



## Scientific Note

### Movements of a solitary adult male killer whale, *Orcinus orca* (Cetacea, Delphinidae), along the coast of south-eastern Brazil

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**Abstract.** This note reports eleven new sightings of a previously identified male killer whale (*Orcinus orca*) between Mongaguá, São Paulo State and Saquarema, Rio de Janeiro State, between 1999 and 2010. These observations suggest the existence of site fidelity within these areas.

**Key words:** *Orcinus orca*, male, records, south-eastern, Brazil

**Resumo. Movimentos de um macho solitário de orca, *Orcinus orca* (Cetacea: Delphinidae), no sudeste do Brasil.** São reportados onze novos registros de um macho previamente identificado de orca (*Orcinus orca*) entre Mongaguá, Estado de São Paulo, e Saquarema, Estado do Rio de Janeiro, entre 1999 e 2010. Estas observações sugerem a existência de fidelidade de uso entre essas áreas.

**Palavras chave:** *Orcinus orca*, macho, registros, sudeste, Brasil

Killer whales (*Orcinus orca*) records have been reported at various locations along a ca. 4,700 km stretch along the contour of the Brazilian coastline extending from the State of Rio Grande do Sul (34°59' S) (Secchi & Vaske Jr. 1998) in the south to the State of Ceará (02°30'S) (Meirelles *et al.* 2009) in the north. Apart from short-term studies of the interaction of killer whales with the longline fisheries in the south/southeast (Secchi & Vaske Jr. 1998, Dalla Rosa & Secchi 2007) and northeast (Charles 2007) of Brazil, detailed information regarding this species is limited to occasional and opportunistic reports of sightings and of stranded animals. Thus, despite the demonstration of a wide distribution of killer whales in Brazilian waters, there remains a need for long-term studies on the species.

This note reports eleven additional coastal sightings (Table I) of an adult male killer whale between the States of São Paulo and Rio de Janeiro, and serves to update and complement the

information previously reported by Santos & Netto (2005) and Santos & Silva (2009) on the same individual (Figure 1).

The sightings reported herein concern a ca. 7 m long, solitary adult male killer whale who could be readily identified on the basis of a large notch located on the upper third posterior border of the dorsal fin and a smaller notch immediately below it (Figure 2). The records were obtained by opportunistic direct observations, as well as by careful examination of good quality pictures provided by collaborators.

Between September 1999 and March 2010, the killer whale was seen unaccompanied on 14 different occasions; this note, Santos & Netto (2005) and Santos & Silva (2009); at intervals ranging from 12 days to 37 months (Table I). Most of sightings occurred in the State of São Paulo ( $n = 9$ ), and the interval between the first and the last recorded sighting was 126 months. In all sightings, the killer whale was located near the coast (< 2 km) in waters

approximately less than 20 m depth, estimated by nautical charts. The animal was generally observed cruising parallel with the coast line, and on numerous occasions (70%) it approached the

observer's boat. In one sighting, during which it was possible for an observer to dive, the animal swam upside down in circles at approximately 3 m from the diver.

**Table I.** Total number of sightings (n = 14) of the solitary male killer whale (*Orcinus orca*) reported between the states of Paraná and Rio de Janeiro during the period 1999 - 2010.

Record	Date	Sighting	Interval (months) since previous sighting	Reference
1	02-sep-99	Praia Grande, São Paulo 24°00' S; 46°24' W	—	This note
2	oct-02	Mongaguá, São Paulo 24°24' S; 46°30' W	37	This note
3	28-mar-04	Ubatuba, São Paulo 23°22' S; 44°50' W	17	This note
4	jan-05	Guarujá, São Paulo 23°58' S; 46°15' W	10	This note
5	22-mar-05	8 km from Canal de Ararapira, Paraná, 25°20' S; 45°05' W	2	Santos & Netto 2005
6	25-may-05	Barra da Tijuca, Rio de Janeiro 23°00' S; 43°25' W	2	This note
7	25-jan-07	Praia de Maresias, São Paulo 23°48' S; 45°23' W	32	This note
8	31-mar-07	Bonete, Ilha Bela, São Paulo 23°46' S; 45°21' W	2	This note
9	10-sep-07	Ilha do Cardoso, Cananéia, São Paulo 25°03' S, 47°55' W	6	Santos & Silva 2009
10	08-feb-08	Barra do Una, São Sebastião, São Paulo 23°25' S; 44°58' W	5	Santos & Silva 2009
11	03-may-08	A) Barra da Tijuca, Rio de Janeiro 23°00' S; 43°25' W B) Praia de São Conrado, Rio de Janeiro 23°00' S; 43°15' W C) Praia de Ipanema, Rio de Janeiro 22°59' S; 43°12' W	3	Santos & Silva 2009  This note
12	05-feb-09	Canal de Ilha Bela, São Paulo 23°46' S; 45°20' W	9	This note
13	02-mar-10	Barra da Tijuca, Rio de Janeiro 23°01' S; 43°26' W	13	This note
14	14-mar-10	Praia da Vila, Saquarema, Rio de Janeiro 22°56' S; 42°29' W	0 (12 days)	This note

