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Records of vagrant and visitor bird species in the Fildes Region, King George Island, Maritime Antarctic, between 1980 and 2023

Abstract. We provide information on vagrant and visitor bird species recorded in the Fildes Region (King George Island, South Shetlands, Antarctic) during the long-term bird monitoring programme between the 1979—1980 and 2022—2023 seasons. The total ice-free territory covers approximately 35 km^2, making it one of the largest ice-free areas in the Western Antarctic Peninsula region. In addition to 13 breeding and one potentially breeding bird species, we recorded 28 non-breeding bird species. Of these non-breeding bird species, we defined 18 as vagrants and 10 as visitors. The vagrant and visitor bird species recorded were representatives of the families Spheniscidae, Diomedeidae, Procellariidae, Pelecanoididae, Laridae, Ardeidae, Scolopacidae, and Anatidae. Furthermore, we include information on the frequency of observations of bird species that do not breed in the study area. Most frequently observed were white-rumped sandpiper, cattle egret, emperor penguin, macaroni penguin, and king penguin. These data contribute to knowledge of rare birds in the Antarctic. Together with similar studies, this information may provide valuable clues to unusual environmental conditions that allow vagrants to reach regions beyond their usual distribution range. Furthermore, long-term data on rare bird sightings can indicate a potential expansion of the breeding range of individual species. Such studies may be relevant for the evaluation of environmental changes that are already occurring as a result of current climate change, e.g., changes in sea ice cover or food web structures.

Keywords: bird monitoring, Fildes Region, rare bird sightings, South Shetland Islands, species distribution, vagrancy

1 Introduction

The term vagrancy as a natural phenomenon is used in birds to describe individuals sighted outside their usual breeding, wintering, and migration areas. Vagrancy is usually observed in migratory species, due to their high mobility, but it also applies to all other species that are outside their home range or distribution area (Newton, 2008). There are diverse reasons for vagrancy in birds. These reasons include normal long-distance dispersal, drift due to strong winds, overshooting during migration movements, reversed-direction migration, and the consequences of environmental change (Milius, 2000; Raya Rey et al., 2007; Newton, 2008).

Furthermore, birds can reach high latitudes via ship-based transport (Hahn et al., 1998; Shirihai, 2002; Korczak-Abshire et al., 2011a; Petersen et al., 2015). Vagrancy is particularly associated with

young birds as they more frequently disperse outside their usual population routes (Newton, 2008). Unlike vagrants, visitors are also rarely observed birds that occur outside their range but within their typical habitat (Golubev, 2020). Long-term documentation of visitors and vagrants in the Antarctic is of high value, as changes in the frequency of occurrence are likely to indicate changing environmental conditions. In particular, environmental conditions like strong storm events or temperature increases may allow or promote the occurrence of migrants in the maritime Antarctic (Korczak-Abshire et al., 2011a; Petersen et al., 2015). Long-term data on sightings of rare birds can also help to detect a potential expansion of the breeding range of individual species (Juáres et al., 2014; Juáres et al., 2017; Gryz et al., 2019). In addition, visitor and vagrant species pose a risk, albeit low, of the introduction of biological material, especially microorganisms, including pathogens (e.g., Kerry & Riddle, 2009), but also plant propagules (e.g., Convey, 1996; Parnikoza et al., 2007; Kalwij et al., 2019).

Numerous studies have documented rare bird sightings in the Antarctic (e.g., Montalti et al., 1999; Petersen et al., 2015; Sierakowski et al., 2017; Golubev, 2020). This study provides information on records of vagrants and visitors in the Fildes Region between the 1979–1980 and 2022–2023 seasons and thus contributes to the completion of observations from other areas of the Antarctic Peninsula region.

2 Materials and methods

The study was carried out in the Fildes Region in the southwest of King George Island, South Shetland Islands (62°08′ to 62°14′ S, 59°02′ to 58°51′ W, Fig. 1). The study area includes the Fildes Peninsula, Ardley Island, as well as all large neighbouring islands within 0.5 km or less of the Peninsula. The Fildes Region has a total of about 35 km^2 not covered by ice. It is thus one of the largest ice-free areas in the Western Antarctic Peninsula region (Henriques et al., 2018).

The Fildes Region is a breeding ground for 13 bird species and four of the six seal species living in the Antarctic and is, therefore, together with the rich moss and lichen vegetation, of great importance for regional biodiversity (Braun et al., 2012).

The study is based on three data sets. Firstly, it consists of historical data from year-round breeding bird and seal monitoring carried out between December 1979 and February 1990 within the long-term biological research programme of the Research Centre for Vertebrate Animal Research (FWF) at the GDR Academy of Sciences, extracted from publications (Table 1) and from scientific reports. Secondly, it includes observations between 1994 and 2003 by German scientists and partly by members of the resident station. Thirdly, it includes data from the resumed bird monitoring carried out by the author's research group exclusively during the austral summer months (December to February) in the seasons 2003–2004 to 2005–2006 and 2008–2009 to 2022–2023 and following the methodology from the period between 1979 and 1990. These data were supplemented by data from station members or other scientists. Within the framework of a comprehensive breeding bird and seal monitoring programme as well as within additional studies, the entire study area was regularly surveyed by 3 to 5 researchers at intervals of five to ten days. The researchers were trained in advance on breeding bird species and possible rare bird sight-

Table 1. Data sources between 1981 and 1988

Year	Data source
1981	Bannasch, 1984
1982	Bannasch, 1984
1983	Peter et al., 1988
1984	Peter et al., 1988
1985	Peter et al., 1988
1986	Mönke & Bick, 1990
1987	Mönke & Bick, 1990
1988	Lange & Naumann, 1990

