A pile of weeds that were removed on Penguin Island

The most satisfying part of this project is seeing birds using the re-vegetated plots for nesting. It is quite a feeling to see a bridled tern pair defending a newly-established berry saltbush patch which they have used as cover for their nest. It does make chick-banding more difficult however!

A bridled tern guarding its nest under the re-established saltberry bush on Penguin Island

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Origin and movements of Red-necked Phalarope wintering in the Arabian Sea

Rob van Bemmelen, Hans Schekkerman & Ingrid Tulp

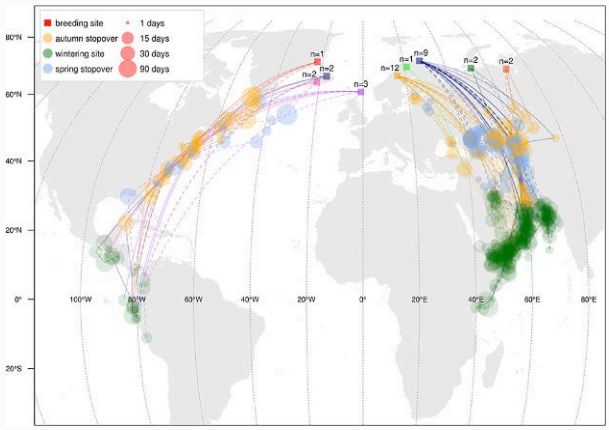
Weighing only ca. 30 g, Red-necked Phalaropes are amongst the smallest seabirds. They are probably best known for their reversed sex-roles, in which females compete for males and leave incubation and care of chicks to the males. While this remarkable breeding system has received quite some attention by (wader) biologists, their biology outside the breeding period has been poorly studied. This is no surprise, given that Red-necked Phalaropes, after breeding on (sub)arctic tundra, migrate long distances to remote, oceanic places. Three distinct wintering areas are mainly known from historical records: the northern Humboldt Current in the Pacific Ocean, the Arabian Sea and in the East Indies. The wintering area in the Arabian Sea has been described by the Dutch captain Mörzer Bruijns, who estimated over 100.000 Red-necked Phalaropes along a transect in the Arabian Sea on 20-21 January 1954 (Mörzer-Bruijns and Mörzer-Bruijns 1957).

The origin of Red-necked Phalaropes wintering in the Arabian Sea has been unclear until recently. Red-necked Phalaropes ringed in northern Norway that were subsequently retrieved to the southeast strongly suggested that at least Fennoscandinan birds winter in the Arabian Sea (Bakken et al. 2003). However, not a single ring recovery exists for the oceanic wintering areas. This shows how ringing studies are suitable for studying overland migrations, but not oceanic movements. Just as in most other seabirds, the study of the phalaropes' migration only fledged after the development of tiny tracking devices: light-level geolocators.

A female Red-necked Phalarope with a geolocator attached, taken in Ammarnäs, Lapland, Sweden. Credit: Rob van Bemmelen

During 2013-2018, we deployed geolocators on Red-necked Phalaropes in Ammarnäs, Swedish Lapland, in Slettnes, northern Norway, and in two sites in Arctic Russia: Tobseda and Erkuta. Another team deployed geolocators in northern Finland. The first four males were retrapped in 2014 and confirmed what we already suspected based on the Norwegian ringing records: they wintered in the Arabian Sea, a migration of ca 6000 km (van Bemmelen et al. 2016). The larger sample (34 annual tracks from 26 individuals), now including tracks from Norway, Finland and Russia, confirmed that also these populations migrate to the Arabian Sea (van Bemmelen et al. 2019). In the latter paper, also 10 tracks (8 individuals) from Greenland, Iceland and Scotland were included, which showed a very different migration route. After the breeding season, these birds migrated westwards across the Atlantic and wintered in the northern Humboldt Current in the eastern Pacific. A truly remarkable migration route!

