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# Vagrants and visitors in the avifauna of the Haswell archipelago, East Antarctica

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**Abstract:** The purpose of the work is to provide a comprehensive review of the available historical and current records of vagrant and visiting individuals sighted at the Haswell archipelago, near the Russian Antarctic station Mirny (Davis Sea, southern Indian Ocean), from 1956 to 2016. Three rare vagrant species (eight observations) were recorded: the Chinstrap Penguin (*Pygoscelis antarctica*), Macaroni Penguin (*Eudyptes chrysolophus*) and Kelp Gull (*Larus dominicanus*). The Southern Giant Petrel (*Macronectes giganteus*; ten observations) and Pomarine Jaeger (*Stercorarius pomarinus*; a single observation) were visitors of the archipelago. Southern Giant Petrels and all vagrant individuals are of southern origin, the Pomarine Jaeger is a Holarctic breeding species. A single vagrant (and one uncertain case) appeared in the austral spring, and another eight – in the summer. Three cases of visitors were recorded in the austral spring, and eight in the summer. Records of vagrancy and visitors cover the dynamic period of changes in ice conditions. While most vagrants and visitors were sighted only for one day, two Macaroni Penguins stayed for several days at the archipelago. The most detailed issues in this work are those related to the study of vagrancy. I evaluate the possibilities of limited existence of vagrants and visitors into groups of endemic species as well as interspecific interactions. I also discuss the physical condition of vagrant individuals and factors contributing to their survival, ponder on the origin of vagrant individuals and visitors, their association with specific populations and causes of vagrancy.

Key words: Antarctic, Haswell Islands, Mirny Station, birds, out-of-range individuals.

## Introduction

Vagrants and visitors are a characteristic structural component of many avifaunistic assemblages of Antarctica (Woehler 1992; Petersen *et al.* 2015; Sierakowski *et al.* 2017) and the sub-Antarctic (Newton *et al.* 1983; Gauthier-Clerc *et al.* 2002; Oosthuizen *et al.* 2009). Their registration not only supplements the local and regional taxonomic checklists, but often importantly contributes to the "portraits" of species, allows for a more accurate determination of their status.

Visitor species are those observed out of their normal range (*e.g.* during migrations) and can be spotted tens, hundreds and even thousands of kilometers from breeding sites. Visitors are found in places not related to extraordinary events in their lives, *e.g.* dispersion of immature Southern Giant Petrels *Macronectes giganteus* (Gmelin, 1789) (Sander *et al*. 2010; van den Hoff 2011). In comparison, vagrants appear outside their home range and, at the same time, in a different habitat. They can be often observed under the conditions of extreme survival, *e.g.* Kerguelen Pintail *Anas eatoni* (Sharpe, 1875) at Mawson Station (Johnstone and Irvine 2004). Due to the harsh polar conditions the likelihood of survival of vagrant individuals in Antarctica can be significantly reduced (Sierakowski *et al.* 2017). From the point of view of a naturalist, sightings of vagrant species belong to the category of extraordinary avifaunistic events, although the phenomenon of vagrancy is widespread in the class Aves. It is inherent in many species of birds, especially migratory ones (Lees and Gilroy 2009).

The study of the vagrancy is of particular interest in Antarctica, the “ultimate frontier”. Antarctic vagrants hold a number of records with regard to survival and length of distances traveled. For example, South Polar Skuas *Catharacta maccormicki* (H. Saunders, 1893) have been observed as far south as the central parts of the Antarctic Continent. This includes observations at the South Pole, also at some distance from it, as well as at the Earth’s Southern Pole of Cold (at the Vostok Antarctic Station). Obviously, such birds are unlikely to survive as they probably have insufficient body reserves to return to the coast, and food resources are non-existent along their way (Eklund 1958; Petrov and Chernov 1965; Sabbatini 2003).

Many seabirds are naturally long-distance migrants, and they forage in the ocean. Occasionally, even land birds are encountered at sea, sometimes far from the shores of their native continents (*e.g.* Orgeira 1996). Vagrants (marine and non-marine species) also appear among the local avifauna at remote and inaccessible islands, archipelagos and sections of the coast of Antarctica and adjacent areas (Woehler 1992; Copson and Brothers 2008; Oosthuizen *et al.* 2009; Petersen *et al.* 2015).

It is well known that individuals of each bird population have certain spatial connections with the inhabited territory that allow them to optimally navigate in the environment and adequately implement an individual program of life history. But the stability of these connections can sometimes be compromised or broken.

