

RESEARCH NOTE

Northernmost record of dusky dolphin *Lagenorhynchus obscurus* in coastal waters off northern Peru (4°S)

Registro más septentrional del delfín oscuro *Lagenorhynchus obscurus* frente a la costa del norte de Perú (4°S)

Ana Paula Suárez¹, Vanessa Jaramillo², Aldo S. Pacheco^{3,4*}, Sebastián Silva⁴ and Belén Alcorta⁴

¹Universidad San Francisco de Quito, Campus Cumbayá, Av. Diego de Robles e Interoceánica, Quito, Ecuador

²Ecología y Evolución de Vertebrados, Instituto de Biología, Facultad de Ciencias Exactas y Naturales, Universidad de Antioquia, Calle 67 N° 53-108, Medellín, Colombia

³Instituto de Ciencias Naturales Alexander von Humboldt, Universidad de Antofagasta, Avenida Angamos 601, Antofagasta, Chile

⁴Pacífico Adventures-Manejo Integral del Ambiente Marino S.A.C., Av. Rivera del Mar s/n, Los Órganos, Piura, Perú

*Corresponding author: babuchapv@yahoo.com

Abstract.- Dusky dolphin *Lagenorhynchus obscurus* is distributed primarily in cool coastal waters at several continental margins and island borders in the Southern Hemisphere. Off Peru, the northernmost record of this species has been in front of the coast of Salaverry (*ca.*, 6°S). In this paper, we report for the first-time a pod of dusky dolphin at the coast of Los Órganos (4°9.517'S; 81°11.958'W) northern Peru, thus extending the potential distributional range *ca.*, 350 km towards the equator. A group of between 10 to 20 adult individuals was sighted on 17 October 2017, during a whale-watching excursion. Digital photographs and film allowed us to confirm the species based on body morphology and coloration. The sighted group was moving around the area without heading to a given direction. This record constitutes the northernmost record of dusky dolphin in Peru and arguably in the Southern Hemisphere.

Key words: Vagrant individuals, *Lagenorhynchus obscurus*, whale-watching, upwelling, distribution, Peru

INTRODUCTION

The dusky dolphin *Lagenorhynchus obscurus* (Gray, 1828) is a relatively small delphinid distributed in the waters of the Southern Hemisphere (Jefferson *et al.* 2015) and characterized by having a conspicuous areal behavior (Würsig & Whitehead 2009). The distribution of the dusky dolphin includes mainly coastal waters of New Zealand, southern Australia, southwestern Africa and southern South America (Jefferson *et al.* 2015). In addition, there are reports of this species in waters surrounding islands; Falkland Islands (Malvinas), Chatham and Campbell Island (New Zealand) and Tristan da Cunha Archipelago in the mid-Atlantic, the Prince Edward Islands, and Crozet and Amsterdam Island in the southern Indian Ocean (Van Waerebeek *et al.* 1995, Van Waerebeek & Würsig 2018). Along the southeast Pacific coast, the distribution seems to be disjoint with continuous range from central Peru to central Chile with a gap between 33° and 46°S (Van Waerebeek 1992) then range extended down to the Patagonian region (Jefferson *et al.* 2015).

Along the southeast Pacific coast of Peru, earlier Van Waerebeek (1992) proposed Chimbote (9°S) as the northern limit of the distribution of dusky dolphin. Multiple new records (Van Waerebeek *et al.* 1997, Reyes 2009, Tzika *et al.* 2010, Llapapasca *et al.* 2018) indicated that Salaverry

(6°S) should be considered the northern limit. Indeed, Reyes (2009) proposed that this species could expand its range distribution further north during the occurrence of cold events such as La Niña, the cold phase of the El Niño Southern Oscillation cycle. However, so far, there are no supported records of dusky dolphins further north of Salaverry. In this paper, we report the presence of dusky dolphin of the coast of Los Órganos (4°S) thus constituting the first extra-limit record closest to the equator.

MATERIALS AND METHODS

A group of 10 to 20 dolphins (best estimated range) was sighted on 17 October 2017 off the coast of Los Órganos (4°9'31.032", 81°11'57.478") Piura, northern Peru (Fig. 1) during a whale-watching excursion. The pod was alone with no other associated species. The daytrip started at 7:30 AM and the dolphin pod was localized around 8:00 AM at an approximate perpendicular distance from the shore of 6 km at *ca.*, 60 m depth. During the sighting, digital photographs and video were taken for further examination and confirmation of the species following the descriptions of external body features presented in Van Waerebeek (1993), Reyes (2009), Jefferson *et al.* (2015) and Waerebeek & Würsig (2018). The 9 m whale-watching boat stayed approximately 7 min with the pod until dolphins swam away.

