

# Analysis of the Little Tern *Sternula albifrons* wintering area by use of light-level Geolocators

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## INTRODUCTION

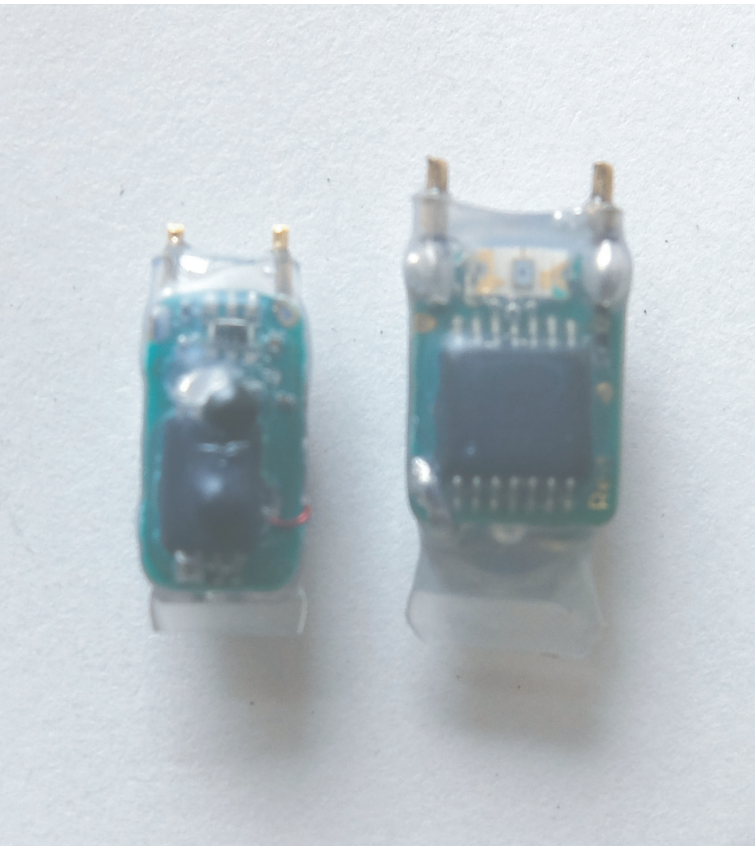
The Little Tern (*Sternula albifrons*) is considered an indicator species due to their requirement for a healthy environment and sufficient food source to support their potentially large colonies. In Japan, their population is declining due to habitat loss, predation and human disturbance. The species has been studied in Japan for

decades, but much remain unknown specifically information of their wintering areas and migration routes. For the first time in Japan, geolocators were used to track the species during their breeding and wintering migrations. As a result, we succeeded in tracking of the migration routes of Little Terns.



## MATERIALS & METHODS

Research was conducted in various locations all throughout Japan from late May until mid to late August. We captured Little Terns and equipped geolocators there. We used geolocator model MK5090 from Biotrack Ltd. and model Intigeo-W50A9 from Migrate Technology Ltd.. The MK5090 weighs 1.2 grams including the flag and Intigeo-W50A9 weighs 0.9 grams including the flag. The dimensions for MK5090 are 15mmL x 7mmW x 5.5mmD. The Intigeo-W50A9 is 13.5mmL x 6mmW x 6mmD. The geolocators with the flags were attached to the left tarsus.



The geolocators we used; Migrate Technology Ltd. (left side) and Biotrack Ltd. (right side)