For various reasons, perhaps forced by circumstances such as storm events, some birds may experience disruption of their orientation system. These individuals may thus become vagrants and appear in unfamiliar habitats, far from their normal range. That is why, for example, vagrant charadriid waders from the Palaearctic arrive on the sub-Antarctic islands (Roux and Martinez 1987; Gauthier-Clerc *et al.* 2002), and some South American bird species and cosmopolitans are found at the Antarctic Peninsula (Marin 2014).

Despite the substantial material already accumulated by ornithologists over a long period of observation, the phenomenon of vagrancy, its causes and mechanisms are still poorly understood (Thorup *et al.* 2012). The need to study vagrancy in local faunistic assemblages allows us to better understand the significance of this phenomenon against the backdrop of dynamic changes in climate, the natural environment and increased human activity. It also sheds light on some issues related to the formation of local sub-Antarctic and Antarctic avifauna, extremal situations, dispersion and migration as well as the impact of colonization through vagrancy on local terrestrial biota (*e.g.* Cowie and Holland 2006; Lees and Gilroy 2009; Oosthuizen *et al.* 2009; Gryz *et al.* 2015). Furthermore, vagrant birds can become a driver of transoceanic transfer of vascular plant spores from temperate latitudes to the sub-Antarctic (Kalwij *et al.* 2019), and can contribute to change in the native vegetation cover of sub-Antarctic islands, as some alien plant species can spread quickly and displace native species (Bergstrom and Smith 1990).

The purpose of this work is to comprehensively review the available historical and current records of vagrant individuals and visitors at the Haswell archipelago as well as to offer interpretations for these infrequent events.

## Material and methods

The islands of the Haswell archipelago (also known as the Haswell Islands; East Antarctica) support the largest breeding populations of colonial seabirds in the Davis Sea basin (southern Indian Ocean), and hence provide an excellent opportunity to record non-breeding bird species. Most bird diversity (eight species) occurs at Haswell Island that due to its abundant wildlife has become an Antarctic Specially Protected Area (ASPA 127). Five species of pinnipeds have also been sighted here (Mawson 1915; Korotkevich 1958; Arseniev 1960; Starck 1980).

The data for this article were derived from material collected at the Russian research station Mirny (66˚33′11″ S; 93˚00′35″ E; Fig.1), located in the vicinity of said archipelago, during a long-term, non-annual monitoring study of seabirds and mammals. I have gathered information on historical and recent sightings of vagrants and visitors recorded between 1956 and 2016, including previously published records, unpublished evidence obtained from colleagues, collections of bird skins from the collections of museums in St. Petersburg and Moscow.


Fig. 1. Location map of study area.

All recent observations were made between 8 January 2012 and 7 January 2013 as well as between 9 January 2015 and 14 January 2016.

This report only includes records of vagrants and visitors noted by biologists (in order to avoid potential misidentifications), although the number of observations of visitors (Southern Giant Petrels) would be supposedly larger upon inclusion of those made by other polar researchers and maintenance personnel of the Mirny Station. Non-biologists reported the direction of flight, the distance from the object to the observer, time, the large size of the observed individuals. Unfortunately, the latter observers were not able to identify/discriminate between the Southern and Northern Giant Petrels *Macronectes halli* Mathews, 1912, and rather vaguely described spotted individuals. The lack of available photographs was an additional inconvenience.

## Results

The avifauna of the Haswell archipelago consists solely of native, mostly endemic species. There are neither non-marine vagrant avian species nor any introduced or domestic species of birds and mammals. The geographic location of the archipelago, its remoteness and relative isolation from sub-Antarctic islands, climatic, meteorological, oceanographic features and environmental conditions determine the low species composition of resident breeding populations as well as a limited number of non-breeding bird species.