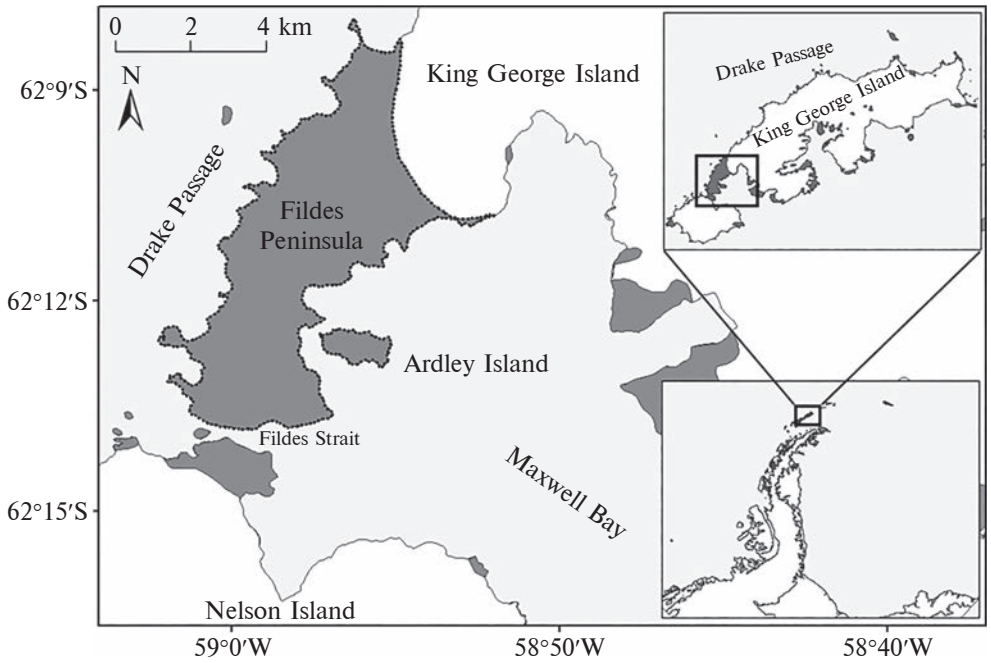

Figure 1. Overview of the study area Fildes Region (marked by dashed line)

ings. All individuals of bird species not breeding in the study area were recorded, both alive and dead. If possible, a photo documentation was made. In the case of dead finds, it was not always possible to determine the species due to the condition of the remains. In total, data from 36 years are available.

All birds observed not breeding in the area or the immediate vicinity were characterized as either visitors or vagrants following the definition of Golubev (2020) and Scientific Committee on Antarctic Research (SCAR) Expert Group on Birds (2005). Visitors were those species observed in their normal habitat but outside their usual distribution. Vagrants were those species observed in habitats ecologically different from their usual distribution area. In addition, species were classified according to their frequency of occurrence based on Sierakowski et al. (2017). However, we modified the classification because of the longer time span we used to rarely (in 1–5 seasons), occasionally (in 6–15 seasons), and regularly observed (more than 15 seasons). All species names were obtained from the current International Ornithological Congress (IOC) World Bird List (13.1) (https://www.worldbirdnames.org/new/).

Since the study area includes the Antarctic Special Protected Areas No. 125 research was conducted within the requirements of the Protocol on Environmental Protection to the Antarctic Treaty (Madrid, 1991) with the relevant permit by the German Authority Federal Environment Agency.

3 Results

In total, 28 non-breeding bird species were recorded in the Fildes Region between the 1978–1979 and 2022–2023 seasons. Of these 28, 10 were visitor species, and 18 were vagrants by the definition above (see Table 2). Five of the visitor species were seen regularly, three visitor species occasionally, and two were seen rarely. Four species of the vagrant species were seen regularly, none occasionally, and 14 species were seen rarely during the study period. In contrast to observations also in neighbouring areas on King George Island (e.g., Korczak-Abshire et al., 2011b; Gryz et al., 2015), no passerine birds have yet been recorded in the Fildes Region.

3.1 Spheniscidae (Sphenisciformes)

Emperor penguins *Aptenodytes forsteri* (Gray, 1844) were recorded occasionally throughout the year and classified as vagrants by the definition applied (Table 2). Most of them were immature individuals, i.e., they had not yet their adult plumage. These birds often spent several days in the area. In total, there were 51 sightings of this species in 29 seasons (Table 2), with the highest number of observations in January. No moulting individuals of the emperor penguin were observed.

King penguins *Aptenodytes patagonicus* (Miller, 1778) were observed in the Fildes Region both in austral summer and, although less frequently, in autumn and winter. There were 22 sightings in 22 seasons (Table 2), both immature and adult individuals, as well as moulting and freshly dead individuals of this visitor species.

Macaroni penguins *Eudyptes chrysolophus* (Brandt, 1837) are classified as regular visitors to the Fildes Region due to their distribution range and frequency of occurrence (Table 2). Single individuals were documented exclusively during summer and autumn among other native penguins and were either immature or adult individuals and often moulting after breeding had ceased. Single individuals of the rockhopper penguin *Eudyptes*

Figure 2. Visitor and vagrant bird species recorded in the Fildes Region: (a) Rockhopper penguin among chinstrap penguins; (b) Magellanic penguin; (c) northern giant petrel; (d) Baird's sandpiper

Table 2. Records of vagrants (va) and visitors (vi) in the Fildes Region from December 1979 to February 2023 (classification following SCAR Expert Group on Birds, 2005, Sierakowski et al., 2017 and Golubev, 2020), observation frequency: regularly (>15 seasons), occasionally (6–15 seasons), rarely (1–5 seasons), numbers marked with asterisk represent minimum numbers due to occurrence in swarms or difficulties of identification of dead bird remains

