

ANTARCTIC AND SUB-ANTARCTIC SEABIRDS IN SOUTH AMERICA: A REVIEW

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ABSTRACT

We analyzed reports of Antarctic and Sub-Antarctic seabirds with migration routes over seven South American countries (Argentina, Brazil, Chile, Ecuador, Peru, Uruguay, and Venezuela). Forty-eight species were reported, observed over oceanic and/or coastal areas. Chile presented the highest number of Antarctic seabird species (39), followed closely by Brazil (38). *Diomedea exulans*, *D. epomophora*, *Thalassarche melanophris*, *Macronectes giganteus*, *Fulmarus glacialis*, *Pachyptila desolata* and *Oceanites oceanicus* were the most common species, recorded in six of the seven searched countries. The least reported species were *Pygoscelis adeliae*, *Thalassoica antarctica*, *Pagodroma nivea*, *Pachyptila salvini* and *Pterodroma inexpectata*, observed in one country each. According to the IUCN, the species with migration routes over the South American countries are considered endangered (three species), vulnerable (eight species) and near threatened (eight species). Consequently, it is important to protect not only breeding habitats in the Antarctic environment, but their entirely migration routes over South America.

Keywords: Pelagic seabirds; conservation areas; biodiversity.

RESUMO

AVES MARINHAS ANTÁRTICAS E SUB-ANTÁRTICAS NA AMÉRICA DO SUL: UMA REVISÃO. Foram analisados registros de aves marinhas Antárticas e Subantárticas nos países da América do Sul (Argentina, Brasil, Chile, Equador, Peru, Uruguai e Venezuela) com base em artigos e resumos científicos, dissertações, teses e livros. Quarenta e oito espécies foram registradas, ocorrendo em áreas oceânicas e/ou costeiras dos países analisados. O Chile apresentou o maior número de espécies de aves migratórias que nidificam na Antártica e em ilhas Sub-Antárticas (39), seguido pelo Brasil (38). *Diomedea exulans*, *D. epomophora*, *Thalassarche melanophris*, *Macronectes giganteus*, *Fulmarus glacialis*, *Pachyptila desolata* e *Oceanites oceanicus* foram as aves marinhas mais registradas, encontradas em seis dos sete países amostrados. As espécies menos frequentes foram *Pygoscelis adeliae*, *Thalassoica antarctica*, *Pagodroma nivea*, *Pachyptila salvini* e *Pterodroma inexpectata*, observadas em um país cada. Entre as espécies reportadas, três são consideradas ameaçadas de extinção, oito vulneráveis e outras oito classificadas como quase ameaçadas de extinção, de acordo com dados da IUCN. Consequentemente, é importante proteger não apenas as áreas de nidificação no ecossistema Antártico, mas toda a rota de migração destas aves marinhas sobre os países da América do Sul.

Palavras-chave: Aves marinhas pelágicas; áreas para conservação; biodiversidade.

RESUMEN

AVES MARINAS ANTÁRTICAS Y SUB-ANTÁRTICAS EN AMÉRICA DEL SUR: UNA REVISION. Analizamos registros de aves marinas antárticas y sub-antárticas en países de América del Sur (Argentina, Brasil, Chile, Ecuador, Perú, Uruguay y Venezuela) en publicaciones científicas, disertaciones, tesis y libros. Se registraron cuarenta y ocho especies, observadas sobre áreas oceánicas o costeras de los países estudiados. Chile presentó el mayor número de especies migratorias que anidan en la Antártida (39), seguido por Brasil (38). Las especies observadas con mayor frecuencia fueron *Diomedea exulans*, *D. epomophora*, *Thalassarche melanophris*, *Macronectes giganteus*, *Fulmarus glacialis*, *Pachyptila desolata* y *Oceanites oceanicus*; las cuales fueron reportadas en seis de los siete países analizados. Asimismo, las especies con menor frecuencia fueron *Pygoscelis adeliae*, *Thalassoica antarctica*, *Pagodroma nivea*, *Pachyptila salvini* y *Pterodroma inexpectata*, observadas apenas en uno sólo de los países analizados. Entre las especies registradas, tres son consideradas especies amenazadas, ocho vulnerables y otras ocho clasificadas como casi amenazadas de acuerdo con IUCN. Consecuentemente, es importante proteger no sólo las áreas de nidificación en el ecosistema Antártico, sino también toda la ruta de migración de estas aves marinas sobre los países de América del Sur.

Palabras clave: Aves marinas pelágicas; áreas para conservación; biodiversidad.

INTRODUCTION

Seabirds are important components of the marine ecosystems and are the most studied taxa in relation to long-term demographic studies on land (Weimerskirch 1997, Péron *et al.* 2010a, 2010b). However, ecological studies in open ocean areas are rare, since logistic procedures to support field works are exceedingly difficult (Tasker *et al.* 1984, Weimerskirch 1997).

Consequently, the available data on seabirds distribution at sea have been limited in space and time, as well as historical reports on their global occurrence. On the other hand, counting pelagic seabirds at sea from vessels or ships can present some problems, such as the absence of standardization methods to become data comparable (Tasker *et al.* 1984).

Approximately 300 avian species feed mainly at sea (Harrison 1983). Of the 43 species breeding south of the Antarctic Convergence (~60°S), seven species of penguins, twenty four of albatrosses and petrels, two of cormorants and five species of gulls, skuas and terns live and feed only in the sea, while other five live entirely on land (Shirihai 2008).

