

SIGHTING OF A BECK'S PETREL *PSEUDOBULWERIA BECKI* AND A VANUATU PETREL *PTERODROMA [CERVICALIS] OCCULTA* IN REMOTE OCEANIA, AND THE PROCESS OF IDENTIFICATION

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ABSTRACT

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This note reports observations of a presumed Beck's Petrel *Pseudobulweria becki* and a Vanuatu Petrel *Pterodroma [cervicalis] occulta* in April 2022, in the low latitudes of the North Pacific, north of Kiritimati, Republic of Kiribati. The sightings are significant because the ranges of both taxa are barely known and their conservation classifications are concerning. We explain the circumstances of each sighting and the process of identification, reflecting upon current identification criteria and our studies of Beck's Petrel and Vanuatu Petrel at their breeding grounds. Discussion is illustrated with photographs of each bird and its cryptic confusion counterpart—the larger Tahiti Petrel *Pseudobulweria rostrata* for Beck's Petrel, and the larger White-necked Petrel *Pterodroma cervicalis* for Vanuatu Petrel. These two confusion pairs are generally considered inseparable at sea, but we demonstrate otherwise, given favourable circumstances.

Key words: Beck's Petrel range, Beck's Petrel identification, Vanuatu Petrel range, Vanuatu Petrel identification

INTRODUCTION

Sightings of a presumed Beck's Petrel *Pseudobulweria becki* and a Vanuatu Petrel *Pterodroma [cervicalis] occulta* in remote Oceania took place during a yacht-based expedition, sailing from Hawai'i to Fiji, via Kiritimati and the Phoenix Islands (Flood *et al.* 2023). The expedition departed Waikiki Yacht Club, Honolulu, Hawai'i on 16 April 2022. The 8-day southward sail to Kiritimati encountered brisk winds, ranging from 15–30 kt, most often 20–25 kt, from a favourable northeast direction (trade wind), and a rough sea having waves of about three meters. A fish-oil drip operated throughout daylight hours, forming a smelly, oily wash that stretched back hundreds of meters. Tubenoses have enlarged olfactory glands for ultra-sensitive smelling capabilities and respond to the smell of fish oil.

BECK'S PETREL

The first Tahiti Petrel *Pseudobulweria rostrata* was attracted to the fish oil early morning on 19 April 2022, *ca.* 460 km south of Hawai'i, at *ca.* 15.5°N. During 19–23 April, Tahiti Petrels regularly visited the oily wash, and 116 birds were logged. A low percentage of 'small Tahiti Petrels' were noted from 22 April 2002, though initially none approached close enough for photography and detailed study.

At 17h01 on 23 April, *ca.* 180 km north of Kiritimati, at *ca.* 4.15°N, one of the 'small Tahiti Petrels' worked its way up the oily wash and made a close pass behind the stern. KZ took a series of photographs (Fig. 1). RLF made notes and recorded the exact time to locate the correct photographs for study (camera clock always set to local time).

The petrel flew with more rapid wingbeats and greater manoeuvrability than is characteristic of 'regular' Tahiti

Petrels. Its size was strikingly small at *ca.* 80% the magnitude of Tahiti Petrel. The first thought/impression was that it was a Phoenix Petrel *Pterodroma alba*, which is notably smaller than Tahiti Petrel, having a slighter bill though having the same basic pattern and colour scheme. Nine Phoenix Petrels were seen in the forerunning 60 h. However, amongst other features, Phoenix Petrel was quickly eliminated by its characteristic *Pterodroma* petrel wing shape—strongly angular at the carpal joint, and flight style—fast, frequently arcing, and highly manoeuvrable. *Pseudobulweria* petrels have straighter wings and a more measured flight style.

Fig. 1 pictures the petrel from multiple angles and in disparate postures, overcoming misleading impressions that can result from a few images. Fig. 2 shows four Beck's Petrels photographed in Silur Bay, New Ireland, Papua New Guinea, where nearby breeding is suspected. Fig. 3 shows a lightly-built, an average-built, and a more heavily-built Tahiti Petrel for comparison. Size and build of Tahiti Petrel vary by age, sexual dimorphism, and origin of population (see below), but no Tahiti Petrel that we know of is as small-scale and lightly built as the bird in question.

