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SHORT NOTE

A wandering Weddell seal (*Leptonychotes weddellii*) at Trindade Island, Brazil: the extreme sighting of a circumpolar species

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Abstract
Records of vagrant marine organisms provide important information on oceanographic anomalies and the changing environment. We report on an immature Weddell seal, *Leptonychotes weddellii*, sighted at Calheta Beach in Trindade Island (20°31′S 29°19′W), Brazil, on July 9, 2015. A number of injuries were noted, including blisters on the dorsal surface of the body and a small cut at the right-hand side distal portion of the mandible. Based on its size and the state of fusion of cranial sutures, we suggest that it was born in the 2014 austral spring and was possibly 8–10 months old. We suggest that it comes from the South Shetland Islands, Antarctic Peninsula. This is the closest breeding location of this species. This sighting is the northernmost of *L. weddellii*, being at least ~ 5140 km from the Antarctic Peninsula (63°12′S 55°04′W) and ~ 2840 km north from the second northernmost sighting of this species in Uruguay.

Keywords Weddell seal · Circumpolar distribution · El Niño · Trindade Island · Climate change

Introduction

The Weddell seal *Leptonychotes weddellii* (Lesson, 1826) is a marine mammal (order Carnivora) belonging to family Phocidae. It has a circumpolar distribution in waters around the Antarctic Continent and associated islands (Stirling 1971). *L. weddellii* is associated with Antarctic fast ice; it is seldom found in temperate seas. However, sightings of vagrants have been recorded in the Southern Ocean at Heard Island, Macquarie Island, Marion Island, the Kerguelen Islands and the Malvinas (Falkland) Islands. They have been sighted further north at the Auckland Islands and Juan Fernandez Archipelago (Pacific Ocean) and on the coasts of Australia, New Zealand, Chile, Argentina and Uruguay (Fig. 1) (Albert 1901; Olrog 1950; Torres et al. 1984; Skinner and Smithers 1990; Thomas and Terhune 2009; Shaughnessy et al. 2012; Miskelly 2015). This species is sexual dimorphic with the length of males being 2.5–2.9 m and females being 2.6–3.3 m. The body mass ranges from 400 to 450 kg for both males and females (Kooyman et al. 1973).

This species breeds during the austral spring (late September–late December) and it is limited to the areas south to Antarctic Convergence during this time (Laws 1984). Behaviour at sea is little known (Testa 1994).

Materials and methods

On July 9, 2015 a young *L. weddellii* (total length: 172 cm) (Fig. 2) was sighted alive in Trindade Island, southeastern Brazil (Fig. 1). The specimen was observed alive for 2 days before being found dead at the Calheta Beach (20°31′S; 029°19′W). The animal was buried at this location by the Brazilian Navy and was recovered by one of us (VLH) in February 2017. The partial skeleton including several vertebrae, ribs, forelimbs, hindlimbs and several parts of the broken skull and teeth were accessioned to the Scientific Collection of Mammalogy of the Museu de Ciências Naturais

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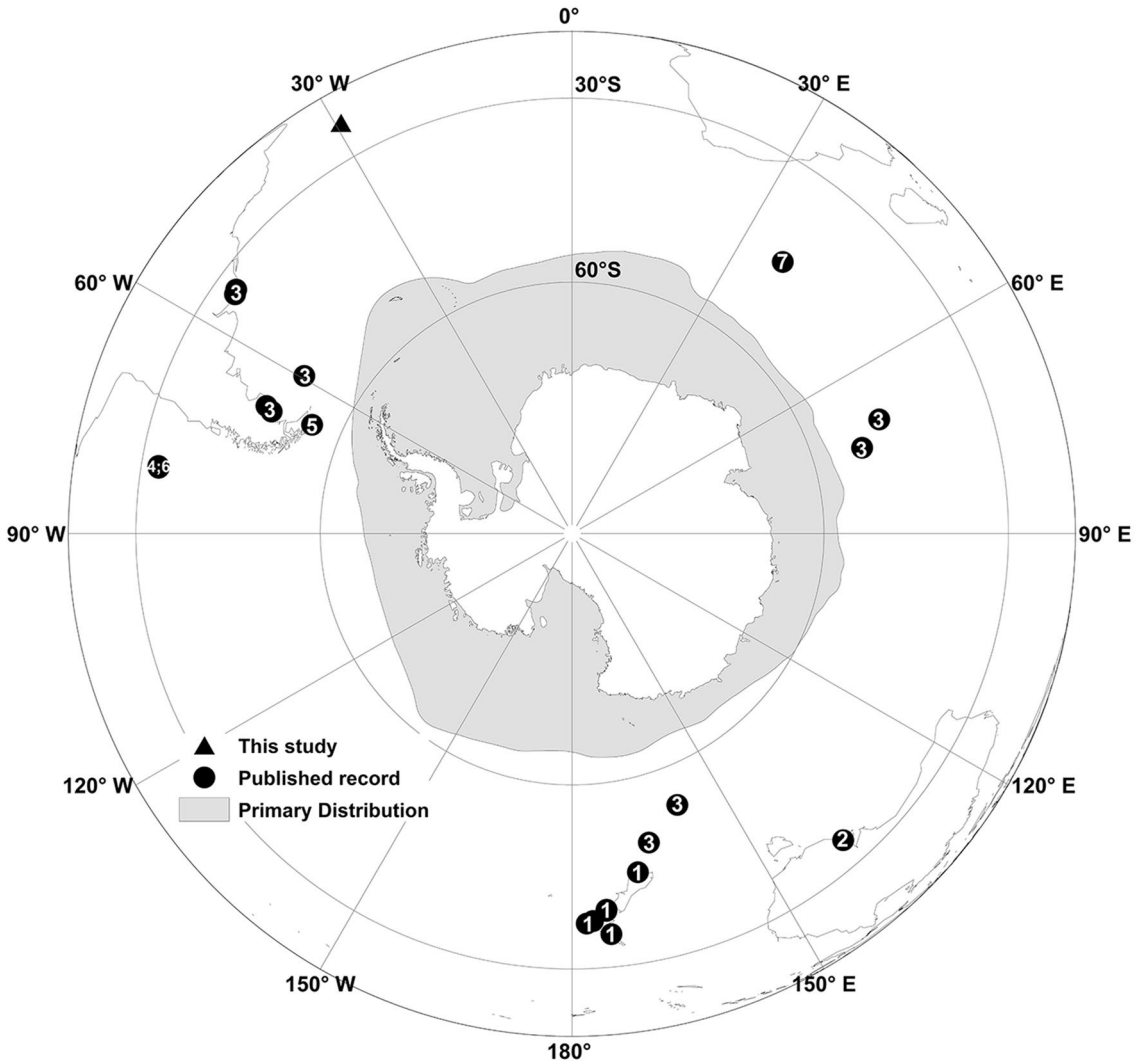