Joining scientific data on distribution and occurrence of seabirds in remote areas far from breeding sites can provide some initial but important information about seabirds ecology. This information is needed to the establishment of monitoring networks,

expanding study areas and elucidating unclear points on migration routes. The Antarctica environment and the Sub-Antarctic Islands are well-known sites for seabirds breeding and/or feeding. Many species are long-range migrants, with their routes over the South American countries still under studied by marine ornithologists. Long-term demographic studies have recently shown that climate change, together with direct impacts of human activities (such as overfishing, bycatch, and pollution), are affecting population dynamics of marine top predators, including seabirds (Ormerod 2003, Ramos *et al.* 2009, Péron *et al.* 2010a, 2010b). Consequently, studies on seabirds migration routes over oceanic areas and coastal lands are very important for conservation and management plans. Negative impacts at migration routes far from breeding sites can be even more dangerous to some species, such as the accidental capture of albatrosses and petrels by longline fisheries which can cause considerable mortality and population decline (Tuck *et al.* 2001).

This paper presents an up to date review of Antarctic and sub-Antarctic breeding seabirds reported over the coastline of seven South American countries (Argentina, Brazil, Chile, Ecuador, Peru, Uruguay, and Venezuela), all members of the “South American Network on Antarctic Marine Biodiversity” project (BioMAntar; see further information in Costa *et al.* 2009). This information is useful for seabird’s management aiming at international conservation

plans, since temporary feeding areas and routes are as important as breeding sites to the biology, ecology and survival of seabirds.

MATERIAL AND METHODS

The scientific literature related to Antarctic and Sub-Antarctic seabirds (Shirihai 2008, Woehler

2006), with migration routes over the coastline of the BioMAntar countries, was searched, analyzed and linked in a cooperation study among researchers from all countries (Table 1). First priority was given to articles published in international journals, primarily in English. Then, scientific abstracts, dissertations, theses and books were also considered.

Table 1. Countries members of the “South American Network on Antarctic Marine Biodiversity” project (BioMAntar), researchers responsible for data compilation for each country and references analysed.

Country	Researchers	References
Argentina	N. Coria	Cooke & Mills 1972; Brown <i>et al.</i> 1975, Orlog 1979, Prince <i>et al.</i> 1997, Montalti & Orgeira 1998, Schiavini <i>et al.</i> 1998, Montalti <i>et al.</i> 1999, Yorio & Caille 1999, Orgeira 1995a, 1995b, 2001a, 2001b, Favero & Silva-Rodriguez 2005.
Brazil	E.S. Costa J.A. Ivar do Sul M.A.S. Alves M.V. Petry	Novaes 1959, Sander 1982, Teixeira <i>et al.</i> 1986, Vooren & Fernandes 1989, Petry <i>et al.</i> 1991, 2001, 2006, 2008, 2010, Roman & Soto 1996, Roman 1998, Sampaio & Castro 1998, Fonseca <i>et al.</i> 2000, 2001, Olmos 2000a, 2000b, 2001, Bencke 2001, Lima <i>et al.</i> 2001, Telino-Júnior <i>et al.</i> 2001, Ross & Piacentini 2003, Mohr 2004, Oliva 2004, Sander <i>et al.</i> 2004, Carlos <i>et al.</i> 2005a, 2005b, Colabuono <i>et al.</i> 2006, Barquete <i>et al.</i> 2006, Bugoni 2006, 2008, Bugoni <i>et al.</i> 2007, Dénes <i>et al.</i> 2007, Costa & Sander 2008, Scherer <i>et al.</i> 2010, Tourinho <i>et al.</i> 2010.
Chile	P. Piedrahita	Schlatter 1973, 1974, 1975, 1976, 1977, 1984, 1987, Brown <i>et al.</i> 1975, Venegas 1978, 1998, Oyarzo & Cekalovic 1981, Prince <i>et al.</i> 1997, Schlatter & Simeone 1999, Moore & Battam 2000, Lawton <i>et al.</i> 2003, Narosky & Yzurieta 2003, Weichler <i>et al.</i> 2004, Spear <i>et al.</i> 2005, Post 2007, Nicholls 2009
Ecuador	E.S. Costa	Harris 1973, 1974, 1975, Castro & Philips 1996, Ridgely & Greenfield 2001, Wiedenfeld 2006.
Peru	L. Ayala R.E. Sanchez-Scaglioni	Plengue 1974, 2005, Hughes 1982, Prince <i>et al.</i> 1997, Clements & Shany 2001, Schulenberg <i>et al.</i> 2007, Spear & Ainley 2008.
Uruguay	E.S. Costa	Prince <i>et al.</i> 1997, Aspiroz 2003, Narosky & Yzurieta 2003, Domingo <i>et al.</i> 2007
Venezuela	E.S. Costa	Ascanio 2007

Seabird species breeding in Argentinean oceanic and coastal islands (such as Malvinas and Georgias) were also analysed and included here. In acquiring data from the other six countries, all seabirds found in the surrounding areas were included in their lists.

All species had their Threatened Category status defined (IUCN 2007). Albatrosses and petrels also had their status defined by the Agreement on the

Conservation of Albatrosses and Petrels (ACAP), which aimed to protect Procellariiformes species from anthropogenic impacts. Thirty countries, including Argentina, Brazil, Chile, Ecuador, Peru and Uruguay had signed the ACAP. In Brazil, Procellariiformes are also protected by a national Law, the National Plan for the Conservation of Albatrosses and Petrels.