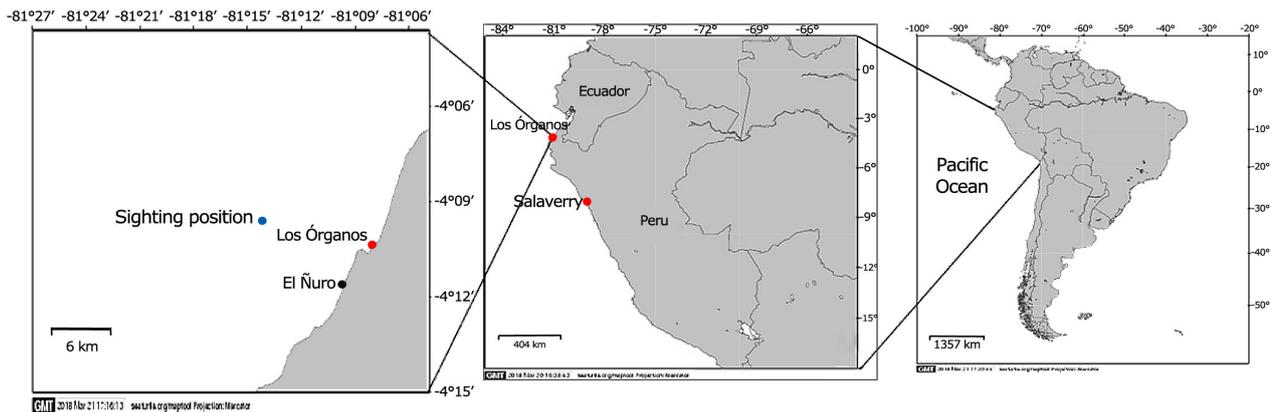


Figure 1. Map indicating the sighting position of *Lagenorhynchus obscurus* in front of Los Órganos, northern Peru. Middle map shows Salaverry which was considered the northern limit of the distributional range / Mapa indicando la posición de observación de *Lagenorhynchus obscurus* frente a Los Órganos, norte de Perú. El mapa en el centro muestra Salaverry, localidad considerada el límite norte del rango de distribución

RESULTS AND DISCUSSION

Dolphins were positively identified as *Lagenorhynchus obscurus* after a careful examination of photographs and film. Dusky dolphins were in a group of between 10 to 20 adult individuals (no calves were sighted) that seemed to be travelling in a non-defined direction. Dolphins did not approach the boat during the sighting. Dusky dolphin was positively recognized based on their conspicuous characteristics including robust and short body, black and small snout barely perceptible, half black and half light gray large and curved dorsal fin located in the center of the spine, and a characteristic bluish black and light gray coloration visible when surfacing (Fig. 2). The average sea surface temperature during the day/site of sighting was 21.4 °C (IMARPE)¹.

This record extends *ca.*, 350 km northwards the distributional limit of dusky dolphin from Salaverry (6°S) to Los Órganos (4°S) thus, constituting the closest to the equator report throughout the coast of the southeast Pacific. The presence of dusky dolphin in this area should be considered as an occasional event and possibly the case of vagrant individuals that moved northward. Whale-watching daily navigation-observation effort from 7:30 to 11:00 during 2009 to 2017 from late July to the end of October

covering an approximately 168 km² surface area during humpback whale (*Megaptera novaeangliae*) breeding season (Pacheco *et al.* 2009, Guidino *et al.* 2014, Valdivia *et al.* 2017) have been conducted in the area but no dusky dolphins have been reported. To our knowledge, there are no records of dusky dolphin in this area during summer and autumn months but its occurrence in warm seasons seems to be unlikely. Dusky dolphins seem to prefer relatively cold waters, Gaskin (1968) proposed a thermal range between 9.8 and 16 °C off New Zealand. Van Waerebeek (1992) proposed a preference for waters of $\leq 17^{\circ}\text{C}$ in agreement with Würsig & Würsig (1980) that also suggest that thermal range. Cold, nutrient-rich upwelled waters are characteristics of the northern branch of the Humboldt current ecosystem of Peru. These cold conditions are unique for an upwelling ecosystem due to its position closest to the equator *i.e.*, tropical latitude (Chavez & Messié 2009). Such conditions may be suitable not only for dusky dolphin but for the Peruvian anchovy (*Engraulis ringens*) which seems to be its preferred prey (García-Godos *et al.* 2007, Llapapasca *et al.* 2018). Our argument that the sighting at Los Órganos is the northern most record of dusky dolphin is based also on the fact that there is no published information of this species further north off Ecuador neither in sightings, stranding or by-catch literature (*e.g.*, Van Waerebeek *et al.* 1997, Clarke *et al.* 2002, Félix *et al.* 2007, 2011).

¹Instituto del Mar del Perú. Data freely available at: <http://www.imarpe.gob.pe/argen/uprsig/tsm2017_archivo/octubre17_general17oct17.png>



Figure 2. Dusky dolphin (*Lagenorhynchus obscurus*) at Los Órganos, northern Peru. Upper photo: lateral view of the species body plane (from Waerebeek & Würsig 2018). Middle photo: some distinctive characteristic of the species; A= large and curved dorsal fin, half black and half-light gray, located towards the center of the dorsal plane of body, B= the light-gray, whitish stripe with two blazes is also visible. Lower photo: C= view of the small and black snout separated from the also blackish melon by a light grey band. The eye is surrounded by a light grey or blackish patch / Delfín oscuro (*Lagenorhynchus obscurus*) en Los Órganos, norte de Perú. Foto superior: vista lateral del cuerpo de la especie (Tomado de Waerebeek & Würsig 2018). Foto en el medio: A= aleta dorsal caracterizada por su curvatura, mitad negra y mitad gris suave y ubicada hacia el centro del plano dorsal del cuerpo y B= la banda blanquecina que se separa en dos líneas en el dorso. Foto inferior: C= vista del hocico pequeño y negro separado del melón por un surco rodeado por un parche gris. El ojo está rodeado por un parche gris claro

Since about 1950 in the central coast of Peru the sea surface temperature has declined due to an intensification of alongshore winds correlated with an increase of upwelling during spring (Gutiérrez *et al.* 2011). This process may extend cooling conditions northwards and therefore triggering distribution expansions of cool adapted species. Whether this may be the mechanism explaining the presence of dusky dolphin at such low latitude remain speculative, further year-round monitoring of cetaceans is necessary for a better understanding of the diversity in this region.

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²<<http://www.seaturtle.org/maptool/>>

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