Fig. 1 shows the petrel had a deep-based bill relative to its small head, leaving a shallow forehead, giving the impression of a 'massive' bill base (Shirihai 2008). The latericorn was shallow compared to Tahiti Petrel, giving a high step-up, from the culmen to the ridge of the nasal tubes, and a wedge shape between the distal end of the nasal tubes and the somewhat swollen unguis (typically notch-shaped on Tahiti Petrel).

The neck notably narrowed between the head and shoulders, so the 'head, neck, and back' present as structurally distinct parts.

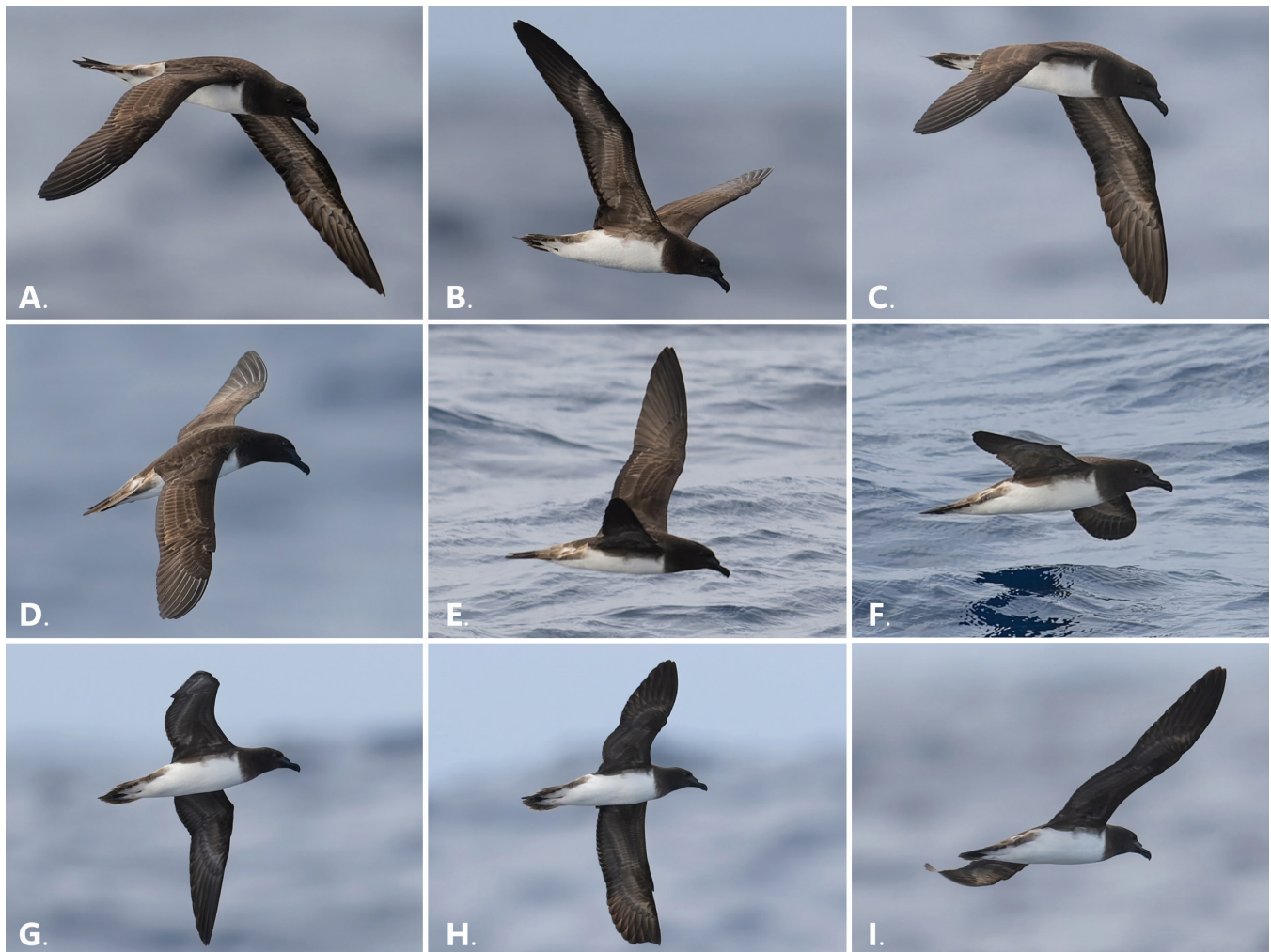


Fig. 1. Presumed Beck's Petrel *Pseudobulweria beeki*, ca. 460 km south of Hawai'i, at ca. 15.5°N, 19 April 2022. Note the overall slender structure, deep-based but otherwise slender bill, and well-developed white fore-flank notch. Underwing-coverts are dark with a paler band across median coverts, a feature that we observed in numerous birds in Silur Bay, New Ireland (e.g., Fig. 2C; Flood *et al.* 2017). Tahiti Petrel can show such a pale band, though, especially western populations. Central tail feathers are recently replaced with fresh dark ones, which contrast with remaining old bleached-brown tail feathers. (Photos: Kirk Zufelt).

Hence, the bird looked gawky in certain postures (Figs. 1A, D). The gawky look was more exaggerated than found among lightly-built Tahiti Petrels (Fig. 3A). The body was long and slender, with a flat chest, thin belly, and slim hips. The caudal projection was longer and more pointed than Tahiti Petrel. The petrel in question looked small and puny alongside Tahiti Petrel.

