha et al. 2005; Caballero et al. 2007), but two species are now recognized. Cunha et al. (2005) estimated the divergence times between two species at about 5-2.5 Ma, or Pliocene, and suggested that, at about 2.5 Ma, *Sotalia* was able to colonize the Amazon basin as a consequence of reduced river discharge during a period of high sea levels. Miller et al. (2012) reported that Pliocene sea levels reached +22 m at 3.2-2.8 Ma. Alternatively, a more recent divergence between coastal and riverine *Sotalia* at about 1-1.2 Ma was proposed, linked to sea level changes that affected the Amazon basin during the Pleistocene (Caballero et al. 2007).

Fossils and the delphinine radiation

The cetacean fossil record, which has distinctive strengths and weaknesses, is informative if interpreted carefully (Fordyce and Muizon 2001). The short review below supports the notion that delphinines had a substantial Pliocene radiation (e.g., Bianucci 2013). To consider general patterns in the record, some epochs or geographic regions are represented poorly. Most parts of fossil skeletons have been used as type specimens (Fordyce and Muizon 2001), but some elements (skulls, teeth, mandibles, earbones) are much more informative than others (vertebrae, limb bones). Many fossils are placed in extant genera, but most need morphological phylogenetic analysis to establish relationships, and placement as crown or stem taxa. Pleistocene fossils can help to understand the origins of living cetacean species, but informative specimens are rare because of the lack of suitable mid-shelf marine rocks. Late Miocene-Pliocene fossils have great potential to elucidate the origins of modern genera and families, such as Balaenopteridae and Delphinidae (Tsai et al. 2013).

The Pliocene saw high speciation-extinction rates for Delphinidae, associated with the origins of extant taxa (Bianucci 2013). In summary, the explosive Pliocene-

Pleistocene diversification of delphinids seems to be related, in general, to their enhanced echolocation abilities, increase in brain size, global climatic cooling, and the beginning of the Northern Hemisphere glaciations and related changes in sea level (Bianucci 2013). Pliocene fossils assigned to extant delphinine genera, such as *Stenella*, *Delphinus*, and *Tursiops*, have a widespread geographic distribution of fragmentary specimens, with more complete specimens mainly recovered from assemblages in Italy and North Carolina, USA (Bianucci 2013). Globicephaline delphinid fossils are similarly widely distributed (Boessenecker et al. 2015). However, close study is needed to confirm that such fossils indeed represent extant genera and/or are properly identified at species level, leading Bianucci (2013) to suggest that the reported diversity of Pliocene dolphins is probably underestimated.

To review regional patterns, Italian Pliocene cetacean assemblages include fossils referred to *Tursiops*, *Stenella*, and *Delphinus* (Bianucci 1996). One, *Tursiops osennae*, is close to living *Tursiops truncatus*. Two Pliocene *Stenella* fossils from Tuscany were described as *Stenella giulli* and *Stenella* sp., diagnosed on the basis of size and rostral proportions (Bianuuci 1996). Later, Bianucci et al. (2009) removed "*Stenella*" *giulli* to a new genus, *Etruridelphis*. New genera and species namely *Astadelphis gastaldii* and *Septidelphis morii* were also described from Sabbie di Asti Formation (northwestern Italy) of the Pliocene epoch (Bianucci 1996, 2013). A phylogenetic analysis using a molecular scaffold positioned *Septidelphis* and *Etruridelphis* as sister taxa inside Delphininae in a basal position in relation to the clade formed by all other extant delphinines (Bianucci 2013). *Astadelphis* was positioned as the sister taxon of this clade and all extant delphinines except *Sousa* (Bianucci 2013). Note that the latter three fossil delphinines (*Etruridelphis*, *Astadelphis*, and *Septidelphis*) are geographically restricted to the Mediterranean.

Whether this apparent higher concentration of delphinids in Italian sediments is real, or an artifact of sampling, is uncertain.

Bianucci et al. (1998) observed that the Italian record indicates a turnover of the Mediterranean fauna during the Pliocene, involving archaic Miocene cetaceans at time of intense climatic crisis at about 2.6 – 2.4 Ma, probably triggered by Northern Hemisphere glaciation (Bianucci et al. 1998).

In North America, the Lee Creek Mine (North Carolina) has produced one of the most diverse fossil marine mammal assemblages from the western North Atlantic. Here, the Pliocene Yorktown Formation cetacean assemblage was deposited from about 4.8 to 3 Ma, in a shoreline environment gently shelving and open to the ocean (Whitmore 1994; Whitmore and Kaltenbach 2008). Fossil delphinids have been identified as *Stenella*, *Tursiops*, *Delphinus, Lagenorhynchus, Globicephala*, and *Pseudorca*, some representing named new species (Whitmore 1994; Whitmore and Kaltenbach 2008). For example, an extinct species of *Stenella*, *Stenella rayi*, was described from much of a skull that allows morphological comparison with living species (Whitmore and Kaltenbach 2008). Pliocene to early Pleistocene cetacean assemblages from the Purisima and San Diego formations of California, eastern North Pacific, include fossils similar to *Tursiops*, *Delphinus* or *Stenella*, and *Globicephala* (Barnes 1977; Boessenecker 2013); specimens have yet to be assigned to named species.

In the eastern North Atlantic, fossils trawled from Plio-Pleistocene sediments of the North Sea (Netherlands) include extant and extinct genera (Post 2005; Post and Bosselaers 2005; Post and Kompanje 2010). The extinct late Pliocene delphinid *Hemisyntrachelus* is considered a member of a temperate to cold cetacean fauna (Post and Bosselaers 2005). Previously, it was suggested that *Hemisyntrachelus* was the most common delphinid from Italian Pliocene sediments, and was possibly endemic to the Mediterranean (Bianucci 1997). Post and Bosselaers (2005) concluded that the early Pliocene *Tursiops oligodon*, which was described by Pilleri and Siber (1989) from the Pisco Formation of Peru, actually shows all of the characteristics of *Hemisyntrachelus*. Accordingly, it appears that *Hemisyntrachelus* had a wider distribution, spanning at least the early to late Pliocene. Another Italian species, previously assigned to *Tursiops*, was described as *Hemisyntrachelus cortesii* (Bianucci 1997). Bianucci (1996, 1997) noted that *Tursiops osennae*, which appears closely related to modern *Tursiops*, showed intermediate features between the extant species of *Tursiops* and *Hemisyntrachelus*. However, there is uncertainty about the exact phylogenetic position of *Hemisyntrachelus* in Delphinidae (Bianucci 1996, 1997; Post and Bosselaers 2005).

A new genus and species of extinct Delphinidae, *Protoglobicephala mexicana*, was described based on a cranium from Pliocene sediments of the Gulf of California, Mexico (Aguirre-Fernández et al. 2009). A phylogenetic analysis placed this species close to living *Globicephala*, in the Globicephalinae. However, the authors also noted that the cranial propoportions of *Protoglobicephala mexicana* resembled living species of *Tursiops*. Furthermore, the phylogenetic analysis placed *Hemisyntrachelus cortesii* within a clade that includes *Orcinus*, *Feresa*, *Globicephala*, *Pseudorca*, and *Grampus* as well as *Protoglobicephala mexicana* (Aguirre-Fernández et al. 2009).

In South America, Pliocene aquatic mammals are scarce (Cozzuol 1996), but are reported from the Pliocene section of the Pisco Formation (Peru), which produced Delphininae related to *Delphinus* and *Stenella* (Muizon and DeVries 1985; Cozzuol 1996; Pilleri and Siber 1989). Muizon and DeVries (1985) noted a similar occurrence of *Stenella*- and *Delphinus*-like periotics in the Yorktown Formation (above), and suggested that patterns of marine vertebrates from Peru and North Carolina might indicate a late Miocene age, in part, for the Yorktown Formation. Microfossils have been used, however, to date the Yorktown as partly early to partly late Pliocene (4.8–3.1 Ma; e.g. Vélez-Juarbe et al. 2016). Muizon and DeVries (1985) suggested a free exchange of cetaceans between the western Atlantic and southeastern Pacific via the Caribbean during the late Miocene; current understanding of the Panama uplift, above, might allow exchange also during the early Pliocene. Exchange implies that the Central American Seaway and the Panamanian uplift indeed affected the evolution of delphinines.

Miocene-Pliocene sediments from Southern Africa reveal little of dolphin history. Along the Namaqualand coast, fossils include abundant fish and shark teeth, and terrestrial mammals (Pickford and Senut 1997). The premiere fossil site of Langebaanweg (Brumfitt et al. 2013) includes Pliocene odontocetes, not yet reported in detail. Offshore fossil cetacean assemblages have so far revealed a high diversity of ziphiids (Bianucci et al. 2007, 2008).

Relevant Australian fossils are mainly early Pliocene undescribed Delphinidae-like taxa; the late Pliocene record is poorly known (Fitzgerald 2004). Fossil dolphins from New Zealand (McKee and Fordyce 1987) include a *Delphinus*- or *Stenella*-like mandible from the middle Pliocene, 3.6-3.0 Ma (McKee and Fordyce 1987) and a *Delphinus*- or *Stenella*-like periotic no older than late Miocene (Fordyce and Campbell 1990).

Fossil Cetacea of Japan are abundant and diverse and the record extends from Oligocene to the Holocene (Oishi and Hasegawa 1995). Among the fossil species listed by Oishi and Hasegawa (1995) those related to Delphininae are: *Stenella kabatensis* from late Miocene, '*Delphinus' rikuzenensis* from early Pliocene, *Stenella* sp. from early Pleistocene, and several other undetermined Delphinidae/Delphininae-related taxa. Cetacean fossils from Taiwan included a meager record of delphinids, but no certain species of Delphininae (Tsai et al. 2013).

A recent study by Murakami et al. (2014b) used a morphological cladistic analysis, enforcing molecular constraints from McGowen et al. (2009), to investigate the phylogenetic position of modern and fossil delphinids including the Japanese late Miocene *Stenella kabatensis*. The latter was placed in a new genus, *Eodelphinus* (see Murakami et al. 2014a). The constrained phylogenetic tree recovered a Delphininae clade, comprising mostly extant species, with *Tursiops aduncus* in a basal polytomy with the fossil species *Stenella rayi*, *Tursiops osennae*, and *Etruridelphis giulli*, plus a clade of other Delphininae. Murakami et al. (2014b) stated that *Stenella rayi*, *Tursiops osennae*, and *Etruridelphis giulli* lie outside of Delphininae, but this is questionable as *Tursiops aduncus* is a delphinine in the sense of McGowen et al. (2009), and other extant delphinines plot basal to the polytomy involving *Tursiops aduncus*. The age is not clear for *Eodelphinus kabatensis*: Murakami et al. (2014b: fig. 1) cited about 9.2 Ma, but also stated a minimum of 7.6 Ma, and also indicated a range of 8.5-13.0 Ma (Murakami et al. 2014b:493) at the base of crown Delphinidae. The youngest of the latter ages, 7.6 Ma, implies an older origin for the crown group than discussed elsewhere in this paper. Paleobiogeographical analyses conducted by Murakami et al. (2014b) revealed uncertainty for delphinid origins. Another study by Murakami et al. (2015), also focusing on Delphinoidea, included an unconstrained morphological cladistic analysis. Results did not show clear division into Globicephalinae and Delphininae. The extant *Cephalorhynchus hectori* and *Orcaella brevirostris* are at the base of crown Delphinidae, while two fossil delphinids (*Eodelphinus kabatensis* and *Hemisyntrachelus cortesii*) are more-crownward, but distant from *Delphinus*.

There are few Pleistocene records of Delphininae in South America that represent living species or close relatives. Late Pleistocene to Holocene remains of *Tursiops* and a specimen related to *Delphinus* or *Stenella* are known from Buenos Aires province (Cozzul 1996). Late Pleistocene assemblages were also deposited in the southern North Sea, including normally high latitude cetaceans such as beluga and gray whale (Post 2005). However, fossils from *Tursiops* and *Delphinus* did not occur in this late Pleistocene fauna, but instead represent faunas probably deposited during the warmer early Holocene (Post 2005).

Biogeographic history

The biogeographical history of the Delphininae likely involves a mosaic of vicariant and dispersal events associated with soft and hard barriers, all influenced by geological, oceanic and climatic reorganization. We next consider the fossil record, events recovered by biogeographical analysis based on the McGowen et al. (2009) phylogeny, and estimated divergence dates among lineages, to suggest a biogeographic scenario for the evolution of Delphininae.

The fossil record is consistent with basal species of Delphininae being widespread in the still-warm early Pliocene oceans (McGowen et al. 2009; Hassanin et al. 2012; Banguera-Hinestroza et al. 2014). When the Central American Seaway became increasingly restricted during the late Miocene-early Pliocene, leading to the isolation of the tropical Atlantic, vicariance may have given rise to some extant lineages of Delphininae now recognized as distinct genera, for example, *Sotalia*. This may be reflected in the oldest delphinine fossils dating to approximately 4 Ma (Bianucci 2013).

We suggest that, from about 3 Ma, tropical connections between the Atlantic and Indo-Pacific oceans became restricted to the South African gateway because of tectonic closures, cooling, and increased fluctuations in sea level (Fig. 1b). Cyclically-warmer temperatures and higher sea levels might have repeatedly opened the gateway. Conversely, blocked connections during cool times of lowered sea level - whether the southern African gateway or other(s) - might explain the allopatric origins of extant delphinine species. Indeed, the fragmentation of shelf ecospace during glacial-interglacial cycles may have lead to isolated local niches occupied by short-duration specialized eco/morphotypes, allowing the early Pleistocene divergences proposed (Fig. 1a) for *Delphinus*, *Tursiops*, and *Stenella*.

General considerations

In most studies, historical, ecological, geographical, and phylogenetic aspects of the delphinine diversification are treated separately. Here, we consider these aspects simultaneously in order to understand the processes involved in Delphininae evolution.

Marine ecosystems are dynamic and fluid on both temporal and spatial scales and it is likely that cetaceans have responded to such variability by changing their distributional patterns (Redfern et al. 2006). For these top marine predators, several physiographic features (e.g., depth and SST) are considered predictors of cetacean distribution, mainly because they influence the aggregation of prey species (e.g., Baumgartner et al. 2001; Cañadas et al. 2002).

Recent data suggest that delphinine dolphins are the cetacean guild most dependent on phytoplankton groups that are dominant in the tropics (Manocci et al. 2015). Food chains based on large phytoplankton lead to high fish abundances, typically supporting such top predators as delphinines (Parsons and Lalli 2002; Manocci et al. 2015). Indeed, geological patterns of fossil phytoplankton have been linked to patterns of cetacean evolution and extinction (e.g., Marx and Fordyce 2015). The fossil record of Southern Ocean diatoms (Fig. 1b, upper) shows part of a 15 Ma pattern of diatom evolutionary turnover in response to changes in circulation and climate (Crampton et al. 2016). Note that diatom pulses D and E of Crampton et al. (2016) closely parallel the late Pliocene and early Pleistocene divergences leading to extant species of Delphininae.

Ecological niches are thought to show considerable conservatism over evolutionary time periods (Peterson 2011). Therefore, barriers considered soft for delphinine species, such as the Benguela Upwelling System, the Gulf Stream, the Agulhas Current, and the Indonesian through-flow are most likely to be hard barriers to phytoplankton assemblages and, thus, affecting them directly and impacting biology productivity and food chain. On the other hand, physical barriers such as Central American Seaway Closure and marine regressions/transgressions may have affected delphinine directly, leading to allopatric speciation.

The biogeographical scenario proposed here will be tested with new phylogenies, taxonomic refinement of widespread taxa, improved estimates of divergence times for delphinine lineages, and perhaps new fossils. Future efforts might concentrate on creating new, more comprehensive phylogenies based on both morphological and molecular evidence, as well as a review of delphinine taxonomy. More generally, our study demonstrates the potential for distributional and ecological data to be integrated with phylogenetic data, and invites a (re-)analysis of the biogeography of other marine mammal clades.

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SUPPLEMENTARY INFORMATION

Historical biogeography of Delphininae dolphins and related taxa (Artiodactyla: Delphinidae)*

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Table 1. Records of *Delphinus* spp.

Species	Longitude	Latitude	Reference
Delphinus sp.	-20.97	38.63	Bearzi 2000
Delphinus sp.	14.5	44.58	Bearzi et al. 1998
Delphinus sp.	18.81	-34.36	Berrow and Rogan 1998
Delphinus sp.	-15.91	45.83	Berrow and Rogan 1998
Delphinus sp.	-13.8	48.85	Berrow and Rogan 1998
Delphinus sp.	-12.8	48.96	Berrow and Rogan 1998
Delphinus sp.	-13.25	49.05	Berrow and Rogan 1998
Delphinus sp.	-8.96	50.8	Berrow and Rogan 1998
Delphinus sp.	-8.58	50.93	Berrow and Rogan 1998
Delphinus sp.	-15.61	51.05	Berrow and Rogan 1998
Delphinus sp.	-15.63	51.05	Berrow and Rogan 1998
Delphinus sp.	-10.53	52.08	Berrow and Rogan 1998
Delphinus sp.	-9.93	52.56	Berrow and Rogan 1998
Delphinus sp.	-10.15	52.75	Berrow and Rogan 1998
Delphinus sp.	-11.28	53.01	Berrow and Rogan 1998
Delphinus sp.	-9	39	Breese and Tershy 1993
Delphinus sp.	-114	30	Cañadas et al. 2002
Delphinus sp.	-73.76	-33.23	Cárdenas et al. 1991
Delphinus sp.	-71.36	-29.5	Cárdenas et al. 1991
Delphinus sp.	-75.5	-27.26	Cárdenas et al. 1991
Delphinus sp.	-70.22	-22.1	Cárdenas et al. 1991
Delphinus sp.	-8.96	51.52	Cárdenas et al. 1991
Delphinus sp.	-90.68	-0.76	Cockcroft 1992
Delphinus sp.	-20	50	Das et al. 2000
Delphinus sp.	-1.95	4.8	Denkinger et al. 2013
Delphinus sp.	-52.17	-32.19	Di Beneditto and Ramos 2001
Delphinus sp.	49.37	12.25	Eyre 1995
Delphinus sp.	174.3	-41.08	Fertl et al. 1999
Delphinus sp.	173.29	-41.04	Fertl et al. 1999
Delphinus sp.	174.09	-41.01	Fertl et al. 1999
Delphinus sp.	174.32	-35.16	Fertl et al. 1999
Delphinus sp.	-117.27	32.85	Fertl et al. 1999
Delphinus sp.	-118.52	32.89	Fertl et al. 1999
Delphinus sp.	-117.86	33.57	Fertl et al. 1999
Delphinus sp.	-119.68	34.41	Fertl et al. 1999
Delphinus sp.	-5.34	36.1	Fertl et al. 1999
Delphinus sp.	-2.42	36.76	Fertl et al. 1999
Delphinus sp.	8	42	Forcada et al. 1995
Delphinus sp.	-43.36	-23.01	Geise and Borobia 1987
Delphinus sp.	-76.79	-12.46	Jefferson et al. 1997
Delphinus sp.	13.7	-11.52	Jefferson et al. 1997
Delphinus sp.	9.21	-1.9	Jefferson et al. 1997
Delphinus sp.	8.91	4.12	Jefferson et al. 1997
Delphinus sp.	-4.92	5.03	Jefferson et al. 1997
Delphinus sp.	-10.09	5.87	Jefferson et al. 1997