Family	Species	Observation frequency			Seasons with sightings	Sightings	Individuals
		Regularly	Occasionally	Rarely			
Spheniscidae	Emperor penguin *Aptenodytes forsteri* (Gray, 1844)	va	–	–	29	51	54
	King penguin *Aptenodytes patagonicus* (Miller, 1778)	va	–	–	12	22	22
	Macaroni penguin *Eudyptes chrysolophus* (Brandt, 1837)	vi	–	–	19	30	31
	Rockhopper penguin *Eudyptes chrysocome* (Forster, 1781)	–	–	va	3	3	3
	Magellanic penguin *Spheniscus magellanicus* (Forster, 1781)	–	–	va	1	1	1
Diomedeidae	Wandering albatross *Diomedea exulans* (Linnaeus, 1758)	–	vi	–	1	1	1
	Black-browed albatross *Thalassarche melanophris* (Temminck, 1828)	–	vi	–	5	7	8
Procellariidae	Northern giant petrel *Macronectes halli* (Mathews, 1912)	–	–	vi	2	2	3
	Sooty shearwater *Ardenna grisea* (Gmelin, 1789)	–	–	vi	1	1	1
	Southern fulmar *Fulmarus glacialoides* (Smith, 1840)	vi	–	–	27	138*	360*
	Soft-plumaged petrel *Pterodroma mollis* (Gould, 1844)	–	–	va	2*	2*	2*
	Blue petrel *Halobaena caerulea* (Gmelin, 1789)	vi	–	–	1*	8*	9*
	Snow petrel *Pagodroma nivea* (Forster, 1777)	vi	–	–	21	220	>4000*
	Antarctic prion *Pachyptila desolata* (Gmelin, 1789)	vi	–	–	5*	5*	9*
	Broad-billed prion *Pachyptila vittata* (Forster, 1777)	–	–	va	1	1	1
	Kerguelen petrel *Aphrodroma brevirostris* (Lesson, 1831)	–	–	va	1	3	3
	Atlantic petrel *Pterodroma incerta* (Schlegel, 1863)	–	–	va	1	2	3
	Antarctic petrel *Thalassoica antarctica* (Gmelin, 1789)	–	vi	–	11	32	418*
Pelecanoididae	Diving petrel *Pelecanoides* sp. (Lacépède, 1799)	–	–	va	1	1	1
Laridae	Pomarine jaeger *Stercorarius pomarinus* (Temminck, 1815)	–	–	va	1	1	1
	South American tern *Sterna hirundinacea* (Lesson, 1831)	–	–	va	1	1	1
Ardeidae	Cattle egret *Bubulcus ibis* (Linnaeus, 1758)	va	–	–	15	45	57
Scolopacidae	White-rumped sandpiper *Calidris fuscicollis* (Vieillot, 1819)	va	–	–	15	23	85
	Pectoral sandpiper *Calidris melanotos* (Vieillot, 1819)	–	–	va	1	1	8
	Baird's sandpiper *Calidris bairdii* (Coues, 1861)	–	–	va	2	2	7
Anatidae	Black-necked swan *Cygnus melancoryphus* (Molina, 1782)	–	–	va	1	1	11
	Yellow-billed pintail *Anas georgica* (Gmelin, 1789)	–	–	va	1	1	10
	Chiloé wigeon *Mareca sibilatrix* (Poeppig, 1829)	–	–	va	2	2	3

chrysocome (Forster, 1781) occurred in the Fildes Region in January 2010, January 2011 and November 2022 (Fig. 2a). These individuals were an immature animal and two moulting adults and were observed only in the austral summer.

The only documented observation of an (immature) Magellanic penguin *Spheniscus magellanicus* (Forster, 1781) in the Fildes Region to date was made in the 2016–2017 season at the penguin colony on Ardley Island (Fig. 2b).

The latter two penguin species are classified as rare vagrants. Most of the individuals of the vagrant or visitor penguins were seen as solitary animals. Emperor and king penguins were recorded exclusively outside local penguin colonies. Other species, however, the macaroni, rockhopper, and Magellanic penguins, were mainly found among native penguins either in their colonies or within groups of moulting birds.

3.2 Diomedeidae (Procellariiformes)

Albatrosses are often found over the open sea in the latitudes of the Antarctic Convergence, but regularly also south of it, making them visitors in the Fildes Region. There is a single observation of a wandering albatross, *Diomedea exulans* (Linnaeus, 1758) from the Fildes Region, sighted following a supply vessel in Maxwell Bay near Stranger Point, Potter Peninsula, in March 1985. Black-browed albatrosses *Thalassarche melanophris* (Temminck, 1828) occurred several times in the Fildes Region.

3.3 Procellariidae (Procellariiformes)

In the Fildes Region, the occurrence of the visitor species northern giant petrel *Macronectes halli* (Mathews, 1912) was first documented in October 1987, when two individuals were present in a breeding colony of southern giant petrels. Another observation was reported from January 2016 beyond a southern giant petrel breeding colony in the northern Fildes Region (Fig. 2c). It remains unclear to what extent these relatively few observations are due to a rare occurrence of this species in the area or to confusion with *M. halli* due to its close resemblance to *M. giganteus* (Gmelin, 1789).

The discovery of a freshly dead sooty shearwater *Ardenna grisea* (Gmelin, 1789) on the west coast of the Fildes Peninsula in February 2018 was the only record of this rare visitor in the Fildes Region (Table 2).

Due to their frequent presence in the Southern Ocean, other representatives of the petrels are recorded on the coasts of the Fildes Region either regularly (southern fulmar *Fulmarus glacialoides* (Smith, 1840), snow petrel *Pagodroma nivea* (Forster, 1777), blue petrel *Halobaena caerulea* (Gmelin, 1789), Antarctic prion *Pachyptila desolata* (Gmelin, 1789)) or occasionally Antarctic petrel *Thalassoica antarctica* (Gmelin, 1789) (Table 2). Due to their usual distribution range and frequency of occurrence, they are, therefore, regular visitors by our definition. In contrast, individuals of the vagrant species soft-plumaged petrel *Pterodroma mollis* (Gould, 1844), broad-billed prion *Pachyptila vittata* (Forster, 1777) and Kerguelen *Aphrodroma brevirostris* (Lesson, 1831) and Atlantic petrels *Pterodroma incerta* (Schlegel, 1863) were only rarely seen (Table 2). In addition, there were many findings of the remains of stranded dead birds that could not be precisely assigned to the genera *Pachyptila* or *Halobaena* due to the state of the remains.

3.4 Pelecanoididae (Procellariiformes)

The only individual of the genus *Pelecanoides* (Lacépède, 1799) was found dead in December 2008. It was not possible to identify this individual to the species. Nevertheless, one representative of the diving petrels is considered a rare vagrant in the Fildes Region (Table 2).