RESULTS

Forty-eight species were recorded over oceanic and/or coastal areas of the South American countries surveyed (Table 2). Chile was the main flyway route, presenting the highest number of seabird migrant species (39), followed closely by Brazil (38). *Diomedea exulans*, *D. epomophora*, *Thalassarche melanophrys*, *Macronectes giganteus*, *Fulmarus glacialisoides*, *Pachyptila desolata* and *Oceanites*

oceanicus were the most observed species, reported in six of the seven studied countries (Table 2). The least reported species were *Pygoscelis adeliae*, *Thalassoica antarctica*, *Pagodroma nivea*, *Pachyptila salvini* and *Pterodroma inexpectata*, recorded in one country each (Table 2). Many of these species have migration routes over oceanic areas, hampering records by researchers on land. Registers are then restricted to lost individuals far from their original routes.

Table 2. Antarctic and Sub-Antarctic seabirds recorded in the “South American Network on Antarctic Marine Biodiversity” project (BioMANTar) countries (Argentina, Brazil, Chile, Ecuador, Peru, Uruguay and Venezuela). ¹-Seabirds breeding in Antarctic and Sub-Antarctic regions; ²- Seabirds breeding in Sub-Antarctic regions only (Shirihai 2008, Woehler 2006). X = confirmed species; ? = species that needs confirmation; * = species breeding in land ; ! = species that occurs (but not breed) in the country. EN = Endangered, VU = Vulnerable, NT = Near Threatened, LC = Least Concern.

Common names are in accordance with Shirihai (2008). Species with both oceanic and coastal migration routes are presented.

ORDER, FAMILY and Scientific name	Common name	IUCN	Countries						
			Argentina	Brazil	Chile	Ecuador	Peru	Uruguay	Venezuela
SPHENISCIFORMES									
SPHENISCIDAE									
<i>Aptenodytes patagonicus</i> ²	King Penguin	LC	X	X	X		?		
<i>A. forsteri</i> ¹	Emperor Penguin	LC	X		X				
<i>Pygoscelis papua</i> ¹	Gentoo Penguin	NT	*		X				
<i>P. adeliae</i> ¹	Adélie Penguin	LC			X				
<i>P. antarctica</i> ¹	Chinstrap Penguin	LC	X		X				
<i>Eudyptes chrysocome</i> ²	Rockhopper Penguin	VU	*	X	X			X	
<i>E. chrysolophus</i> ¹	Macaroni Penguin	VU	*	X	X			X	
PROCELLARIIFORMES									
DIOMEDEIDAE									
<i>Diomedea exulans</i> ²	Wandering Albatroz	VU	X	X	X	X	X	X	
<i>D. epomophora</i> ²	Southern Royal Albatroz	VU	X	X	X	X	?	X	
<i>Thalassarche melanophrys</i> ²	Black-browed Albatroz	EN	X	X	*	X	X	X	
<i>T. cauta</i> ²	Shy Albatroz	NT	X	X	X		X		
<i>T. chrysostoma</i> ²	Grey-headed Albatroz	VU	X	X	*		X	X	
<i>T. chlororhynchos</i> ²	Atlantic Yellow-nosed Albatroz	EN	X	X				X	
<i>Phoebastria fusca</i> ²	Sooty Albatroz	EN	X	X	X				
<i>P. palpebrata</i> ²	Light-mantled Sooty Albatroz	NT	X	X	X		X	X	
PROCELLARIIFORMES									
PROCELLARIIDAE									
<i>Macronectes giganteus</i> ¹	Southern Giant Petrel	NT	*	X	X	X	X	X	
<i>M. halli</i>	Northern Giant Petrel	NT	X	X	X	X	X	X	
<i>Fulmarus glacialisoides</i> ¹	Southern Fulmar	LC	X	X	X	X	X	X	

Continuation of Table 2

ORDER, FAMILY and Scientific name	Common name	IUCN	Countries						
			Argetina	Brazil	Chile	Ecuador	Peru	Uruguay	Venezuela
<i>Thalassoica antarctica</i> ¹	Antarctic Petrel	LC			X				
<i>Daption capense</i> ¹	Cape Petrel	LC	X	X	X	X	X	X	
<i>Pagodroma nivea</i> ¹	Lesser Snow Petrel	LC			X				
<i>Pterodroma macroptera</i> ²	Great-winged Petrel	LC	X	X	X				
<i>P. lessonii</i> ²	White-headed Petrel	LC	X	X	X				
<i>P. incerta</i> ²	Atlantic Petrel	VU	X	X					
<i>P. brevirostris</i> ²	Kerguelen Petrel	LC		X	X				
<i>P. mollis</i> ²	Soft-plumaged Petrel	LC	X	X					
<i>P. inexpectata</i> ²	Mottled Petrel	NT			X				
<i>Halobaena caerulea</i> ²	Blue Petrel	LC		X	X		X	X	
<i>Pachyptila vittata</i> ²	Broad-billed Prion	LC	X	X			X		
<i>P. salvini</i> ²	Salvin's Prion	LC			X				
<i>P. desolata</i> ¹	Antarctic Prion	LC	X	X	X	X	X	X	
<i>P. belcheri</i> ²	Slender-billed Prion	LC	X	X	X		X	X	
<i>P. turtur</i> ²	Fairy Prion	LC	X						
<i>Procellaria aequinoctialis</i> ²	White-chinned Petrel	VU	X	X	X		X	X	
<i>P. conspicillata</i> ²	Spectacled Petrel	VU	X	X				X	
<i>P. cinerea</i> ²	Grey Petrel	NT	X	X	X		?		
<i>Puffinus gravis</i> ²	Great Shearwater	LC	X	X	X			X	X
<i>P. griseus</i> ²	Sooty Shearwater	NT	X	X	*		X	X	
<i>P. assimilis</i> ²	Little Shearwater	LC	X	X	X		X		
PROCELARIFORMES									
HYDROBATIDAE									
<i>Oceanites oceanicus</i> ¹	Wilson's Storm-petrel	LC	X	X	X		X	X	X
<i>Fregetta tropica</i> ¹	Black-bellied Storm-petrel	LC	X	X	X		X	X	
<i>F. grallaria</i> ²	White-bellied Storm-petrel	LC		X			X		
PELECANIFORMES									
PHALACROCORACIDAE									
<i>Phalacrocorax bransfieldensis</i> ¹	Antarctic Shag	LC		X	X				
CHARADRIIFORMES									
CHIONIDAE									
<i>Chionis alba</i> ¹	Pale-faced Sheathbill	LC	!	X	X			X	
CHARADRIIFORMES									
STERCORARIIDAE									
<i>Chataracta antarctica</i> ¹	Subantarctic Skua	LC	X	X	X				
<i>C. maccormicki</i> ¹	South Polar Skua	LC	X	X	X	X	X		X
CHARADRIIFORMES									
LARIDAE									
<i>Larus dominicanus</i> ¹	Kelp Gull	LC	*	*	*	X	*	*	
CHARADRIIFORMES									
STERNIDAE									
<i>Sterna vittata</i> ¹	Antarctic Tern	LC		X	X			X	