Since the discovery of these islands by a party of Mawson's Australasian Antarctic Expedition (1911–1914; Mawson 1915), 14 seabird species were documented until 2016. Nine seabird species breed at the Haswell archipelago annually: Emperor Penguin *Aptenodytes forsteri* Gray, 1844, Adélie Penguin *Pygoscelis adeliae* (Hombron and Jacquinot, 1841), Southern Fulmar *Fulmarus glacialoides* (Smith, 1840), Antarctic Petrel *Thalassoica antarctica* (J.F. Gmelin, 1789), Cape Petrel *Daption capense* (Linnaeus, 1758), Snow Petrel *Pagodroma nivea* (G. Forster, 1777), Wilson's Storm Petrel *Oceanites oceanicus* Kuhl, 1820, South Polar Skua and subspecies of Brown Skua *Catharacta antarctica lonnbergi* (Mathews, 1912) (Golubev 2018). The last one was first recorded here in the austral summer of 2009/2010 (Mizin 2015). Since 2012, Brown Skuas —including alleged hybrids—have been documented to form breeding pairs with South Polar Skuas, but breeding pairs of the former have not been recorded (author's personal observation). The status of the Brown Skua has changed from a non-breeding to a breeding species over the course of four years (2009/2010–2012/2013). Breeding of mixed pairs of skuas occurs only on Haswell Island. According to the author's preliminary data, in 2012/2013 two pairs were breeding on the island, in 2014/2015 – a single pair, in 2015/2016 – two pairs and one pair did not have a nest. It is possible that we are witnessing, for the first time, the initial stage of the colonization of the archipelago by the Brown Skua. In the past, Brown Skuas were recorded repeatedly in a number of places in East Antarctica (Woehler 1992), but they appear to be rare visitors to the Ross Sea region (Spurr *et al.* 1990). There was a single observation of a Brown Skua breeding with a South Polar Skua at Port Martin, Adélie Land (Barbraud *et al.* 1999).

Most non-breeding seabird species at the Haswell archipelago are outside their natural distribution. Three rare vagrant species were recorded, and include the Chinstrap Penguin *Pygoscelis antarctica* (J.R. Forster, 1781), Macaroni Penguin *Eudyptes chrysolophus* (Brandt, 1837) and Kelp Gull *Larus dominicanus* Lichtenstein, 1823. The only regular spring/summer visitor is the Southern Giant Petrel and Pomarine Jaeger *Stercorarius pomarinus* (Temminck, 1815) is a very rare summer visitor (for a complete list of vagrants and visitors, both the historical and recent records, see Table 1).

Southern Giant Petrels are widely dispersed within maritime Antarctica and subtropical waters (Sander *et al.* 2010; van den Hoff 2011); however, they breed

Table 1

Records of vagrant bird species and visitors in the avifauna of the Haswell archipelago (1956-2016). Abbreviations: V – vagrant, V? – probably vagrant, RV – regular visitor, VRV – very rare visitor.

| № | Species | Status | Date | Count | Sex | Age | Place | Observer | Source |
|---|---|---|---|---|---|---|---|---|---|
| 1 | *Pygoscelis antarctica* | V | 29.01.1957 | 1[1] | Female | Adult | Haswell | E.E. Syroechkovsky | Hollerbach and Syroechkovsky 1960 |
| 2 | *Pygoscelis antarctica* | V? | 21.11.1962 | 1 | | | Near Haswell | M.E. Pryor | Pryor 1968 |
| 3 | *Pygoscelis antarctica* | V | 25.02.2004 | 1 | | Adult | Hill of the Winds | Y.A. Mizin | Mizin 2004 |
| 4 | *Eudyptes chrysolophus* | V | 20–26.02.2000 | 1 | | Adult | Mabus Point | Y.A. Mizin, A.S. Chernov | Golubev 2016b |
| 5 | *Eudyptes chrysolophus* | V | 02–11.02.2012 | 1 | Likely a male | Likely to be 1-year-old | Mabus Point | S.V. Golubev | Golubev 2016b |
| 6 | *Eudyptes chrysolophus* | V | 17.02.2012 | 1 | Likely a female | Likely to be 1-year-old | Hill of the Winds | S.V. Golubev | Golubev 2016b |
| 7 | *Macronectes giganteus* | RV | 08.11.1962 | 1 | | | Haswell | M.E. Pryor | Pryor 1968 |
| 8 | *Macronectes giganteus* | RV | 10.11.1962 | 1[2] | | | Haswell | M.E. Pryor | Pryor 1968 |
| 9 | *Macronectes giganteus* | RV | Second half of Jan 1957 | 1 | | | Haswell | E.E. Syroechkovsky | Hollerbach and Syroechkovsky 1960 |
| 10 | *Macronectes giganteus* | RV | Second half of Jan 1957 | 1 | | | Haswell | E.E. Syroechkovsky | Hollerbach and Syroechkovsky 1960 |

