



## First offshore records of the red-footed booby *Sula sula* (Linnaeus, 1766) between the states of São Paulo and Santa Catarina, Brazil

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**Abstract:** This note records the first two occurrences of red-footed booby (*Sula sula*) juveniles in offshore waters between the states of São Paulo and Santa Catarina, in southeastern and south Brazil. These may comprise the southernmost records of this species in the country.

**Key words:** Red-footed booby; offshore waters; South Brazil.

**Primeiros registros offshore do atobá-de-pés-vermelhos *Sula sula* (Linnaeus, 1766) entre os estados de São Paulo e Santa Catarina, Brasil. Resumo:** A presente nota registra as duas primeiras ocorrências de indivíduos juvenis de atobá-de-pés-vermelhos (*Sula sula*) em águas offshore entre os estados de São Paulo e Santa Catarina, no sudeste e sul do Brasil. Estes podem compreender os registros mais austrais da espécie no país.

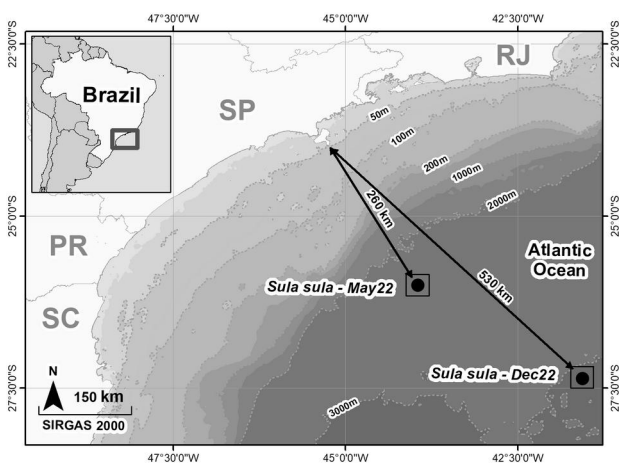
**Palavras-chave:** Atobá-de-pés-vermelhos; águas offshore; Sul do Brasil.

The red-footed booby *Sula sula* (Linnaeus, 1766) (Aves: Sulidae) is a seabird with pelagic habits and a pantropical distribution (Nelson 1978). The species displays a wide geographical distribution within the Sulidae family (Nelson 1978, Enticott & Tipling 2002, Schreiber *et al.* 2020). Known for its long foraging journeys, the red-footed booby can be found hundreds of kilometers from the nearest landmasses (Carboneras 1992), with recaptures recorded up to 6,000 km from the place of birth during the first year of life (Nelson 1980). In Brazil, the only breeding ground of this species is at the Fernando de Noronha archipelago (Antas 1991, Schultz-Neto 2004), which is also the primary red-footed booby nesting and occurrence location in the South Atlantic (Marques *et al.* 2018). Sightings for the species have been noted at Atol das Rocas and the Sao Pedro and Sao Paulo Archipelago, in

Northeastern Brazil (see Nelson 1978, Mohr *et al.* 2009, Mancini *et al.* 2016), as well as infrequent occasional recordings along the Brazilian coast (Sick 1997). Recently, Port & Fisch (2020), recorded a young red-footed booby flying over the coast of Trindade Island, around 1200 km from the coast of Espírito Santo State, without any evidence of breeding activity. In the past, the species used to breed on Trindade Island, but they were not seen there since 2000, as reported by Fonseca-Neto (2004). Mancini *et al.* (2016) assumed the red-footed bobby is, in fact, extinct in the island, once during their research they also didn't register the birds breeding in Trindade. It is believed that the southernmost occurrence of the species in Brazil is limited to the state of Rio de Janeiro, with no records published for southernmost states, even considering extensive records reviews used to develop checklists

(Silveira & Uezu 2011). Pelagic seabirds can be monitored by tracking techniques, especially reproductive adults in their colonies. However, juveniles are hardly seen and, consequently, barely monitored, leading to sub-sampling which limits knowledge on the true red-footed booby distribution. Opportunistic sightings can generate novel data concerning bird distributions, general health conditions and life stages, among others. This note, therefore, aims to register the occurrences of juvenile red-footed boobies at the Santos Basin, an oceanic area located between the states of São Paulo and Santa Catarina, Brazil.