3.5 Stercorariidae / Laridae (Charadriiformes)

In the study area, a breeding south polar skua *Stercorarius maccormicki* (Saunders, 1893) with clear Chilean skua *Stercorarius chilensis* (Bonaparte, 1857) characteristics was observed in January 1994. It was presumed using mitochondrial DNA to be a

hybrid between Chilean and south polar skua (Reinhardt et al., 1997). Later, suspected hybrids of these two species with the typical colouration were observed in seven more seasons, both among non-breeders and breeding birds. Observations of individual brown skua with the typical reddish-brown partial colouration of Chilean skua on the Fildes Peninsula in the season 2002–2003 indicate a possible hybridization between brown skua and Chilean skua (*S. chilensis* × *S. antarcticus lonnbergi*). However, genetic evidence for this is still lacking.

A pomarine jaeger *Stercorarius pomarinus* (Temminck, 1815) was observed in the area of the Russian Antarctic Station Bellingshausen between 26 and 28 December 1981. This individual was then attacked by brown skua.

In addition to the Arctic tern *Sterna paradisaea* (Pontoppidan, 1763), which is regularly observed in the study area as a migrant and sometimes in large numbers of up to 150 individuals, another tern was observed on 11 February 1986 in the northern area of the northern Fildes Peninsula (Table 2). This bird was attacked by the numerous Antarctic terns and chased away. Based on morphologictics this individual was determined to be a South American tern *Sterna hirundinacea* (Lesson, 1831).

3.6 Scolopacidae (Charadriiformes)

The first report of a representative of the Scolopacidae family dates back to the early 1980s when three white-rumped sandpipers, *Calidris fuscicollis* (Vieillot, 1819), were observed on Ardley Island in October 1981. Since then, there have been 23 sightings of white-rumped sandpipers totalling 85 individuals in the study area. The most recent observation of white-rumped sandpipers in the Fildes Region comes from February 2023. This species mostly occurred in small flocks. The largest group, of 12, was observed in December 2000. The white-rumped sandpiper was thus the most abundant vagrant species in the Fildes Region.

Other species of this family also occur as vagrants in the study area. One pectoral sandpiper, *Calidris melanotos* (Vieillot, 1819), was observed in November 1987, and 8 individuals in December 1987 on Ardley Island. Furthermore, observations of Baird's sandpiper *C. bairdii* (Coues, 1861) were made in the Fildes Region in January 2022 (1 individual, Fig. 2d) and in November 2022 (6 individuals).

3.7 Ardeidae (Ciconiiformes)

The first report of the cattle egret (*Bubulcus ibis* (Linnaeus, 1758) near the study region dates back to March 1983, when six cattle egrets landed on a ship during a snowstorm at about 60° S, 57° W near the South Shetland Islands. Since then, numerous carcasses of this species have been recorded in the Fildes Region. The first of these was in March 1985. However, repeated observations of living cattle egrets were made on Fildes Peninsula in April 1986, whereas some of the birds observed alive were found dead shortly afterward. Since then, only dead birds have been recorded. Overall, cattle egrets are among the most frequently observed vagrants in the Fildes Region, with 57 individuals in 45 sightings.

3.8 Anatidae (Anseriformes)

Representatives of the Anatidae family have also been recorded in the Fildes Region and are all considered rare vagrant species. Thus, living black-necked swans *Cygnus melancoryphus* (Molina, 1782) were repeatedly observed between January 1989 and April 1989 – individually or in groups of up to 11. The first dead individuals were found shortly after the first observation. Furthermore, two observations of Chiloé wigeon *Mareca sibilatrix* (Poeppig, 1829) were from the Fildes Region. In June 1984, a specimen was sighted in the station area of Bellingshausen station, which was later found dead. In addition, two individuals were observed in November 2008 on the south-east coast of the Fildes Peninsula.

Another species of the family observed in the study area is the yellow-billed pintail *Anas geor-*

gica (Gmelin, 1789), presumably of the subspecies *A. g. spinicauda*. In the austral spring, in October and November 1989 (37 days in total), up to ten birds were present in several coastal sections of the Fildes Peninsula at the same time.

4. Discussion

4.1 Spheniscidae (Sphenisciformes)

Emperor penguin's breeding areas are circumpolar along the coasts of the Antarctic between 64° and 77° S (Fretwell et al., 2012). The closest breeding site of emperor penguins to the Fildes Region, also the northernmost, is located approximately 270 km away on Snow Hill Island at 64° S (Fretwell et al., 2012; Leonardi et al., 2019). This indicates the high mobility of emperor penguins, especially juveniles (Kooyman & Ponganis, 2007), which were also recorded most frequently in the Fildes Region. In many species, juveniles migrating for the first time show a greater spread of directions than adults, so juveniles more frequently end up outside the usual route for their population (Newton, 2008). Much of the global emperor penguin population is potentially under long-term threat because of climate change in the form of reduced sea-ice concentration and thickness and duration of sea-ice cover (Ainley et al., 2010; Trathan et al., 2011; Jenouvrier et al., 2014). In this context, these long dispersal routes may also be considered in terms of a potential search for new breeding habitats (Jenouvrier et al., 2017; Hrbáček et al., 2018).

The usual distribution range of king penguins is circumpolar between 45° and 55° S in the Subantarctic. The largest colonies exist on South Georgia Island and on the islands or archipelagos of Prince Edward, Marion, Crozet, Kerguelen, Heard, and Macquarie, while small populations are also found in the Falkland Islands and in southern Chile (BirdLife International, 2022a). Outside the breeding season, king penguins are thought to roam in Subantarctic and Antarctic waters and also reach more southerly latitudes, such as the waters along the Antarctic Peninsula (Williams, 1995). King penguin populations in South Georgia have increased significantly over more than 120 years, although the reasons for this are not yet fully understood (Foley et al., 2018). Other areas have also seen significant population increases (e.g., Woehler et al., 2001; Delord et al., 2004). Nevertheless, there are indications that this species in the northern part of its range cannot react sufficiently quickly to the new conditions caused by climate warming and the associated changes due to its low genetic diversity and long generation time (Cristofari et al., 2018). Therefore, a rather local extinction or migration instead of successful adaptation is expected (Cristofari et al., 2018).