Delphinus sp.	-12.96	8.02	Jefferson et al. 1997
Delphinus sp.	-13.48	9.35	Jefferson et al. 1997
Delphinus sp.	-17.33	14.58	Jefferson et al. 1997
Delphinus sp.	-23.53	15.16	Jefferson et al. 1997
Delphinus sp.	-16.33	18.15	Jefferson et al. 1997
Delphinus sp.	-15.5	24.2	Jefferson et al. 1997
Delphinus sp.	-16.65	28.44	Jefferson et al. 1997
Delphinus sp.	-9.01	32.79	Jefferson et al. 1997
Delphinus sp.	-16.99	32.82	Jefferson et al. 1997
Delphinus sp.	-60	44	Lucas and Hooker 1997
Delphinus sp.	150	40	Ohizumi et al. 1998
Delphinus sp.	-80.82	-33.78	Peddemors 1999
Delphinus sp.	29.41	-31.73	Peddemors 1999
Delphinus sp.	-84.03	7.4	Perrin 1994
Delphinus sp.	-83.9	7.53	Perrin 1994
Delphinus sp.	-90.83	7.75	Perrin 1994
Delphinus sp.	-87.9	8.13	Perrin 1994
Delphinus sp.	-83.25	8.23	Perrin 1994
Delphinus sp.	-84	8.41	Perrin 1994
Delphinus sp.	-84.53	8.66	Perrin 1994
Delphinus sp.	-84.16	9	Perrin 1994
Delphinus sp.	-84.76	9.3	Perrin 1994
Delphinus sp.	-83.38	26.89	Perrin 1994
Delphinus sp.	-75.4	35.49	Perrin 1994
Delphinus sp.	-76.21	37.19	Perrin 1994
Delphinus sp.	-75.01	37.3	Perrin 1994
Delphinus sp.	-74.46	37.45	Perrin 1994
Delphinus sp.	-74.73	37.73	Perrin 1994
Delphinus sp.	-74.86	37.78	Perrin 1994
Delphinus sp.	-74.65	37.95	Perrin 1994
Delphinus sp.	-73.76	38.18	Perrin 1994
Delphinus sp.	-73.73	38.23	Perrin 1994
Delphinus sp.	-73.28	38.58	Perrin 1994
Delphinus sp.	-73.23	38.63	Perrin 1994
Delphinus sp.	-73.08	38.8	Perrin 1994
Delphinus sp.	-73.01	38.9	Perrin 1994
Delphinus sp.	-72.88	38.93	Perrin 1994
Delphinus sp.	-73.58	39	Perrin 1994
Delphinus sp.	-72.73	39.33	Perrin 1994
Delphinus sp.	-71.9	39.65	Perrin 1994
Delphinus sp.	-74	39.86	Perrin 1994
Delphinus sp.	-73.55	40.18	Perrin 1994
Delphinus sp.	-74.03	40.55	Perrin 1994
Delphinus sp.	41.62	41.63	Perrin 1994
Delphinus sp.	-70.91	42.38	Perrin 1994
Delphinus sp.	-63.71	42.96	Perrin 1994
Delphinus sp.	-64.41	43.53	Perrin 1994
Delphinus sp.	-63.68	44.38	Perrin 1994

Delphinus sp.	34.16	44.47	Perrin 1994
Delphinus sp.	37.78	44.71	Perrin 1994
Delphinus sp.	-27.85	46.91	Perrin 1994
Delphinus sp.	173.6	-34.96	Perrin et al. 1995
Delphinus sp.	-120.13	31	Perrin et al. 1995
Delphinus sp.	-120.13	31.21	Perrin et al. 1995
Delphinus sp.	-123.15	35.36	Perrin et al. 1995
Delphinus sp.	-124.98	35.65	Perrin et al. 1995
Delphinus sp.	-122.66	35.7	Perrin et al. 1995
Delphinus sp.	-124.76	36.3	Perrin et al. 1995
Delphinus sp.	-126.11	36.98	Perrin et al. 1995
Delphinus sp.	-125.71	37.13	Perrin et al. 1995
Delphinus sp.	-127.9	37.16	Perrin et al. 1995
Delphinus sp.	-127.7	37.68	Perrin et al. 1995
Delphinus sp.	-126.21	38.58	Perrin et al. 1995
Delphinus sp.	-2.01	47	Perrin et al. 1995
Delphinus sp.	31.04	-29.86	Read et al. 1988
Delphinus sp.	-77.08	-12.11	Read et al. 1988
Delphinus sp.	-77.18	-11.72	Read et al. 1988
Delphinus sp.	-78.59	-9.08	Read et al. 1988
Delphinus sp.	-79.57	-7.39	Read et al. 1988
Delphinus sp.	151.71	-33.44	Robineau and Vely 1998
Delphinus sp.	-16.15	18.03	Robineau and Vely 1998
Delphinus sp.	-64.51	10.21	Romero et al. 2001
Delphinus sp.	64.63	10.26	Romero et al. 2001
Delphinus sp.	-64.36	10.36	Romero et al. 2001
Delphinus sp.	-64.46	10.4	Romero et al. 2001
Delphinus sp.	-64.43	10.41	Romero et al. 2001
Delphinus sp.	-64.21	10.45	Romero et al. 2001
Delphinus sp.	-64.36	10.45	Romero et al. 2001
Delphinus sp.	-64.16	10.48	Romero et al. 2001
Delphinus sp.	-64.16	10.5	Romero et al. 2001
Delphinus sp.	-66.05	10.58	Romero et al. 2001
Delphinus sp.	-66.56	10.63	Romero et al. 2001
Delphinus sp.	-64.33	10.66	Romero et al. 2001
Delphinus sp.	-63.15	10.73	Romero et al. 2001
Delphinus sp.	-63.63	10.9	Romero et al. 2001
Delphinus sp.	-64.1	10.9	Romero et al. 2001
Delphinus sp.	-65.08	10.9	Romero et al. 2001
Delphinus sp.	-65.15	10.91	Romero et al. 2001
Delphinus sp.	-64.1	10.91	Romero et al. 2001
Delphinus sp.	-63.81	10.96	Romero et al. 2001
Delphinus sp.	-64.16	10.96	Romero et al. 2001
Delphinus sp.	-64.1	11	Romero et al. 2001
Delphinus sp.	-64.4	11.03	Romero et al. 2001
Delphinus sp.	-64.2	11.05	Romero et al. 2001
Delphinus sp.	-63.98	11.08	Romero et al. 2001
Delphinus sp.	19.96	-35	Sekiguchi et al. 1992

Delphinus sp.	19.51	-34.9	Sekiguchi et al. 1992
Delphinus sp.	20.48	-34.81	Sekiguchi et al. 1992
Delphinus sp.	19.18	-34.8	Sekiguchi et al. 1992
Delphinus sp.	19.61	-34.75	Sekiguchi et al. 1992
Delphinus sp.	19.06	-34.73	Sekiguchi et al. 1992
Delphinus sp.	20.25	-34.68	Sekiguchi et al. 1992
Delphinus sp.	18.98	-34.65	Sekiguchi et al. 1992
Delphinus sp.	20.55	-34.63	Sekiguchi et al. 1992
Delphinus sp.	24.63	-34.63	Sekiguchi et al. 1992
Delphinus sp.	19.08	-34.58	Sekiguchi et al. 1992
Delphinus sp.	19.25	-34.58	Sekiguchi et al. 1992
Delphinus sp.	20.41	-34.55	Sekiguchi et al. 1992
Delphinus sp.	20.5	-34.46	Sekiguchi et al. 1992
Delphinus sp.	20.96	-34.46	Sekiguchi et al. 1992
Delphinus sp.	19.31	-34.45	Sekiguchi et al. 1992
Delphinus sp.	18.48	-34.45	Sekiguchi et al. 1992
Delphinus sp.	21.56	-34.45	Sekiguchi et al. 1992
Delphinus sp.	19.23	-34.43	Sekiguchi et al. 1992
Delphinus sp.	18.45	-34.33	Sekiguchi et al. 1992
Delphinus sp.	18.46	-34.31	Sekiguchi et al. 1992
Delphinus sp.	18.4	-34.3	Sekiguchi et al. 1992
Delphinus sp.	24.88	-34.25	Sekiguchi et al. 1992
Delphinus sp.	18.38	-34.23	Sekiguchi et al. 1992
Delphinus sp.	18.31	-34.23	Sekiguchi et al. 1992
Delphinus sp.	18.3	-34.2	Sekiguchi et al. 1992
Delphinus sp.	18.43	-34.18	Sekiguchi et al. 1992
Delphinus sp.	18.43	-34.15	Sekiguchi et al. 1992
Delphinus sp.	18.86	-34.15	Sekiguchi et al. 1992
Delphinus sp.	18.33	-34.13	Sekiguchi et al. 1992
Delphinus sp.	18.43	-34.13	Sekiguchi et al. 1992
Delphinus sp.	18.46	-34.11	Sekiguchi et al. 1992
Delphinus sp.	22.51	-34.11	Sekiguchi et al. 1992
Delphinus sp.	18.83	-34.11	Sekiguchi et al. 1992
Delphinus sp.	18.51	-34.1	Sekiguchi et al. 1992
Delphinus sp.	18.46	-34.1	Sekiguchi et al. 1992
Delphinus sp.	18.56	-34.08	Sekiguchi et al. 1992
Delphinus sp.	25.13	-34	Sekiguchi et al. 1992
Delphinus sp.	18.4	-33.91	Sekiguchi et al. 1992
Delphinus sp.	25.93	-33.83	Sekiguchi et al. 1992
Delphinus sp.	18.43	-33.68	Sekiguchi et al. 1992
Delphinus sp.	18.41	-33.66	Sekiguchi et al. 1992
Delphinus sp.	11.45	-17.71	Sekiguchi et al. 1992
Delphinus sp.	-80.86	-5.73	Sekiguchi et al. 1992
Delphinus sp.	-67.38	41.21	Selzer and Payne 1988
Delphinus sp.	-47.91	-25.01	Siciliano 1994
Delphinus sp.	-43.25	-22.93	Siciliano 1994
Delphinus sp.	-3.23	48.78	Silber et al. 1994
Delphinus sp.	-49.71	-29.32	Silva 1999

Delphinus sp.	-48.49	-27.71	Simões-Lopes and Ximenez 1993
Delphinus sp.	-48.42	-27.57	Simões-Lopes and Ximenez 1993
Delphinus sp.	-48.37	-27.46	Simões-Lopes and Ximenez 1993
Delphinus sp.	-48.38	-27.43	Simões-Lopes and Ximenez 1993
Delphinus sp.	-48.64	-26.89	Simões-Lopes and Ximenez 1993
Delphinus sp.	-48.6	-26.78	Simões-Lopes and Ximenez 1993
Delphinus sp.	174.81	-36.85	Stockin and Visser 2005
Delphinus sp.	175.1	-36.65	Stockin and Visser 2005
Delphinus sp.	174.81	-36.61	Stockin and Visser 2005
Delphinus sp.	174.95	-36.58	Stockin and Visser 2005
Delphinus sp.	175.05	-36.51	Stockin and Visser 2005
Delphinus sp.	175.03	-36.43	Stockin and Visser 2005
Delphinus sp.	175.16	-36.21	Stockin and Visser 2005
Delphinus sp.	175.2	-36.21	Stockin and Visser 2005
Delphinus sp.	174.71	-35.51	Stockin and Visser 2005
Delphinus sp.	174.33	-35.11	Stockin and Visser 2005
Delphinus sp.	173.95	-34.96	Stockin and Visser 2005
Delphinus sp.	-3.98	5.21	Stockin and Visser 2005
Delphinus sp.	-62	-42.33	Tavares et al. 2010
Delphinus sp.	-51.21	-35.03	Tavares et al. 2010
Delphinus sp.	-51.88	-34.54	Tavares et al. 2010
Delphinus sp.	52.1	-34.51	Tavares et al. 2010
Delphinus sp.	-52.01	-34.48	Tavares et al. 2010
Delphinus sp.	-51.88	-34.4	Tavares et al. 2010
Delphinus sp.	-53.77	-34.4	Tavares et al. 2010
Delphinus sp.	-51.54	-34.23	Tavares et al. 2010
Delphinus sp.	-51.38	-34.2	Tavares et al. 2010
Delphinus sp.	-51.6	-34.17	Tavares et al. 2010
Delphinus sp.	-51.3	-34.16	Tavares et al. 2010
Delphinus sp.	-51.62	-33.85	Tavares et al. 2010
Delphinus sp.	-51.3	-33.83	Tavares et al. 2010
Delphinus sp.	-50.78	-33.68	Tavares et al. 2010
Delphinus sp.	-51.9	-33.56	Tavares et al. 2010
Delphinus sp.	-50.96	-33.53	Tavares et al. 2010
Delphinus sp.	-50.71	-33.49	Tavares et al. 2010
Delphinus sp.	-51.29	-33.48	Tavares et al. 2010
Delphinus sp.	-50.82	-33.41	Tavares et al. 2010
Delphinus sp.	-50.71	-33.35	Tavares et al. 2010
Delphinus sp.	-49.99	-33.09	Tavares et al. 2010
Delphinus sp.	-49.81	-32.9	Tavares et al. 2010
Delphinus sp.	-52.44	-32.71	Tavares et al. 2010
Delphinus sp.	-50.15	-32.48	Tavares et al. 2010
Delphinus sp.	-50.12	-32.32	Tavares et al. 2010
Delphinus sp.	-50.08	-32.18	Tavares et al. 2010
Delphinus sp.	-52.1	-32.15	Tavares et al. 2010
Delphinus sp.	-50.14	-32.08	Tavares et al. 2010
Delphinus sp.	-50.08	-32.06	Tavares et al. 2010
Delphinus sp.	-49.67	-31.35	Tavares et al. 2010

Delphinus sp.	-50.96	-31.3	Tavares et al. 2010
Delphinus sp.	-50.86	-31.21	Tavares et al. 2010
Delphinus sp.	-49.55	-31.19	Tavares et al. 2010
Delphinus sp.	-49.86	-31.16	Tavares et al. 2010
Delphinus sp.	-50.71	-31.02	Tavares et al. 2010
Delphinus sp.	-49.18	-30.93	Tavares et al. 2010
Delphinus sp.	-50.63	-30.92	Tavares et al. 2010
Delphinus sp.	-48.78	-30.91	Tavares et al. 2010
Delphinus sp.	-50.57	-30.83	Tavares et al. 2010
Delphinus sp.	-49.2	-30.68	Tavares et al. 2010
Delphinus sp.	-48.95	-30.65	Tavares et al. 2010
Delphinus sp.	-48.36	-30.62	Tavares et al. 2010
Delphinus sp.	-48.56	-30.61	Tavares et al. 2010
Delphinus sp.	-48.16	-30.48	Tavares et al. 2010
Delphinus sp.	-50.3	-30.4	Tavares et al. 2010
Delphinus sp.	-50.22	-30.22	Tavares et al. 2010
Delphinus sp.	-48.67	-30.19	Tavares et al. 2010
Delphinus sp.	-50.19	-30.15	Tavares et al. 2010
Delphinus sp.	-50.11	-29.96	Tavares et al. 2010
Delphinus sp.	-49.99	-29.72	Tavares et al. 2010
Delphinus sp.	-48.93	-29.36	Tavares et al. 2010
Delphinus sp.	-47.63	-29.34	Tavares et al. 2010
Delphinus sp.	-47.75	-29.2	Tavares et al. 2010
Delphinus sp.	-48.5	-27.71	Tavares et al. 2010
Delphinus sp.	-48.42	-27.58	Tavares et al. 2010
Delphinus sp.	-48.37	-27.45	Tavares et al. 2010
Delphinus sp.	-48.41	-27.42	Tavares et al. 2010
Delphinus sp.	-48.65	-26.9	Tavares et al. 2010
Delphinus sp.	-48.62	-26.79	Tavares et al. 2010
Delphinus sp.	-48.68	-26.6	Tavares et al. 2010
Delphinus sp.	-48.66	-26.56	Tavares et al. 2010
Delphinus sp.	-48.57	-26.43	Tavares et al. 2010
Delphinus sp.	-48.54	-26.31	Tavares et al. 2010
Delphinus sp.	-48.53	-26.17	Tavares et al. 2010
Delphinus sp.	-48.61	-26.11	Tavares et al. 2010
Delphinus sp.	-48.38	-25.58	Tavares et al. 2010
Delphinus sp.	-48.38	-25.58	Tavares et al. 2010
Delphinus sp.	-48.3	-25.54	Tavares et al. 2010
Delphinus sp.	-48.18	-25.39	Tavares et al. 2010
Delphinus sp.	-48.17	-25.38	Tavares et al. 2010
Delphinus sp.	-48.19	-25.38	Tavares et al. 2010
Delphinus sp.	-48.02	-25.23	Tavares et al. 2010
Delphinus sp.	-48.02	-25.23	Tavares et al. 2010
Delphinus sp.	-47.91	-25.1	Tavares et al. 2010
Delphinus sp.	-47.96	-25.04	Tavares et al. 2010
Delphinus sp.	-47.72	-24.86	Tavares et al. 2010
Delphinus sp.	-47.72	-24.86	Tavares et al. 2010
Delphinus sp.	-47	-24.31	Tavares et al. 2010

Delphinus sp.	-46.81	-24.19	Tavares et al. 2010
Delphinus sp.	-46.31	-24.12	Tavares et al. 2010
Delphinus sp.	-45.64	-24.06	Tavares et al. 2010
Delphinus sp.	-46.42	-24.01	Tavares et al. 2010
Delphinus sp.	-44.73	-23.5	Tavares et al. 2010
Delphinus sp.	-44.5	-23.3	Tavares et al. 2010
Delphinus sp.	-44.16	-23.21	Tavares et al. 2010
Delphinus sp.	-44.35	-23.16	Tavares et al. 2010
Delphinus sp.	-44.14	-23.14	Tavares et al. 2010
Delphinus sp.	-44.15	-23.13	Tavares et al. 2010
Delphinus sp.	-43.78	-23.06	Tavares et al. 2010
Delphinus sp.	-42	-23.03	Tavares et al. 2010
Delphinus sp.	-42.01	-23.02	Tavares et al. 2010
Delphinus sp.	-43.41	-23.01	Tavares et al. 2010
Delphinus sp.	-43.29	-23.01	Tavares et al. 2010
Delphinus sp.	-42	-23.01	Tavares et al. 2010
Delphinus sp.	-42.01	-23	Tavares et al. 2010
Delphinus sp.	-42.02	-22.99	Tavares et al. 2010
Delphinus sp.	-42.02	-22.99	Tavares et al. 2010
Delphinus sp.	-43.18	-22.97	Tavares et al. 2010
Delphinus sp.	-42.03	-22.96	Tavares et al. 2010
Delphinus sp.	-42.78	-22.96	Tavares et al. 2010
Delphinus sp.	-42.3	-22.94	Tavares et al. 2010
Delphinus sp.	-42.49	-22.93	Tavares et al. 2010
Delphinus sp.	-42.49	-22.93	Tavares et al. 2010
Delphinus sp.	-42.02	-22.89	Tavares et al. 2010
Delphinus sp.	-42.72	-22.86	Tavares et al. 2010
Delphinus sp.	-41.99	-22.83	Tavares et al. 2010
Delphinus sp.	-41.6	-22.78	Tavares et al. 2010
Delphinus sp.	-41.67	-22.73	Tavares et al. 2010
Delphinus sp.	-41.2	-22.72	Tavares et al. 2010
Delphinus sp.	-41.52	-22.22	Tavares et al. 2010
Delphinus sp.	-46.26	-22.18	Tavares et al. 2010
Delphinus sp.	-41.05	-22.03	Tavares et al. 2010
Delphinus sp.	-43.67	-1.74	Tavares et al. 2010
Delphinus sp.	-43.8	-1.73	Tavares et al. 2010
Delphinus sp.	-47.53	-0.61	Tavares et al. 2010
Delphinus sp.	-5.64	35.93	Van Waerebeek et al. 1998
Delphinus sp.	175.18	-36.68	Van Waerebeek et al. 2009
Delphinus sp.	18.34	-33.96	Van Waerebeek et al. 2009
Delphinus sp.	14.49	-22.94	Van Waerebeek et al. 2009
Delphinus sp.	11.29	-18	Van Waerebeek et al. 2009
Delphinus sp.	10.64	-3.42	Van Waerebeek et al. 2009
Delphinus sp.	-2.22	4.85	Van Waerebeek et al. 2009
Delphinus sp.	-5.49	-22.67	Weir 2010
Delphinus sp.	11.7	-11.8	Weir 2010
Delphinus sp.	13.25	-10.83	Weir 2010
Delphinus sp.	13.75	-10.72	Weir 2010

Delphinus sp.	11.83	-4.77	Weir 2010
Delphinus sp.	9.08	-1.83	Weir 2010
Delphinus sp.	8.82	-0.74	Weir 2010
Delphinus sp.	2.35	6.16	Weir 2010

Table 2. Records of *Lagenodelphis hosei.*

Species	Longitude	Latitude	Reference
Lagenodelphis hosei	127.66	26.22	Amano et al. 1996
Lagenodelphis hosei	135.93	33.6	Amano et al. 1996
Lagenodelphis hosei	-16.65	28.44	Anderson et al. 1999
Lagenodelphis hosei	-41.84	22.5	Azevedo et al. 2003
Lagenodelphis hosei	-7.43	57.24	Bones et al. 1998
Lagenodelphis hosei	-45.36	16.15	Caldwell et al. 1976
Lagenodelphis hosei	8.62	-0.26	Denkinger et al. 2013
Lagenodelphis hosei	-40.98	21.58	Di Beneditto and Ramos 2001
Lagenodelphis hosei	118.53	7.76	Dolar et al. 1997
Lagenodelphis hosei	123.03	9.04	Dolar et al. 1999
Lagenodelphis hosei	-90.68	-0.76	Dolar et al. 2003
Lagenodelphis hosei	-1.94	4.79	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-2.24	4.86	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-68.11	10.48	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-60	12	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-68.27	12.15	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-61.23	13.17	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-61	14.3	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-61.25	14.76	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-61	15.21	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-61	15.61	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-61.3	15.88	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-60.9	16.23	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-62	16.45	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-24.31	16.58	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-66.06	17.96	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-66.1	17.96	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-82.1	24.84	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-96.2	25.48	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-77.33	25.92	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-77.46	25.97	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-91.97	25.99	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-82.88	26.4	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-91.02	26.46	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-93.06	26.78	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-82.57	27.32	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-97.28	27.43	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-94.41	27.63	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-90.4	27.89	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-82.8	28.08	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-86.24	29.2	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-16.84	32.63	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-16.16	32.65	Gomes-Pereira et al. 2013
Lagenodelphis hosei	126.83	33.31	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-76.05	34.97	Gomes-Pereira et al. 2013

