

Letter to the Editor

Southernmost Record of False Killer Whale (*Pseudorca crassidens*)

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The distribution and diversity of most pelagic marine organisms are linked to sea surface temperature (SST). SST is an effective environmental predictor of geographic range across a broad range of taxa (e.g., Rutherford et al., 1999; Worm et al., 2005; Fuhrman et al., 2008). Indeed, the biogeography of cetaceans is largely determined by SST such that climatic changes are predicted to alter distributions on a global scale (MacLeod, 2009; Kaschner et al., 2011; Lambert et al., 2014), particularly for deep-water species such as the false killer whale (*Pseudorca crassidens*; Whitehead et al., 2008). Owing to their low density, offshore distribution, and extensive range, false killer whales are a difficult species to study. As such, even isolated records can advance our knowledge on their ecology, particularly regarding distribution.

False killer whales occur in the tropical and temperate waters of all oceans at latitudes lower than 50° with a core range from 40°N to 40°S (Stacey et al., 1994), but a lack of at-sea sightings in temperate waters makes it difficult to determine their geographic range. They have been documented in SSTs ranging from 9 to 31°C but appear to use temperate waters only during the summer (Baird, 2018). Analyses of genetic (Chivers et al., 2007) and morphological (Kitchener et al., 1990) data support long-term isolation of populations inhabiting the Indo-Pacific and Atlantic Oceans (Martien et al., 2014). Recent evidence from mitochondrial DNA analysis indicates that false killer whales sampled in the South Atlantic and South Pacific show greater connectivity than do whales in the North and South Atlantic (Crofts et al., 2019). However, a limited sample from high latitudes and exclusively from stranded specimens (of unknown provenance) precludes a thorough assessment of gene flow between the Atlantic and Pacific Oceans (Crofts et al., 2019).

Extralimital records of false killer whales from South America are from infrequent mass strandings: Straits of Magellan, 180 individuals in March 1989 (Alonso et al., 1999) and 46 individuals in February 2013 (Haro et al., 2015); and East Falkland, 22 individuals in February 2013 (Crofts et al., 2013). Bellisio (1966) listed false killer whales among cetacean species common to Antarctic waters but with a lack of supporting evidence (Leatherwood et al., 1989). Their occurrence in the Southern Ocean or near the Antarctic Convergence Zone is unlikely given what is known about their thermal niche and diet (Alonso et al., 1999). The southernmost record of false killer whales to date is a mass stranding in the Falkland Islands (51° 50' S) when the SST was 11.2°C (Crofts et al., 2019).

On 27 December 2018, a group of 150 to 200 false killer whales was observed and photographed from the *M/V National Geographic Explorer* 17 km east of Cape Horn, Chile (55° 56' 50.3" S, 66° 56' 9.1" W). Water depth at the location of the sighting was 80 m, and the SST measured by the ship's instruments was 8°C. Species identification was based on head shape, relative size of the dorsal fin, colouration (Figure 1), and body length estimates following Baird (2010). The group was first seen heading in a southwesterly direction at an estimated speed of 10 kts for the duration of the 30-min observation. Several calves were present in the group. Seabird species which appeared to be associating with and following the whales included sooty shearwater (*Ardenna grisea*), white-chinned petrel (*Procellaria aequinoctialis*), and black-browed albatross (*Thalassarche melanophris*).

This is a noteworthy observation of false killer whales for several reasons. To our knowledge, it is the southernmost sighting of this species. It also suggests a tolerance for slightly colder waters



Figure 1. This photograph, taken during the encounter, was used to confirm species identification following Baird (2010). It shows the following features which differentiate false killer whales (*Pseudorca crassidens*) from other blackfish species: a relatively small dorsal fin, a tapering but blunt melon, and uniform black colouration with no dorsal cape.

than previously reported (8°C rather than 9°C) and demonstrates that an exchange between the South Atlantic and the South Pacific can occur. Whitehead et al. (2008) predicted that warming seas will result in deep-diving cetaceans, including false killer whales, deserting low latitudes due to unsuitably warm SSTs. A commensurate increase in cetacean genus diversity is predicted at higher latitudes (MacLeod, 2009; Kaschner et al., 2011), almost doubling between latitudes 50 to 70° during the period 1980 to 2080 assuming a moderate warming scenario (Whitehead et al., 2008). These latitudes contain all the major oceanic transition areas (e.g., Cape Horn). Although we report an isolated observation, documenting such extralimital sightings is an important first step in tracking possible early signs of predicted distribution changes, which will have consequences for the admixture of false killer whale populations.

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