Harrison *et al.* (2021) illustrate Beck's Petrel with a shorter dark hood than Tahiti Petrel. As a result, a white notch is shown at the fore-flank, dividing the thick dark flank bar from the border of the dark hood. A well-developed white notch was present in a good number, but not all, Beck's Petrels that we photographed off Silur Bay (e.g., Fig. 2A). Indeed, the border of the dark hood in relation to the leading edge of the wing varies individually in both species (H. Shirihai, pers. comm., 2023), so that Tahiti Petrel rarely shows a well-developed white notch, scarcely poorly developed, commonly absent; while Beck's Petrel commonly shows a well-developed white notch, scarcely poorly developed, rarely absent. The petrel in question had a well-developed white notch (Fig. 1).

We are aware of a small form of Tahiti Petrel that breeds on Taveuni Island, Fiji, and possibly elsewhere, first recognised by Vincent Bretagnolle and Hadoram Shirihai (Flood *et al.*, in preparation). We spent three days off Taveuni toward the end of the expedition studying this form. As Bretagnolle and Shirihai found, it is a small but stocky and compact counterpart to the regular Tahiti Petrel, unlike the small-headed, long-necked, slender-bodied Beck's Petrel and other populations of Tahiti Petrel. Of 48 sightings off Taveuni, about half were photographed, and of these, none showed a white fore-flank notch. We considered the possibility of an undiscovered small form of Tahiti Petrel, but with no supporting evidence, this is nothing more than conjecture.

The *combination* of notably small size, slight build, and well-developed white fore-flank notch eliminate Tahiti Petrel and are consistent with Beck's Petrel. It is possible that the other 'small Tahiti Petrels' between Hawai'i and Kiritimati were Beck's Petrels; if so, with conservation in mind, that ocean stretch would be important to the species.