Lagenodelphis hosei	-74.6	35.56	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-73.51	36.01	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-28.18	38.31	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-28.33	38.38	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-28.04	38.59	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-3.2	47.7	Gomes-Pereira et al. 2013
Lagenodelphis hosei	-4.1	47.9	Gomes-Pereira et al. 2013
Lagenodelphis hosei	153.02	-31.63	Hersh and Odell 1986
Lagenodelphis hosei	153.25	-25.25	Hersh and Odell 1986
Lagenodelphis hosei	-171.23	-4.45	Hersh and Odell 1986
Lagenodelphis hosei	-82.1	24.58	Hersh and Odell 1986
Lagenodelphis hosei	120.89	8.51	Jefferson et al. 1997
Lagenodelphis hosei	-2.25	4.86	Kim et al. 2013
Lagenodelphis hosei	144.33	-38.16	McColl and Obendorf 1982
Lagenodelphis hosei	-66.75	17.96	Mignucci-Giannoni et al. 1999
Lagenodelphis hosei	-66.36	17.97	Mignucci-Giannoni et al. 1999
Lagenodelphis hosei	165	0	Miyazaki and Wada 1978
Lagenodelphis hosei	142.06	1.55	Miyazaki and Wada 1978
Lagenodelphis hosei	164.88	1.71	Miyazaki and Wada 1978
Lagenodelphis hosei	141.91	3	Miyazaki and Wada 1978
Lagenodelphis hosei	122.36	5	Miyazaki and Wada 1978
Lagenodelphis hosei	120.28	22.61	Miyazaki and Wada 1978
Lagenodelphis hosei	138.45	23.25	Miyazaki and Wada 1978
Lagenodelphis hosei	140.1	35.1	Miyazaki and Wada 1978
Lagenodelphis hosei	-65	-42.9	Moreno et al. 2003
Lagenodelphis hosei	-57.51	-35.06	Moreno et al. 2003
Lagenodelphis hosei	-55.26	-34.86	Moreno et al. 2003
Lagenodelphis hosei	-54.61	-34.81	Moreno et al. 2003
Lagenodelphis hosei	-57.96	-34.81	Moreno et al. 2003
Lagenodelphis hosei	-55.85	-34.8	Moreno et al. 2003
Lagenodelphis hosei	-56.35	-34.78	Moreno et al. 2003
Lagenodelphis hosei	-57.25	-34.43	Moreno et al. 2003
Lagenodelphis hosei	-57.43	-34.43	Moreno et al. 2003
Lagenodelphis hosei	-52.63	-33.11	Moreno et al. 2003
Lagenodelphis hosei	-51.86	-31.93	Moreno et al. 2003
Lagenodelphis hosei	-51.7	-31.83	Moreno et al. 2003
Lagenodelphis hosei	-51.05	-31.37	Moreno et al. 2003
Lagenodelphis hosei	-51.04	-31.35	Moreno et al. 2003
Lagenodelphis hosei	-50.94	-31.28	Moreno et al. 2003
Lagenodelphis hosei	-50.82	-31.17	Moreno et al. 2003
Lagenodelphis hosei	-50.74	-31.07	Moreno et al. 2003
Lagenodelphis hosei	-50.71	-31.03	Moreno et al. 2003
Lagenodelphis hosei	-50.66	-30.96	Moreno et al. 2003
Lagenodelphis hosei	-50.66	-30.95	Moreno et al. 2003
Lagenodelphis hosei	-50.2	-30.16	Moreno et al. 2003
Lagenodelphis hosei	-46.26	-24	Moreno et al. 2003
Lagenodelphis hosei	-42.01	-22.95	Moreno et al. 2003
Lagenodelphis hosei	-42.31	-22.93	Moreno et al. 2003

Lagenodelphis hosei	-43.16	-22.85	Moreno et al. 2003
Lagenodelphis hosei	-38.61	-3.68	Moreno et al. 2003
Lagenodelphis hosei	30.96	-30.78	Perrin 1973
Lagenodelphis hosei	153.16	-30.16	Perrin 1973
Lagenodelphis hosei	32.33	-30.15	Perrin 1973
Lagenodelphis hosei	32.2	-29.55	Perrin 1973
Lagenodelphis hosei	-95.75	5	Perrin 1973
Lagenodelphis hosei	-122.36	5	Perrin 1973
Lagenodelphis hosei	144.77	-38.6	Perrin et al. 2003
Lagenodelphis hosei	18.34	-33.96	Perrin et al. 2003
Lagenodelphis hosei	31.04	-29.86	Perrin et al. 2003
Lagenodelphis hosei	148.46	-19.71	Perrin et al. 2003
Lagenodelphis hosei	123.41	-8.58	Perrin et al. 2003
Lagenodelphis hosei	128.15	-3.68	Perrin et al. 2003
Lagenodelphis hosei	142.06	1.58	Perrin et al. 2003
Lagenodelphis hosei	124.36	9.59	Perrin et al. 2003
Lagenodelphis hosei	123.19	9.63	Perrin et al. 2003
Lagenodelphis hosei	130.29	30.77	Perrin et al. 2003
Lagenodelphis hosei	135.94	33.59	Perrin et al. 2003
Lagenodelphis hosei	73.51	4.16	Sekiguichi et al. 1992
Lagenodelphis hosei	-16.76	13.83	Torda et al. 2010
Lagenodelphis hosei	-22.78	15.98	Torda et al. 2010
Lagenodelphis hosei	27.65	-33.76	Van Bree et al. 1986
Lagenodelphis hosei	26.66	-33.66	Van Bree et al. 1986
Lagenodelphis hosei	28.5	-32.5	Van Bree et al. 1986
Lagenodelphis hosei	31.45	-31.21	Van Bree et al. 1986
Lagenodelphis hosei	31.63	-30.58	Van Bree et al. 1986
Lagenodelphis hosei	31.65	-30.28	Van Bree et al. 1986
Lagenodelphis hosei	32.1	-30.08	Van Bree et al. 1986
Lagenodelphis hosei	32.66	-27.5	Van Bree et al. 1986
Lagenodelphis hosei	-96.98	0.51	Van Bree et al. 1986
Lagenodelphis hosei	142.06	1.55	Van Bree et al. 1986
Lagenodelphis hosei	119	2	Van Bree et al. 1986
Lagenodelphis hosei	-95.75	5	Van Bree et al. 1986
Lagenodelphis hosei	-122.35	5.65	Van Bree et al. 1986
Lagenodelphis hosei	124.5	10.5	Van Bree et al. 1986
Lagenodelphis hosei	-61.2	13.25	Van Bree et al. 1986
Lagenodelphis hosei	153	25	Van Bree et al. 1986
Lagenodelphis hosei	-3.23	48.78	Van Bree et al. 1986
Lagenodelphis hosei	-16.6	27.8	Van Waerebeek et al. 2009
Lagenodelphis hosei	-61.27	13.23	Watkins et al. 1994
Lagenodelphis hosei	-61.5	15.21	Watkins et al. 1994
Lagenodelphis hosei	-61.5	15.61	Watkins et al. 1994
Lagenodelphis hosei	-11.68	-7.66	Weir 2010
Lagenodelphis hosei	11.34	-7.63	Weir 2010
Lagenodelphis hosei	6.78	3.16	Weir 2010
Lagenodelphis hosei	-1.95	4.8	Weir 2010
Lagenodelphis hosei	-24.46	16.55	Weir et al. 2013

Table 3. Records of *Sotalia fluviatilis.*

Species	Longitude	Latitude	Reference
Sotalia fluviatilis	-65.53	3.16	Romero et al. 2001
Sotalia fluviatilis	-66.25	7.16	Romero et al. 2001
Sotalia fluviatilis	-64.4	8.06	Romero et al. 2001
Sotalia fluviatilis	-62.6	8.36	Romero et al. 2001
Sotalia fluviatilis	-60.9	8.6	Romero et al. 2001
Sotalia fluviatilis	-61.55	8.83	Romero et al. 2001
Sotalia fluviatilis	-72.28	9.06	Romero et al. 2001
Sotalia fluviatilis	-71.75	9.25	Romero et al. 2001
Sotalia fluviatilis	-71.83	9.5	Romero et al. 2001
Sotalia fluviatilis	-71.91	9.5	Romero et al. 2001
Sotalia fluviatilis	-72	9.5	Romero et al. 2001
Sotalia fluviatilis	-71.66	10	Romero et al. 2001
Sotalia fluviatilis	-62.63	10.1	Romero et al. 2001
Sotalia fluviatilis	-62.88	10.4	Romero et al. 2001
Sotalia fluviatilis	-64.16	10.45	Romero et al. 2001
Sotalia fluviatilis	-71.58	10.58	Romero et al. 2001
Sotalia fluviatilis	-69.58	11.46	Romero et al. 2001
Sotalia fluviatilis	-71.66	11.66	Romero et al. 2001

Table 4. Records of *Sotalia guianensis.*

Species	Longitude	Latitude	Reference
Sotalia guianensis	-48.56	-27.59	Geise and Borobia 1987
Sotalia guianensis	-48.64	-27.49	Geise and Borobia 1987
Sotalia guianensis	-48.53	-27.44	Geise and Borobia 1987
Sotalia guianensis	-48.46	-27.42	Geise and Borobia 1987
Sotalia guianensis	-48.67	-26.63	Geise and Borobia 1987
Sotalia guianensis	-34.79	-7.17	Lucena et al. 1998
Sotalia guianensis	-34.93	-6.77	Lucena et al. 1998
Sotalia guianensis	-35	-6.37	Lucena et al. 1998
Sotalia guianensis	-47.46	-0.5	Lucena et al. 1998
Sotalia guianensis	-48.51	-27.43	Siciliano 1994
Sotalia guianensis	-48.5	-25.51	Siciliano 1994
Sotalia guianensis	-47.91	-25.01	Siciliano 1994
Sotalia guianensis	-47.25	-24.33	Siciliano 1994
Sotalia guianensis	-46.33	-23.95	Siciliano 1994
Sotalia guianensis	-44.03	-22.96	Siciliano 1994
Sotalia guianensis	-43.25	-22.93	Siciliano 1994
Sotalia guianensis	-43.06	-22.93	Siciliano 1994
Sotalia guianensis	-42.81	-22.91	Siciliano 1994
Sotalia guianensis	-41.01	-21.37	Siciliano 1994
Sotalia guianensis	-40.28	-20.21	Siciliano 1994
Sotalia guianensis	-39.81	-19.38	Siciliano 1994
Sotalia guianensis	-39.73	-18.59	Siciliano 1994
Sotalia guianensis	-39.85	-18.42	Siciliano 1994
Sotalia guianensis	-40.7	-18.41	Siciliano 1994
Sotalia guianensis	-39.36	-17.88	Siciliano 1994
Sotalia guianensis	-39.21	-17.33	Siciliano 1994
Sotalia guianensis	-39.25	-17.33	Siciliano 1994
Sotalia guianensis	-38.58	-17.33	Siciliano 1994
Sotalia guianensis	-38.91	-13.66	Siciliano 1994
Sotalia guianensis	-38.58	-12.91	Siciliano 1994
Sotalia guianensis	-38.65	-12.9	Siciliano 1994
Sotalia guianensis	-37.05	-10.99	Siciliano 1994
Sotalia guianensis	-37.04	-10.91	Siciliano 1994
Sotalia guianensis	-36.85	-10.73	Siciliano 1994
Sotalia guianensis	-36.29	-10.35	Siciliano 1994
Sotalia guianensis	-35.71	-9.66	Siciliano 1994
Sotalia guianensis	-34.9	-8.05	Siciliano 1994
Sotalia guianensis	-34.8	-7.11	Siciliano 1994
Sotalia guianensis	-35.11	-6.83	Siciliano 1994
Sotalia guianensis	-38.54	-3.71	Siciliano 1994
Sotalia guianensis	-38.72	-3.62	Siciliano 1994
Sotalia guianensis	-38.9	-3.5	Siciliano 1994
Sotalia guianensis	-39.03	-3.41	Siciliano 1994
Sotalia guianensis	-40.51	-2.8	Siciliano 1994
Sotalia guianensis	-42.74	-2.56	Siciliano 1994
Sotalia guianensis	-44	-2.51	Siciliano 1994

Sotalia guianensis	-44.41	-2.4	Siciliano 1994
Sotalia guianensis	-48.5	-1	Siciliano 1994
Sotalia guianensis	-47.35	-0.61	Siciliano 1994
Sotalia guianensis	-48.56	-27.55	Simões-Lopes and Ximenez 1993

Table 5. Records of *Sousa chinensis.*

Species	Longitude	Latitude	Reference
Sousa chinensis	108.79	-0.3	Dolar et al. 1997
Sousa chinensis	104.11	1.22	Jefferson and Van Waerebeck 2004
Sousa chinensis	100.44	13.08	Jefferson and Van Waerebeck 2004
Sousa chinensis	109.31	14	Jefferson and Van Waerebeck 2004
Sousa chinensis	114.07	22.34	Jefferson and Van Waerebeck 2004

Table 6. Records of *Stenella attenuata.*

Species	Longitude	Latitude	Reference
Stenella attenuata	-31.86	-20.55	Amaral et al. 2015
Stenella attenuata	72.9	6.53	Anderson et al. 1999
Stenella attenuata	156.7	20.7	Baird et al. 2001
Stenella attenuata	-81.85	7.25	Borrell et al. 2004
Stenella attenuata	-81.96	7.41	Borrell et al. 2004
Stenella attenuata	-81.91	7.5	Borrell et al. 2004
Stenella attenuata	-81.91	7.53	Borrell et al. 2004
Stenella attenuata	-82.01	7.58	Borrell et al. 2004
Stenella attenuata	-81.78	7.88	Borrell et al. 2004
Stenella attenuata	-47.83	-25.54	Cremer and Simões-Lopes 1997
Stenella attenuata	-90.68	-0.76	Denkinger et al. 2013
Stenella attenuata	30.96	-30.78	Dolar et al. 1997
Stenella attenuata	-122.36	5	Dolar et al. 1997
Stenella attenuata	91.09	-12.33	Eyre 1995
Stenella attenuata	38.51	20.93	Eyre 1995
Stenella attenuata	37.54	22.53	Eyre 1995
Stenella attenuata	174.98	-40.88	Gilpatrick 1987
Stenella attenuata	42.65	-35.5	Gilpatrick 1987
Stenella attenuata	180	-35	Gilpatrick 1987
Stenella attenuata	22	-35	Gilpatrick 1987
Stenella attenuata	57.12	-34.1	Gilpatrick 1987
Stenella attenuata	57.47	-34	Gilpatrick 1987
Stenella attenuata	30.47	-32.57	Gilpatrick 1987
Stenella attenuata	66.9	-32.52	Gilpatrick 1987
Stenella attenuata	66.57	-32.08	Gilpatrick 1987
Stenella attenuata	51	-32	Gilpatrick 1987
Stenella attenuata	30.23	-31.45	Gilpatrick 1987
Stenella attenuata	31.85	-31.33	Gilpatrick 1987
Stenella attenuata	52.05	-31.08	Gilpatrick 1987
Stenella attenuata	58.83	-31.07	Gilpatrick 1987
Stenella attenuata	40.15	-30.98	Gilpatrick 1987
Stenella attenuata	153.15	-30.27	Gilpatrick 1987
Stenella attenuata	31.45	-30.07	Gilpatrick 1987
Stenella attenuata	31.13	-30.05	Gilpatrick 1987
Stenella attenuata	31.12	-30.05	Gilpatrick 1987
Stenella attenuata	31.72	-28.98	Gilpatrick 1987
Stenella attenuata	32.43	-28.4	Gilpatrick 1987
Stenella attenuata	55.42	-21.7	Gilpatrick 1987
Stenella attenuata	50.8	-20.72	Gilpatrick 1987
Stenella attenuata	168	-16	Gilpatrick 1987
Stenella attenuata	172.7	-15.37	Gilpatrick 1987
Stenella attenuata	125	-15	Gilpatrick 1987
Stenella attenuata	45	-15	Gilpatrick 1987
Stenella attenuata	123.42	-14.42	Gilpatrick 1987
Stenella attenuata	170.13	-14.07	Gilpatrick 1987
Stenella attenuata	126.52	-12.33	Gilpatrick 1987

Stenella attenuata	51.03	-9.23	Gilpatrick 1987
Stenella attenuata	161	-9	Gilpatrick 1987
Stenella attenuata	123.2	-8.43	Gilpatrick 1987
Stenella attenuata	160	-8.33	Gilpatrick 1987
Stenella attenuata	160	-8.33	Gilpatrick 1987
Stenella attenuata	123	-8.25	Gilpatrick 1987
Stenella attenuata	125.17	-8.17	Gilpatrick 1987
Stenella attenuata	160.07	-8.15	Gilpatrick 1987
Stenella attenuata	161.5	-8	Gilpatrick 1987
Stenella attenuata	162.65	-7.87	Gilpatrick 1987
Stenella attenuata	52.83	-7.83	Gilpatrick 1987
Stenella attenuata	-169.97	-7.32	Gilpatrick 1987
Stenella attenuata	53.75	-7	Gilpatrick 1987
Stenella attenuata	159.58	-6.62	Gilpatrick 1987
Stenella attenuata	159.25	-6	Gilpatrick 1987
Stenella attenuata	126	-6	Gilpatrick 1987
Stenella attenuata	147.32	-5.35	Gilpatrick 1987
Stenella attenuata	156.03	-5.02	Gilpatrick 1987
Stenella attenuata	146.48	-4.93	Gilpatrick 1987
Stenella attenuata	147	-4.72	Gilpatrick 1987
Stenella attenuata	146.7	-4.55	Gilpatrick 1987
Stenella attenuata	152.42	-4.47	Gilpatrick 1987
Stenella attenuata	152.42	-4.33	Gilpatrick 1987
Stenella attenuata	155.85	-4.33	Gilpatrick 1987
Stenella attenuata	55.75	-4.25	Gilpatrick 1987
Stenella attenuata	146.45	-4.22	Gilpatrick 1987
Stenella attenuata	146.72	-3.87	Gilpatrick 1987
Stenella attenuata	125.72	-3.8	Gilpatrick 1987
Stenella attenuata	155.07	-3.8	Gilpatrick 1987
Stenella attenuata	153.73	-3.42	Gilpatrick 1987
Stenella attenuata	40.13	-3.25	Gilpatrick 1987
Stenella attenuata	153.52	-3.1	Gilpatrick 1987
Stenella attenuata	145.25	-3.05	Gilpatrick 1987
Stenella attenuata	148.13	-3	Gilpatrick 1987
Stenella attenuata	148.68	-2.97	Gilpatrick 1987
Stenella attenuata	172.97	-2.8	Gilpatrick 1987
Stenella attenuata	-174.22	-2.78	Gilpatrick 1987
Stenella attenuata	154.6	-2.67	Gilpatrick 1987
Stenella attenuata	151.57	-2.43	Gilpatrick 1987
Stenella attenuata	159.82	-2.33	Gilpatrick 1987
Stenella attenuata	151.17	-2.15	Gilpatrick 1987
Stenella attenuata	145.92	-2.12	Gilpatrick 1987
Stenella attenuata	144.83	-2.08	Gilpatrick 1987
Stenella attenuata	151.75	-2.05	Gilpatrick 1987
Stenella attenuata	162.42	-2	Gilpatrick 1987
Stenella attenuata	151.27	-2	Gilpatrick 1987
Stenella attenuata	144.32	-1.95	Gilpatrick 1987
Stenella attenuata	143.88	-1.83	Gilpatrick 1987