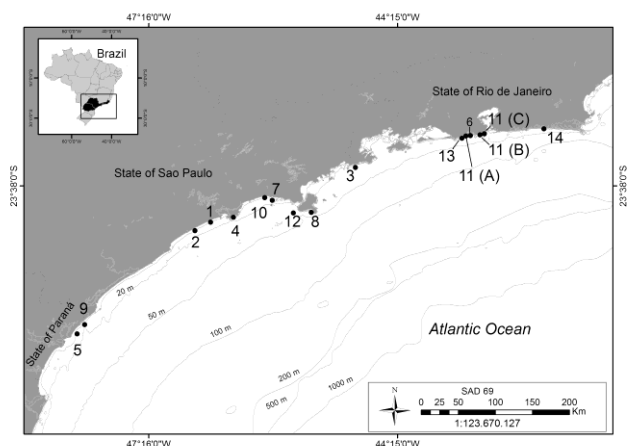
Between the north of the State of Paraná (25°20'S; 45°05'W) and the town of Saquarema in the State of Rio de Janeiro (22°56'S; 42°29'W), the animal covered a minimum linear distance travelling of 630 km, in 11 years, i.e. 80 km more than that previously reported by Santos & Silva (2009). Long-distance movements of killer whales are known to occur in several regions, ranging from 750 km off Alaska (Matkin *et al.* 1997); 2,600km from Alaska

to California (Goley & Straley 1994) and 5,535 km from Mexico to Peru (Guerrero-Ruiz *et al.* 2005) to 15,600 km in New Zealand waters, reported as the minimum distance travelled during a 6-year period, going back and fourth (Visser 1999).

The seasonal occurrence and movements of killer whales elsewhere have been associated primarily with the movement of their prey (Iñíguez 2001, Baird 2002). However, patterns of area usage

by killer whales along the coast of south-eastern Brazil remain to be elucidated. Killer whale groups comprising of up to 15 individuals have been observed off the Rio de Janeiro coast, primarily during the

austral spring and summer (Lodi & Hetzel 1998, Siciliano *et al.* 1999) The individual we report here has been seen on all seasons, but most frequently during summer ( $n = 7$ ; 50%).



**Figure 1.** Sightings ( $n = 14$ ) of a solitary male killer whale (*Orcinus orca*) in southern and south-eastern Brazil between 1999 and 2010. Locations are identified by numbers, the key to which is provided in Table I.

Although the animal was seen alone on 14 different occasions, careful analysis of photographic images obtained during the sighting at Maresias beach (Table 1, record 7) revealed the presence of bite marks behind the dorsal fin, suggesting possible interactions with other individuals. The dispersion of adult males from transient groups has been documented in British Columbia, Washington State and Alaska (Baird 2000, Baird & Whitehead 2000), as well as in Norway (Bisther & Vongraven 1995), indicating a social organization pattern. In southern Atlantic waters, numerous observations ( $n = 97$ ) of a lone adult male killer whale have been recorded off the coast of Patagonia in the period 1994-1997 (Iñíguez 2001).

Among cetaceans, killer whales exhibit unusual features related to their elaborate social interactions, ecology and behaviour that are variable between distinct populations (Ford 2002). Evidence suggests that solitary individuals may occupy extensive areas, frequently covering hundreds of km along the coast line, and that the amount of time spent in any particular location vary seasonally (Baird 2000, 2002).

There are significant gaps in information relating to the general aspects of the biology and ecology of this species in Brazil, and greater effort



**Figure 2.** Solitary male killer whale (*Orcinus orca*) identified by distinctive notches on the posterior border of the dorsal fin at Maresias beach, São Paulo, SP, Brazil in January 2007. Photography by Paulo Magalhães.

on the investigation of the abundance, distribution, seasonal occurrence, habitat requirements, diet and social organization is required in order to correct these deficiencies. Moreover, the reported sightings indicate the existence of site fidelity of the solitary male killer whale, especially within the area between São Paulo and Rio de Janeiro, and thus contribute to our knowledge of the patterns of area usage and movements of killer whales in coastal waters of Brazil.

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