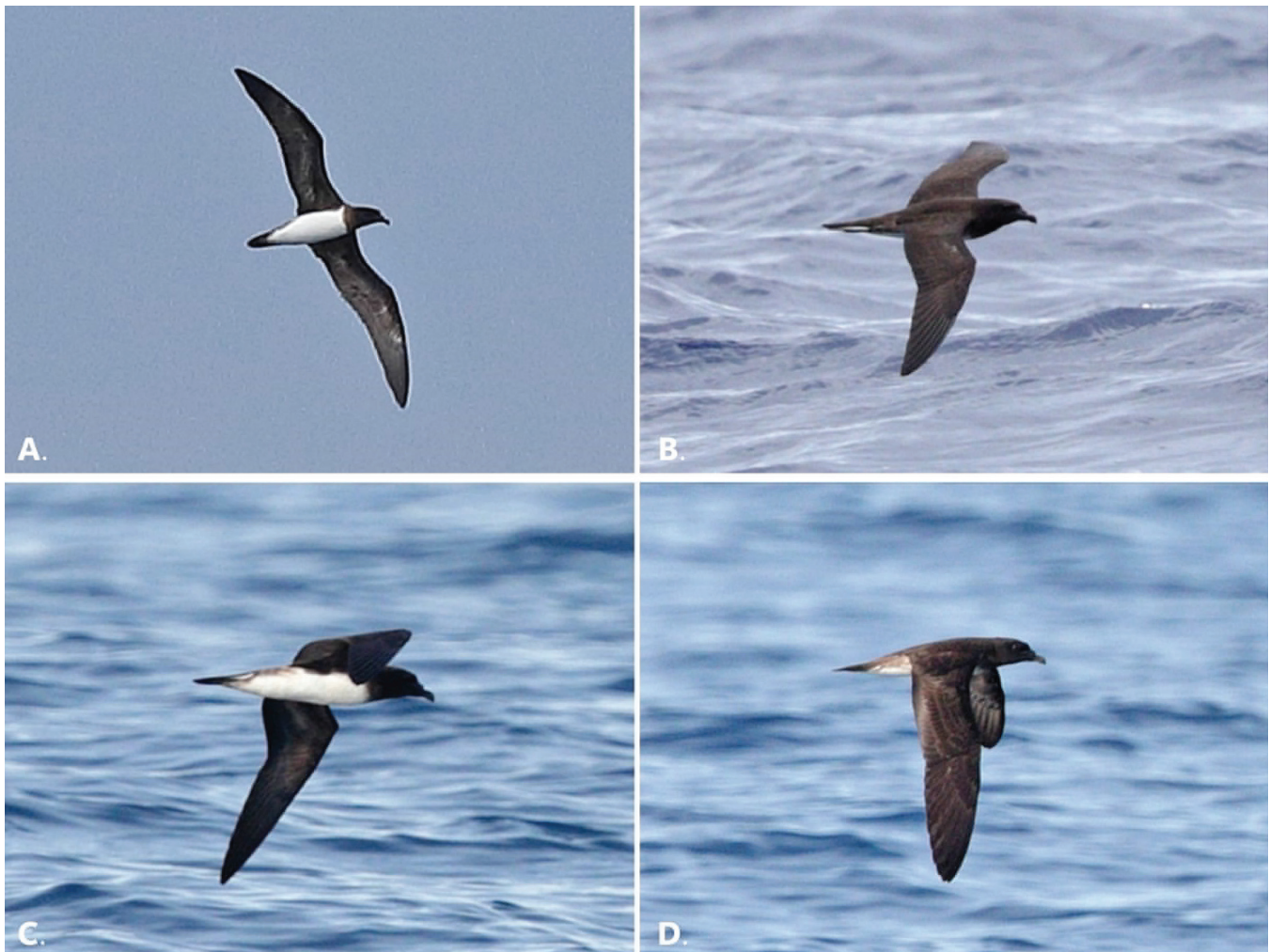


Fig. 2. Beck's Petrels *Pseudobulweria becki*, Silur Bay, New Ireland, Papua New Guinea, 20–22 January 2017. Note the overall slender structure, deep-based but otherwise slender bill, well-developed white fore-flank notch (A), and pale band across median coverts (C). (Photos: Fig. 2A, John & Jemi Holmes; Figs. 2B–2D, Mike Danzenbaker).



Fig. 3. Tahiti Petrels *Pseudobulweria rostrata*, between Austral Islands and Tahiti Island, French Polynesia, November 2019, from lightly-built to heavily-built, respectively. These birds were photographed during the same chumming session south of Tahiti Island and illustrate a wide range in build of the species. (A) is exceptionally lightly built and could be taken for a Beck's Petrel. However, it was seen alongside numerous other Tahiti Petrels with no obvious size difference. Also note lack of white fore-flank notch. So, two of three criteria used to identify our Beck's Petrel are missing from this bird. (B) shows a hint of white fore-flank notch because feathers on the fore-flank are white basally. (Photos: Kirk Zufelt).