Stenella attenuata	151.88	-1.82	Gilpatrick 1987
Stenella attenuata	140.68	-1.53	Gilpatrick 1987
Stenella attenuata	147.2	-1.43	Gilpatrick 1987
Stenella attenuata	151.38	-1.32	Gilpatrick 1987
Stenella attenuata	144.32	-1.28	Gilpatrick 1987
Stenella attenuata	174.2	-1.27	Gilpatrick 1987
Stenella attenuata	157.82	-1.15	Gilpatrick 1987
Stenella attenuata	153.5	-1.05	Gilpatrick 1987
Stenella attenuata	154.52	-1.05	Gilpatrick 1987
Stenella attenuata	168.2	-1	Gilpatrick 1987
Stenella attenuata	139.38	-0.57	Gilpatrick 1987
Stenella attenuata	144.07	-0.52	Gilpatrick 1987
Stenella attenuata	152.18	-0.47	Gilpatrick 1987
Stenella attenuata	152.08	-0.42	Gilpatrick 1987
Stenella attenuata	150.83	-0.25	Gilpatrick 1987
Stenella attenuata	143.87	0	Gilpatrick 1987
Stenella attenuata	140.45	0.03	Gilpatrick 1987
Stenella attenuata	172.18	0.33	Gilpatrick 1987
Stenella attenuata	135.15	0.47	Gilpatrick 1987
Stenella attenuata	139.18	0.5	Gilpatrick 1987
Stenella attenuata	137.73	0.62	Gilpatrick 1987
Stenella attenuata	147.5	1	Gilpatrick 1987
Stenella attenuata	171.32	1.25	Gilpatrick 1987
Stenella attenuata	145.47	1.3	Gilpatrick 1987
Stenella attenuata	144.2	1.42	Gilpatrick 1987
Stenella attenuata	105	1.5	Gilpatrick 1987
Stenella attenuata	161.43	1.9	Gilpatrick 1987
Stenella attenuata	102.5	2	Gilpatrick 1987
Stenella attenuata	156.4	2.22	Gilpatrick 1987
Stenella attenuata	152.18	2.73	Gilpatrick 1987
Stenella attenuata	149.4	2.93	Gilpatrick 1987
Stenella attenuata	149.4	2.98	Gilpatrick 1987
Stenella attenuata	-164.5	3	Gilpatrick 1987
Stenella attenuata	104	3	Gilpatrick 1987
Stenella attenuata	58	3	Gilpatrick 1987
Stenella attenuata	140.63	3.05	Gilpatrick 1987
Stenella attenuata	72.5	3.5	Gilpatrick 1987
Stenella attenuata	82	3.5	Gilpatrick 1987
Stenella attenuata	166.05	3.53	Gilpatrick 1987
Stenella attenuata	174	4	Gilpatrick 1987
Stenella attenuata	73.47	4	Gilpatrick 1987
Stenella attenuata	144.95	4.1	Gilpatrick 1987
Stenella attenuata	144.63	4.43	Gilpatrick 1987
Stenella attenuata	149.9	4.45	Gilpatrick 1987
Stenella attenuata	167	4.5	Gilpatrick 1987
Stenella attenuata	55.5	4.5	Gilpatrick 1987
Stenella attenuata	149.9	4.8	Gilpatrick 1987
Stenella attenuata	138.58	4.87	Gilpatrick 1987

Stenella attenuata	179.2	4.92	Gilpatrick 1987
Stenella attenuata	172.08	4.98	Gilpatrick 1987
Stenella attenuata	131.18	5.02	Gilpatrick 1987
Stenella attenuata	163.22	5.17	Gilpatrick 1987
Stenella attenuata	131.08	5.17	Gilpatrick 1987
Stenella attenuata	131.05	5.23	Gilpatrick 1987
Stenella attenuata	80.55	5.55	Gilpatrick 1987
Stenella attenuata	77	6	Gilpatrick 1987
Stenella attenuata	80.5	6	Gilpatrick 1987
Stenella attenuata	79.83	6.12	Gilpatrick 1987
Stenella attenuata	150.73	6.18	Gilpatrick 1987
Stenella attenuata	142.17	6.22	Gilpatrick 1987
Stenella attenuata	159.07	6.32	Gilpatrick 1987
Stenella attenuata	79.67	6.35	Gilpatrick 1987
Stenella attenuata	76.5	6.92	Gilpatrick 1987
Stenella attenuata	79.48	6.93	Gilpatrick 1987
Stenella attenuata	79.72	6.97	Gilpatrick 1987
Stenella attenuata	170.83	7	Gilpatrick 1987
Stenella attenuata	101	7.05	Gilpatrick 1987
Stenella attenuata	79.75	8	Gilpatrick 1987
Stenella attenuata	79.75	8.02	Gilpatrick 1987
Stenella attenuata	79.72	8.02	Gilpatrick 1987
Stenella attenuata	75.57	8.05	Gilpatrick 1987
Stenella attenuata	82.13	8.13	Gilpatrick 1987
Stenella attenuata	160.75	8.42	Gilpatrick 1987
Stenella attenuata	81.42	8.5	Gilpatrick 1987
Stenella attenuata	81.5	8.5	Gilpatrick 1987
Stenella attenuata	81.65	8.57	Gilpatrick 1987
Stenella attenuata	81.42	8.58	Gilpatrick 1987
Stenella attenuata	81.5	8.63	Gilpatrick 1987
Stenella attenuata	81.33	8.67	Gilpatrick 1987
Stenella attenuata	81.22	8.9	Gilpatrick 1987
Stenella attenuata	81	9	Gilpatrick 1987
Stenella attenuata	81.2	9.17	Gilpatrick 1987
Stenella attenuata	81.12	9.17	Gilpatrick 1987
Stenella attenuata	80.98	9.4	Gilpatrick 1987
Stenella attenuata	80.97	9.45	Gilpatrick 1987
Stenella attenuata	81.13	9.6	Gilpatrick 1987
Stenella attenuata	81	9.63	Gilpatrick 1987
Stenella attenuata	100	10	Gilpatrick 1987
Stenella attenuata	75.57	10.2	Gilpatrick 1987
Stenella attenuata	-166.58	10.5	Gilpatrick 1987
Stenella attenuata	124	10.5	Gilpatrick 1987
Stenella attenuata	147.8	10.58	Gilpatrick 1987
Stenella attenuata	43.18	11.58	Gilpatrick 1987
Stenella attenuata	162	12	Gilpatrick 1987
Stenella attenuata	100	12	Gilpatrick 1987
Stenella attenuata	44.55	12.4	Gilpatrick 1987

Stenella attenuata	-174	13	Gilpatrick 1987
Stenella attenuata	84.25	13.5	Gilpatrick 1987
Stenella attenuata	89.5	14	Gilpatrick 1987
Stenella attenuata	92.5	14.25	Gilpatrick 1987
Stenella attenuata	89	14.5	Gilpatrick 1987
Stenella attenuata	138.47	14.83	Gilpatrick 1987
Stenella attenuata	149.62	20.65	Gilpatrick 1987
Stenella attenuata	-160.42	21.63	Gilpatrick 1987
Stenella attenuata	90	22	Gilpatrick 1987
Stenella attenuata	118	22.33	Gilpatrick 1987
Stenella attenuata	118	22.33	Gilpatrick 1987
Stenella attenuata	59.5	22.67	Gilpatrick 1987
Stenella attenuata	151.7	23.5	Gilpatrick 1987
Stenella attenuata	151.58	23.58	Gilpatrick 1987
Stenella attenuata	-166.67	24.02	Gilpatrick 1987
Stenella attenuata	149.15	24.08	Gilpatrick 1987
Stenella attenuata	57	24.13	Gilpatrick 1987
Stenella attenuata	142.72	25.37	Gilpatrick 1987
Stenella attenuata	142	25.53	Gilpatrick 1987
Stenella attenuata	143.63	25.92	Gilpatrick 1987
Stenella attenuata	34.25	26.07	Gilpatrick 1987
Stenella attenuata	127.77	26.23	Gilpatrick 1987
Stenella attenuata	127.5	26.58	Gilpatrick 1987
Stenella attenuata	124.83	26.67	Gilpatrick 1987
Stenella attenuata	127.5	26.67	Gilpatrick 1987
Stenella attenuata	143.12	26.68	Gilpatrick 1987
Stenella attenuata	127.75	26.75	Gilpatrick 1987
Stenella attenuata	127.67	26.83	Gilpatrick 1987
Stenella attenuata	127.58	26.92	Gilpatrick 1987
Stenella attenuata	129.37	27.17	Gilpatrick 1987
Stenella attenuata	158.33	27.42	Gilpatrick 1987
Stenella attenuata	130.57	31.15	Gilpatrick 1987
Stenella attenuata	134.6	31.47	Gilpatrick 1987
Stenella attenuata	161.67	31.5	Gilpatrick 1987
Stenella attenuata	162.7	31.53	Gilpatrick 1987
Stenella attenuata	131.68	31.8	Gilpatrick 1987
Stenella attenuata	162.3	31.9	Gilpatrick 1987
Stenella attenuata	162.3	31.98	Gilpatrick 1987
Stenella attenuata	135.02	32.05	Gilpatrick 1987
Stenella attenuata	134.07	32.63	Gilpatrick 1987
Stenella attenuata	129.83	32.67	Gilpatrick 1987
Stenella attenuata	129.1	33	Gilpatrick 1987
Stenella attenuata	128.5	33	Gilpatrick 1987
Stenella attenuata	137.87	33.32	Gilpatrick 1987
Stenella attenuata	135.93	33.6	Gilpatrick 1987
Stenella attenuata	136.27	33.63	Gilpatrick 1987
Stenella attenuata	138	34	Gilpatrick 1987
Stenella attenuata	136.32	34.18	Gilpatrick 1987

Stenella attenuata	139.1	34.87	Gilpatrick 1987
Stenella attenuata	139.13	34.95	Gilpatrick 1987
Stenella attenuata	139.13	34.95	Gilpatrick 1987
Stenella attenuata	138.4	34.98	Gilpatrick 1987
Stenella attenuata	146.7	35.03	Gilpatrick 1987
Stenella attenuata	147.33	36.02	Gilpatrick 1987
Stenella attenuata	144.77	36.42	Gilpatrick 1987
Stenella attenuata	148.77	36.62	Gilpatrick 1987
Stenella attenuata	140.92	37	Gilpatrick 1987
Stenella attenuata	143.83	37.63	Gilpatrick 1987
Stenella attenuata	143.42	37.72	Gilpatrick 1987
Stenella attenuata	142	39.17	Gilpatrick 1987
Stenella attenuata	141.97	39.23	Gilpatrick 1987
Stenella attenuata	173	40.75	Gilpatrick 1987
Stenella attenuata	-97.29	27.39	Jefferson and Baumgartner 1997
Stenella attenuata	-97.46	27.83	Jefferson and Baumgartner 1997
Stenella attenuata	-94.92	29.2	Jefferson and Baumgartner 1997
Stenella attenuata	-4.92	5.03	Jefferson et al. 1997
Stenella attenuata	-0.35	5.45	Jefferson et al. 1997
Stenella attenuata	135.94	33.59	Kasuya 1976
Stenella attenuata	139.13	34.9	Kasuya 1976
Stenella attenuata	139.14	34.93	Kasuya 1976
Stenella attenuata	-35.17	-5.87	Lucena et al. 1998
Stenella attenuata	-79.96	10.08	Mignucci-Giannoni et al. 2003
Stenella attenuata	-75.77	10.18	Mignucci-Giannoni et al. 2003
Stenella attenuata	-64.5	10.33	Mignucci-Giannoni et al. 2003
Stenella attenuata	-64.56	10.36	Mignucci-Giannoni et al. 2003
Stenella attenuata	-60.66	10.65	Mignucci-Giannoni et al. 2003
Stenella attenuata	-65.12	10.66	Mignucci-Giannoni et al. 2003
Stenella attenuata	-64.04	10.99	Mignucci-Giannoni et al. 2003
Stenella attenuata	-60.63	11.19	Mignucci-Giannoni et al. 2003
Stenella attenuata	-74.08	11.33	Mignucci-Giannoni et al. 2003
Stenella attenuata	-78.08	11.83	Mignucci-Giannoni et al. 2003
Stenella attenuata	-68.66	12.01	Mignucci-Giannoni et al. 2003
Stenella attenuata	-68.86	12.05	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.83	12.08	Mignucci-Giannoni et al. 2003
Stenella attenuata	-69	12.13	Mignucci-Giannoni et al. 2003
Stenella attenuata	-74.26	13.2	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.27	13.24	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.11	13.85	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.21	13.91	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.15	13.93	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.08	14.43	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.16	14.5	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.25	14.63	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.14	14.64	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.25	14.66	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.26	14.76	Mignucci-Giannoni et al. 2003

Stenella attenuata	-61.21	14.78	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.01	14.98	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61	15	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.4	15.2	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.39	15.29	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.43	15.31	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.45	15.31	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.42	15.35	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.49	15.38	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.5	15.41	Mignucci-Giannoni et al. 2003
Stenella attenuata	-79.28	15.41	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.51	15.45	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.53	15.46	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.48	15.49	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.5	15.5	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.56	15.5	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.56	15.51	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.5	15.51	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.51	15.52	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.5	15.53	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.5	15.54	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.52	15.54	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.58	15.55	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.5	15.56	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.5	15.56	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.5	15.57	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.51	15.58	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.5	15.6	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.5	15.62	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.62	15.62	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.5	15.63	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.5	15.63	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.51	15.64	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.82	16.05	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.81	16.08	Mignucci-Giannoni et al. 2003
Stenella attenuata	-61.15	16.31	Mignucci-Giannoni et al. 2003
Stenella attenuata	-82.63	16.33	Mignucci-Giannoni et al. 2003
Stenella attenuata	-85.33	17.35	Mignucci-Giannoni et al. 2003
Stenella attenuata	-71.45	17.38	Mignucci-Giannoni et al. 2003
Stenella attenuata	-86.36	17.53	Mignucci-Giannoni et al. 2003
Stenella attenuata	-67.01	17.63	Mignucci-Giannoni et al. 2003
Stenella attenuata	-74.13	17.7	Mignucci-Giannoni et al. 2003
Stenella attenuata	-74.63	17.76	Mignucci-Giannoni et al. 2003
Stenella attenuata	-74.55	17.76	Mignucci-Giannoni et al. 2003
Stenella attenuata	-66.71	17.87	Mignucci-Giannoni et al. 2003
Stenella attenuata	-67.42	18.01	Mignucci-Giannoni et al. 2003
Stenella attenuata	-74.7	18.71	Mignucci-Giannoni et al. 2003
Stenella attenuata	-65.46	19.24	Mignucci-Giannoni et al. 2003

Stenella attenuata	-81.86	20.11	Mignucci-Giannoni et al. 2003
Stenella attenuata	-84.33	23	Mignucci-Giannoni et al. 2003
Stenella attenuata	-71.23	24.16	Mignucci-Giannoni et al. 2003
Stenella attenuata	-39.76	-21.83	Moreno et al. 2005
Stenella attenuata	-39.58	-19.98	Moreno et al. 2005
Stenella attenuata	-35.25	-19.47	Moreno et al. 2005
Stenella attenuata	-36.93	-17.21	Moreno et al. 2005
Stenella attenuata	-37.53	-16.55	Moreno et al. 2005
Stenella attenuata	-38.31	-16.45	Moreno et al. 2005
Stenella attenuata	-38.06	-15.68	Moreno et al. 2005
Stenella attenuata	-35.18	-9.68	Moreno et al. 2005
Stenella attenuata	-33.1	-8.76	Moreno et al. 2005
Stenella attenuata	-34.53	-8.63	Moreno et al. 2005
Stenella attenuata	-34.33	-8.4	Moreno et al. 2005
Stenella attenuata	-34.31	-8.295	Moreno et al. 2005
Stenella attenuata	-34.19	-8.183	Moreno et al. 2005
Stenella attenuata	-34.26	-8.11	Moreno et al. 2005
Stenella attenuata	-34.38	-8.05	Moreno et al. 2005
Stenella attenuata	-33.91	-7.45	Moreno et al. 2005
Stenella attenuata	-34	-7.2	Moreno et al. 2005
Stenella attenuata	-33.61	-7.18	Moreno et al. 2005
Stenella attenuata	-33.73	-7.11	Moreno et al. 2005
Stenella attenuata	-34.01	-7	Moreno et al. 2005
Stenella attenuata	-34.05	-6.9	Moreno et al. 2005
Stenella attenuata	-33.36	-6.76	Moreno et al. 2005
Stenella attenuata	-34.51	-6.66	Moreno et al. 2005
Stenella attenuata	-34.18	-6.51	Moreno et al. 2005
Stenella attenuata	-34.21	-6.43	Moreno et al. 2005
Stenella attenuata	-34.58	-6.36	Moreno et al. 2005
Stenella attenuata	-33.75	-6.28	Moreno et al. 2005
Stenella attenuata	-33.55	-6.26	Moreno et al. 2005
Stenella attenuata	-33.76	-6.25	Moreno et al. 2005
Stenella attenuata	-33.16	-6.18	Moreno et al. 2005
Stenella attenuata	-33.55	-6.13	Moreno et al. 2005
Stenella attenuata	-33.2	-5.98	Moreno et al. 2005
Stenella attenuata	-34.13	-5.95	Moreno et al. 2005
Stenella attenuata	-34.6	-5.83	Moreno et al. 2005
Stenella attenuata	-34.42	-5.75	Moreno et al. 2005
Stenella attenuata	-33.3	-5.6	Moreno et al. 2005
Stenella attenuata	-34.81	-5.51	Moreno et al. 2005
Stenella attenuata	-33.98	-5.5	Moreno et al. 2005
Stenella attenuata	-34.18	-5.43	Moreno et al. 2005
Stenella attenuata	-34.88	-5.41	Moreno et al. 2005
Stenella attenuata	-34.06	-5.41	Moreno et al. 2005
Stenella attenuata	-33.57	-5.11	Moreno et al. 2005
Stenella attenuata	-36.66	-4.1	Moreno et al. 2005
Stenella attenuata	-32.41	-3.83	Moreno et al. 2005
Stenella attenuata	29.41	-31.73	Peddemors 1999

Stenella attenuata	32.56	-28.12	Peddemors 1999
Stenella attenuata	86	2.5	Perrin 1975
Stenella attenuata	103	7	Perrin 1975
Stenella attenuata	90.53	7.18	Perrin 1975
Stenella attenuata	100.83	7.78	Perrin 1975
Stenella attenuata	90.53	7.83	Perrin 1975
Stenella attenuata	107	8	Perrin 1975
Stenella attenuata	106.88	8.16	Perrin 1975
Stenella attenuata	92	9	Perrin 1975
Stenella attenuata	114	9	Perrin 1975
Stenella attenuata	110.73	9.33	Perrin 1975
Stenella attenuata	129.3	9.46	Perrin 1975
Stenella attenuata	133.41	9.78	Perrin 1975
Stenella attenuata	89.78	9.83	Perrin 1975
Stenella attenuata	135	10	Perrin 1975
Stenella attenuata	118	10	Perrin 1975
Stenella attenuata	124	10	Perrin 1975
Stenella attenuata	92.86	10.51	Perrin 1975
Stenella attenuata	102.03	10.6	Perrin 1975
Stenella attenuata	125	11	Perrin 1975
Stenella attenuata	128	11	Perrin 1975
Stenella attenuata	136	12	Perrin 1975
Stenella attenuata	93.3	12.85	Perrin 1975
Stenella attenuata	88	13.5	Perrin 1975
Stenella attenuata	107	18	Perrin 1975
Stenella attenuata	-78.83	8.1	Perrin et al. 1985
Stenella attenuata	-78.83	8.11	Perrin et al. 1985
Stenella attenuata	-78.83	8.13	Perrin et al. 1985
Stenella attenuata	-78.78	8.21	Perrin et al. 1985
Stenella attenuata	-78.75	8.33	Perrin et al. 1985
Stenella attenuata	60	-28.33	Perrin et al. 1987
Stenella attenuata	49.11	-19.7	Perrin et al. 1987
Stenella attenuata	-5.72	-15.92	Perrin et al. 1987
Stenella attenuata	-83.28	-12.2	Perrin et al. 1987
Stenella attenuata	44.39	-12.16	Perrin et al. 1987
Stenella attenuata	160.73	-9.58	Perrin et al. 1987
Stenella attenuata	51.02	-9.22	Perrin et al. 1987
Stenella attenuata	-91.55	-9.2	Perrin et al. 1987
Stenella attenuata	-90.57	-9.13	Perrin et al. 1987
Stenella attenuata	-84.47	-9.05	Perrin et al. 1987
Stenella attenuata	-90.78	-8.88	Perrin et al. 1987
Stenella attenuata	-89.35	-8.8	Perrin et al. 1987
Stenella attenuata	52.73	-7.01	Perrin et al. 1987
Stenella attenuata	85.77	-6.03	Perrin et al. 1987
Stenella attenuata	53.33	-4.81	Perrin et al. 1987
Stenella attenuata	55.53	-4.66	Perrin et al. 1987
Stenella attenuata	-32.39	-3.84	Perrin et al. 1987
Stenella attenuata	-98.75	-2.88	Perrin et al. 1987