Probably of special interest for seabird biologists working in the Indian Ocean, are the extensive movements by Red-necked Phalaropes within the Arabian Sea and adjacent areas. Birds generally arrived from their stopovers near the Black, Caspian and Aral Sea to the Gulf of Oman. From here, they dispersed to the Gulf of Aden, the East African coast down to Kenya, or east to Pakistan. In spring, they returned to the Gulf of Oman or to the Persian Gulf before migrating overland back to their breeding areas. During the wintering period, individuals used on average nine sites (range=4-13). The strategy in which birds use multiple sites during the wintering period has been termed 'itinerancy' by (Moreau 1972) and differs from a strategy of residency when individuals remain at a single site throughout the wintering period.



Autumn (solid lines) and spring (dashed lines) migration stopovers and wintering areas of individual Red-necked Phalaropes derived from light-level geolocator tracks.
Credit : Rob van Bemmelen. Published in Frontiers in Ecology and Evolution
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Why do Red-necked Phalaropes show itinerancy? We hypothesize that this results from spatio-temporal dynamics in food availability. Where and when primary productivity peaks in the Arabian Sea and adjacent areas depends strongly on monsoon winds, which change direction twice a year. We were however unable to statistically link phalarope movements to increased experienced primary productivity, which may be due to the fact they feed on zooplankton, not phytoplankton, and to the coarse spatial resolution of the geolocator data and the primary productivity data. Nevertheless, the idea that these movements are driven by environmental dynamics is supported by the strategy of residency shown by Red-necked Phalaropes wintering in the northern Humboldt Current, an area characterized by stable primary productivity throughout the year.

The movements of only few seabird species have been tracked within the Arabian Sea (cf http://seabirdtracking.org), despite this area being one of the most productive marine areas on Earth. We hope our work on Red-necked Phalaropes is an incentive for increased

attention to the study of phalaropes and other seabirds in this rich and dynamic area. In particular, it would be interesting to see whether the strategy of itinerancy is shared among multiple seabird species in the Arabian Sea.

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A bivouac for seabird research at Ile du Lys (Glorieuse Archipelago)

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Between April 19th and 24th 2019, a group of 7 seabird researchers camped at Ile du Lys to investigate various components of seabird ecology and conservation on this remote islet of the Glorieuse Archipelago. This expedition was part of the "Opération Iles Eparses 2019", a large multidisciplinary scientific cruise aboard the Marion Dufresne organised by the TAAF and cofunded by the Iles Eparses Consortium (TAAF, IRD, CNRS, IFREMER, AFB, Université de La Réunion, Centre Universitaire de Formation et de Recherche de Mayotte).

The collaborative seabird component of this operation included three research programs: ECOMIE (Ecologie et Conservation des Oiseaux Marins des Iles Eparses, led by Matthieu Le Corre) aims to investigate the population dynamics of seabirds of the Iles Eparses in relation to restoration operations (mostly invasive mammal eradications); SPILE (Structure des communautés et transmission des Parasites dans les ILes Eparses), led by Camille Lebarbenchon) examines the effects of the seabird host community on parasite transmission and spillover on small oceanic islands; CLIMOM (Changements cLIMatiques et Oiseaux Marins, led by Henri Weimerskirch and David Grémillet) is looking at the impact of global warming on tropical seabird ecology and ecophysiology.

The Marion Dufresne. (Credit : Marc Leménager, TAAF)

Thanks to the excellent organisation of the TAAF and the crew of the Marion Dufresne, the stopover at Ile du Lys went extremely well and we all managed to carry out the planned research activities.

Among the interesting results of the expedition, we found that the seabird community now includes 4 (possibly 5) breeding species, 16 years after rats were eradicated from the islet. Brown noddies and sooty terns are still very abundant and two (possibly three) new species were found: the lesser noddy (60 breeding pairs, most of them on eggs + several thousand roosting birds at night), the crested tern (3 pairs, 2 on eggs and 1 on a downy chick + 10 non breeding birds) and the tropical shearwater (two calls heard at night suggesting that some birds may breed on the islet).