Beck's Petrel was known only from specimens collected by Rollo Beck in 1928 and 1929 until rediscovered in 2007 by Shirihai (2008). Recently, a tracked bird migrated 1400 km west from

the suspected breeding grounds at New Ireland to north of West Papua (Rayner *et al.* 2019). Otherwise, as far as we know, Beck's Petrel has not been documented away from the suspected breeding

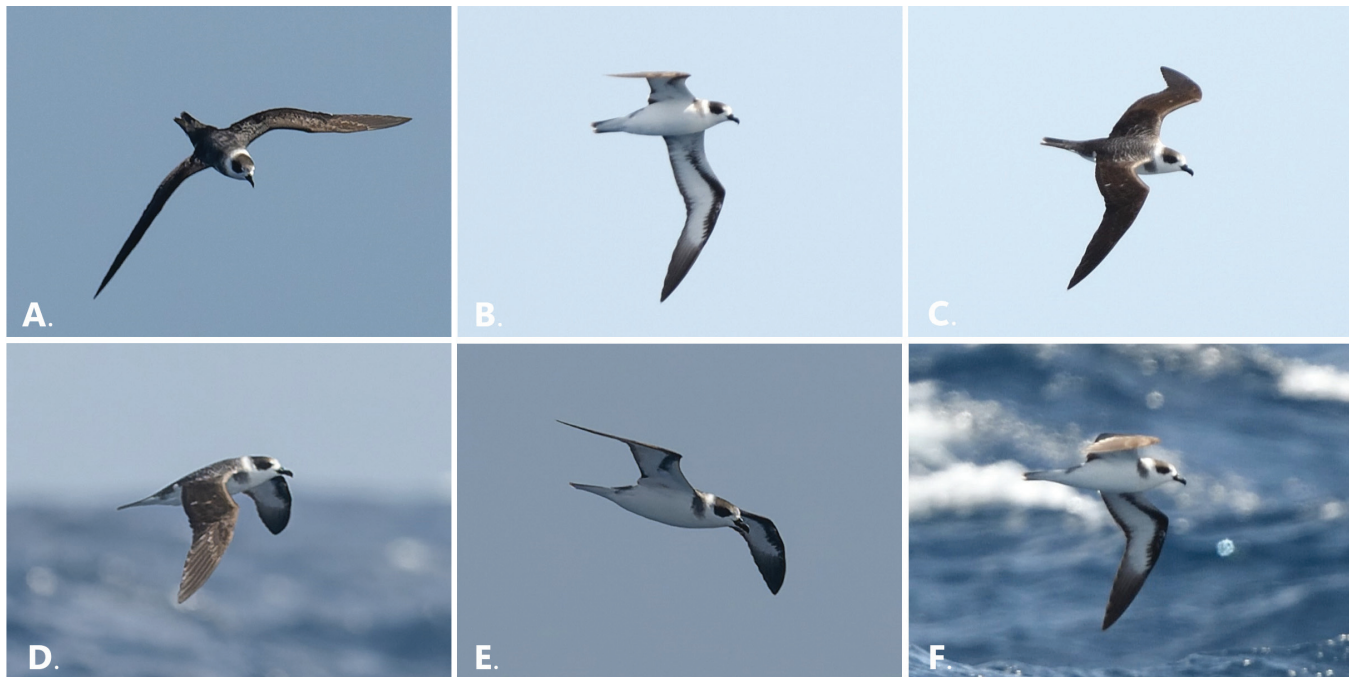


Fig. 4. Vanuatu Petrel *Pterodroma [cervicalis] occulta*, ca. 1 000 km north of Kiritimati, Republic of Kiribati, at ca. 6.45°N, 22 April 2022. Note the diminutive demeanour, overall slight build, neat white hind-collar, all-dark under primaries, extent of near-solid dark feathering along leading edge of outer wing, and dark bar in inner wing running from carpal joint toward mid region of body, reaching axillaries. Note moult of central and possibly adjacent inner rectrices. (Photos: Kirk Zufelt).

environs. Accordingly, our sighting is the first fully documented truly oceanic record of a presumed Beck's Petrel, ca. 5 500 km east-northeast of the suspected breeding grounds.