However, several recent studies indicate a significant regional increase in observations of this Subantarctic species in the South Shetland Islands area (Juáres et al., 2017; Gryz et al., 2019; Borowicz et al., 2020; Juáres et al., 2023). A first indication of a potential expansion was the first record of king penguins breeding south of 60° S on Elephant Island, South Shetland Islands 2009–2010 and 2010–2011, when two incubating pairs were recorded in both seasons and two juveniles in the 2010–2011 season (Petry et al., 2013a). Subsequent breeding attempts on Elephant Island were reported in the 2019–2020 season (Borowicz et al., 2020). Furthermore, broods of king penguins on King George Island were first documented in the 2011–2012 season and at least four consecutive seasons on the Potter Peninsula (Juáres et al., 2014; Juáres et al., 2017). In the neighbouring Lions Rump, the Western Shore of King George Bay, and King George Island, king penguins attempted to breed from 2013–2014 to 2016–2017 (Gryz et al., 2019). However, no fledglings were successfully raised from breeding attempts in these areas. In contrast, breeding attempts of the king penguin have not yet been documented in the Fildes Region.

The main breeding grounds of the macaroni penguin are located on South Georgia Island and other Subantarctic islands or island groups such as Crozet, Kerguelen, Heard, and Marion (BirdLife International, 2022b). In addition, breeding

is observed repeatedly in the Antarctic, especially on Laurie Island, South Orkney Islands (Coria et al., 2011) or in the area of the South Shetland Islands, e.g., on Ridley Island (Jabłoński, 1984), Elephant Island (Petry et al., 2018), Livingston Island (Croxall cited in Volkman et al., 1982; Torres et al., 1986; Pfeiffer & Peter, 2003), on Deception Island (Croxall & Kirkwood, 1979; Bernstein & Tirrell, 1981; ATS, 2005), Gibbs and Nelson Island (Volkman et al., 1982) and in the Western Antarctic Peninsula (Gorman et al., 2010). The southernmost documented breeding site is on Cormorant Island (64° S), Palmer Archipelago (Gorman et al., 2010). In addition, numerous observations of migrating macaroni penguins are documented in the Antarctic (e.g., Torres et al., 1986), including on islands of the Palmer Archipelago (Gorman et al., 2010). Observations of this species from King George Island are available from the offshore Penguin Island (Pfeiffer & Peter, 2004), Admiralty Bay (Jabłoński, 1986; Trivelpiece et al., 1987; Lesiński, 1993; Sierakowski et al., 2017) and Potter Peninsula (Peter et al., 1988; Aguirre, 1995; Hahn et al., 1998). The southernmost record of a macaroni penguin is from the Haswell Archipelago, East Antarctica (66° S, Golubev, 2016) and from Avian Island, Marguerite Bay, Antarctic Peninsula (67° S, Gorman et al., 2010). As in the Fildes Region, the species has often been observed in summer or autumn among other native penguins (Gorman et al., 2010; Sierakowski et al., 2017).

Rockhopper penguins have a circumpolar breeding area on islands in the southern Atlantic, Pacific, and Indian Ocean between 46° and 56° S (Marchant & Higgins, 1990a; Pütz et al., 2013). The southernmost known breeding record is from the 1976–1977 season from Clarence Island, South Shetland Islands (61° S, Furse, 1979 cited in Trivelpiece et al., 1987). Other observations of vagrant rockhopper penguins in the Antarctic are generally rare, documented for example for Laurie Island (Marchant & Higgins, 1990a; Coria et al., 2011) and Moe Island (Tickell, 1965), both in the South Orkney Islands, as well as for Cormorant Island, Palmer Archipelago (64° S, Matthew, 1982). Besides the Fildes Region, for the South Shetland Islands, rockhopper penguins are recorded on Elephant Island (Petry et al., 2013b), Half Moon Island (Marin, 2014), and Admiralty Bay, King George Island (Trivelpiece et al., 1987; Marin, 2014; Sierakowski et al., 2017).

The distribution of the Magellanic penguin extends to the coasts of Argentina and Chile and the Falkland Islands (BirdLife International, 2022c). However, the species occasionally turns up in the Antarctic. It has been recorded, e.g., in Admiralty Bay, King George Island (Trivelpiece et al., 1987), in the South Orkney Islands (Rootes, 1988; Coria et al., 2011), and at the north-eastern Antarctic Peninsula (Montalti et al., 1999). The southernmost record observation was reported in 2006 on Avian Island, Marguerite Bay, Antarctic Peninsula (67° S, Barbosa et al., 2007).

4.2 Diomedeidae (Procellariiformes)

Most Diomedeidae (albatross) species live in subpolar and polar latitudes of the southern hemisphere. The main breeding areas are Subantarctic islands, such as the Falkland Islands, South Georgia, Macquarie, Marion, Kerguelen, and Crozet Islands (Marchant & Higgins, 1990a). Outside the breeding areas, albatrosses reach the latitudes of the Antarctic Convergence and further south. Thus, several albatross species occasionally occur in the Antarctic (SCAR Expert Group on Birds, 2005), except for the wandering albatross, which rarely ventures so far south (Peter et al., 1988). Black-browed albatrosses regularly travel as far as 64° S in the South Shetland Islands region (Shirihai, 2002). It has been also been observed in Admiralty Bay, Maxwell Bay, and Fildes Strait, all adjacent to the Fildes Region (Lumpe & Weidinger, 2000; Sierakowski et al., 2017). Since the 1980s, light-mantled sooty albatrosses have occasionally been observed in the Fildes Region as part of breeding bird monitoring (Peter et al., 1988). These were considered vagrant until the first reliable breeding record was made in the 2008–2009

season (Lisovski et al., 2009). This breeding site of the sooty albatross in the Fildes Region is, so far, the southernmost breeding colony of an albatross species ever recorded.

4.3 Procellariidae (Procellariiformes)

A large number of migratory seabirds, especially members of the Procellariiformes, breed in the southern hemisphere and regularly visit the maritime Antarctic. However, due to their pelagic lifestyle, they are rarely found in the coastal regions of the Fildes Region.