According to the IUCN, three species with migration routes over the South American countries are considered endangered (all albatrosses), eight vulnerable (two penguins, two albatrosses and three petrels), and other eight are categorized as near threatened (Table 2). According to the ACAP, albatrosses species (*Phoebetria fusca*, *Thalassarche chlororhynchos* and *T. melanophris*) are classified as endangered. Other Procellariiformes (*Diomedea epomophora*, *D. exulans*, *T. chrysostoma*, *Procellaria aequinoctialis* and *P. conspicillata*) are categorized as vulnerable. Two species of albatrosses (*Phoebetria palpebrata* and *T. cauta*) and one petrel (*Procellaria cinerea*) are classified as near threatened.

DISCUSSION AND CONCLUSIONS

South American countries house important migration route areas to Antarctic and Sub-Antarctic seabirds. These areas are primarily used for feeding on local oceanic and/or coastal resources during migration, being extremely important to seabirds conservation and protection. Adult seabirds are very frequent in the winter while young individuals are common throughout the year (Vooren & Fernandes 1989).

Brazil presented the most diverse literature (32 articles) related to the occurrence and distribution of seabirds along the coast, when compared with the other South American countries (Table 1). The majority of the articles recently (last decade) published are reporting new registers of species on diverse coastal regions in Brazil (e.g., Fonseca *et al.* 2000, 2001, Lima *et al.* 2001, Telino-Júnior *et al.* 2001, Mohr 2004, Soto *et al.* 2004, Carlos *et al.* 2005a, 2005b, Barquete *et al.* 2006, Bugoni 2006, Costa & Sander 2008), as well as new feeding habits found through the analyses of death specimens (e.g., Petry *et al.* 1996, 2010). Other studies also reported behavioural interactions between seabirds and other marine predators, such as mammals (Scherer *et al.* 2010), and interactions between seabirds and marine pollution (e.g., Tourinho *et al.* 2010), among others.

Countries with least records in relation to Antarctic and sub-Antarctic seabirds in their coastal and marine areas (Ecuador, Peru, Uruguay, Venezuela) had also fewer published articles (Table 1). Possible, this is a consequence of logistic problems since

field campaigns are very expensive and marine ornithologists from different countries do not have the same opportunities to make campaigns systemically.

Further international collaboration is necessary to the development of accurate studies related to population structures and dynamic patterns of seabird species along their coastal migratory flyways over the South American countries. Moreover, the evaluation of anthropogenic impacts (Omerod 2003, Tourinho *et al.* 2010) and climate changes (e.g., Péron *et al.* 2010b) over seabird populations would be of paramount importance, improving the elaboration of international management and conservation plans. Species with wide dispersion, such as White-chinned Petrel, Black-browed Albatross and Wandering Albatross, are being incidentally caught by longline fisheries in Brazil, Chile, Uruguay and Argentina (Nel & Taylor 2003). In this way, the establishment of conservation measures limited to Antarctic and Sub-Antarctic environments are insufficient to protect seabirds since they migrate (Weimerskirch *et al.* 1999), when they will be exposed to innumerable threats.

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REFERENCES

- ACAP (Agreement on the conservation of albatrosses and petrels) 2010. <<http://www.acap.aq/>>. (Accessed in 12/11/2010).
- ASCANIO, D. 2007. Field checklist of the birds of Venezuela. <www.ascaniobirding.com>. (Accessed in 12/07/2008).
- ASPIROZ, A.B. 2003. *Aves del Uruguay: Lista e introducción a su biología y conservación*. Aves Uruguay-GUPECA, Montevideo. 104p.
- BARQUETE, V.; BUGONI, L.; SILVA-FILHO, R.P. & ADORNES, A.C. 2006. Review of records and notes on King Penguin (*Aptenodytes patagonicus*) and Rockhopper Penguin (*Eudyptes chrysocome*). *El Hornero*, 21: 45-48.