Table 1 continued

| № | Species | Status | Date | Count | Sex | Age | Place | Observer | Source |
|---|---|---|---|---|---|---|---|---|---|
| 11 | *Macronectes giganteus* | RV | 30.09.2006 | 1 | | | Near Fulmar | Y.A. Mizin | Mizin 2007 |
| 12 | *Macronectes giganteus* | RV | 07.12.2006 | 1 | | | Haswell | Y.A. Mizin | Mizin 2007 |
| 13 | *Macronectes giganteus* | RV | 25.12.2009 | 1 | | | Haswell | I.A. Mizin | Mizin 2010 |
| 14 | *Macronectes giganteus* | RV | 26.02.2010 | 1 | | | Hill of the Winds | I.A. Mizin | Mizin 2010 |
| 15 | *Macronectes giganteus* | RV | 15.02.2012 | 1 | | Likely immature | Mabus Point | S.V. Golubev | Golubev 2012 |
| 16 | *Macronectes giganteus* | RV | 11.02.2015 | 1 | | Likely immature | Mabus Point | S.V. Golubev | Golubev 2016a |
| 17 | *Larus dominicanus* | V | Nov-Dec 1956–1957 | Several | | | Near Mirny Station | E.S. Korotkevich | Korotkevich 1959 |
| 18 | *Larus dominicanus* | V | 05.12.1956 | 1[3] | | Adult | Haswell | E.S. Korotkevich | Korotkevich 1959 |
| 19 | *Larus dominicanus* | V | 06.12.1999 | 1 | | Adult | Haswell | Y.A. Mizin, A.S. Chernov | Mizin and Chernov 2000 |
| 20 | *Stercorarius pomarinus* | VRV | 26.12.2003 | 1 | | Adult | Mirny Station | Y.A. Mizin | Mizin 2004 |

[1] Specimen is stored in the Zoological Museum of Moscow State University named after M.V. Lomonosov.
[2] Records № 7 and № 8 may have been of the same individual.
[3] Specimen is stored in the Department of Ornithology and Herpetology of the Zoological Institute of the Russian Academy of Sciences.

mainly on sub-Antarctic islands scattered throughout the Southern Ocean and at the Antarctic Peninsula. In East Antarctica, there are only four known breeding sites (Wienecke *et al.* 2009). Records of immature Southern Giant Petrels are likely part of the track of their regular movements (Sander *et al.* 2010; van den Hoff 2011) along the coast of Antarctica. Pomarine Jaeger is a Holarctic, non-Antarctic species. It breeds in the northern hemisphere, and winters in the open sea or in coastal waters of continents (Harrison 1983).

In total, I found 19 records of non-breeding species: Chinstrap Penguins and Macaroni Penguins were recorded three times, Kelp Gulls were sighted twice, a Pomarine Jaeger once, and Southern Giant Petrels ten times. The number of records of the South Giant Petrel exceeds the total number of records of all vagrant species. The Pomarine Jaeger is trans-equatorial migrant, migrates to the southern hemisphere during the northern winter. The remaining four species came from other regions in Antarctica and the sub-Antarctic (Macaroni and Chinstrap penguins, Southern Giant Petrel), or from the southern parts of other continents and the north of the Antarctic Peninsula (Kelp Gull). The only bird that may have arrived at the archipelago via an Antarctic expedition vessel is the Pomarine Jaeger, whose observation at Mirny coincided with the arrival of the RV Akademik Fedorov (Mizin 2004).

Non-breeding birds were recorded at the archipelago during the dynamic period of changes in the sea ice, *i.e.* in the interval between the maximum fast ice development (September and October) and the clearing of the water area from ice (February). Chinstrap Penguins appeared between breakout of fast ice (late November) and clearing of sea ice (February). Macaroni Penguins were noted only in February when the sea ice had disappeared and the coastal waters were clear of ice. Kelp Gulls were observed between the presence of fast ice and its breaking (November and December). The Pomarine Jaeger (adult, light morph) was found in December when the fast ice was breaking out. Southern Giant Petrels were sighted from September to February under a wide range of ice conditions. The timing of the occurrence of vagrants and visitors is closely related to the local features of oceanography, especially with regard to sea ice conditions. Thus, their appearance off the coast of Antarctica is a seasonal phenomenon, which for species breeding at high southern latitudes covers the most favorable time of the year (reduced sea ice extent and the clearing of the water area from ice, availability and abundance of food).

