Notornis, 2020, Vol. 67: 657-658
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SHORT NOTE

Bar-tailed godwits (*Limosa lapponica*) crossing the Inland Kaikoura Ranges, South Island, New Zealand

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Bar-tailed godwits (*Limosa lapponica*) are widely distributed around New Zealand and migrate towards staging sites in East Asia in March (Conklin & Battley 2011; Battley *et al.* 2012). Observations at Farewell Spit and the Manawatu River Estuary, and satellite-tracking from Golden Bay (Battley 1997; Conklin & Battley 2011; Battley *et al.* 2012) indicate that birds on coasts adjacent to the Tasman Sea head directly across the sea in a NW direction. Six satellite-tracked godwits that were transmitting when they departed from the Firth of Thames in March 2007 or March 2020 headed up the east coast of the North Island (PFB *unpubl. data*.). There are no published data that indicate whether godwits from the east coast of the South Island of New Zealand take a coastal route when embarking on migration or cross the mountain ranges to head directly to the Tasman Sea.

On 13 March 1998, BLS was climbing Tapuae o Uenuku (2,885 m), the highest peak in the Inland Kaikoura Ranges (173°39′46″E, 41°59′45″S). Soon after having reached the peak, at around 1100 h a group of approximately 20 bar-tailed godwits was seen rapidly approaching the summit of the mountain from the south. The day was clear, cloudless, and windless as were the days before and after. The birds passed about 20 m from the summit at the same altitude and disappeared towards the north. They were identified as godwits from their form, colour and their extended beaks. BLS has previously seen and identified godwits feeding and in flight on several occasions at Pūkorokoro/Miranda and at other locations in New Zealand.

The date of this observation is consistent with these birds being on migration, and the flock size is also typical for godwits migrating from a smallish population (e.g. the mean flock size at the Manawatu River Estuary was 14 birds whereas it was 40 on Farewell Spit: Battley 1997; Conklin & Battley 2011). The timing of the observation, however, means that we cannot be certain the birds were migrating. Shorebirds tend to migrate in the late afternoon (Piersma *et al.* 1990; Battley 1997) although they can depart after dusk. If birds passing over the Kaikoura Mountains at 1100 h were on migration,

Received 5 September 2019; accepted 3 September 2020
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they had potentially been in flight for at least 12 hours, which would imply they had departed from considerably further south. With a flight speed of 59 km.h^{-1} on migration (Battley *et al.* 2012), they could have departed from 600–700 km away, which would mean the southernmost part of the South Island. The only tracking data from that region are of four birds from Otago tracked via geolocator; all appeared to directly cross the South Island to the Tasman Sea rather than move northwards along the east coast (PFB and S. Lisovski, *unpubl. data*). Another possibility is that the movement was a pre-migratory short-distance shift from the Kaikoura or Canterbury region to Tasman Bay. While a colour-banding study around New Zealand found few examples of birds potentially moving north within New Zealand before migrating (Battley *et al.* 2011), detailed observations at the Manawatu River Estuary (J.R. Conklin *pers. comm*.) show that some individuals do appear there in March, having spent the non-breeding season at a different site. A final possibility, that the birds experienced unusually good local wind conditions that prompted a morning departure (Leyrer *et al.* 2009), seems less likely given the calm conditions. Examination of the NIWA Cliflo climate database (https://cliflo.niwa.co.nz) for records of 12 and 13 March 1998 for eight station sites south of Tapuae o Uenuku and on the eastern side of the South Island, all indicated fine rainless days with light variable winds.

Regardless of the specific context of the flight, this observation confirms that godwits will cross mountain ranges in New Zealand. The only other record of a bar-tailed godwit at high altitude in New Zealand is that of Battley & Horn (2006) who recorded the finding of a single dead bird on a snow surface at 2,610 m on Mt Ruapehu in the central North Island of New Zealand. From its appearances it seemed that this bird had been on its southern migration from the Northern Hemisphere towards an area in New Zealand south of latitude 39°28′S when it perished.

The flight altitudes of bar-tailed godwits migrating from New Zealand have not been documented. Radar studies indicate that bar-tailed godwits migrate over southern Sweden at an average height of 2,223 m, and up to 2,806 m (Alerstam & Gudmundsson 1999), and black-tailed godwits (*L. limosa*) have been recorded at altitudes of over 5,000 m during migration southwards over western Africa (Senner *et al.* 2018). Senner *et al.* (2018) suggested that migratory flight height of black-tailed godwits appeared to be linked in context to ground surface temperatures, wind assistance, and topography. In the case of our observation at Tapuae o Uenuku none of the foregoing appeared to be relevant.

ACKNOWLEDGEMENTS

BLS acknowledges the help of the Marlborough Tramping Club for confirming the date and time of the event from archived hut books. The NIWA Cliflo database was used to examine the records of several South Island weather stations. We thank an anonymous reviewer of the manuscript.

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Keywords: bar-tailed godwits, *Limosa lapponica*, migration, South Island, New Zealand, flight altitude