Both members of the giant petrel genus (southern giant petrel and northern giant petrel) have a circumpolar distribution (Warham, 1990). They were considered to belong to one species until 1966 (Patterson et al., 2008). They were subsequently classified as two species based on proven morphological and behavioural differences (Bourne & Warham, 1966). While the southern giant petrel is a breeding species in the Antarctic Peninsula region (Braun et al., 2012; Korczak-Abshire et al., 2019), the breeding range of the northern giant petrel is restricted to Subantarctic islands north of the Antarctic Convergence (Patterson et al., 2008). On five of these island groups (South Georgia, Prince Edward Islands, Îles Crozet, Îles Kerguelen and Macquarie Island), the two species breed sympatrically but differ in breeding chronology (Hunter, 1987; Patterson et al., 2008; Brown et al., 2015) and foraging behaviour (Granroth-Wilding & Phillips, 2019). Hybridization between the two species (male *M. giganteus* and female *M. halli*) has nevertheless been observed on Bird Island (South Georgia), Marion Island, and (very rarely) Macquarie Island (Techow et al., 2010; Brown et al., 2015). Only on Bird Island has successful hybrid breeding been recorded (Hunter et al., 1982; Brown et al., 2015). Sighting records from the Antarctic are available for Signy Island, South Orkney Islands (Rootes, 1988; Coria et al., 2011) as well as Elephant Island (Petersen et al., 2015) and Half Moon Island (Marin, 2014), both South Shetland Islands.

4.4 Pelecanoididae (Procellariiformes)

The diving petrels of the family Pelecanoididae (order Procellariiformes) as seabirds of the southern hemisphere breed on Subantarctic islands, especially on South Georgia, Tristan da Cunha, but also off the coasts of Chile, Peru, Australia and New Zealand (Marchant & Higgins, 1990b). They hardly reach that far south, and there is a lack of further evidence from coastal areas of the Antarctic Peninsula region, apart from the one presented here.

4.5 Stercorariidae / Laridae (Charadriiformes)

Hybridization in southern hemisphere skuas occurs in areas where brown and southern polar skuas breed sympatrically (Ritz et al., 2006). On the other hand, hybridization with a Chilean skua has only been rarely described (Reinhardt et al., 1997). The breeding range of the Chilean skua extends to the coasts of Argentina and Chile as far as Peru (Marchant & Higgins, 1990b). There are only a few records of this species in the Antarctic, e.g., for Hope Bay, northern Antarctic Peninsula (Cordier et al., 1983), and from King George Island (Gantlett & Harrap, 1992). In Admiralty Bay, King George Island, one Chilean skua was observed in February 1995 (Sierakowski et al., 2017). In 2004–2005, a Chilean skua or hybrid also bred there (Costa & Alves, 2008). On the Potter Peninsula, King George Island, a breeding bird with clear Chilean skua characteristics was observed in December 1993 (Reinhardt et al., 1997; Hahn et al., 1998). A hybrid was also observed here in January 1994. Mitochondrial DNA examination verified it as a hybrid between Chilean and south polar skua (Reinhardt et al., 1997). The fact that brown, south polar, and Chilean skuas hybridize and produce fertile offspring underlines the need to discuss the status of southern skuas as a subspecies (Reinhardt et al., 1997).

The breeding range of the pomarine jaeger extends to the far north of Eurasia and North America (BirdLife International, 2022d). Outside the breeding season, the pomarine jaeger crosses the

equator and overwinters on the oceans, including as far as the coasts of South America (Higgins & Davies, 1996; BirdLife International, 2022d) or the South Atlantic (Burton & Croxall, 2012). There are few reports of observations of this species in the Antarctic (e.g., Watson, 1975; Higgins & Davies, 1996), as far south as the Haswell Archipelago (66° S; Golubev, 2020).

The South American tern breeds along the coasts of Peru and eastern Brazil as far as Tierra del Fuego, as well as in the Falkland Islands (Shirihai, 2002). Outside the breeding season, it migrates north to Brazil and Ecuador. Thus, the occurrence of a South American tern in the Fildes Region is atypical, and, assuming correct species identification, this observation is probably the only known record of this vagrant in the Antarctic (SCAR Expert Group on Birds, 2005).

4.6 Scolopacidae (Charadriiformes)

The first report of white-rumped sandpipers on Ardley Island represents the earliest-ever record of a representative of the Scolopacidae family in the Antarctic. This North American species is known to have one of the longest migration routes (Higgins & Davies, 1996). There are numerous observations of the species in the Antarctic, and the weather seems to play an important role in determining when white-rumped sandpipers reach high altitudes (Korczak-Abshire et al., 2011a). More southerly observations are reported from the Northern Antarctic Peninsula (63° S; Pavel & Weidinger, 2013; Silvestro et al., 2021).

Repeated observations of large groups of white-rumped sandpipers (up to 25 individuals in Admiralty Bay, King George Island), sometimes over long periods (between the end of October 1985 and at least mid-February 1986), prove that these animals can stay in the Maritime Antarctic during the entire southern summer if conditions are favourable (Trivelpiece et al., 1987; Korczak-Abshire et al., 2011b). This is supported by numerous reports of foraging sandpipers in the coastal area and lakes (e.g., Trivelpiece et al., 1987; Milius, 2000; Korczak-Abshire et al., 2011b; Pavel & Weidinger, 2013; Petersen et al., 2015). In line with this, despite the systematic recording of all mortalities of visitors and vagrants since 2003–2004, no mortalities of white-rumped sandpipers have been documented in the Fildes Region, in contrast to other species. It is, therefore, probable that this species can find sufficient food in the form of algae and crustaceans in the area and continue their route. Another, but much rarer, vagrant of the Scolopacidae in the Antarctic is the pectoral sandpiper, which breeds in western North America and eastern Russia and overwinters predominantly in southern South America (BirdLife International, 2022e). This species is recorded in the circumpolar and Subantarctic regions of the Falkland Islands, Tristan da Cunha, South Georgia, and the South Sandwich Islands (Prince & Croxall, 1996; BirdLife International, 2022e). The only published record of this species so far from the Antarctic is one from Rothera Point in 1978 (Milius, 2000).