The visits by vagrants and visitors were largely limited to a single day. Macaroni Penguins stayed for the longest periods of time on the archipelago; two of them for seven and ten days, respectively. However, some vagrants, for example, Macaroni Penguins on the Hill of Winds, may have stayed longer, but due to logistic and other conditions, the site where vagrants were seen was not revisited, and the actual length of their stay was not established.

Wandering penguins gravitated to Adélie Penguin groups. Chinstrap Penguins were observed together with Adélie Penguin groups in all three cases,

and no aggressive interactions were observed between these two species (Gollerbach and Syroechkovsky 1960; Pryor 1968; Mizin 2004). The three Macaroni Penguins joined groups of moulted Adélie Penguins. Non-contact aggressive interactions were recorded only between an adult Macaroni Penguin and Adélie Penguin nearest to it, but similar aggressive reactions were also observed between Adélie Penguins (Mizin and Chernov 2000). Southern Giant Petrels made reconnaissance flights over Haswell Island, landing only occasionally (six cases). One of them flew over the Emperor Penguins colony, and two crossed the area in transit (Gollerbach and Syroechkovsky 1960; Pryor 1968; Mizin 2007; Mizin 2010; author's data). Generally, local bird species did not react aggressively towards the vagrants or visitors. One of the two solitary Kelp Gulls was present for several hours. While flying, a South Polar Skua repeatedly attacked the gull, but there were no attacks when the bird sat on the ground (Mizin and Chernov 2000). At Australian Antarctic stations, South Polar Skuas also targeted Kelp Gulls on several occasions (Bassett *et al.* 1988). The Pomarine Jaeger flew towards the South Polar Skuas sitting on the snow for several minutes, but was expelled by them (Mizin 2004). Transit flight and reconnaissance behavior were observed for the Southern Giant Petrel, Kelp Gull and Pomarine Jaeger. Chinstrap and Macaroni penguins exhibited comfort behaviors, such as grooming, rest, sleep and sipping.

Chinstrap and Macaroni penguins did not have difficulty introducing into local Adélie Penguins groups. There were no indications of aggression by local birds towards Southern Giant Petrels. In contrast, South Polar Skuas attacked the Kelp Gulls and the Pomarine Jaeger, and their continued presence on the archipelago was doubtful. Consequently, the chances of limited integration into local groups of aboriginal species may be higher in both penguin species and Southern Giant Petrels than for the gulls.

## Discussion

For many resident species the Antarctic coast is the southern limit of distribution. Therefore, the number of bird species breeding at the archipelago is not high, and the species diversity of non-breeding birds is almost two times lower. Sightings of visitors and vagrant species are associated with the level of ornithological activity and cannot be considered exhaustive, since (as a rule) only the year-round presence of a biologist at Mirny increased the number of non-breeding bird records from one to three (*e.g.* Korotkevich 1959; Pryor 1968; Mizin 2004; Golubev 2016a; Table 1).

**An assumption of provenance of vagrant individuals and visitors and link to specific populations. —** The dispersal of vagrant individuals from sub-Antarctic islands most likely occurs in all directions. The vast water masses of the Southern Ocean extend for hundreds and thousands of kilometers from

Antarctica to the nearest northern landmasses. Thus, the Southern Ocean generates strong spatial isolation and serves as an important geographical and ecological barrier for species.

None of the vagrants that could be examined from a close range had been ringed and or otherwise marked. Therefore, the birds could not be linked to a specific geographical population. However, based on the distribution of the seabird species considered here (Harrison 1983; Patterson *et al.* 2008; Wienecke *et al.* 2009), the geodesic distance from the Haswell archipelago to the nearest populations of Chinstrap Penguins is 2951 km (Balleny Islands), and for Macaroni Penguins as well as Kelp Gulls it amounts to 1828 km (Heard Island). The Southern Giant Petrel colonies nearest to Haswell Island are at Hawker Island and Frazier Islands – 683 km and 766 km, respectively. The longest distance travelled by a visitor was achieved by a Pomarine Jaeger (≥15,000 km).

**The physical condition of vagrants and visiting individuals, and factors contributing to their survival. —** All vagrants and visitors sighted at the Haswell archipelago are more (Chinstrap and Macaroni Penguins, Southern Giant Petrels) or less (Kelp Gull, Pomarine Jaeger) connected with the sea. They are able to survive and successfully cover extreme distances from their natal and/or breeding colonies. Vagrant birds observed at Mirny and its environs did not perish. On the contrary, all vagrant individuals appeared to be in good condition, even the immature Macaroni Penguin spotted on Cape Mabus. In the latter case, however, the Leopard Seal *Hydrurga leptonyx* (hunting Adélie Penguins in the vicinity) was probably responsible for a wound (a 10 cm diameter bloodstain) observed on the lower right flank of the young bird (Golubev 2016b).