The Geolocators with the flag



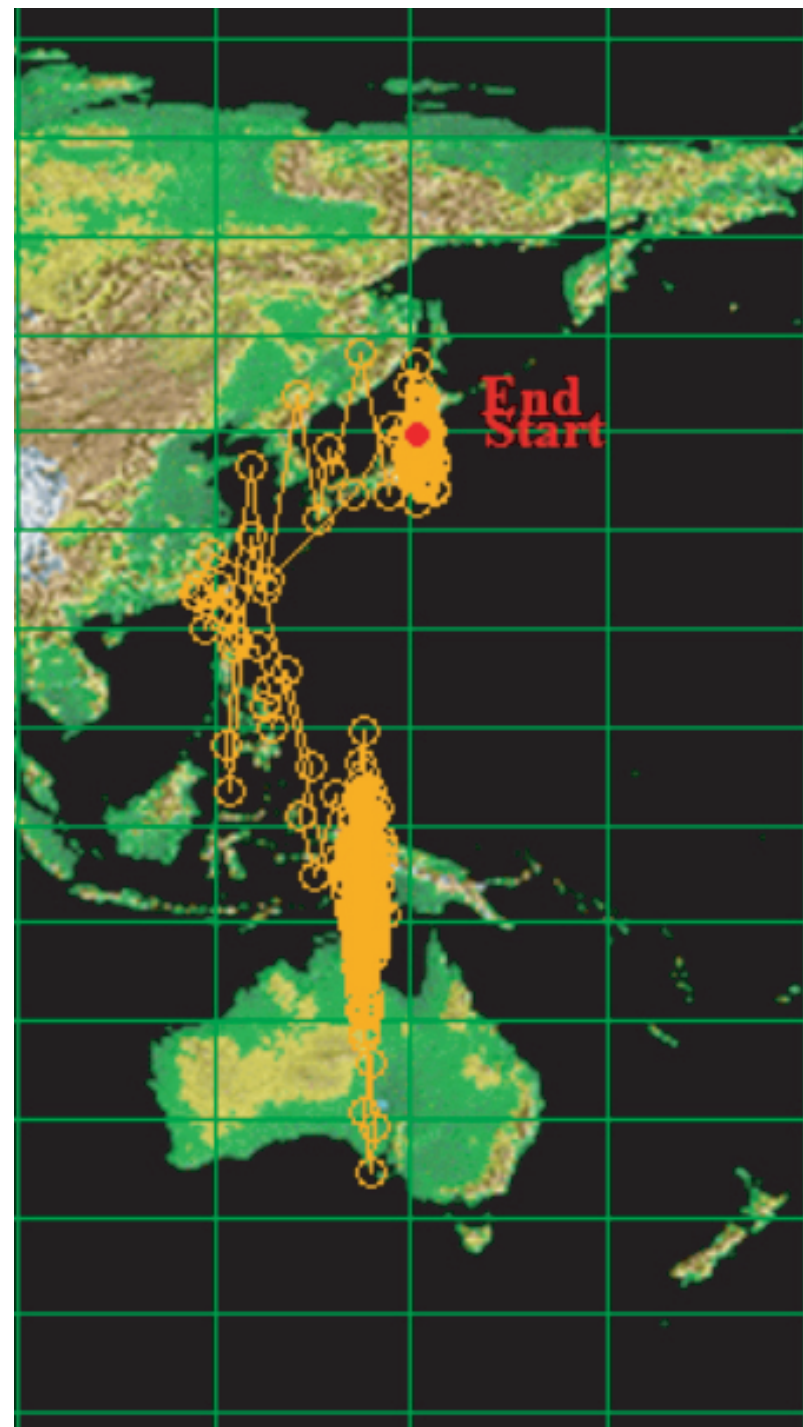
Study areas in Japan

## RESULTS

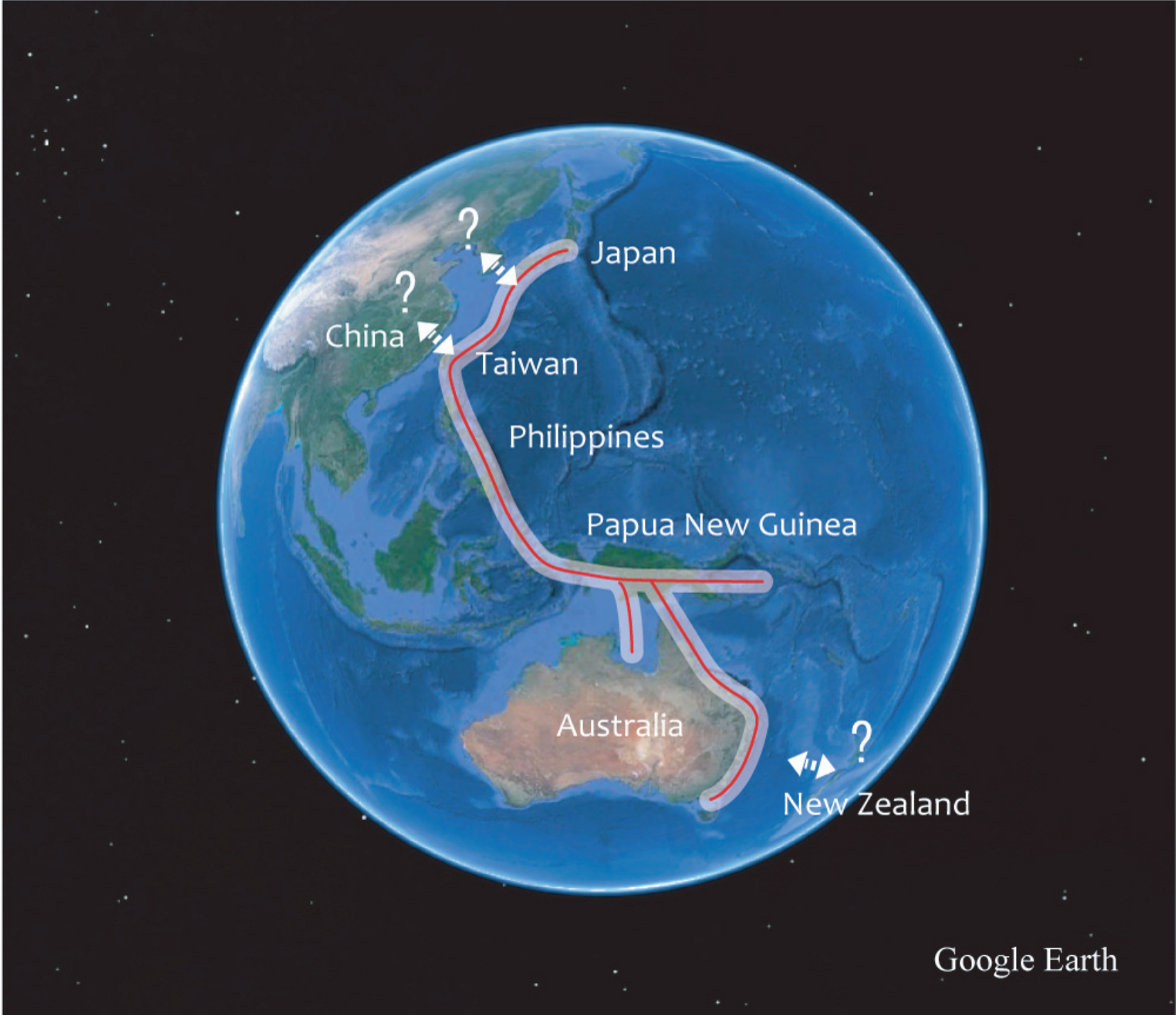
We have attached geolocators to 137 Little Terns. 100 individuals were caught in 2013 and fitted with MK5090, 17 caught in 2014 were fitted with Intigeo-W50A9 and 20 caught in from 2015 to 2017 were fitted with Intigeo-W65A9. Up to 2018 we have managed to retrieve 14 geolocators and we have collected data from 10 devices.

The recovered geolocator data showed Little Terns were migrating south from Japan to Papua New Guinea and the Northern and eastern coast of Australia. In addition, we discovered they leap-frog along islands chains called stop-over sites. This data shows us which routes the individuals used in order to migrate between seasons.