Stenella attenuata	9.21	-1.9	Perrin et al. 1987
Stenella attenuata	-29	2.73	Perrin et al. 1987
Stenella attenuata	-119.33	2.92	Perrin et al. 1987
Stenella attenuata	-105.25	4.67	Perrin et al. 1987
Stenella attenuata	-107.75	4.92	Perrin et al. 1987
Stenella attenuata	-129.67	5.9	Perrin et al. 1987
Stenella attenuata	-24.58	6.77	Perrin et al. 1987
Stenella attenuata	-132.95	7.3	Perrin et al. 1987
Stenella attenuata	-130.97	7.5	Perrin et al. 1987
Stenella attenuata	-98.53	8.22	Perrin et al. 1987
Stenella attenuata	-135.33	8.22	Perrin et al. 1987
Stenella attenuata	-132.33	8.25	Perrin et al. 1987
Stenella attenuata	-140.77	8.27	Perrin et al. 1987
Stenella attenuata	-138.55	8.28	Perrin et al. 1987
Stenella attenuata	-138.17	8.3	Perrin et al. 1987
Stenella attenuata	-140.8	8.48	Perrin et al. 1987
Stenella attenuata	-105.33	8.7	Perrin et al. 1987
Stenella attenuata	-102.08	8.95	Perrin et al. 1987
Stenella attenuata	-33	9	Perrin et al. 1987
Stenella attenuata	-101.95	9	Perrin et al. 1987
Stenella attenuata	-109.73	9.45	Perrin et al. 1987
Stenella attenuata	-106.28	9.65	Perrin et al. 1987
Stenella attenuata	-47	11	Perrin et al. 1987
Stenella attenuata	42.71	11.57	Perrin et al. 1987
Stenella attenuata	-132.43	11.73	Perrin et al. 1987
Stenella attenuata	-61.75	12.12	Perrin et al. 1987
Stenella attenuata	-61.45	13.2	Perrin et al. 1987
Stenella attenuata	-61.23	13.33	Perrin et al. 1987
Stenella attenuata	-61	14.18	Perrin et al. 1987
Stenella attenuata	-23.53	15.16	Perrin et al. 1987
Stenella attenuata	-98.87	16.27	Perrin et al. 1987
Stenella attenuata	-103.83	18.3	Perrin et al. 1987
Stenella attenuata	-74.7	18.72	Perrin et al. 1987
Stenella attenuata	-74.83	18.87	Perrin et al. 1987
Stenella attenuata	-84.48	20.1	Perrin et al. 1987
Stenella attenuata	-84.58	20.23	Perrin et al. 1987
Stenella attenuata	38.45	20.28	Perrin et al. 1987
Stenella attenuata	106.53	20.43	Perrin et al. 1987
Stenella attenuata	-84.47	23	Perrin et al. 1987
Stenella attenuata	-106.43	23.22	Perrin et al. 1987
Stenella attenuata	-80.16	25.59	Perrin et al. 1987
Stenella attenuata	-80.24	25.71	Perrin et al. 1987
Stenella attenuata	-80.1	26.11	Perrin et al. 1987
Stenella attenuata	51.68	26.59	Perrin et al. 1987
Stenella attenuata	-80.08	26.92	Perrin et al. 1987
Stenella attenuata	-80.43	27.83	Perrin et al. 1987
Stenella attenuata	-80.61	28.41	Perrin et al. 1987
Stenella attenuata	-80.88	29.02	Perrin et al. 1987

Stenella attenuata	-84.21	30.08	Perrin et al. 1987
Stenella attenuata	-87.2	30.4	Perrin et al. 1987
Stenella attenuata	-81.42	30.67	Perrin et al. 1987
Stenella attenuata	-77.88	34.03	Perrin et al. 1987
Stenella attenuata	-71.63	41.35	Perrin et al. 1987
Stenella attenuata	-70.98	42.4	Perrin et al. 1987
Stenella attenuata	-76.48	-13.03	Read et al. 1988
Stenella attenuata	-76.79	-12.46	Read et al. 1988
Stenella attenuata	31	-29.83	Sekiguchi et al. 1992
Stenella attenuata	55.41	-21.7	Sekiguchi et al. 1992
Stenella attenuata	-40.84	-23.86	Sucunza et al. 2015
Stenella attenuata	8.73	0.25	Van Waerebeek et al. 2009
Stenella attenuata	-0.73	5.28	Van Waerebeek et al. 2009
Stenella attenuata	-61.5	15.62	Watkins et al. 1994
Stenella attenuata	11.7	-11.8	Weir 2010
Stenella attenuata	6.72	0.34	Weir 2010
Stenella attenuata	0.75	4.18	Weir 2010

Table 7. Records of *Stenella clymene.*

Species	Longitude	Latitude	Reference
Stenella clymene	-38.65	-14.79	Amaral et al. 2015
Stenella clymene	-95.28	27.2	Fertl et al. 1997
Stenella clymene	-74	39.86	Fertl et al. 1997
Stenella clymene	-46.93	-28.86	Fertl et al. 2003
Stenella clymene	-33.65	-10.26	Fertl et al. 2003
Stenella clymene	-33.76	-10.23	Fertl et al. 2003
Stenella clymene	-34	-8.88	Fertl et al. 2003
Stenella clymene	-33.56	-8.5	Fertl et al. 2003
Stenella clymene	-33.48	-8.46	Fertl et al. 2003
Stenella clymene	-33.41	-7.66	Fertl et al. 2003
Stenella clymene	-34.26	-7.43	Fertl et al. 2003
Stenella clymene	-33.95	-7.2	Fertl et al. 2003
Stenella clymene	-33.81	-6.9	Fertl et al. 2003
Stenella clymene	-33.53	-6.15	Fertl et al. 2003
Stenella clymene	10.53	-4.38	Fertl et al. 2003
Stenella clymene	-33.83	7.58	Fertl et al. 2003
Stenella clymene	-61.6	12.41	Fertl et al. 2003
Stenella clymene	-17.33	16	Fertl et al. 2003
Stenella clymene	-88.28	25.96	Fertl et al. 2003
Stenella clymene	-87.98	26	Fertl et al. 2003
Stenella clymene	-95.15	26.03	Fertl et al. 2003
Stenella clymene	-87.43	26.1	Fertl et al. 2003
Stenella clymene	-90.98	26.13	Fertl et al. 2003
Stenella clymene	-79.61	26.15	Fertl et al. 2003
Stenella clymene	-91.01	26.2	Fertl et al. 2003
Stenella clymene	-93	26.25	Fertl et al. 2003
Stenella clymene	-94.63	26.26	Fertl et al. 2003
Stenella clymene	-94.38	26.28	Fertl et al. 2003
Stenella clymene	-94.2	26.28	Fertl et al. 2003
Stenella clymene	-91.98	26.33	Fertl et al. 2003
Stenella clymene	-93	26.35	Fertl et al. 2003
Stenella clymene	-93.63	26.4	Fertl et al. 2003
Stenella clymene	-96.88	26.53	Fertl et al. 2003
Stenella clymene	-94.26	26.55	Fertl et al. 2003
Stenella clymene	-91.96	26.56	Fertl et al. 2003
Stenella clymene	-91.98	26.61	Fertl et al. 2003
Stenella clymene	-91	26.66	Fertl et al. 2003
Stenella clymene	-87.98	26.68	Fertl et al. 2003
Stenella clymene	-90.03	26.71	Fertl et al. 2003
Stenella clymene	-92	26.71	Fertl et al. 2003
Stenella clymene	-89.95	26.76	Fertl et al. 2003
Stenella clymene	-93.96	26.81	Fertl et al. 2003
Stenella clymene	-91.98	26.85	Fertl et al. 2003
Stenella clymene	-92.81	26.86	Fertl et al. 2003
Stenella clymene	-91	26.93	Fertl et al. 2003
Stenella clymene	-90.3	27.01	Fertl et al. 2003

Stenella clymene	-90	27.03	Fertl et al. 2003
Stenella clymene	-89.01	27.05	Fertl et al. 2003
Stenella clymene	-91.83	27.1	Fertl et al. 2003
Stenella clymene	-88.96	27.1	Fertl et al. 2003
Stenella clymene	-93.11	27.16	Fertl et al. 2003
Stenella clymene	-89	27.16	Fertl et al. 2003
Stenella clymene	-91.78	27.18	Fertl et al. 2003
Stenella clymene	-88.98	27.21	Fertl et al. 2003
Stenella clymene	-87.98	27.25	Fertl et al. 2003
Stenella clymene	-95.06	27.26	Fertl et al. 2003
Stenella clymene	-91.73	27.26	Fertl et al. 2003
Stenella clymene	-93.5	27.28	Fertl et al. 2003
Stenella clymene	-93.01	27.3	Fertl et al. 2003
Stenella clymene	-95.01	27.31	Fertl et al. 2003
Stenella clymene	-85.31	27.31	Fertl et al. 2003
Stenella clymene	-92.16	27.36	Fertl et al. 2003
Stenella clymene	-90.93	27.36	Fertl et al. 2003
Stenella clymene	-89.86	27.41	Fertl et al. 2003
Stenella clymene	-46.61	27.41	Fertl et al. 2003
Stenella clymene	-93.31	27.41	Fertl et al. 2003
Stenella clymene	-91	27.43	Fertl et al. 2003
Stenella clymene	-93.61	27.45	Fertl et al. 2003
Stenella clymene	-91	27.45	Fertl et al. 2003
Stenella clymene	-92.16	27.46	Fertl et al. 2003
Stenella clymene	-89.16	27.48	Fertl et al. 2003
Stenella clymene	-91	27.5	Fertl et al. 2003
Stenella clymene	-89.98	27.5	Fertl et al. 2003
Stenella clymene	-91.4	27.5	Fertl et al. 2003
Stenella clymene	-87	27.53	Fertl et al. 2003
Stenella clymene	-91.98	27.56	Fertl et al. 2003
Stenella clymene	-92.31	27.56	Fertl et al. 2003
Stenella clymene	-89.31	27.58	Fertl et al. 2003
Stenella clymene	-89.41	27.63	Fertl et al. 2003
Stenella clymene	-87.03	27.68	Fertl et al. 2003
Stenella clymene	-91	27.68	Fertl et al. 2003
Stenella clymene	-90.03	27.71	Fertl et al. 2003
Stenella clymene	-82.75	27.75	Fertl et al. 2003
Stenella clymene	-88.65	27.78	Fertl et al. 2003
Stenella clymene	-89.98	27.81	Fertl et al. 2003
Stenella clymene	-90.36	27.86	Fertl et al. 2003
Stenella clymene	-89.71	28.05	Fertl et al. 2003
Stenella clymene	-89.45	28.08	Fertl et al. 2003
Stenella clymene	-88.98	28.15	Fertl et al. 2003
Stenella clymene	-89.58	28.3	Fertl et al. 2003
Stenella clymene	-88.51	28.43	Fertl et al. 2003
Stenella clymene	-86.26	28.5	Fertl et al. 2003
Stenella clymene	-88.03	28.55	Fertl et al. 2003
Stenella clymene	-88	28.68	Fertl et al. 2003

Stenella clymene	-87.3	28.85	Fertl et al. 2003
Stenella clymene	-18.18	28.88	Fertl et al. 2003
Stenella clymene	-71.86	29.36	Fertl et al. 2003
Stenella clymene	-71.8	30.8	Fertl et al. 2003
Stenella clymene	-75.41	34.31	Fertl et al. 2003
Stenella clymene	-74.38	35.23	Fertl et al. 2003
Stenella clymene	-74.7	35.43	Fertl et al. 2003
Stenella clymene	-73.5	35.46	Fertl et al. 2003
Stenella clymene	-74.48	35.58	Fertl et al. 2003
Stenella clymene	-74.63	35.73	Fertl et al. 2003
Stenella clymene	-74	35.78	Fertl et al. 2003
Stenella clymene	-73.75	36.08	Fertl et al. 2003
Stenella clymene	-73.11	36.75	Fertl et al. 2003
Stenella clymene	-74	38	Fertl et al. 2003
Stenella clymene	-83.38	26.89	Jefferson 1996a
Stenella clymene	-96.03	28.12	Jefferson 1996a
Stenella clymene	-91.61	29.16	Jefferson 1996a
Stenella clymene	-87	29.7	Jefferson 1996b
Stenella clymene	-34.81	-7.13	Jefferson and Baumgartner 1997
Stenella clymene	-97.57	27.25	Jefferson and Baumgartner 1997
Stenella clymene	-97.46	27.83	Jefferson and Baumgartner 1997
Stenella clymene	-95.32	28.87	Jefferson and Baumgartner 1997
Stenella clymene	-94.86	29.36	Jefferson and Baumgartner 1997
Stenella clymene	-81.78	24.54	Jefferson et al. 1995
Stenella clymene	-81.24	24.72	Jefferson et al. 1995
Stenella clymene	-82.68	27.44	Jefferson et al. 1995
Stenella clymene	-82.74	27.64	Jefferson et al. 1995
Stenella clymene	-91.24	29.23	Jefferson et al. 1995
Stenella clymene	-16.33	18.15	Jefferson et al. 1997
Stenella clymene	-34.81	-7.11	Lucena et al. 1998
Stenella clymene	-2.5	2.16	Lucena et al. 1998
Stenella clymene	-18.08	-3.66	Perrin et al. 1981
Stenella clymene	-31.33	4.3	Perrin et al. 1981
Stenella clymene	-61.6	12.25	Perrin et al. 1981
Stenella clymene	-61.23	13.33	Perrin et al. 1981
Stenella clymene	-17.33	14.58	Perrin et al. 1981
Stenella clymene	-96.06	20.85	Perrin et al. 1981
Stenella clymene	-97.34	27.21	Perrin et al. 1981
Stenella clymene	-82.56	27.34	Perrin et al. 1981
Stenella clymene	-82.62	27.77	Perrin et al. 1981
Stenella clymene	-81.3	29.89	Perrin et al. 1981
Stenella clymene	-74.56	39.27	Perrin et al. 1981
Stenella clymene	-16.77	14	Robineau et al. 1994
Stenella clymene	-17.42	14.77	Robineau et al. 1994
Stenella clymene	-17.12	14.91	Robineau et al. 1994
Stenella clymene	-16.56	16	Robineau et al. 1994
Stenella clymene	-97.04	27.83	Robineau et al. 1994
Stenella clymene	-48.67	-26.7	Romero et al. 2001

Stenella clymene	-49.7	-29.3	Simões-Lopes et al. 1994
Stenella clymene	-38.9	-3.5	Simões-Lopes et al. 1994
Stenella clymene	3.73	3.59	Van Waerebeck et al. 2009
Stenella clymene	-0.73	5.28	Van Waerebeck et al. 2009
Stenella clymene	-0.6	5.34	Van Waerebeck et al. 2009
Stenella clymene	0.98	5.91	Van Waerebeck et al. 2009
Stenella clymene	11.41	-6.43	Weir 2006
Stenella clymene	-63.15	10.73	Weir 2006
Stenella clymene	10.54	-4.39	Weir 2010
Stenella clymene	-0.62	5.33	Weir 2010
Stenella clymene	-17.75	12.73	Ximenez and Praderi 1992

Table 8. Records of *Stenella coeruleoalba.*

Species	Longitude	Latitude	Reference
Stenella coeruleoalba	-47.62	-30.09	Amaral et al. 2015
Stenella coeruleoalba	-49.03	-31.03	Amaral et al. 2015
Stenella coeruleoalba	55.49	-20.29	Ballance and Pitman 1998
Stenella coeruleoalba	55.33	-3.57	Ballance and Pitman 1998
Stenella coeruleoalba	73.46	1.95	Ballance and Pitman 1998
Stenella coeruleoalba	81.08	5.97	Ballance and Pitman 1998
Stenella coeruleoalba	66.58	8.63	Ballance and Pitman 1998
Stenella coeruleoalba	51	9.94	Ballance and Pitman 1998
Stenella coeruleoalba	60.83	18.05	Ballance and Pitman 1998
Stenella coeruleoalba	-62	-42.33	Bastida et al. 2001
Stenella coeruleoalba	-58.16	-39.33	Bastida et al. 2001
Stenella coeruleoalba	-55.4	-39	Bastida et al. 2001
Stenella coeruleoalba	-57.83	-38.5	Bastida et al. 2001
Stenella coeruleoalba	-56.96	-37.25	Bastida et al. 2001
Stenella coeruleoalba	-56.86	-37.11	Bastida et al. 2001
Stenella coeruleoalba	-15.66	51.06	Berrow and Rogan 1998
Stenella coeruleoalba	0.75	37.58	Blanco et al. 1995
Stenella coeruleoalba	-0.53	40.41	Blanco et al. 1995
Stenella coeruleoalba	-12.91	50.03	Bloch et al. 1996
Stenella coeruleoalba	-16.93	50.05	Bloch et al. 1996
Stenella coeruleoalba	-11.73	50.33	Bloch et al. 1996
Stenella coeruleoalba	-11.98	50.33	Bloch et al. 1996
Stenella coeruleoalba	-15.78	50.38	Bloch et al. 1996
Stenella coeruleoalba	-27.84	50.57	Bloch et al. 1996
Stenella coeruleoalba	-27.92	50.62	Bloch et al. 1996
Stenella coeruleoalba	-28.05	50.73	Bloch et al. 1996
Stenella coeruleoalba	-11.83	51.05	Bloch et al. 1996
Stenella coeruleoalba	-29.68	51.65	Bloch et al. 1996
Stenella coeruleoalba	-29.71	51.67	Bloch et al. 1996
Stenella coeruleoalba	-30.14	51.89	Bloch et al. 1996
Stenella coeruleoalba	-24.92	52.34	Bloch et al. 1996
Stenella coeruleoalba	-22.83	53.81	Bloch et al. 1996
Stenella coeruleoalba	-7.25	55.66	Bloch et al. 1996
Stenella coeruleoalba	-6.16	55.76	Bloch et al. 1996
Stenella coeruleoalba	-6.16	57.25	Bloch et al. 1996
Stenella coeruleoalba	-3.63	57.63	Bloch et al. 1996
Stenella coeruleoalba	-1.5	60.25	Bloch et al. 1996
Stenella coeruleoalba	-6.73	61.4	Bloch et al. 1996
Stenella coeruleoalba	-7.03	62.11	Bloch et al. 1996
Stenella coeruleoalba	-16.56	63.85	Bloch et al. 1996
Stenella coeruleoalba	-54.97	-34.92	Brownell and Praderi 1976
Stenella coeruleoalba	-55.95	-34.84	Brownell and Praderi 1976
Stenella coeruleoalba	-2.42	36.76	Cañadas et al. 2002
Stenella coeruleoalba	-70.48	-23.65	Cárdenas et al. 1991
Stenella coeruleoalba	-9	46	Das et al. 2000
Stenella coeruleoalba	-90.68	-0.76	Denkinger et al. 2013

Stenella coeruleoalba	108.76	-12.63	Eyre 1995
Stenella coeruleoalba	18.64	35.07	Eyre 1995
Stenella coeruleoalba	15.67	35.7	Eyre 1995
Stenella coeruleoalba	1.24	35.8	Eyre 1995
Stenella coeruleoalba	8	42	Forcada et al. 1995
Stenella coeruleoalba	-178	9	Hubbs et al. 1973
Stenella coeruleoalba	-89.48	9.6	Hubbs et al. 1973
Stenella coeruleoalba	-109.75	10.25	Hubbs et al. 1973
Stenella coeruleoalba	-124.35	10.68	Hubbs et al. 1973
Stenella coeruleoalba	-127.78	11.23	Hubbs et al. 1973
Stenella coeruleoalba	-157.83	21.27	Hubbs et al. 1973
Stenella coeruleoalba	-106.9	21.98	Hubbs et al. 1973
Stenella coeruleoalba	-108.21	22.16	Hubbs et al. 1973
Stenella coeruleoalba	-108.15	22.16	Hubbs et al. 1973
Stenella coeruleoalba	-108.81	22.18	Hubbs et al. 1973
Stenella coeruleoalba	-107.53	22.2	Hubbs et al. 1973
Stenella coeruleoalba	-108.06	22.3	Hubbs et al. 1973
Stenella coeruleoalba	-97.17	27.71	Jefferson and Baumgartner 1997
Stenella coeruleoalba	-94.63	29.44	Jefferson and Baumgartner 1997
Stenella coeruleoalba	-93.85	29.65	Jefferson and Baumgartner 1997
Stenella coeruleoalba	-4.92	5.03	Jefferson et al. 1997
Stenella coeruleoalba	-17.33	14.58	Jefferson et al. 1997
Stenella coeruleoalba	-23.53	15.16	Jefferson et al. 1997
Stenella coeruleoalba	-16.65	28.44	Jefferson et al. 1997
Stenella coeruleoalba	-9.01	32.79	Jefferson et al. 1997
Stenella coeruleoalba	-16.99	32.82	Jefferson et al. 1997
Stenella coeruleoalba	18.04	34.55	Jefferson et al. 1997
Stenella coeruleoalba	-5.64	35.93	Jefferson et al. 1997
Stenella coeruleoalba	139.14	34.93	Kasuya 1976
Stenella coeruleoalba	126	20	Kasuya 1999
Stenella coeruleoalba	128	21	Kasuya 1999
Stenella coeruleoalba	140	24	Kasuya 1999
Stenella coeruleoalba	145	25	Kasuya 1999
Stenella coeruleoalba	150	30	Kasuya 1999
Stenella coeruleoalba	135	35	Kasuya 1999
Stenella coeruleoalba	145	37	Kasuya 1999
Stenella coeruleoalba	180	37	Kasuya 1999
Stenella coeruleoalba	150	38	Kasuya 1999
Stenella coeruleoalba	150	42	Kasuya 1999
Stenella coeruleoalba	140	45	Kasuya 1999
Stenella coeruleoalba	-60	44	Lucas and Hooker 1997
Stenella coeruleoalba	-36.3	-20.33	Maia-Nogueira et al. 2001
Stenella coeruleoalba	-37.98	-12.56	Maia-Nogueira et al. 2001
Stenella coeruleoalba	18.83	37.79	Marsili and Focardi 1996
Stenella coeruleoalba	13.17	40.2	Marsili and Focardi 1996
Stenella coeruleoalba	17.32	41.73	Marsili et al. 1997
Stenella coeruleoalba	-80.35	27.25	Odell and Chapman 1976
Stenella coeruleoalba	-83.41	27.86	Odell and Chapman 1976