The Arctic-breeding Baird's sandpiper moves to South America during the non-breeding period and may be rarely seen in the Antarctic (SCAR Expert Group on Birds, 2005; BirdLife International, 2022f). To our knowledge, published observations of this species from the Antarctic are only available for Signy Island, South Orkney Islands (Rootes, 1988).

Further representatives of the Scolopacidae recorded in Antarctica are the least sandpiper *Calidris minutilla* (Vieillot, 1819) (Hemmings, 1985), upland sandpiper *Bartramia longicauda* (Bechstein, 1812) (Dabbene, 1923; Holdgate, 1965; Petersen et al., 2015), Hudsonian godwit *Limosa haemastica* (Linnaeus, 1758) (Juáres et al., 2010), and Wilson's phalarope *Phalaropus tricolor* (Vieillot, 1819) (Conroy, 1971; Rootes, 1988; Sierakowski et al., 2017). However, none of these have been reported from the Fildes Region.

4.7 Ardeidae (Ciconiiformes)

The Ardeidae family includes the cattle egret, which has rapidly spread since the end of the XIXth cen-

tury and now has an almost global distribution. From an original distribution of Africa, Asia, and south-western Europe (Marchant & Higgins, 1990b), the species has succeeded in permanently colonizing all other continents – with the exception of the Antarctic (Marchant & Higgins, 1990b). In the 1870s, the species started to occur in the Americas and, in the 1970s, spread rapidly into South America (Handtke & Mauersberger, 1977). This spread into South America led to an increase in cattle egret observations from the Falkland Islands (Strange, 1979) and South Georgia (Prince & Croxall, 1983; Prince & Croxall, 1996). That these cattle egrets died was possibly because they lacked food (especially insects, Marchant & Higgins, 1990b) or because of the unfavourable climate. Cattle egrets are now regular vagrants in the Antarctic (BirdLife International, 2022g), as evidenced by numerous observations south of 60° S (e.g., Prince & Croxall, 1983; Torres et al., 1986; Trivelpiece et al., 1987; Rootes, 1988; Mönke & Bick, 1990).

It is likely, therefore, that the occurrence of this species depends strongly on weather conditions, especially wind direction and strength. As most observations of live birds in the Antarctic were in late summer or autumn (Prince & Croxall, 1996), strong autumn storms seem to promote the drift of cattle egrets to higher latitudes. Beginning in the 1984–1985 season, numerous cattle egrets have also been documented for King George Island from Admiralty Bay (Trivelpiece et al., 1987; Petersen et al., 2015; Sierakowski et al., 2017) and Potter Peninsula (Aguirre, 1995; Silva et al., 1995). There are further observations of cattle egrets from the South Shetland Islands area, e.g., Elephant Island (Petersen et al., 2015; Rossi et al., 2015), Deception Island (Ibácez & Monge, 1999/2001), Penguin Island (Sander et al., 1988 cited in Petersen et al., 2015), and Nelson Island (Silva et al., 1995; USA, 2022).

4.8 Anatidae (Anseriformes)

Several species from the Anatidae family, which includes ducks, geese, and swans, occasionally occur in the Antarctic. One of these species is the black-necked swan. It is widespread in southern South America and the Falkland Islands and usually migrates northwards in winter (Shirihai, 2002).

The first report of a black-necked swan in the Antarctic – specifically in the South Shetland Islands – dates from the 1916–1917 season (Bennett, 1922). There are numerous other observations of this species in high latitudes. Most of these are from the South Shetland Islands (Orgeira & Fogliatto, 1991; Lesiński, 1993; Aguirre, 1995; Silva et al., 1995; Hahn et al., 1998; Olavarría et al., 1999; Sierakowski et al., 2017; USA, 2022) and the South Orkney Islands (Coria et al., 2011). Others, however, come from the Antarctic Peninsula (Orgeira & Fogliatto, 1991; Olavarría et al., 1999; Quintana et al., 2000).

Noteworthy are many parallel observations of black-necked swans in January and February 1989 from several locations. Many of these locations are on the Antarctic Peninsula, e.g., Anvers Island and Wiencke Island (Parmelee & Fraser, 1989), Petermann Island (Stonehouse cited in Lazo & Yacez, 1989), and Hope Bay (Orgeira & Fogliatto, 1991). There are others, however, from several islands in the South Shetland Islands, including Deception Island (Lazo & Yacez, 1989), Livingston Island (Lazo & Yacez, 1989; Lange & Naumann, 1990), Nelson Island (Bastos et al., 1989; Favero et al., 1991; Orgeira & Fogliatto, 1991), and King George Island.

On King George Island, black-necked swans have been sighted on Fildes Peninsula, Potter Peninsula (Aguirre, 1995), and Admiralty Bay (Sierakowski, 1991; Lesiński, 1993; Sierakowski et al., 2017). These sightings amounted to 64 individuals documented at 16 sites between January and March 1989 (Orgeira & Fogliatto, 1991). Such a peak in simultaneous sightings suggests a connection with storms affecting the usual migration route or severe drought in Argentina (Orgeira & Fogliatto, 1991).

Chiloé wigeon are native to southern South America and the Falkland Islands and are con-

sidered vagrants to South Georgia, the South Orkney and South Shetland Islands and the Antarctic Peninsula (Marchant & Higgins, 1990b), including Anvers Island (Parmelee et al., 1977; Maxson & Bernstein, 1980). The first known record for King George Island was from Admiralty Bay when four Chiloé wigeon were sighted in late 1981 following a strong storm from the northwest (Trivelpiece et al., 1987). These stayed in the area for 46 days and were frequently observed foraging. One was later found dead, and the other three subsequently disappeared. In October 2013, two individuals – along with 16 individuals of rosy-billed pochard *Netta peposaca* (Vieillot, 1816) – have been observed on the neighbouring Potter Peninsula (Perchivale et al., 2016).