Fig. 1 Primary distribution of *Leptonychotes weddellii* provided by the IUCN (Red List Data) (grey) from Hückstädt (2015) and the extralimital sightings reported so far ($n = 21$), including the northernmost sighting and the first record for Brazilian waters in Trindade Island (triangle) is described here. Published records were compiled from Miskelly 2015 (1), Shaughnessy et al. 2012 (2), Thomas and Terhune 2009 (3), Torres et al. 1984 (4), Olrog 1950 (5), Albert 1901 (6) and Skinner and Smithers 1990 (7). Map: VLH

(MUCIN) of the Universidade Federal do Rio Grande do Sul (UFRGS) under the collection number MUCIN 0054.

Results and discussion

Blisters were presented on the dorsal surface of the body of the seal and it had a small cut at the right-hand side distal portion of mandible. Skeletal material recovered had partially deteriorated due to the young age of the animal (i.e. the bones were more cartilaginous than those of adults, and many cranial sutures were not fused) and the high temperature at the burial location. The remaining parts of the disarticulated skull, including the mandible (Fig. 3), were used to confirm species identification based on comparison to diagrams presented in Stirling (1971). Based on size and state of skeletal ossification, we determined that this specimen was born in the 2014 austral spring, suggesting that it was 8–10 months old.

Throughout the austral winter, some Weddell seals maintain holes in coastal land-fast ice while other individuals are commonly seen on offshore pack ice (Thomas and Terhune 2009). However, the post-reproductive period of some pinniped species is characterized by long distance movements of adult individuals from the breeding colonies to the open ocean (Ferreira et al. 2008). Testa et al. (1991) pointed out that changes on some biological parameters in this species—such as population size, age structure, productivity and regular interannual variability, especially in reproduction—might be correlated with *El Niño*—Southern Oscillation events

Fig. 2 Young *Leptonychotes weddellii* (total length: 172 cm) sighted at Calheta Beach, Trindade Island, southeastern Brazil, exhibiting a cut at the right-hand side distal portion of the mandible. Photo: Joel Braga

Fig. 3 Right-hand side mandible, in lateral view, of the vagrant *Leptonychotes weddellii* (MUCIN 0054, total length: 172 cm) stored at the Scientific Collection of Mammalogy of the Museu de Ciências Naturais (MUCIN) of the Universidade Federal do Rio Grande do Sul (UFRGS). Scale bar: 1 cm. Photo: GF

(ENSO). This record coincides with a typical *El Niño* event that strengthened in the preceding month (NOAA 2015). Oliveira et al. (2001) noted a similar link with records of other vagrants pinnipeds species in Brazil such as the Subantarctic fur seal (*Arctocephalus tropicalis*) and the Antarctic fur seal (*Arctocephalus gazella*).

This is the first sighting of this species in Brazil and the northernmost of a *L. weddellii*, being ~ 2840 km north from the previous record in Uruguay (Thomas and Terhune 2009). It is some 5140 km distant from the nearest part of the range of this species on the Antarctic continent (63°12′S; 55°04′W). A plausible origin of this vagrant is the closest part of Antarctica, the South Shetland Islands, or even South Georgia Island which is the closest but a small population of this species. Hofmeyr and Amir (2010) pointed out that the origin of a vagrant animal is related to distance, size of population of origin, and direction of currents. While the animal would be carried northward by the Falkland/Malvinas Current, it would also have to swim against the Brazil Current to find its way to Trindade Island. Alternatively, this animal could also be influenced by the intense Subtropical Gyre which is a counterclockwise circulation in the Southern Atlantic, thus increasing the possibilities of the real origin of this vagrant (Peterson and Stramma 1991).

While rare events, such as records of vagrants, should be interpreted with caution since this is unusual behaviour (Stachowicz et al. 2002) and they are important in indicating potential distances and directions of dispersal. They are also important in indicating potential effects of climate change on the species in question. According Ruiz et al. (1997), changes on water temperature would affect the ranges of marine species, e.g. as seen on the short-term range extension of species from the southern and northern hemispheres due to ENSO consequences (Glynn 1988). Therefore, the occurrence of this compromised wandering *L. weddellii* at Trindade Island could also reflect the biological responses to climate change, as observed for other marine mammals (Scheinin et al. 2011).

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