- BENCKE, G.A. 2001. Lista de referência das aves do Rio Grande do Sul. Porto Alegre: Fundação Zoobotânica do Rio Grande do Sul. 104p.
- BROWN, R.G.B.; COOKE, F.; KINNEAR, P.K. & MILLS, E.L. 1975. Summer seabird distributions in Drake Passage, the Chilean Fjords and off Southern South America. *Ibis*, 117: 339-356.
- BUGONI, L. 2006. Great-winged Petrel *Pterodroma macroptera* in Brazil. *Bulletin of British Ornithologists Club*, 126(1): 52-54.
- BUGONI, L. 2008. Ecology and conservation of albatrosses and petrels at sea off Brazil. *PhD thesis*. Institute of Biomedical and Life Sciences, University of Glasgow. 251p.
- BUGONI, L.; SANDER, M. & COSTA, E.S. 2007. Effects of the first southern Atlantic Hurricane on Atlantic Petrels (*Pterodroma incerta*). *The Wilson Journal of Ornithology*, 119: 725-729.
- CARLOS, C.J.; FEDRIZZI, C.E. & AZEVEDO-JÚNIOR, S.M. 2005a. Notes on some seabirds of Pernambuco state, north-east Brazil. *Bulletin of British Ornithologists Club*, 125: 140-147.
- CARLOS, C.J.; VOISIN, J.F. & VOOREN, C.M. 2005b. Records of Southern Giant Petrel *Macronectes giganteus solanderi* and Northern Giant Petrel *M. halli* off southern Brazil. *Bulletin of British Ornithologists Club*, 125: 288-292.
- CASTRO, I. & PHILIPS, A. 1996. *A guide to The Birds of the Galapagos Islands*. Christopher Helm Publisher, London. 144p.
- CLEMENTS, J.F. & SHANY, N. 2001. *A field guide to the birds of Peru*. Ibis Publ. Co., Temecula, California. 283p.
- COOKE, F & MILLS, E.L. 1972. Summer distribution of pelagic birds off the coast of Argentina. *Ibis*, 114: 245-251.
- COLABUONO, F.I.; FEDRIZZI, C.E. & CARLOS, C.J. 2006. A black-browed albatross *Thalassarche melanophrys* consumes a tern *Sterna sp.* *Marine Ornithology*, 34: 167-168.
- COSTA, E.S. & SANDER, M. 2008. Variação sazonal de aves costeiras (Charadriiformes e Ciconiiformes) no litoral norte do Rio Grande do Sul, Brasil. *Biodiversidade Pampeana*, 6: 3-8.
- COSTA, E.S.; ALVES, M.A.S.; AYALA, L.; CORIA, N.R.; PETRY, M.V.; PIEDRAHITA, P. & SÁNCHEZ-SCAGLIONI, R.E. 2009. Occurrence of Antarctic and Sub-Antarctic Seabirds in countries of South American Network on Antarctic Marine Biodiversity (BioMAntar): Argentina, Brazil, Chile, Ecuador, Peru, Uruguay and Venezuela. In: IV Simposio Latinoamericano de Investigaciones Antárticas y la VII Reunión Chilena de Investigación Antártica, 2008. Valparaíso. Antártica y Sudamérica: Ciencia en el Año Polar Internacional. Libro de resúmenes del IV Simposio Latinoamericano sobre Investigaciones Antárticas y VII Reunión Chilena de Investigación Antártica, Valparaíso - Chile. p. 193-197.
- DÉNES, F.V.; CARLOS, C.J. & SILVEIRA, L.F. 2007. The albatrosses of the genus *Diomedea* Linnaeus, 1758 (Procellariiformes: Diomedidae) in Brazil. *Revista Brasileira de Ornitologia*, 15: 543-550.
- DOMINGO, A.; SEBASTIÁN, J. & PASSADORE, C. 2007. *Plan de Acción Nacional para Reducir la Captura Incidental de Aves Marinas em las Pesquerías Uruguayas*. Montevideo, DINARA. 76p.
- OLIVA, T.D. 2004. Distribuição e abundância de albatrozes no Oceano Atlântico sul entre Rio Grande (Brasil) e Shetlands do Sul (Antártica) em novembro de 2002 e novembro de 2003. *Monografia*. Universidade do Vale do Rio dos Sinos, São Leopoldo, RS, Brasil. 42p.
- FAVERO, M. & SILVA RODRIGUEZ, M.P. 2005. Estado actual y conservación de aves pelágicas que utilizan la plataforma continental argentina como áreas de alimentación. *Hornero*, 20: 95-110.
- FONSECA, V.S.S.; AZEVEDO, M.S. & PETRY, M.V. 2000. Nota sobre a ocorrência da pomba-antártica, *Chionis alba* (Gmelin, 1789), no litoral Norte do Rio Grande do Sul, Brasil. *Acta Biologica Leopoldensia*, 22: 133-135.
- FONSECA, V.S.; PETRY, M.V. & FONSECA, F.L.S. 2001. Ocorrência de petrel-azul (*Halobaena caerulea*) no litoral do Brasil. *Ornitologia Neotropical*, 12: 355-356.
- HARRIS, M. 1973. The Galapagos Avifauna. *Condor*, 75: 265-278.
- HARRIS, M. 1974. *A field guide to the Birds of Galapagos*. Collins. London. 160p.
- HARRIS, M. 1975. Additions to the Galapagos Avifauna. *Condor*, 77: 355-355.
- HARRISON, P. 1983. *Seabirds, an identification guide*. Houghton Mifflin Company, Boston. 448p.
- HUGHES, R.A. 1982. Broad-billed Prion at Mollendo, Peru: first record for the Pacific coast of South America. *Condor*, 84: 130.
- IUCN (INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND NATURAL RESOURCES). 2007. IUCN Red List of Threatened Species. <www.iucnredlist.org>. (Accessed in 08/06/2008).
- LAWTON, K.; ROBERTSON, G.; VALENCIA, J.; WIENECKE, B. & KIRKWOOD, R. 2003. The status of Black-browed Albatrosses *Thalassarche melanophrys* at Diego de Almagro Island, Chile. *Ibis*, 145: 502-505.
- LIMA, P.C.; GRANTSAU, R.; LIMA, R.C.F.R. & SANTOS, S.S. 2001. Notas sobre os registros brasileiros de *Calonestris edwardsii* (Oustalet, 1883) e *Pelagodroma marina hypoleuca* (Moquin-Tandon, 1841) e primeiro registro de *Phalacrocorax bransfieldensis* Murphy, 1936 para o Brasil. *Ararajuba*, 10: 261-277.
- MOHR, L.V. 2004. Novo registro do pinguim-rei *Aptenodytes patagonicus* para o Brasil. *Ararajuba*, 12: 78-79.
- MONTALTI, D. & ORGEIRA, J.L. 1998. Distribución de aves marinas em la Costa Patagónica Argentina. *Ornitologia Neotropical*, 9: 193-199.
- MONTALTI, D.; ORGEIRA, J.L. & DI MARTINO, S. 1999. New records of vagrant Bird in the South Atlantic and in the Antarctic. *Polish Polar Research*, 20: 347-354.