Factors contributing to the survival of some vagrant individuals are associated with the use of available food resources in places of human activity. For example, in Antarctica, Kelp Gulls were repeatedly attracted to stations where they sometimes scavenged (Bassett *et al.* 1988; Thomas and Bretagnolle 1988; Woehler 1992). Although at Mirny, this species did not use kitchen waste. In the last century, an increase in observations of these gulls was likely the result of increased human activity in the Antarctic (Sagar 1976). Nowadays, kitchen waste is hardly accessible to wild birds in this polar region.

**Possible causes of vagrancy. —** Storms and hurricanes, ocean currents and features of drifting ice could contribute to the vagrancy of adult Macaroni and Chinstrap penguins. The inexperience of young birds associated with errors in navigation may lead to observed vagrancy in juvenile Macaroni Penguins. Failure in spatial orientation may also explain the sightings of Kelp Gulls and the Pomarine Jaeger probably following the RV Akademik Fedorov to the station.

In general, the influence of both biotic and abiotic factors can be responsible for vagrancy in birds in the Antarctic. Biotic factors include human activity associated with the presence of various vessels (Petersen *et al.* 2015) and navigation errors. Moreover, one of the possible causes of vagrancy may be a genetic mutation (Gilroy and Lees 2003). Abiotic factors include sea currents,

ocean winds, ice conditions and climate change. Obviously, the occurrence of some species outside their normal distribution ranges may result from the impact of a solitary factor as well as a combination of triggers (Montalti *et al.* 1999).

Records of all vagrant birds from Mirny and its environs (Table 1) are not unique to East Antarctica. Breeding populations of Chinstrap Penguins are concentrated at the Antarctic Peninsula and the sub-Antarctic islands in South Atlantic (Trivelpiece and Trivelpiece 2013). Vagrant Chinstrap Penguins were recorded several times in East Antarctica and on Ross Island (Spurr *et al.* 1990). A single Chinstrap was discovered near Davis Station in 1987; the bird incubated on an Adélie Penguin nest (Woehler 1992). At Pointe Géologie, Adélie Land, there were 40 sightings of Chinstrap Penguins from 1976 to 1986 (Thomas and Bretagnolle 1988). However, it was only in 1992 that a breeding Chinstrap Penguin in Adélie Land was first sighted (Capdeville *et al.* 1994). Thus, isolated cases of breeding attempts by Chinstrap Penguins were recorded east and west of Mirny. They did not lead to the colonization of new territories.

Macaroni Penguins breed in the sub-Antarctic regions of the Atlantic and Indian oceans and at the Antarctic Peninsula (Naveen *et al.* 2000; Gorman *et al.* 2010). Vagrant Macaroni Penguins have been recorded repeatedly in East Antarctica (Merilees 1970), including a vicinity of Davis Station and east of it (Woehler 1992).

Vagrant Kelp Gulls were observed around the coast of Antarctica: the closest such places to Mirny being Bunger Hills, Davis Station, and Casey (former Wilkes) Station (Korotkevich 1959; Ingham 1962; Derksen 1975; Thomas and Bretagnolle 1988; Spurr *et al.* 1990; Higgins and Davies 1996). The southernmost records of Kelp Gulls in East Antarctica were made 1920 km from their nearest breeding site on Heard Island (Bassett *et al.* 1988).

## Conclusions

One of the problems of identifying the status of non-breeding species of local avifauna is the insufficient knowledge of the home ranges of Antarctic and sub-Antarctic birds. Currently, the correct identification of the status of vagrants, visitors or bird species that are expanding their breeding ranges is possible only on the basis of an integrated approach and long-term monitoring of local faunal assemblages. An integrated approach involves acquaintance of the home ranges of birds as well as processes occurring in populations, the size of local populations and their trends. Ultimately, such an angle can be useful to differentiate between species expanding their ranges, vagrants and visitors.

The true causes of vagrancy of birds within and to the Antarctic, the ways of movement of vagrant individuals and their survival are still difficult to study. However, in the case of some vagrants (*e.g.* penguins), GPS tracking devices/satellite tags can be utilized. This approach would allow us to monitor the future

fate of such individuals. Obviously, more research is needed to better understand the phenomena discussed in this work.

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