The sightings took place opportunistically by the first author, who was working as a Marine Mammal Observer onboard the M/V Oceanic Vega seismic vessel. At the time, the vessel was operating offshore in the Santos basin, in the southwest Atlantic Ocean. The first sighting transpired on May 5<sup>th</sup>, 2022, during the afternoon, at 26°00.4'S and 043°56.9'W (Fig 1), at a depth of 2,245 meters and 260 kilometers from the coast. The second sighting ensued on December 3<sup>rd</sup>, 2022, during the morning, at 27°21.5' S and 041°33.4'W (Fig 1), at a depth of 3,281 meters and around 530 km from the coast. Both animals (Figs 2 and 3) were juveniles, in their second molting cycle. In general, the main morphological red-footed booby characteristics are red feet and a bluish bill (Sick 1997), although this is a polymorphic species, with three main morphs, namely white with black limbs, brown with a white tail and brown with darker wings (Nelson 1978).



**Figure 1.** Map of the sighting areas in south and southeastern Brazil. The black dots indicate the location of the red-footed booby (*Sula sula*) individuals.

Juvenile red-footed boobies in their first molting cycle can be completely brown or brown with a darker stripe on the chest, darker wings, a blackened bill, and pink feet, which may resemble immature brown booby (*Sula leucogaster*) (Boddaert, 1783). In the second molting cycle, they are normally brown or brown with lighter areas in the neck and abdomen region, darker wings, a pinker bill with a dark tip and pink feet (Howell & Zufelt 2019). In the first sighting, a fishing line of around 70 cm length it was observed attached to the animal, which appeared to be longer than its body length, with a rusty-looking hook at the end hooked in the left wing (Fig 4). The wing feathers in this area appeared misaligned, which could, over time, interfere with the individual's flight performance and quality of life. Despite this, the individual was active, looking for food and flying close to the vessel. This is a common behavior in other species belonging to the same genus, frequently observed from operating seismic vessels, such as *Sula dactylatra* (Lesson, 1931) and *S. leucogaster*.

The main threats faced by seabirds on land comprise intense human activity on virtually every island group these animals inhabit (Carboneras 1992). Offshore activities also negatively influence seabird health, as the proximity of these animals to vessels can result in fishing gear interactions and bycatch mortality during trawling, longline and gillnet fisheries (Petry *et al.* 2012). The bycatch using different fishing gear; the human presence; pollution; climate change; overfishing and invasive alien species consist in the main factors responsible for the decline of these animals on a global scale, with 84% of all 359 seabird species impacted by at least one of these threats (Dias *et al.* 2019).

In addition, this species currently suffers from the habitat destruction, as occurred on Ascension Island and Trindade; egg predation by invasive species; and disorderly tourism, since it employs a reproduction area of less than 500 km<sup>2</sup> and, in some places as Fernando de Noronha, nesting sites must compete with other invasive species, such as the Cattle Egret (*Bubulcus ibis*) (Barbosa-Filho *et al.* 2009). The red-footed booby is categorized as "Endangered" by the List of Threatened Species in Brazil (MMA, 2022), and such threats can lead to a continued decline in the quality of the species' habitat (Marques *et al.* 2018).



**Figure 2.** The first juvenile red-footed booby (*Sula sula*), sighted in May 2022. Photo: CIR.



**Figure 3.** The second juvenile red-footed booby (*Sula sula*), sighted in December 2022. Photo: CIR.



**Figure 4.** Fishing gear hooked in the left wing of the first sighted individual of red-footed booby (*Sula sula*). (Photo: CIR)

This paper presents the first offshore sightings of the red-footed booby recorded between southeastern and south Brazil, thus expanding the species occurrence area, as this comprises the southernmost recording for this species in Brazilian territory.

### Ethical statement

The present investigation did not involve the manipulation of regulated animals and did not require approval by an Ethical Committee.

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