- MOORE, P.J. & BATTAM, H. 2000. Procellariiforms killed by fishers in Chile to obtain bands. *Notornis*, 47: 168-169.
- NAROSKY, T. & YZURIETA, D. 2003. *Guía para la identificación de las aves de Argentina e Uruguay*. Buenos Aires: Vazquez Mazzini Editores. 348p.
- NEL, D.C. & TAYLOR, F.E. 2003. Globally threatened seabirds at risk from longline fishing: international conservation responsibilities. BirdLife to the meeting of the UN Food and Agriculture Organization Committee on Fisheries. <http://www.birdlife.org/action/campaigns/save_the_albatross/fao_doc3.pdf>. (Accessed in 12/10/2010).
- NICHOLLS, D.G. 2009. Plumages of Northern (*Diomedea sanfordi*) and Southern Royal (*D. epomophora*) albatrosses observed in Chilean seas in September 2004. *Notornis*, 54: 158-167.
- NOVAES, F.C. 1959. *Procellaria aequinoctiales* on Amazon River in Brazil. *Condor*, 61: 299-299.
- OLMOS, F. 2000a. Registro documentado e novas observações de *Fregatta grallaria* para o Brasil (Procellariiformes: Hydrobatidae). *Nattereria*, 1: 20-22.
- OLMOS, F. 2000b. Revisão dos registros de *Fregatta tropica* para o Brasil (Procellariiformes: Hydrobatidae). *Nattereria*, 1: 27-28.
- OLMOS, F. 2001. Revisão dos registros de *Procellaria conspicillata* no Brasil, com novas observações sobre sua distribuição. *Nattereria*, 2: 16-18.
- ORGEIRA, J.L. 1995a. Seabird observations of the Argentine Atlantic shore between Tierra del Fuego and Buenos Aires. Bolletino del Museo Regionale di Scienze Naturali - Torino, 12: 105-115.
- ORGEIRA, J.L. 1995b. Composición específica de la avifauna marina de la costa Patagónica Argentina y Pasaje de Drake. *Ararajuba*, 3: 65-67.
- ORGEIRA, J.L. 2001a. Distribución espacial de densidades de aves marinas en la Plataforma Argentina y Océano Atlántico Sur. *Ornitología Neotropical*, 12: 45-55.
- ORGEIRA, J.L. 2001b. Nuevos registros del Petrel Atlántico (*Pterodroma incerta*) em Océano Atlántico Sur y Antártida. *Ornitología Neotropical*, 12: 165-171.
- ORLOG, C.C. 1979. *Nueva lista de la avifauna argentina*. Opera Lilloana, 27. Fundación Miguel Lillo, Tucumán. 324p.
- ORMEROD, S.J. 2003. Current issues with fish and fisheries: editor's overview and introduction. *Journal of Applied Ecology*, 40: 204-213.
- OYARZO, H. & CEKALOVIC, T. 1981. *Pachyptila salvini* (Mathews, 1912) Petrel Ballena de pico mediano: primera cita para Chile y clave para las especies de *Pachyptila* (Aves, Procellariiformes, Puffinidae). *Boletín de la Sociedad de Biología de Concepción*, 52: 247-250.
- PÉRON, C.; AUTHIER, M.; BARBRAUD, C.; DELORD, K.; BESSON, D. & WEIMERSKIRCH, H. 2010a. Contrasting changes in at-sea distribution and abundance of subantarctic seabirds in the Southern Ocean. *BOU Proceedings – Climate Change and Birds*. <<http://www.bou.org.uk/bouproc-net/ccb/peron-et-al.pdf>>. (Accessed in 10/10/2010).
- PERON, C.; AUTHIER, M.; BARBRAUD, C.; DELORD, K.; BESSON, D. & WEIMERSKIRCH, H. 2010b. Interdecadal changes in at-sea distribution and abundance of subantarctic seabirds along a latitudinal gradient in the Southern Indian Ocean. *Global Change Biology*, 16: 1895-190.
- PETRY, M.V.; KLEIN, G.N. & BENCKE, G.A. 1991. First record of the Shy Albatross *Diomedea cauta* for the Brazilian coast. *Bulletin of the British Ornithologists' Club*, 111: 189-189.
- PETRY, M.V.; FONSECA, V.S.S. & SANDER, M. 2001. Food habits of the royal albatross, *Diomedea epomophora* (Lesson, 1825), at the seacoast of Brazil. *Acta Biologica Leopoldensia*, 23: 207-212.
- PETRY, M.V.; FONSECA, V.S.S. & SCHERER, A.L. 2006. Analysis of stomach contents from the black-browed albatross, *Thalassarche melanophris*, on the coast of Rio Grande do Sul, Southern Brazil. *Polar Biology*, 30: 321-325.
- PETRY, M.V.; FONSECA, V.S.S.; GARCIA, L.K. & PIUCO, R.C. 2008. Shearwater diet during migration along the coast of Rio Grande do Sul. *Marine Biology*, 154: 613-621.
- PETRY, M.V.; PETERSEN, E.S.; SCHERER, J.F.M.; KRUGER, L. & SCHERER, A.L. 2010. Notas sobre a ocorrência e dieta de *Macronectes giganteus* (Procellariiformes: Procellariidae) no Rio Grande do Sul, Brasil. *Ararajuba*, 18: 237-239.
- PLENGUE, M.A. 1974. Notes on some birds in west-central Perú. *Condor*, 76: 326.
- PLENGUE, M.A. 2005. Lista de las aves del Perú. <http://www.perubirdingroutes.com/NewWebsiteBirds/Site/Common/documents/Listadeaves_mplenge.pdf>. (Accessed in 12/07/2008).
- POST, P.W. 2007. Observations of prion (*Pachyptila*) wrecks on the west coast of South America. *Notornis*, 54: 220-225.
- PRINCE, P.A. CROXALL, J.P.; TRATHAN, P.N. & WOOD, A.G. 1997. The pelagic distribution of South Georgia albatrosses and their relationships with fisheries. In: G. Robertson & R. Gales (eds). Albatross biology and conservation. Surrey Beatty & Sons, Chipping Norton. 300p.
- RAMOS, R.; GONZALEZ-SOLI, S.J.; CROXALL, J.P.; ORO, D. & RUIZ, X. 2009. Understanding Oceanic Migrations with intrinsic biogeochemical markers. *PLoS ONE*, 4: e6236. doi:10.1371/journal.pone.0006236
- RIDGELY, R. & GREENFIELD, J. 2001. *The Birds of Ecuador*. Cornell University Press, Ithaca, NY. 880p.
- ROMAN, A.H. 1998. Novo registro de Albatroz Pardo, *Phoebastria fusca* (Procellariiformes: Diomedidae), para o litoral sul do Brasil. Pp. 70. In: VII Congresso Brasileiro de Ornitologia, Resumos. Rio de Janeiro, Universidade do Estado do Rio de Janeiro.
- ROMAN, A.H. & SOTO, J.M.R. 1996. Dois espécimes de pingüim-rei, *Aptenodytes patagonicus* (Forster, 1844) encontrados no litoral do Rio Grande do Sul, Brasil. Pp. 547-547. In: Anais III Reunião Especial da SBPC. Florianópolis.