Stenella coeruleoalba	-57.83	-38.28	Ott and Danilewicz 1996
Stenella coeruleoalba	-54.61	-34.85	Ott and Danilewicz 1996
Stenella coeruleoalba	-55.91	-34.81	Ott and Danilewicz 1996
Stenella coeruleoalba	-51.66	-32	Ott and Danilewicz 1996
Stenella coeruleoalba	-50.23	-30.23	Ott and Danilewicz 1996
Stenella coeruleoalba	-49.81	-29.46	Ott and Danilewicz 1996
Stenella coeruleoalba	-34.81	-6.96	Ott and Danilewicz 1996
Stenella coeruleoalba	18.15	-33.36	Peddemors 1999
Stenella coeruleoalba	-56.74	-35.19	Perrin et al. 1981
Stenella coeruleoalba	-61.23	13.33	Perrin et al. 1981
Stenella coeruleoalba	-75.4	35.49	Perrin et al. 1981
Stenella coeruleoalba	-74	37.16	Perrin et al. 1981
Stenella coeruleoalba	-76.21	37.19	Perrin et al. 1981
Stenella coeruleoalba	-72.15	37.46	Perrin et al. 1981
Stenella coeruleoalba	-73.56	37.7	Perrin et al. 1981
Stenella coeruleoalba	-74.03	40.55	Perrin et al. 1981
Stenella coeruleoalba	-70.91	42.38	Perrin et al. 1981
Stenella coeruleoalba	-28.4	44	Perrin et al. 1981
Stenella coeruleoalba	0.9	50.11	Perrin et al. 1981
Stenella coeruleoalba	-4.83	50.62	Perrin et al. 1981
Stenella coeruleoalba	-4.25	51.06	Perrin et al. 1981
Stenella coeruleoalba	-127.7	-37.68	Perrin et al. 1995
Stenella coeruleoalba	-124.98	35.65	Perrin et al. 1995
Stenella coeruleoalba	-124.76	36.3	Perrin et al. 1995
Stenella coeruleoalba	-126.11	36.98	Perrin et al. 1995
Stenella coeruleoalba	-126.21	38.58	Perrin et al. 1995
Stenella coeruleoalba	-105.31	21.53	Reynoso 1985
Stenella coeruleoalba	-16.33	18.15	Robineau and Vely 1998
Stenella coeruleoalba	-64.68	10.71	Romero et al. 2001
Stenella coeruleoalba	-64.83	11.66	Romero et al. 2001
Stenella coeruleoalba	-67	12.91	Romero et al. 2001
Stenella coeruleoalba	-47.89	-25.05	Rosas et al. 2002
Stenella coeruleoalba	20.36	-34.58	Sekiguchi et al. 1992
Stenella coeruleoalba	26.88	-34.46	Sekiguchi et al. 1992
Stenella coeruleoalba	21.21	-34.4	Sekiguchi et al. 1992
Stenella coeruleoalba	18.85	-34.36	Sekiguchi et al. 1992
Stenella coeruleoalba	21.43	-34.36	Sekiguchi et al. 1992
Stenella coeruleoalba	18.36	-34.23	Sekiguchi et al. 1992
Stenella coeruleoalba	18.43	-34.15	Sekiguchi et al. 1992
Stenella coeruleoalba	18.86	-34.15	Sekiguchi et al. 1992
Stenella coeruleoalba	18.45	-33.9	Sekiguchi et al. 1992
Stenella coeruleoalba	18.45	-33.8	Sekiguchi et al. 1992
Stenella coeruleoalba	18.18	-33.38	Sekiguchi et al. 1992
Stenella coeruleoalba	-175.03	-36.43	Stockin and Visser 2005
Stenella coeruleoalba	135.95	33.58	Tanabe et al. 1988
Stenella coeruleoalba	-78.88	-33.61	Van Waerebeck et al. 1998
Stenella coeruleoalba	-72.17	-20.95	Van Waerebeck et al. 1998
Stenella coeruleoalba	-76.21	-14.13	Van Waerebeck et al. 1998

Stenella coeruleoalba	-80.86	-5.73	Van Waerebeck et al. 1998
Stenella coeruleoalba	-80.85	-2.25	Van Waerebeck et al. 1998
Stenella coeruleoalba	-80.83	-2.18	Van Waerebeck et al. 1998
Stenella coeruleoalba	-80.71	-1.93	Van Waerebeck et al. 1998
Stenella coeruleoalba	-90.33	-0.76	Van Waerebeck et al. 1998
Stenella coeruleoalba	-90.31	-0.74	Van Waerebeck et al. 1998
Stenella coeruleoalba	-80.41	-0.55	Van Waerebeck et al. 1998
Stenella coeruleoalba	-79.06	1.6	Van Waerebeck et al. 1998
Stenella coeruleoalba	-78.8	1.8	Van Waerebeck et al. 1998
Stenella coeruleoalba	-77.37	6.04	Van Waerebeck et al. 1998
Stenella coeruleoalba	12.05	-13.98	Weir 2010
Stenella coeruleoalba	11.7	-11.8	Weir 2010
Stenella coeruleoalba	12.25	-9.25	Weir 2010
Stenella coeruleoalba	-6.13	4.96	Weir 2010
Stenella coeruleoalba	-55.91	-34.82	Ximenez and Praderi 1992

Table 9. Records of *Stenella frontalis.*

Species	Longitude	Latitude	Reference
Stenella frontalis	-39.44	-3.14	Alves-Júnior et al. 1996
Stenella frontalis	-39.6	-3.05	Alves-Júnior et al. 1996
Stenella frontalis	-47.41	-27	Amaral et al. 2015
Stenella frontalis	-47.35	-26.39	Amaral et al. 2015
Stenella frontalis	-46.86	-25.76	Amaral et al. 2015
Stenella frontalis	-46.81	-25.7	Amaral et al. 2015
Stenella frontalis	-46.49	-25.36	Amaral et al. 2015
Stenella frontalis	-45.52	-24.24	Amaral et al. 2015
Stenella frontalis	-43.09	-23.43	Amaral et al. 2015
Stenella frontalis	-38.41	-18.86	Danilewicz et al. 2013
Stenella frontalis	-28.29	38.39	Fertl et al. 1999
Stenella frontalis	-83	26	Fulling et al. 2003
Stenella frontalis	-92	28	Fulling et al. 2003
Stenella frontalis	-86	30	Fulling et al. 2003
Stenella frontalis	-78.56	26.81	Herzing 1997
Stenella frontalis	-78	27	Herzing and Johnson 1997
Stenella frontalis	-94.38	29.54	Jefferson and Baumgartner 1997
Stenella frontalis	9.21	-1.9	Jefferson et al. 1997
Stenella frontalis	3.73	3.59	Jefferson et al. 1997
Stenella frontalis	-13.48	9.35	Jefferson et al. 1997
Stenella frontalis	-47.65	-26.1	Leonel et al. 2012
Stenella frontalis	-48.26	-25.98	Leonel et al. 2012
Stenella frontalis	-47.53	-25.93	Leonel et al. 2012
Stenella frontalis	-47.76	-25.26	Leonel et al. 2012
Stenella frontalis	-47.78	-25.13	Leonel et al. 2012
Stenella frontalis	-47.6	-24.93	Leonel et al. 2012
Stenella frontalis	-34.93	-6.77	Lucena et al. 1998
Stenella frontalis	-34.92	-6.68	Lucena et al. 1998
Stenella frontalis	-16.65	28.44	McLeod et al. 2004
Stenella frontalis	-48.81	-30.77	Moreno et al. 2005
Stenella frontalis	-48.8	-30.76	Moreno et al. 2005
Stenella frontalis	-48.16	-29.84	Moreno et al. 2005
Stenella frontalis	-49.36	-29.75	Moreno et al. 2005
Stenella frontalis	-47.46	-27.62	Moreno et al. 2005
Stenella frontalis	-47.11	-27.56	Moreno et al. 2005
Stenella frontalis	-47.2	-27.4	Moreno et al. 2005
Stenella frontalis	-47.18	-26.8	Moreno et al. 2005
Stenella frontalis	-46.59	-26.35	Moreno et al. 2005
Stenella frontalis	-45.51	-26.08	Moreno et al. 2005
Stenella frontalis	-45.79	-25.83	Moreno et al. 2005
Stenella frontalis	-45.94	-25.64	Moreno et al. 2005
Stenella frontalis	-46	-25.26	Moreno et al. 2005
Stenella frontalis	-45.1	-24.87	Moreno et al. 2005
Stenella frontalis	-47.35	-24.86	Moreno et al. 2005
Stenella frontalis	-45.08	-24.86	Moreno et al. 2005
Stenella frontalis	-46.63	-24.8	Moreno et al. 2005

Stenella frontalis	-47.02	-24.7	Moreno et al. 2005
Stenella frontalis	-45.71	-24.38	Moreno et al. 2005
Stenella frontalis	-44.5	-24.35	Moreno et al. 2005
Stenella frontalis	-44.18	-24.27	Moreno et al. 2005
Stenella frontalis	-46.16	-24.13	Moreno et al. 2005
Stenella frontalis	-45.09	-24.1	Moreno et al. 2005
Stenella frontalis	-45	-23.65	Moreno et al. 2005
Stenella frontalis	-42.13	-23.38	Moreno et al. 2005
Stenella frontalis	-44.33	-23.23	Moreno et al. 2005
Stenella frontalis	-44.56	-23.18	Moreno et al. 2005
Stenella frontalis	-44.4	-23.16	Moreno et al. 2005
Stenella frontalis	-41.67	-23.15	Moreno et al. 2005
Stenella frontalis	-44.58	-23.15	Moreno et al. 2005
Stenella frontalis	-44.21	-23.08	Moreno et al. 2005
Stenella frontalis	-44.23	-23.05	Moreno et al. 2005
Stenella frontalis	-43.25	-23.03	Moreno et al. 2005
Stenella frontalis	-42	-22.98	Moreno et al. 2005
Stenella frontalis	-41.81	-22.66	Moreno et al. 2005
Stenella frontalis	-40.55	-22.3	Moreno et al. 2005
Stenella frontalis	-37.66	-3.94	Moreno et al. 2005
Stenella frontalis	-16.15	18.03	Nieri et al. 1999
Stenella frontalis	-52.49	-35.08	Paro et al. 2014
Stenella frontalis	-5.72	-15.92	Perrin et al. 1987
Stenella frontalis	11.83	-4.77	Perrin et al. 1987
Stenella frontalis	8.85	3.48	Perrin et al. 1987
Stenella frontalis	-4.92	5.03	Perrin et al. 1987
Stenella frontalis	-79	9.5	Perrin et al. 1987
Stenella frontalis	-13.67	9.5	Perrin et al. 1987
Stenella frontalis	-39	10	Perrin et al. 1987
Stenella frontalis	-66	10.68	Perrin et al. 1987
Stenella frontalis	-66.46	10.86	Perrin et al. 1987
Stenella frontalis	-61.56	10.95	Perrin et al. 1987
Stenella frontalis	-64	11	Perrin et al. 1987
Stenella frontalis	-61.9	11.03	Perrin et al. 1987
Stenella frontalis	-73.83	11.65	Perrin et al. 1987
Stenella frontalis	-68	12	Perrin et al. 1987
Stenella frontalis	-70	12.5	Perrin et al. 1987
Stenella frontalis	-61.23	13.15	Perrin et al. 1987
Stenella frontalis	-77.16	14.5	Perrin et al. 1987
Stenella frontalis	-60.05	14.56	Perrin et al. 1987
Stenella frontalis	-17.33	14.58	Perrin et al. 1987
Stenella frontalis	-18	15	Perrin et al. 1987
Stenella frontalis	-23.53	15.16	Perrin et al. 1987
Stenella frontalis	-63.08	17.05	Perrin et al. 1987
Stenella frontalis	-88	17.5	Perrin et al. 1987
Stenella frontalis	-67.36	17.7	Perrin et al. 1987
Stenella frontalis	-64.93	18.33	Perrin et al. 1987
Stenella frontalis	-66.55	18.48	Perrin et al. 1987

Stenella frontalis	-74.7	18.71	Perrin et al. 1987
Stenella frontalis	-67.83	19.7	Perrin et al. 1987
Stenella frontalis	-82.38	23.38	Perrin et al. 1987
Stenella frontalis	-74.5	24	Perrin et al. 1987
Stenella frontalis	-82.8	24.33	Perrin et al. 1987
Stenella frontalis	-81.49	24.79	Perrin et al. 1987
Stenella frontalis	-80.63	24.91	Perrin et al. 1987
Stenella frontalis	-80.13	25.18	Perrin et al. 1987
Stenella frontalis	-80.18	25.75	Perrin et al. 1987
Stenella frontalis	-80.11	25.98	Perrin et al. 1987
Stenella frontalis	-82.26	26.74	Perrin et al. 1987
Stenella frontalis	-97.35	26.84	Perrin et al. 1987
Stenella frontalis	-80.18	27.16	Perrin et al. 1987
Stenella frontalis	-97.34	27.21	Perrin et al. 1987
Stenella frontalis	-80.28	27.47	Perrin et al. 1987
Stenella frontalis	-82.62	27.77	Perrin et al. 1987
Stenella frontalis	-97.04	27.83	Perrin et al. 1987
Stenella frontalis	-80.91	29.02	Perrin et al. 1987
Stenella frontalis	-83.41	29.66	Perrin et al. 1987
Stenella frontalis	-93.71	29.74	Perrin et al. 1987
Stenella frontalis	-81.24	29.76	Perrin et al. 1987
Stenella frontalis	-81.26	29.85	Perrin et al. 1987
Stenella frontalis	-81.3	29.89	Perrin et al. 1987
Stenella frontalis	-86.49	30.38	Perrin et al. 1987
Stenella frontalis	-87.2	30.4	Perrin et al. 1987
Stenella frontalis	-81.2	31.47	Perrin et al. 1987
Stenella frontalis	-80.75	32.21	Perrin et al. 1987
Stenella frontalis	-79.91	32.77	Perrin et al. 1987
Stenella frontalis	-79.5	32.83	Perrin et al. 1987
Stenella frontalis	-79.54	32.98	Perrin et al. 1987
Stenella frontalis	-77.47	34.46	Perrin et al. 1987
Stenella frontalis	-76.75	34.75	Perrin et al. 1987
Stenella frontalis	-75.6	34.81	Perrin et al. 1987
Stenella frontalis	-75.98	35.11	Perrin et al. 1987
Stenella frontalis	-75.53	35.22	Perrin et al. 1987
Stenella frontalis	-75.63	35.22	Perrin et al. 1987
Stenella frontalis	-74.55	35.25	Perrin et al. 1987
Stenella frontalis	-75.52	35.25	Perrin et al. 1987
Stenella frontalis	-75.54	35.27	Perrin et al. 1987
Stenella frontalis	-74.25	35.28	Perrin et al. 1987
Stenella frontalis	-75.49	35.35	Perrin et al. 1987
Stenella frontalis	-75.46	35.54	Perrin et al. 1987
Stenella frontalis	-75.33	35.58	Perrin et al. 1987
Stenella frontalis	-75.58	35.89	Perrin et al. 1987
Stenella frontalis	-75.61	35.95	Perrin et al. 1987
Stenella frontalis	-75.88	36.62	Perrin et al. 1987
Stenella frontalis	-76.08	36.91	Perrin et al. 1987
Stenella frontalis	-74	37	Perrin et al. 1987

Stenella frontalis	-25.67	37.73	Perrin et al. 1987
Stenella frontalis	-73	38	Perrin et al. 1987
Stenella frontalis	-28	38	Perrin et al. 1987
Stenella frontalis	-75.18	38.03	Perrin et al. 1987
Stenella frontalis	-70.16	38.08	Perrin et al. 1987
Stenella frontalis	-71.28	38.25	Perrin et al. 1987
Stenella frontalis	-49	38.66	Perrin et al. 1987
Stenella frontalis	-74.9	38.92	Perrin et al. 1987
Stenella frontalis	-69.61	39.51	Perrin et al. 1987
Stenella frontalis	-29.08	40.25	Perrin et al. 1987
Stenella frontalis	-74.17	40.46	Perrin et al. 1987
Stenella frontalis	-12	40.61	Perrin et al. 1987
Stenella frontalis	-72.14	40.96	Perrin et al. 1987
Stenella frontalis	-70.34	41.62	Perrin et al. 1987
Stenella frontalis	-38.73	46.33	Perrin et al. 1987
Stenella frontalis	-65.43	10.15	Romero et al. 2001
Stenella frontalis	-64.41	10.25	Romero et al. 2001
Stenella frontalis	-66.05	10.6	Romero et al. 2001
Stenella frontalis	-63.15	10.73	Romero et al. 2001
Stenella frontalis	-65.21	10.95	Romero et al. 2001
Stenella frontalis	-71.6	10.98	Romero et al. 2001
Stenella frontalis	-62.11	11	Romero et al. 2001
Stenella frontalis	-64.2	11.05	Romero et al. 2001
Stenella frontalis	-62.36	11.41	Romero et al. 2001
Stenella frontalis	-69.58	11.46	Romero et al. 2001
Stenella frontalis	-71.66	11.66	Romero et al. 2001
Stenella frontalis	-1.95	4.8	Van Waerebeck et al. 2009
Stenella frontalis	11.7	-11.8	Weir 2010
Stenella frontalis	8.82	-0.74	Weir 2010
Stenella frontalis	2.35	6.16	Weir 2010

Table 10. Records of *Stenella longirostris.*

Species	Longitude	Latitude	Reference
Stenella longirostris	-38.16	-13.94	Amaral et al. 2015
Stenella longirostris	73.16	-0.66	Anderson et al. 1999
Stenella longirostris	73.06	-0.61	Anderson et al. 1999
Stenella longirostris	73.11	-0.61	Anderson et al. 1999
Stenella longirostris	-156.7	20.7	Baird et al. 2001
Stenella longirostris	-32.42	-3.25	Barreto and Lodi 2000
Stenella longirostris	-68.68	11.98	Debrot 1998
Stenella longirostris	-69.05	12.2	Debrot 1998
Stenella longirostris	-90.68	-0.76	Denkinger et al. 2013
Stenella longirostris	110.99	1.6	Dolar et al. 1997
Stenella longirostris	-95.75	5	Dolar et al. 1997
Stenella longirostris	123.03	9.04	Dolar et al. 1999
Stenella longirostris	118.07	-12.19	Eyre 1995
Stenella longirostris	122.45	-11.6	Eyre 1995
Stenella longirostris	122.98	-11.44	Eyre 1995
Stenella longirostris	58.58	-11.41	Eyre 1995
Stenella longirostris	142.87	-10.95	Eyre 1995
Stenella longirostris	49.62	-3.62	Eyre 1995
Stenella longirostris	49.21	-3.44	Eyre 1995
Stenella longirostris	50.92	12.22	Eyre 1995
Stenella longirostris	50.5	12.25	Eyre 1995
Stenella longirostris	50.33	12.27	Eyre 1995
Stenella longirostris	43.17	13.19	Eyre 1995
Stenella longirostris	41.79	15.5	Eyre 1995
Stenella longirostris	39.92	18.64	Eyre 1995
Stenella longirostris	39.82	18.82	Eyre 1995
Stenella longirostris	36.21	24.73	Eyre 1995
Stenella longirostris	36.2	24.74	Eyre 1995
Stenella longirostris	123.92	9.48	Fertl et al. 1999
Stenella longirostris	-156.94	20.73	Fertl et al. 1999
Stenella longirostris	-177.37	28.19	Fertl et al. 1999
Stenella longirostris	26.25	-34.15	Gilpatrick 1987
Stenella longirostris	32	-28.87	Gilpatrick 1987
Stenella longirostris	32.58	-28.03	Gilpatrick 1987
Stenella longirostris	32.63	-27.78	Gilpatrick 1987
Stenella longirostris	32.63	-27.77	Gilpatrick 1987
Stenella longirostris	153.1	-27.2	Gilpatrick 1987
Stenella longirostris	112	-25.38	Gilpatrick 1987
Stenella longirostris	155.38	-22.28	Gilpatrick 1987
Stenella longirostris	146.8	-19.22	Gilpatrick 1987
Stenella longirostris	-174.08	-18.67	Gilpatrick 1987
Stenella longirostris	145.72	-16.85	Gilpatrick 1987
Stenella longirostris	146.03	-16.58	Gilpatrick 1987
Stenella longirostris	122.18	-15.03	Gilpatrick 1987
Stenella longirostris	122.52	-14.85	Gilpatrick 1987
Stenella longirostris	-170.73	-14.28	Gilpatrick 1987