The yellow-billed pintail contains two subspecies, *A. g. spinicauda* and *A. g. georgica*. Taking the subspecies together gives the species a range extending to South America, the Falkland Islands and South Georgia (Marchant & Higgins, 1990b). Observations of pintail ducks of the subspecies *A. g. spinicauda* as vagrants are reported for the Antarctic Peninsula (Cordier et al., 1983), the South Orkney Islands (Burton, 1967; Rootes, 1988) and the South Shetland Islands, partly since 1916–1917 (e.g., Bennett, 1922; Parmelee et al., 1977; Maxson & Bernstein, 1980; Rootes, 1988). There are also several records for King George Island in the 1980s and 1990s, such as for Admiralty Bay (Trivelpiece et al., 1987; Sierakowski et al., 2017) and Potter Peninsula (Aguirre, 1995; Hahn et al., 1998). The animals always occurred in groups of up to 20 individuals (Trivelpiece et al., 1987; Sierakowski et al., 2017).

The occurrence patterns for both the Scolopacidae and Anatidae suggest that their presence in the Antarctic coincides with very strong winds or storms from a northerly or north-westerly direction (Trivelpiece et al., 1987; Lazo & Yacez, 1989; Lange & Naumann, 1990; Korczak-Abshire et al., 2011a; Perchivale et al., 2016; Sierakowski et al., 2017). The relatively long residence time of representatives of the Anatidae in the Antarctic region during the austral summer, which has been repeatedly documented (Maxson & Bernstein, 1980; Trivelpiece et al., 1987; Lazo & Yacez, 1989; Perchivale et al., 2016), suggests that they are able to feed for a time on the freshwater algae or crustaceans (e.g., krill) and thus survive until the onset of winter (Trivelpiece et al., 1987). The extent to which they are able to actively return to their ancestral ranges is doubtful, given the presumed importance of drift by wind. It can be assumed that it is impossible for many bird species to cross the Drake Passage under their own power, i.e., without the support of strong winds.

4.9 Vagrant and visitor birds as proxys of environmental changes

Although the species range and the number of vagrants and visitors recorded are strongly dependent on the duration and intensity of recording, valuable conclusions can be drawn about prevailing and possibly changing environmental conditions (temperature rise, changes in wind regime) that enable or promote the occurrence of migratory birds in the maritime Antarctic (Petersen et al., 2015). For example, the occurrence of various vagrants, such as ducks, cattle egrets, or sandpipers, seems to be linked to strong winds or storms from a northerly and north-westerly direction. In view of the ongoing environmental changes, the number of bird species visiting the area and the frequency of their occurrence is likely to increase (Pavel & Weidinger, 2013).

On the other hand, repeated occurrences of certain species outside their traditional breeding areas may indicate an expansion of their range (Newton, 2008; Juáres et al., 2017; Gryz et al., 2019). The current regional climate warming may already result in a bio-geographic range shift for some penguin species (Gorman et al., 2010; Raya Rey et al., 2022). Concurrent with this, the Southern gentoo penguin *Pygoscelis papua ellsworthii* subspecies represents an example of a southward expansion in the Antarctic Peninsula as a result of increasing temperatures (e.g., Lynch et al., 2012; Clucas et al., 2014). Consequently, the occurren-

ce of mature individuals and multiple successive breeding attempts of macaroni and king penguins may also indicate an attempt to colonize areas of the Antarctic Peninsula (Gorman et al., 2010; Petry et al., 2013a; Juáres et al., 2017; Gryz et al., 2019; Borowicz et al., 2020).

5 Conclusions

The majority of the vagrant and visitor bird species observed in the Fildes Region in the past decades are seabirds with a circumpolar distribution or birds with their usual habitat in South America using the Fildes Region for some kind of refuge when they are exhausted while others are dispersed further south usually by strong winds.

In view of the ongoing environmental changes, the number of bird species visiting the area and the frequency of their occurrence is likely to increase. Thus, in addition to contributing to the knowledge of rare bird sightings in the Antarctic Peninsula region, we hope to stimulate further over-regional studies comparisons regarding changes in the spectrum of vagrant and visitor bird species and the frequency of rare bird observations which may indicate unusual environmental conditions in the Antarctic that may be related to current climatic change.

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Залітні та кочові птахи в регіоні Файлдс (о. Кінг-Джордж, морська Антарктика)

Реферат. Наведено відомості про всі залітні та кочові види птахів, зареєстровані в регіоні Файлдс (о. Кінг-Джордж, Південні Шетландські острови, Антарктика) під час моніторингу від сезону 1979–1980 до сезону 2022–2023. В межах досліджуваної території, площа, не вкрита льодом, становить приблизно 35 км^2, що є

однією з найбільших таких площ в межах західного Антарктичного півострова. На додачу до 13 видів, що розмножувалися та одного, що потенційно здатен до розмноження в цьому регіоні, ми відмітили 28 видів птахів, які не розмножувалися (18 кочових та 10 залітних); серед них були представники родин Spheniscidae, Diomedeidae, Procellariidae, Pelecanoididae, Laridae, Ardeidae, Scolopacidae та Anatidae. Окрім того, ми наводимо відомості про частоту спостережень видів птахів, що не розмножуються в дослідженому регіоні. Найчастіше спостерігали *Calidris fuscicollis, Bubulcus ibis, Aptenodytes forsteri, Eudyptes chrisolophus* та *Aptenodytes patagonicus.* Ці дані розширюють знання про рідкісних птахів в Антарктиці. Разом з іншими подібними дослідженнями, ця інформація також потенційно дає можливість виокремити незвичні умови довкілля, які дозволяють кочовим птахам досягати місць поза їхнім звичним ареалом. Окрім того, довгострокові спостереження рідкісних видів птахів можуть вказувати на можливе розширення ареалів розмноження деяких видів. Подібні дослідження є корисними для оцінки змін довкілля, що вже відбуваються внаслідок кліматичних змін, таких як зміни морського льодового режиму чи структур харчових мереж.

Ключові слова: кочівля, моніторинг птахів, Південні Шетландські острови, регіон Файлдс, реєстрація рідкісних птахів, розподіл видів