- ROSS, A.L. & PIACENTINI, V.Q. 2003. Revisão dos registros sul-brasileiros do gênero *Phoebetria* Reichenbach, 1853 e primeiro registro documentado de *Phoebetria palpebrata* (Forster, 1785) (Procellariiformes: Diomedidae) para Santa Catarina. *Ararajuba*, 11: 223-225.
- SAMPAIO, C.L.S. & CASTRO, J.O. 1998. Registros de *Phoebetria palpebrata* (Foster, 1785) no litoral da Bahia, nordeste do Brasil (Procellariiformes: Diomedidae). *Ararajuba*, 6: 136-137.
- SANDER, M. 1982. Nota sobre a presença de *Diomedea epomophora* Lesson, 1825, no Rio Grande do Sul. *Pesquisas (S. Zoologia)*, 33: 23-25.
- SANDER, M.; CASTRO, A.G.S.; COSTA, E.S.; SANTOS, C.R. 2004. Aves Antárticas e Patagônicas registradas no litoral norte do Rio Grande do Sul Brasil. In: V Simpósio Argentino Y 1º Latino Americano sobre investigaciones Antárticas, Buenos Aires. 4p. Actas on-line del Simposio. <<http://www.dna.gov.ar/CIENCIA/SANTAR04/CD/PDF/201BA.PDF>>. (Accessed in 12/07/2008).
- SCHIAVINI, A.; FRERE, E.; GANDINI, P.; GARCÍA, N. & CRESPO, E. 1998. Albatross-fisheries interactions in Patagonian shelf waters. Pp. 208-213. In: G. Robertson & R. Gales (eds). *Albatross Biology and Conservation*. Chipping Norton, Australia: Surrey Beatty and Sons. 300p.
- SCHLATTER, R. 1973. Notas sobre observaciones de ejemplares errantes de *Oceanites oceanicus*, Golondrina de mar, Procellariiformes, en Sudamérica. *Boletín Ornitológico*, 5: 1-4.
- SCHLATTER, R. 1974. Observaciones de aves marinas en El Quisco, Mirasol, Costa Central. *Boletín Ornitológico*, 6: 4-6.
- SCHLATTER, R. 1975. Observaciones de aves en la Región de Quellón, Provincia de Chiloé. *Medio Ambiente*, 1: 29-39.
- SCHLATTER, R. 1976. Aves observadas en el sector del Lago Riñihue, Provincia de Valdivia, con los alcances sobre su ecología. *Boletín de la Sociedad de Biología de Concepción*, 50: 133-143.
- SCHLATTER, R. 1977. Una fardela nueva para los mares chilenos: *Pterodroma brevirostris* Lesson 1831 (Aves: Procellariiformes). *Noticiario Mensual del Museo Nacional de Historia Natural*, 21: 7-8.
- SCHLATTER, R. 1984. The status and conservation of seabirds in Chile. Pp. 261-269. In: J.P. Croxall, P.G. Evans & R.N. Schreiber (eds). *Status and Conservation of the World's Seabirds*. ICBP Technical Publication 2 Cambridge, England. 778p.
- SCHLATTER, R. 1987. Conocimiento y situación de la ornitofauna en la islas oceánicas chilenas. Pp. 271-285. In: J.C. Castilla (Ed). *Islas Oceánicas Chilenas Conocimiento Científico y Necesidades de Investigaciones*. Ediciones Universidad Católica de Chile, Santiago. 353p.
- SCHLATTER, R.P. & SIMEONE, A. 1999. Estado del conocimiento y conservación de las aves en mares chilenos. *Estudios Oceanológicos*, 18: 25-33.
- SCHULENBERG, T.S.; STOTZ, D.F.; LANE, D.F.; O'NEILL, J.P. & PARKER, T.A. 2007. *III. Birds of Peru*. Princeton University Press, New Jersey. 322p.
- SCHERER, A.L.; PETERSEN, E.S.; SCHUH, M.H.; CRISTOFOLI, S.I.; TAVARES, C.L.M.; DUARTE, A.; PETRY, M.V. & SANDER, M. 2010. Interação entre aves marinhas (Procellariiformes) e golfinhos-pintados-do-atlântico *Stenella frontalis* (Cetacea: Delphinidae) em águas oceânicas do sudeste do Brasil. *Ararajuba*, 18: 234-236.
- SHIRIHAI, H. 2008. *The Complete Guide to Antarctic Wildlife*. Princeton University Press. 548p.