Stenella longirostris	123.6	-14.28	Gilpatrick 1987
Stenella longirostris	126.4	-12.63	Gilpatrick 1987
Stenella longirostris	127.32	-12.45	Gilpatrick 1987
Stenella longirostris	127.33	-12.4	Gilpatrick 1987
Stenella longirostris	127.4	-12.38	Gilpatrick 1987
Stenella longirostris	127.45	-12.37	Gilpatrick 1987
Stenella longirostris	127.47	-12.32	Gilpatrick 1987
Stenella longirostris	127.62	-12.17	Gilpatrick 1987
Stenella longirostris	143.22	-12.05	Gilpatrick 1987
Stenella longirostris	144.02	-11.6	Gilpatrick 1987
Stenella longirostris	142.67	-9.37	Gilpatrick 1987
Stenella longirostris	159.98	-9.35	Gilpatrick 1987
Stenella longirostris	161	-9	Gilpatrick 1987
Stenella longirostris	159.87	-8.83	Gilpatrick 1987
Stenella longirostris	151.37	-8.6	Gilpatrick 1987
Stenella longirostris	123.5	-8.53	Gilpatrick 1987
Stenella longirostris	124	-8.53	Gilpatrick 1987
Stenella longirostris	151.08	-8.5	Gilpatrick 1987
Stenella longirostris	-170.03	-8.4	Gilpatrick 1987
Stenella longirostris	157.35	-8.4	Gilpatrick 1987
Stenella longirostris	156.92	-8.15	Gilpatrick 1987
Stenella longirostris	138.12	-8.03	Gilpatrick 1987
Stenella longirostris	124	-8	Gilpatrick 1987
Stenella longirostris	160.08	-7.88	Gilpatrick 1987
Stenella longirostris	160.07	-7.87	Gilpatrick 1987
Stenella longirostris	159.92	-7.68	Gilpatrick 1987
Stenella longirostris	177.25	-7.5	Gilpatrick 1987
Stenella longirostris	164.57	-7.3	Gilpatrick 1987
Stenella longirostris	108	-7	Gilpatrick 1987
Stenella longirostris	158.13	-6.57	Gilpatrick 1987
Stenella longirostris	157.43	-6.52	Gilpatrick 1987
Stenella longirostris	-175.5	-6.17	Gilpatrick 1987
Stenella longirostris	110.03	-6.03	Gilpatrick 1987
Stenella longirostris	85	-6	Gilpatrick 1987
Stenella longirostris	-175.67	-5.92	Gilpatrick 1987
Stenella longirostris	-175.83	-5.92	Gilpatrick 1987
Stenella longirostris	156.88	-5.92	Gilpatrick 1987
Stenella longirostris	106.22	-5.38	Gilpatrick 1987
Stenella longirostris	145.67	-5.23	Gilpatrick 1987
Stenella longirostris	145.75	-5.23	Gilpatrick 1987
Stenella longirostris	156.57	-5.17	Gilpatrick 1987
Stenella longirostris	156.03	-5.02	Gilpatrick 1987
Stenella longirostris	110	-5	Gilpatrick 1987
Stenella longirostris	152.93	-4.92	Gilpatrick 1987
Stenella longirostris	156.18	-4.9	Gilpatrick 1987
Stenella longirostris	39.35	-4.67	Gilpatrick 1987
Stenella longirostris	149.1	-4.57	Gilpatrick 1987
Stenella longirostris	149.13	-4.55	Gilpatrick 1987

Stenella longirostris	152.18	-4.22	Gilpatrick 1987
Stenella longirostris	55.67	-4.18	Gilpatrick 1987
Stenella longirostris	152.08	-4.08	Gilpatrick 1987
Stenella longirostris	55.43	-4	Gilpatrick 1987
Stenella longirostris	155.3	-3.8	Gilpatrick 1987
Stenella longirostris	145.23	-3.1	Gilpatrick 1987
Stenella longirostris	153.37	-2.92	Gilpatrick 1987
Stenella longirostris	172.97	-2.8	Gilpatrick 1987
Stenella longirostris	147.58	-2.77	Gilpatrick 1987
Stenella longirostris	151.47	-2.47	Gilpatrick 1987
Stenella longirostris	151.33	-2.38	Gilpatrick 1987
Stenella longirostris	151.55	-2.38	Gilpatrick 1987
Stenella longirostris	148.4	-2.38	Gilpatrick 1987
Stenella longirostris	157.75	-2.15	Gilpatrick 1987
Stenella longirostris	151.25	-2.07	Gilpatrick 1987
Stenella longirostris	142.82	-1.97	Gilpatrick 1987
Stenella longirostris	148.58	-1.95	Gilpatrick 1987
Stenella longirostris	160.55	-1.7	Gilpatrick 1987
Stenella longirostris	144.8	-1.62	Gilpatrick 1987
Stenella longirostris	162.12	-1.58	Gilpatrick 1987
Stenella longirostris	147.37	-1.4	Gilpatrick 1987
Stenella longirostris	145.2	-1.27	Gilpatrick 1987
Stenella longirostris	106.55	-1.25	Gilpatrick 1987
Stenella longirostris	166.7	-0.87	Gilpatrick 1987
Stenella longirostris	144.5	-0.82	Gilpatrick 1987
Stenella longirostris	144.45	-0.8	Gilpatrick 1987
Stenella longirostris	73.17	-0.7	Gilpatrick 1987
Stenella longirostris	125	0	Gilpatrick 1987
Stenella longirostris	165.65	0.05	Gilpatrick 1987
Stenella longirostris	145.07	0.05	Gilpatrick 1987
Stenella longirostris	165.75	0.08	Gilpatrick 1987
Stenella longirostris	125	0.25	Gilpatrick 1987
Stenella longirostris	153.15	0.42	Gilpatrick 1987
Stenella longirostris	166.78	0.45	Gilpatrick 1987
Stenella longirostris	146.5	0.75	Gilpatrick 1987
Stenella longirostris	165.22	1.3	Gilpatrick 1987
Stenella longirostris	145.47	1.3	Gilpatrick 1987
Stenella longirostris	-174.38	1.38	Gilpatrick 1987
Stenella longirostris	144.98	1.55	Gilpatrick 1987
Stenella longirostris	160.72	1.93	Gilpatrick 1987
Stenella longirostris	169.58	1.97	Gilpatrick 1987
Stenella longirostris	169.68	2.02	Gilpatrick 1987
Stenella longirostris	176.87	2.07	Gilpatrick 1987
Stenella longirostris	122.27	2.15	Gilpatrick 1987
Stenella longirostris	101.87	2.3	Gilpatrick 1987
Stenella longirostris	141.12	2.87	Gilpatrick 1987
Stenella longirostris	143	2.87	Gilpatrick 1987
Stenella longirostris	149.4	2.98	Gilpatrick 1987

Stenella longirostris	141.95	3.05	Gilpatrick 1987
Stenella longirostris	142.12	3.18	Gilpatrick 1987
Stenella longirostris	152.92	3.33	Gilpatrick 1987
Stenella longirostris	98.77	3.77	Gilpatrick 1987
Stenella longirostris	73.28	3.98	Gilpatrick 1987
Stenella longirostris	104.5	4	Gilpatrick 1987
Stenella longirostris	142.03	4.03	Gilpatrick 1987
Stenella longirostris	144.02	4.1	Gilpatrick 1987
Stenella longirostris	139.52	4.12	Gilpatrick 1987
Stenella longirostris	73.52	4.17	Gilpatrick 1987
Stenella longirostris	142.22	4.37	Gilpatrick 1987
Stenella longirostris	149.9	4.45	Gilpatrick 1987
Stenella longirostris	136.68	4.47	Gilpatrick 1987
Stenella longirostris	73.42	4.47	Gilpatrick 1987
Stenella longirostris	175.5	4.5	Gilpatrick 1987
Stenella longirostris	73.15	4.5	Gilpatrick 1987
Stenella longirostris	138.65	4.53	Gilpatrick 1987
Stenella longirostris	136.3	4.57	Gilpatrick 1987
Stenella longirostris	135.58	4.67	Gilpatrick 1987
Stenella longirostris	149.75	4.8	Gilpatrick 1987
Stenella longirostris	131.02	5.33	Gilpatrick 1987
Stenella longirostris	-162.07	5.48	Gilpatrick 1987
Stenella longirostris	74.12	5.52	Gilpatrick 1987
Stenella longirostris	135.07	5.58	Gilpatrick 1987
Stenella longirostris	81.25	5.75	Gilpatrick 1987
Stenella longirostris	80.12	5.78	Gilpatrick 1987
Stenella longirostris	73	5.83	Gilpatrick 1987
Stenella longirostris	150.57	5.85	Gilpatrick 1987
Stenella longirostris	81.03	5.85	Gilpatrick 1987
Stenella longirostris	80.3	5.87	Gilpatrick 1987
Stenella longirostris	80.37	5.88	Gilpatrick 1987
Stenella longirostris	150.83	6	Gilpatrick 1987
Stenella longirostris	80	6	Gilpatrick 1987
Stenella longirostris	79.88	6	Gilpatrick 1987
Stenella longirostris	80.18	6.02	Gilpatrick 1987
Stenella longirostris	80.78	6.02	Gilpatrick 1987
Stenella longirostris	142.17	6.22	Gilpatrick 1987
Stenella longirostris	79.95	6.27	Gilpatrick 1987
Stenella longirostris	81.5	6.33	Gilpatrick 1987
Stenella longirostris	81.52	6.37	Gilpatrick 1987
Stenella longirostris	79.95	6.48	Gilpatrick 1987
Stenella longirostris	79.5	6.5	Gilpatrick 1987
Stenella longirostris	79.95	6.5	Gilpatrick 1987
Stenella longirostris	131.43	6.58	Gilpatrick 1987
Stenella longirostris	154.13	6.65	Gilpatrick 1987
Stenella longirostris	73	6.87	Gilpatrick 1987
Stenella longirostris	79.87	6.92	Gilpatrick 1987
Stenella longirostris	79.48	6.93	Gilpatrick 1987

Stenella longirostris	79.75	7	Gilpatrick 1987
Stenella longirostris	79.4	7	Gilpatrick 1987
Stenella longirostris	171.67	7.03	Gilpatrick 1987
Stenella longirostris	137.27	7.12	Gilpatrick 1987
Stenella longirostris	136.62	7.2	Gilpatrick 1987
Stenella longirostris	100.6	7.2	Gilpatrick 1987
Stenella longirostris	82.18	7.2	Gilpatrick 1987
Stenella longirostris	79.82	7.22	Gilpatrick 1987
Stenella longirostris	79.8	7.3	Gilpatrick 1987
Stenella longirostris	79.33	7.33	Gilpatrick 1987
Stenella longirostris	135.2	7.38	Gilpatrick 1987
Stenella longirostris	79.57	7.53	Gilpatrick 1987
Stenella longirostris	154.32	7.57	Gilpatrick 1987
Stenella longirostris	79.35	7.57	Gilpatrick 1987
Stenella longirostris	82.08	7.68	Gilpatrick 1987
Stenella longirostris	144.2	7.72	Gilpatrick 1987
Stenella longirostris	98.45	7.87	Gilpatrick 1987
Stenella longirostris	79	7.97	Gilpatrick 1987
Stenella longirostris	167	8	Gilpatrick 1987
Stenella longirostris	81.85	8.35	Gilpatrick 1987
Stenella longirostris	81.33	8.4	Gilpatrick 1987
Stenella longirostris	81.35	8.52	Gilpatrick 1987
Stenella longirostris	81.33	8.53	Gilpatrick 1987
Stenella longirostris	81.27	8.55	Gilpatrick 1987
Stenella longirostris	81.33	8.55	Gilpatrick 1987
Stenella longirostris	81.25	8.57	Gilpatrick 1987
Stenella longirostris	81.38	8.58	Gilpatrick 1987
Stenella longirostris	81.58	8.58	Gilpatrick 1987
Stenella longirostris	81.42	8.6	Gilpatrick 1987
Stenella longirostris	81.37	8.6	Gilpatrick 1987
Stenella longirostris	81.5	8.63	Gilpatrick 1987
Stenella longirostris	81.32	8.65	Gilpatrick 1987
Stenella longirostris	81.33	8.7	Gilpatrick 1987
Stenella longirostris	81	9	Gilpatrick 1987
Stenella longirostris	81.22	9.17	Gilpatrick 1987
Stenella longirostris	153.58	9.33	Gilpatrick 1987
Stenella longirostris	80.97	9.45	Gilpatrick 1987
Stenella longirostris	80.95	9.47	Gilpatrick 1987
Stenella longirostris	80.95	9.52	Gilpatrick 1987
Stenella longirostris	81.1	9.67	Gilpatrick 1987
Stenella longirostris	80.9	9.77	Gilpatrick 1987
Stenella longirostris	81.1	9.92	Gilpatrick 1987
Stenella longirostris	80	10.25	Gilpatrick 1987
Stenella longirostris	123.93	10.28	Gilpatrick 1987
Stenella longirostris	75.5	10.38	Gilpatrick 1987
Stenella longirostris	75.2	10.88	Gilpatrick 1987
Stenella longirostris	75.62	11	Gilpatrick 1987
Stenella longirostris	79.77	11.48	Gilpatrick 1987

Stenella longirostris	162.25	11.5	Gilpatrick 1987
Stenella longirostris	42.75	11.67	Gilpatrick 1987
Stenella longirostris	43.67	11.67	Gilpatrick 1987
Stenella longirostris	-174	13	Gilpatrick 1987
Stenella longirostris	100.05	13.42	Gilpatrick 1987
Stenella longirostris	72	13.5	Gilpatrick 1987
Stenella longirostris	51.83	13.58	Gilpatrick 1987
Stenella longirostris	73.33	16	Gilpatrick 1987
Stenella longirostris	162.22	16.38	Gilpatrick 1987
Stenella longirostris	54.18	16.75	Gilpatrick 1987
Stenella longirostris	54.2	16.88	Gilpatrick 1987
Stenella longirostris	57.78	18.67	Gilpatrick 1987
Stenella longirostris	39.47	19.17	Gilpatrick 1987
Stenella longirostris	63.5	20.15	Gilpatrick 1987
Stenella longirostris	58.75	20.25	Gilpatrick 1987
Stenella longirostris	58.75	20.27	Gilpatrick 1987
Stenella longirostris	-160.28	21.62	Gilpatrick 1987
Stenella longirostris	-160.12	21.77	Gilpatrick 1987
Stenella longirostris	-160.18	21.83	Gilpatrick 1987
Stenella longirostris	-160.07	21.88	Gilpatrick 1987
Stenella longirostris	60.5	22.5	Gilpatrick 1987
Stenella longirostris	59.62	22.57	Gilpatrick 1987
Stenella longirostris	59.53	22.57	Gilpatrick 1987
Stenella longirostris	60.33	23	Gilpatrick 1987
Stenella longirostris	61	23	Gilpatrick 1987
Stenella longirostris	58.93	23.33	Gilpatrick 1987
Stenella longirostris	-166.33	23.42	Gilpatrick 1987
Stenella longirostris	-166.4	23.47	Gilpatrick 1987
Stenella longirostris	-166.43	23.53	Gilpatrick 1987
Stenella longirostris	-164.7	23.58	Gilpatrick 1987
Stenella longirostris	-166.5	23.67	Gilpatrick 1987
Stenella longirostris	57.17	24	Gilpatrick 1987
Stenella longirostris	34.72	24.92	Gilpatrick 1987
Stenella longirostris	163.6	27.68	Gilpatrick 1987
Stenella longirostris	-175.85	27.8	Gilpatrick 1987
Stenella longirostris	-177.42	28.25	Gilpatrick 1987
Stenella longirostris	-178.17	28.42	Gilpatrick 1987
Stenella longirostris	-178.17	28.5	Gilpatrick 1987
Stenella longirostris	129.75	28.75	Gilpatrick 1987
Stenella longirostris	152.83	31.72	Gilpatrick 1987
Stenella longirostris	129.83	32.73	Gilpatrick 1987
Stenella longirostris	129.87	32.75	Gilpatrick 1987
Stenella longirostris	129.83	32.78	Gilpatrick 1987
Stenella longirostris	128	33	Gilpatrick 1987
Stenella longirostris	170.98	36.83	Gilpatrick 1987
Stenella longirostris	-97.17	27.71	Jefferson and Baumgartner 1997
Stenella longirostris	-81.77	24.54	Jefferson et al. 1995
Stenella longirostris	-23.53	15.16	Jefferson et al. 1997

Stenella longirostris	-16.33	18.15	Jefferson et al. 1997
Stenella longirostris	-34.97	-6.46	Lucena et al. 1998
Stenella longirostris	-46.36	-27.1	Moreno et al. 2005
Stenella longirostris	-43.91	-24.78	Moreno et al. 2005
Stenella longirostris	-44.07	-24.35	Moreno et al. 2005
Stenella longirostris	-44.18	-24.27	Moreno et al. 2005
Stenella longirostris	-41.14	-23.63	Moreno et al. 2005
Stenella longirostris	-41.1	-23.38	Moreno et al. 2005
Stenella longirostris	-40.7	-22.88	Moreno et al. 2005
Stenella longirostris	-38.01	-15.9	Moreno et al. 2005
Stenella longirostris	-38.06	-15.68	Moreno et al. 2005
Stenella longirostris	-35	-9.69	Moreno et al. 2005
Stenella longirostris	-34.33	-8.4	Moreno et al. 2005
Stenella longirostris	-34.36	-7.35	Moreno et al. 2005
Stenella longirostris	-32.41	-3.86	Moreno et al. 2005
Stenella longirostris	-32.41	-3.85	Moreno et al. 2005
Stenella longirostris	-41.63	-2.86	Moreno et al. 2005
Stenella longirostris	-41.56	-2.15	Moreno et al. 2005
Stenella longirostris	31.04	-29.85	Peddemors 1999
Stenella longirostris	32.56	-28.12	Peddemors 1999
Stenella longirostris	35.43	-21.64	Peddemors 1999
Stenella longirostris	35.84	-19.16	Peddemors 1999
Stenella longirostris	-147.47	-15.1	Perrin 1990
Stenella longirostris	105.67	-10.5	Perrin 1990
Stenella longirostris	-139	-9.82	Perrin 1990
Stenella longirostris	73.46	1.95	Perrin 1990
Stenella longirostris	-4.92	5.03	Perrin 1990
Stenella longirostris	81.08	5.97	Perrin 1990
Stenella longirostris	162.18	11.46	Perrin 1990
Stenella longirostris	-156.02	20.32	Perrin 1990
Stenella longirostris	138.08	34.52	Perrin 1990
Stenella longirostris	-90.53	7.18	Perrin and Roberts 1972
Stenella longirostris	-107	7.66	Perrin and Roberts 1972
Stenella longirostris	-106.6	7.78	Perrin and Roberts 1972
Stenella longirostris	-109.75	8	Perrin and Roberts 1972
Stenella longirostris	-93.3	12.85	Perrin and Roberts 1972
Stenella longirostris	-10.09	5.87	Perrin et al. 1981
Stenella longirostris	-66.5	10.72	Perrin et al. 1981
Stenella longirostris	-61.23	13.33	Perrin et al. 1981
Stenella longirostris	-17.33	14.58	Perrin et al. 1981
Stenella longirostris	-77.81	20.59	Perrin et al. 1981
Stenella longirostris	-80.18	25.75	Perrin et al. 1981
Stenella longirostris	-97.35	26.84	Perrin et al. 1981
Stenella longirostris	-82.48	27.15	Perrin et al. 1981
Stenella longirostris	-93.89	29.68	Perrin et al. 1981
Stenella longirostris	-84.6	29.79	Perrin et al. 1981
Stenella longirostris	-81.43	30.39	Perrin et al. 1981
Stenella longirostris	-86.61	30.39	Perrin et al. 1981