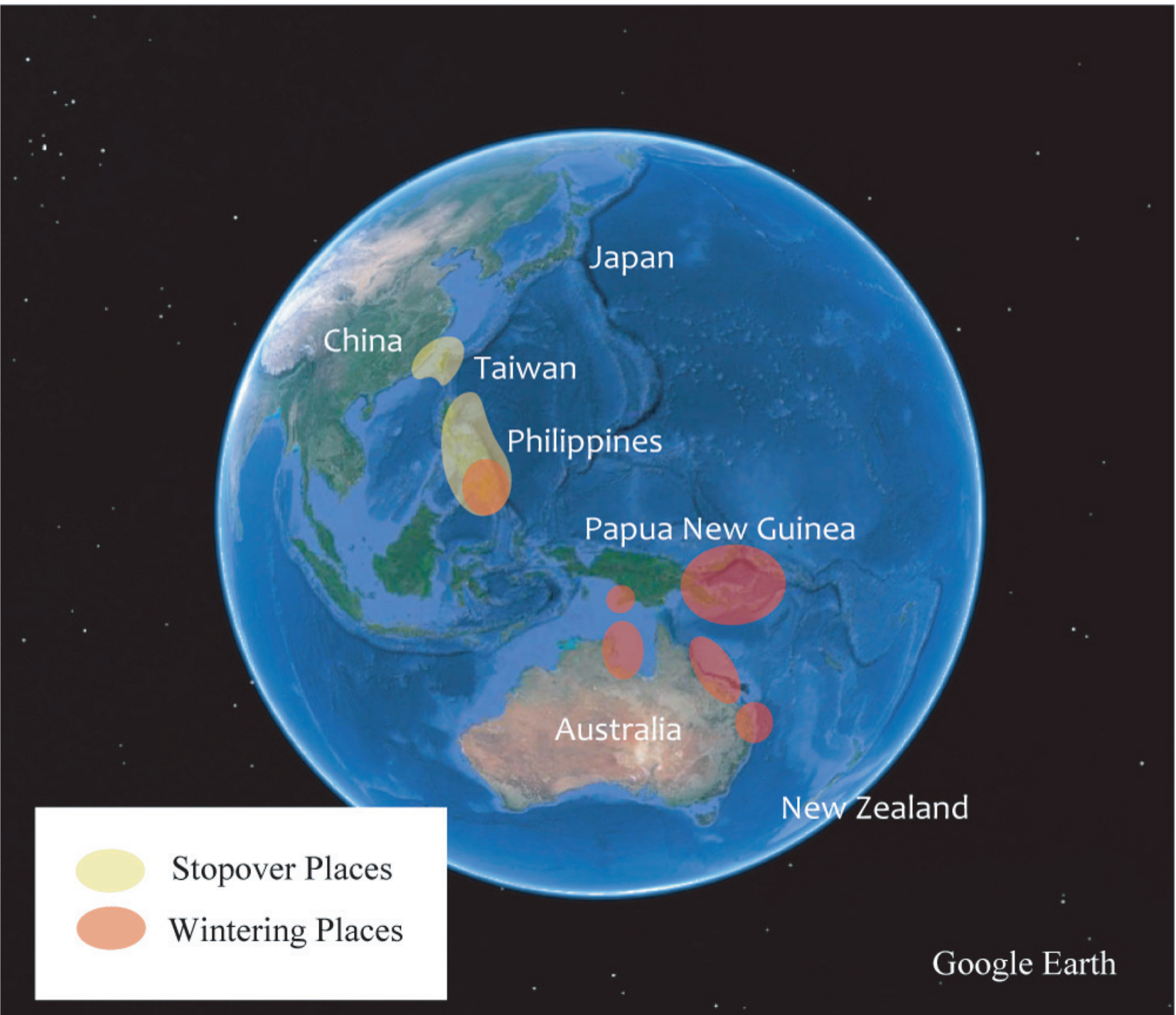
We have gotten 3 records of Little terns with geolocators from the Australasian Wader Studies Group. These records were observed at a filled up land and a boat harbour in Brisbane, Australia in autumn of 2014. We guess that these places are one of the wintering places for Little Terns from Japan.



The migratory route of a Little Tern from the geolocator.



The migratory route of the Little Tern which we guessed from geolocator's data, observation records and past information.



The Stopover places and the wintering places of the Little Tern which we guessed from geolocator's data, observation records and past information.



3 data of the Little Terns with the geolocators were recorded in Brisbane.

## DISCUSSION

The discovery of migration routes following island chains instead of a direct flight to Australia is a new discovery for the Little Tern. Data regarding their migratory routes gave us important information for conservation. Additionally, the recovered data gave us further information because we believed the majority of the Little Tern population wintered in east/southeastern Australia. If our data is accurate most of the population is not wintering in east/southeast Australia as we perceived. Northeastern Australia has the fewest number of researchers thus we are limited in received data. We managed to generate reliable data, but we do not have enough to locate their exact stopover and wintering sites for conservation. Reason being, geolocators have an accuracy reading of a few hundred kilometers in diameter, which prevents us from pin-pointing the precise location of their stopover and wintering sites. Therefore, we are not sure where we should need to place our research and conservation efforts. Although we asked locals of the

Philippines and Indonesia regarding Little Tern stopover and wintering sites, no one is certain. The possibilities of threats by development or poaching requires us to discover their stopover and wintering places as soon as possible. Recently a small GPS device was developed which makes it possible for us to use on Little Terns. This device



The GPS with the Little Tern

has an error margin of up to 15m which makes this device crucial to our investigation of where the Little Tern stop-over sites are as well as where exactly they are wintering. We started to attach GPSs to the Little Terns since 2015. Up to 2018, we have attached GPSs to 115 individuals in Japan.

## ACKNOWLEDGEMENTS

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