- SOTO, J.M.R.; RODRIGUES, N.F.; RODRIGUES, D.F. & DIANO A.S. 2004. Novos registros do pingüim-rei *Aptenodytes patagonicus* (Miller, 1778) (Aves, Spheniscidae) na costa brasileira. In: 1º Congresso Brasileiro de Oceanografia, 2004, Itajaí. Resumos do 1º Congresso Brasileiro de Oceanografia. Itajaí: Universidade do Vale do Itajaí, p. 147-148.
- SPEAR, L.B.; AINLEY, D.G. & WEBB, S.W. 2005. Distribution, abundance, habitat use and behaviour of three *Procellaria* petrels off South America. *Notornis*, 52: 88-105.
- SPEAR, L.B. & AINLEY, D.G. 2008. The seabird community of the Peru current, 1980-1995, with comparisons to other easter boundary currents. *Marine Ornithology*, 36: 125-144.
- TASKER, M.L.; HOPE JONES, P.; DIXON, T. & BLAKE, B.F. 1984. Counting seabirds at sea from ships: a review of methods employed and a suggestion for a standardized approach. *Auk*, 101: 567-577.
- TELINO-JÚNIOR, W.R.; LYRA-NEVES, R.M.; FARIAS, G.B.; BRITO, M.T.; PACHECO, G. & OLIVEIRA-SIQUEIRA, S.A. 2001. Ocorrência e aspectos comportamentais da pomba-antártica, *Chionis alba* (Charadriiformes: Chionidae), em Pernambuco, Brasil. *Tangara*, 1: 26-29.
- TEIXEIRA, D.M.; OREN, D.C. & BEST, R.C. 1986. Notes on some Brazilian seabirds (2). *Bulletin of the British Ornithological Club*, 106: 74-77.
- TOURINHO, P.S.; IVAR DO SUL, J.A. & FILLMANN, G. 2010. Is marine debris ingestion still a problem for the coastal marine biota of southern Brazil? *Marine Pollution Bulletin*, 60: 396-401.
- TUCK, G.N.; POLACHECK, T.; CROXALL, J.P. & WEIMERSKIRCH, H. 2001. Modelling the impact of fishery by-catches on albatross populations. *Journal of Applied Ecology*, 38: 1182-1196.
- VENEGAS, C. 1978. Pingüinos de barbijo (*Pygoscelis antarctica*) y Macaroni (*Eudyptes chrysolophus*) en Magallanes. *Anales del Instituto de la Patagonia*, 9: 179-183.
- VENEGAS, C. 1998. Pingüinos crestados (*Eudyptes chrysocome*, Forster 1781, *E. chrysolophus* Brandt 1837) y de Magallanes (*Spheniscus magellanicus* Forster 1781) en isla Noir, Chile. *Anales del Instituto de la Patagonia*, 26: 59-67.
- VOOREN, C.M. & FERNANDES, A.C. 1989. *Guia de Albatrozes e petréis do Sul do Brasil*. Porto Alegre: Sagra. 100p.
- WEICHLER, T.; GARTHE, S.; LUNA-JORQUERA, G. & MORAGA, J. 2004. Seabird distribution on the Humboldt Current in northern Chile in relation to hydrography, productivity, and fisheries. *ICES Journal of Marine Science*, 61: 148-154.
- WEIMERSKIRCH, H. 1997. Foraging strategies of Indian Ocean albatrosses and their relationships with fisheries. Pp. 168-179. In: G. Robertson & R. Gales (eds). *Albatross biology and conservation*. Surrey Beatty & Sons, Chipping Norton. 300p.

WEIMERSKIRCH, H.; CATARD, A.; PRINCE, P.A.; CHEREL, Y. & CROXALL, J.P. 1999. Foraging white-chinned petrels *Procellaria aequinoctialis* at risk: from the tropics to Antarctica. *Biological Conservation*, 87: 273-275.

WIEDENFELD, D. 2006. Aves, *The Galapagos Islands, Ecuador*. Check List 2 (2).

WOEHLER, E.J. 2006. Species list prepared for SCAR/IUCN/ Bird Life International Workshop on Antarctic Regional Seabird Populations, March 2005, Cambridge, UK.

YORIO, P. & CAILLE, G. 1999. Seabird interactions with coastal fisheries in northern Patagonia: use of discards and incidental captures in nets. *Waterbirds*, 22: 207-216.

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