Stenella longirostris	-79.58	32.9	Perrin et al. 1981
Stenella longirostris	-75.53	35.22	Perrin et al. 1981
Stenella longirostris	-140.15	-8.96	Perrin et al. 1985
Stenella longirostris	-140.05	-8.95	Perrin et al. 1985
Stenella longirostris	-140.1	-8.95	Perrin et al. 1985
Stenella longirostris	-140.01	-8.93	Perrin et al. 1985
Stenella longirostris	-140.01	-8.91	Perrin et al. 1985
Stenella longirostris	-139.33	-8.7	Perrin et al. 1985
Stenella longirostris	-137.6	-8.38	Perrin et al. 1985
Stenella longirostris	43.05	11.7	Robineau and Rose 1983
Stenella longirostris	-64.63	10.21	Romero et al. 2001
Stenella longirostris	-64.45	10.26	Romero et al. 2001
Stenella longirostris	-64.63	10.26	Romero et al. 2001
Stenella longirostris	-64.41	10.31	Romero et al. 2001
Stenella longirostris	-64.35	10.35	Romero et al. 2001
Stenella longirostris	-64.03	10.43	Romero et al. 2001
Stenella longirostris	-64.18	10.46	Romero et al. 2001
Stenella longirostris	-64.23	10.5	Romero et al. 2001
Stenella longirostris	-66.7	10.63	Romero et al. 2001
Stenella longirostris	-63.15	10.73	Romero et al. 2001
Stenella longirostris	-64.08	11	Romero et al. 2001
Stenella longirostris	-67.45	11.96	Romero et al. 2001
Stenella longirostris	-67.66	12	Romero et al. 2001
Stenella longirostris	-44.32	-25.58	Secchi and Siciliano 1995
Stenella longirostris	-44.13	-23.65	Secchi and Siciliano 1995
Stenella longirostris	-43	-23	Secchi and Siciliano 1995
Stenella longirostris	-47.92	25.02	Siciliano 1994
Stenella longirostris	85.77	-6.03	Tanabe et al. 1998
Stenella longirostris	-3.98	5.21	Van Bree 1971
Stenella longirostris	-17.42	14.77	Van Bree 1971
Stenella longirostris	-1.95	4.8	Van Waerebeek et al. 2009
Stenella longirostris	-4.02	5.3	Van Waerebeek et al. 2009
Stenella longirostris	-5.72	-15.92	Weir 2010
Stenella longirostris	11.7	-11.8	Weir 2010
Stenella longirostris	-2.4	2.75	Weir 2010
Stenella longirostris	-2.16	3.68	Weir 2010
Stenella longirostris	-0.83	4.41	Weir 2010
Stenella longirostris	-45.06	-23.48	Ximenez and Praderi 1992
Stenella longirostris	-46.29	-30.04	Zerbini and Kotas 1998

Table 11. Records of *Tursiops aduncus.*

Species	**Longitude**	**Latitude**	**Reference**
Tursiops aduncus	148.46	-19.71	Charlton-Robb et al. 2011
Tursiops aduncus	113.73	-25.75	Heithaus 2001
Tursiops aduncus	129.5	28.4	Kurihara and Oda 2006
Tursiops aduncus	130.22	32.5	Kurihara and Oda 2006
Tursiops aduncus	139.76	35.65	Kurihara and Oda 2006
Tursiops aduncus	29.45	-31.68	Kurihara and Oda 2007
Tursiops aduncus	30.57	-30.57	Kurihara and Oda 2007
Tursiops aduncus	30.85	-30.12	Kurihara and Oda 2007
Tursiops aduncus	31.02	-29.92	Kurihara and Oda 2007
Tursiops aduncus	31.04	-29.85	Kurihara and Oda 2007
Tursiops aduncus	31.08	-29.72	Kurihara and Oda 2007
Tursiops aduncus	144.63	-14.42	Kurihara and Oda 2007
Tursiops aduncus	160.73	-9.58	Kurihara and Oda 2007
Tursiops aduncus	40.8	-2.47	Kurihara and Oda 2007
Tursiops aduncus	81.08	5.97	Kurihara and Oda 2007
Tursiops aduncus	83.25	17.63	Kurihara and Oda 2007
Tursiops aduncus	119.57	23.56	Kurihara and Oda 2007
Tursiops aduncus	119.64	23.58	Kurihara and Oda 2007
Tursiops aduncus	119.66	23.59	Kurihara and Oda 2007
Tursiops aduncus	119.5	23.6	Kurihara and Oda 2007
Tursiops aduncus	120.74	24.61	Kurihara and Oda 2007
Tursiops aduncus	121.46	25.04	Kurihara and Oda 2007
Tursiops aduncus	66.62	25.12	Kurihara and Oda 2007
Tursiops aduncus	50.82	28.97	Kurihara and Oda 2007
Tursiops aduncus	150.7	-35.11	Möller and Beheregaray 2004
Tursiops aduncus	152.1	-32.7	Möller and Beheregaray 2004
Tursiops aduncus	18.8	-34.1	Peddemors 1999
Tursiops aduncus	40.66	15.33	Perrin et al. 2007
Tursiops aduncus	39.45	-6.43	Stensland et al. 2006
Tursiops aduncus	113.26	-3.65	Wang et al. 2000
Tursiops aduncus	107.74	19.75	Wang et al. 2000
Tursiops aduncus	119.62	23.53	Wang et al. 2000
Tursiops aduncus	120.9	24.8	Wang et al. 2000

Tursiops truncatus

Species	Longitude	Latitude	Reference
Tursiops truncatus	-38.54	-3.71	Alves Júnior et al. 1996
Tursiops truncatus	-39.8	-2.94	Alves Júnior et al. 1996
Tursiops truncatus	-40.51	-2.8	Alves Júnior et al. 1996
Tursiops truncatus	-156.7	20.7	Baird et al. 2001
Tursiops truncatus	55.33	-3.57	Ballance and Pitman 1998
Tursiops truncatus	73.46	1.95	Ballance and Pitman 1998
Tursiops truncatus	81.08	5.97	Ballance and Pitman 1998
Tursiops truncatus	66.67	8.09	Ballance and Pitman 1998
Tursiops truncatus	51	9.94	Ballance and Pitman 1998
Tursiops truncatus	57.87	19.77	Ballance and Pitman 1998
Tursiops truncatus	14.5	44.58	Bearzi et al. 1998
Tursiops truncatus	-92.88	-29.7	Berrow and Rogan 1998
Tursiops truncatus	-80.58	27.16	Berrow and Rogan 1998
Tursiops truncatus	-80.15	27.18	Berrow and Rogan 1998
Tursiops truncatus	-82.66	27.33	Berrow and Rogan 1998
Tursiops truncatus	-97	28	Berrow and Rogan 1998
Tursiops truncatus	-80.53	29.01	Berrow and Rogan 1998
Tursiops truncatus	-76.91	34.7	Berrow and Rogan 1998
Tursiops truncatus	-76.68	34.76	Berrow and Rogan 1998
Tursiops truncatus	-75.91	36.83	Berrow and Rogan 1998
Tursiops truncatus	-74.36	39.33	Berrow and Rogan 1998
Tursiops truncatus	-66.4	40.96	Berrow and Rogan 1998
Tursiops truncatus	-70.01	41.91	Berrow and Rogan 1998
Tursiops truncatus	-7.05	37.19	Borrell et al. 2006
Tursiops truncatus	-9.5	38.99	Borrell et al. 2006
Tursiops truncatus	-0.31	39.46	Borrell et al. 2006
Tursiops truncatus	2.68	39.48	Borrell et al. 2006
Tursiops truncatus	1.96	41.23	Borrell et al. 2006
Tursiops truncatus	-2.42	36.76	Cañadas et al. 2002
Tursiops truncatus	-78.94	-33.69	Cárdenas et al. 1991
Tursiops truncatus	147.89	-43.28	Charlton-Robb et al. 2011
Tursiops truncatus	147.4	-40.95	Charlton-Robb et al. 2011
Tursiops truncatus	144.77	-38.6	Charlton-Robb et al. 2011
Tursiops truncatus	31.04	-29.86	Cockcroft 1992
Tursiops truncatus	12.91	43.91	Corsolini et al. 1995
Tursiops truncatus	12.69	43.98	Corsolini et al. 1995
Tursiops truncatus	12.41	44.2	Corsolini et al. 1995
Tursiops truncatus	12.34	44.33	Corsolini et al. 1995
Tursiops truncatus	12.31	44.41	Corsolini et al. 1995
Tursiops truncatus	12.3	45.21	Corsolini et al. 1995
Tursiops truncatus	-68.96	12.11	Debrot 1998
Tursiops truncatus	-90.68	-0.76	Denkinger et al. 2013
Tursiops truncatus	-40.98	-21.58	Di Beneditto et al. 2001
Tursiops truncatus	118.53	7.76	Dolar et al. 1997
Tursiops truncatus	153.33	-25.59	Eyre 1995
Tursiops truncatus	153.44	-24.62	Eyre 1995

Tursiops truncatus	142.89	-11.2	Eyre 1995
Tursiops truncatus	131.55	-9	Eyre 1995
Tursiops truncatus	43.96	12.06	Eyre 1995
Tursiops truncatus	50.92	12.22	Eyre 1995
Tursiops truncatus	50.25	12.28	Eyre 1995
Tursiops truncatus	50.1	12.29	Eyre 1995
Tursiops truncatus	44	12.51	Eyre 1995
Tursiops truncatus	43.28	12.78	Eyre 1995
Tursiops truncatus	43.12	13.31	Eyre 1995
Tursiops truncatus	42.03	15.11	Eyre 1995
Tursiops truncatus	42	15.14	Eyre 1995
Tursiops truncatus	33.21	28.37	Eyre 1995
Tursiops truncatus	33.12	28.5	Eyre 1995
Tursiops truncatus	31.2	31.89	Eyre 1995
Tursiops truncatus	15.22	35.8	Eyre 1995
Tursiops truncatus	-94.81	29.27	Fertl and Landry 1999
Tursiops truncatus	-97.28	26.56	Fertl and Schiro 1994
Tursiops truncatus	-97.05	27.83	Fertl and Schiro 1994
Tursiops truncatus	-97	27.93	Fertl and Schiro 1994
Tursiops truncatus	-82.49	27.18	Fertl et al. 2002
Tursiops truncatus	-96	28	Fulling et al. 2003
Tursiops truncatus	-90	28	Fulling et al. 2003
Tursiops truncatus	-83	28	Fulling et al. 2003
Tursiops truncatus	-90.15	28.46	Fulling et al. 2003
Tursiops truncatus	-89.09	30.36	Fulling et al. 2003
Tursiops truncatus	-75.67	35.18	Fulling et al. 2003
Tursiops truncatus	147.01	-43.31	Gales et al. 1992
Tursiops truncatus	147.43	-42.9	Gales et al. 1992
Tursiops truncatus	146.58	-41.15	Gales et al. 1992
Tursiops truncatus	-43.17	-22.93	Geise and Borobia 1987
Tursiops truncatus	-42.01	-22.88	Geise and Borobia 1987
Tursiops truncatus	-96.06	20.85	Jefferson 1996b
Tursiops truncatus	-83.38	26.89	Jefferson 1996b
Tursiops truncatus	-96.03	28.12	Jefferson 1996b
Tursiops truncatus	-87	29.7	Jefferson 1996b
Tursiops truncatus	-97.16	26.11	Jefferson and Baumgartner 1997
Tursiops truncatus	-97.29	27.39	Jefferson and Baumgartner 1997
Tursiops truncatus	-97.31	27.69	Jefferson and Baumgartner 1997
Tursiops truncatus	-97.28	27.76	Jefferson and Baumgartner 1997
Tursiops truncatus	-97.06	27.81	Jefferson and Baumgartner 1997
Tursiops truncatus	-97.37	27.84	Jefferson and Baumgartner 1997
Tursiops truncatus	-96.94	27.96	Jefferson and Baumgartner 1997
Tursiops truncatus	-97.03	28.03	Jefferson and Baumgartner 1997
Tursiops truncatus	-97.03	28.06	Jefferson and Baumgartner 1997
Tursiops truncatus	-95.82	28.62	Jefferson and Baumgartner 1997
Tursiops truncatus	-95.28	28.94	Jefferson and Baumgartner 1997
Tursiops truncatus	-94.88	29.23	Jefferson and Baumgartner 1997
Tursiops truncatus	-94.79	29.28	Jefferson and Baumgartner 1997

Tursiops truncatus	-94.76	29.3	Jefferson and Baumgartner 1997
Tursiops truncatus	-94.78	29.32	Jefferson and Baumgartner 1997
Tursiops truncatus	-94.73	29.32	Jefferson and Baumgartner 1997
Tursiops truncatus	-94.73	29.33	Jefferson and Baumgartner 1997
Tursiops truncatus	-94.86	29.36	Jefferson and Baumgartner 1997
Tursiops truncatus	-94.63	29.44	Jefferson and Baumgartner 1997
Tursiops truncatus	-94.57	29.46	Jefferson and Baumgartner 1997
Tursiops truncatus	-94.49	29.5	Jefferson and Baumgartner 1997
Tursiops truncatus	-94.5	29.5	Jefferson and Baumgartner 1997
Tursiops truncatus	-94.38	29.54	Jefferson and Baumgartner 1997
Tursiops truncatus	-94.13	29.63	Jefferson and Baumgartner 1997
Tursiops truncatus	-94.97	29.66	Jefferson and Baumgartner 1997
Tursiops truncatus	-94.07	29.66	Jefferson and Baumgartner 1997
Tursiops truncatus	-93.89	29.68	Jefferson and Baumgartner 1997
Tursiops truncatus	-4.92	5.03	Jefferson et al. 1997
Tursiops truncatus	-15.6	11.65	Jefferson et al. 1997
Tursiops truncatus	-17.33	14.58	Jefferson et al. 1997
Tursiops truncatus	-23.53	15.16	Jefferson et al. 1997
Tursiops truncatus	-16.33	18.15	Jefferson et al. 1997
Tursiops truncatus	-16.65	28.44	Jefferson et al. 1997
Tursiops truncatus	-9.01	32.79	Jefferson et al. 1997
Tursiops truncatus	-16.99	32.82	Jefferson et al. 1997
Tursiops truncatus	18.04	34.55	Jefferson et al. 1997
Tursiops truncatus	-5.64	35.93	Jefferson et al. 1997
Tursiops truncatus	135.94	33.59	Kurihara and Oda 2006
Tursiops truncatus	138.2	34.66	Kurihara and Oda 2006
Tursiops truncatus	137.25	34.75	Kurihara and Oda 2006
Tursiops truncatus	139.14	34.93	Kurihara and Oda 2006
Tursiops truncatus	-5.08	50.41	Kurihara and Oda 2006
Tursiops truncatus	76.92	8.46	Kurihara and Oda 2007
Tursiops truncatus	74.67	12.58	Kurihara and Oda 2007
Tursiops truncatus	121.5	23.49	Kurihara and Oda 2007
Tursiops truncatus	119.6	23.61	Kurihara and Oda 2007
Tursiops truncatus	119.56	23.67	Kurihara and Oda 2007
Tursiops truncatus	120.09	23.91	Kurihara and Oda 2007
Tursiops truncatus	135.94	33.59	Kurihara and Oda 2007
Tursiops truncatus	139.14	34.93	Kurihara and Oda 2007
Tursiops truncatus	138.23	37.17	Kurihara and Oda 2007
Tursiops truncatus	-64.01	44.61	Lucas and Hooker 1997
Tursiops truncatus	-34.81	-7.13	Lucena et al. 1998
Tursiops truncatus	-16.15	18.03	Nieri et al. 1999
Tursiops truncatus	14.96	-23	Peddemors 1999
Tursiops truncatus	-90.36	-1.26	Perrin et al. 1985
Tursiops truncatus	-89.68	-0.83	Perrin et al. 1985
Tursiops truncatus	-89.5	-0.76	Perrin et al. 1985
Tursiops truncatus	-89.5	-0.7	Perrin et al. 1985
Tursiops truncatus	-91.55	-0.63	Perrin et al. 1985
Tursiops truncatus	-90.86	-0.1	Perrin et al. 1985

Tursiops truncatus	-76.48	-13.03	Read et al. 1988
Tursiops truncatus	-76.79	-12.46	Read et al. 1988
Tursiops truncatus	-77.08	-12.11	Read et al. 1988
Tursiops truncatus	-78.59	-9.08	Read et al. 1988
Tursiops truncatus	-17.42	14.77	Robineau and Vely 1997
Tursiops truncatus	-16.51	19.33	Robineau and Vely 1997
Tursiops truncatus	-16.94	16.17	Robineau and Vely 1998
Tursiops truncatus	-16.33	18.11	Robineau and Vely 1998
Tursiops truncatus	-16.84	19.36	Robineau and Vely 1998
Tursiops truncatus	-17.36	20.76	Robineau and Vely 1998
Tursiops truncatus	-17.6	21.17	Robineau and Vely 1998
Tursiops truncatus	-65.2	10.1	Romero et al. 2001
Tursiops truncatus	-64.41	10.25	Romero et al. 2001
Tursiops truncatus	-64.18	10.48	Romero et al. 2001
Tursiops truncatus	-66.08	10.5	Romero et al. 2001
Tursiops truncatus	-64.28	10.58	Romero et al. 2001
Tursiops truncatus	-66.73	10.63	Romero et al. 2001
Tursiops truncatus	-64.25	10.66	Romero et al. 2001
Tursiops truncatus	-61.8	10.73	Romero et al. 2001
Tursiops truncatus	-64.16	10.8	Romero et al. 2001
Tursiops truncatus	-64.61	10.83	Romero et al. 2001
Tursiops truncatus	-68.25	10.83	Romero et al. 2001
Tursiops truncatus	-64.08	10.88	Romero et al. 2001
Tursiops truncatus	-63.8	10.98	Romero et al. 2001
Tursiops truncatus	-64.08	11	Romero et al. 2001
Tursiops truncatus	-71.66	11.66	Romero et al. 2001
Tursiops truncatus	-45.4	-23.8	Santos 1997
Tursiops truncatus	-45.38	-23.61	Santos 1997
Tursiops truncatus	19.5	-34.66	Sekiguchi et al. 1992
Tursiops truncatus	19.36	-34.46	Sekiguchi et al. 1992
Tursiops truncatus	19.31	-34.45	Sekiguchi et al. 1992
Tursiops truncatus	19.15	-34.43	Sekiguchi et al. 1992
Tursiops truncatus	21.41	-34.38	Sekiguchi et al. 1992
Tursiops truncatus	18.83	-34.38	Sekiguchi et al. 1992
Tursiops truncatus	22.13	-34.18	Sekiguchi et al. 1992
Tursiops truncatus	18.01	-32.75	Sekiguchi et al. 1992
Tursiops truncatus	17.95	-32.71	Sekiguchi et al. 1992
Tursiops truncatus	14.55	-22.88	Sekiguchi et al. 1992
Tursiops truncatus	-47.91	-25.01	Siciliano 1994
Tursiops truncatus	-43.25	-22.93	Siciliano 1994
Tursiops truncatus	-41.01	-21.61	Siciliano 1994
Tursiops truncatus	-40.49	-20.67	Siciliano 1994
Tursiops truncatus	-112.1	25.65	Silber and Fertl 1995
Tursiops truncatus	-111.19	26.2	Silber and Fertl 1995
Tursiops truncatus	-111.58	27.63	Silber and Fertl 1995
Tursiops truncatus	-97.04	27.87	Silber and Fertl 1995
Tursiops truncatus	-89.32	29.87	Silber and Fertl 1995
Tursiops truncatus	-81.2	31.47	Silber and Fertl 1995

Tursiops truncatus	-81.26	31.48	Silber and Fertl 1995
Tursiops truncatus	-80.75	32.21	Silber and Fertl 1995
Tursiops truncatus	-80.88	32.23	Silber and Fertl 1995
Tursiops truncatus	-114	30	Silber et al. 1994
Tursiops truncatus	174.81	-36.61	Stockin and Visser 2005
Tursiops truncatus	-4.03	5.24	Van Waerebeck et al. 2009
Tursiops truncatus	-4.02	5.3	Van Waerebeck et al. 2009
Tursiops truncatus	-0.48	5.38	Van Waerebeck et al. 2009
Tursiops truncatus	-0.21	5.51	Van Waerebeck et al. 2009
Tursiops truncatus	2.44	6.34	Van Waerebeck et al. 2009
Tursiops truncatus	-80.86	-5.73	Van Waerebeek et al. 1998
Tursiops truncatus	-80.1	26.11	Walsh et al. 1998
Tursiops truncatus	-81.88	26.63	Walsh et al. 1998
Tursiops truncatus	-82.71	27.5	Walsh et al. 1998
Tursiops truncatus	-80.37	27.71	Walsh et al. 1998
Tursiops truncatus	-94.77	29.35	Walsh et al. 1998
Tursiops truncatus	114.07	22.34	Wang et al. 2000
Tursiops truncatus	120.05	23.03	Wang et al. 2000
Tursiops truncatus	119.62	23.53	Wang et al. 2000
Tursiops truncatus	121.87	24.58	Wang et al. 2000
Tursiops truncatus	121.75	25.14	Wang et al. 2000
Tursiops truncatus	-5.72	-15.92	Weir 2010
Tursiops truncatus	9.58	-2	Weir 2010
Tursiops truncatus	6.72	0.34	Weir 2010
Tursiops truncatus	-3.98	5.21	Weir 2010
Tursiops truncatus	-0.2	5.54	Weir 2010
Tursiops truncatus	-0.03	5.61	Weir 2010
Tursiops truncatus	-94.66	29.33	Weller et al. 1997

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