We considered the age of the presumed Beck's Petrel by looking for moult contrast and active moult. If not a photographic artifact, the apparent age contrast between greater coverts and secondaries, and perhaps within the primaries (blackier and fresher outer primaries), eliminates a juvenile bird with feathers of uniform age grown at the same time in the nest. Further, moult contrast is evident in the tail feathers, with fresh dark central ones, the rest bleached browner and worn. Shirihai (2008) reports worn/moulting adult and juvenile Beck's Petrels in early August, near to the suspected breeding grounds. Therefrom, Howell & Zufelt (2019) suggest a breeding period March–August. If these dates are correct, then a bird showing signs of moult in late April, ca. 5 500 km east-northeast of the suspected breeding grounds, is unlikely to be an active breeder. More likely, it was an immature or an adult on a sabbatical year.

VANUATU PETREL

At 09h47 on 22 April, ca. 1 000 km north of Kiritimati, at ca. 6.45°N, one of the 'white-bodied and white-under-winged type' *Pterodroma* petrels (as defined by Howell & Zufelt 2019) flew swiftly up the oily wash and made a close pass behind the stern. KZ took a series of photographs (Fig. 4). To this point, sightings of this 'type' of *Pterodroma* petrel had involved over 40 Hawaiian Petrels *P. sandwichensis*, observed daily from 16 April, and five of the larger Juan Fernandez Petrel *P. externa*, observed that morning and the previous day. Of the two, the size of the petrel was closest to Hawaiian Petrel. However, unlike Hawaiian Petrel, it had a neat white hind-collar, characteristic of the White-necked Petrel complex—White-necked Petrel, similar in size to Juan Fernandez

Petrel, and the somewhat smaller Vanuatu Petrel, similar in size to Hawaiian Petrel.

A Juan Fernandez Petrel in worn plumage can show a white hind-collar, but such a collar is usually scruffy, not neat, and dark markings in the white underwing are minimal, far less extensive than the petrel under consideration (Spear *et al.* 1992, Howell & Zufelt 2019). Also, the size of the petrel and its tail structure were inconsistent with Juan Fernandez Petrel.

Fig. 4 pictures the petrel as it passed by the stern. Fig. 5 shows three White-necked Petrels for comparison. Fig. 5 illustrates much of the range of the species' structure and underwing pattern.

Average biometrics show that Vanuatu Petrel are smaller than White-necked Petrel by ca. 10% (Shirihai & Bretagnolle 2010). Based on this and comparison with other *Pterodroma* petrels, the petrel was judged to be about the size of Vanuatu Petrel. It was a lightly built, slightly smaller version of White-necked Petrel. Its diminutive demeanour is supported by all images. Even a lightly built White-necked Petrel is not quite so lightly built as the petrel in question (Fig. 5B). Three White-necked Petrels were seen during the expedition, much farther south in Fijian waters, on 12–13 and 30 May, and all appeared larger and more heavily built than our petrel. Moreover, the underwing pattern of the petrel is near diagnostic, or possibly diagnostic of Vanuatu Petrel. White-necked Petrel typically shows white 'tongues' in the under primaries—white basal protrusions in the inner webs of the visible under primaries (Fig. 5A), less extensive on some birds (Fig. 5B), limited in others (Fig. 5C). Around 2.5% of White-necked Petrel and ca. 21% of Vanuatu Petrel lack white tongues altogether and have all-dark under primaries (Shirihai & Bretagnolle 2010). Our petrel had all-dark under primaries, strongly favouring Vanuatu Petrel.



Fig. 5. White-necked Petrels *Pterodroma cervicalis*. (A) Off Tauranga, New Zealand, 11 January 2016; long white tongues in under primaries, either cloudy markings or more likely light reflection in p10 (based on left wing, right wing partially obscured), moderately marked underwing-coverts, moderately built. (B) North Cape, New Zealand, 04 March 2013; long white tongues in under primaries, though short in p10 (based on right wing, confused by reflection in left wing), moderately marked underwing-coverts, lightly built (a lightly built White-necked Petrel overlaps in structure with Vanuatu Petrel, thus 'diagnostic' underwing markings are crucial in securing an at-sea identification of Vanuatu Petrel away from Vanuatu). (C) South of New Caledonia, 16 March 2013; moderate white tongues in under primaries, though none in p10 (based on both wings), moderately marked underwing-coverts, heavily built. (Photos: Kirk Zufelt).

The other important underwing feature is the extent of dark feathering along the leading edge of the outer wing (short lesser primary coverts), connected to a dark bar in the inner wing, running from the carpal joint toward the mid region of the body (short lesser secondary coverts at the carpal joint, transitioning tracts to long lesser secondary coverts nearer the body). The amount of dark shown by the petrel is more extreme than shown by the Vanuatu and White-necked petrels pictured in Shirihai & Bretagnolle (2010), and our collection of White-necked Petrel photographs.

The combination of small size, diminutive demeanour, slight build, and extreme underwing pattern argue strongly against White-necked Petrel and are consistent with Vanuatu Petrel.

Vanuatu Petrel was for many years known only from specimens collected by Rollo Beck in 1927. The first evidence that it was extant, absurdly, was a roadkill corpse in New South Wales, Australia, in 1983 (Boles *et al.* 1985). Imber & Tennyson (2001) proposed species status for Vanuatu Petrel. It was rediscovered over the ocean off Vanuatu, West Pacific, in 2006 (Shirihai & Bretagnolle 2010), and confirmed breeding on Vanua Lava, Vanuatu, in 2009 (Totterman 2009). Tanoi (2021) documented, with photographs, sightings of Vanuatu Petrel at Ogasawara, Japan, in September 2018 and September 2020 (the latter bird was toward the end of primary moult). Thus, as far as we are aware, our observation represents only the fourth documented sighting away from the breeding grounds, *ca.* 4 500 km northeast of Vanuatu, and provides a geographical link to the Japanese sightings.

We considered the age of the Vanuatu Petrel by looking for active moult and moult contrast. The mantle, back, and fore scapulars are fresh and grey with white fringes, contrasting with the remaining old and bleached-brown scapulars and upperwing coverts. The central and perhaps adjacent tail feathers are missing, presumably dropped, presumably indicating commencement of tail moult. The sighting in April falls in the middle of the proposed breeding season, January–June (Totterman 2009). If the breeding dates are correct, then the petrel was not a successful breeding adult, since head, body, and tail moult would not be so far advanced mid breeding season. It is likely that the petrel was a juvenile from

the previous breeding season, about to commence primary moult at *ca.* 10 months old, typically two months earlier than successful breeding adults. However, we cannot exclude the possibilities that it was an older immature bird, a failed breeder, or an adult on a sabbatical year, as all of these groups presumably will moult earlier than successful breeding adults.

Finally, if at some point Vanuatu Petrel is accepted as a valid species by the International Union for Conservation of Nature (IUCN), presumably classification will be Critically Endangered, as it is known only from a single location and likely has a declining population. Information about its range, such as herein, would then be vital to conservation planning. Indeed, the taxonomic position of two of the four world checklists supports full species status for Vanuatu Petrel, though one supports subspecies group status, and one supports subspecies status (del Hoyo 2020).

CONCLUSION

The sightings reported herein of a presumed Beck's Petrel and a Vanuatu Petrel are significant for three reasons: (1) the at-sea ranges of the taxa are barely known; (2) the conservation classifications of the taxa are concerning—Beck's Petrel is Critically Endangered, while Vanuatu Petrel lumped with White-necked Petrel is Vulnerable (IUCN, 2022); and (3) observations away from the breeding grounds provide a rare opportunity to test and develop at-sea identification criteria. Our note argues that both species can be identified at sea, given favourable circumstances.

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