MONITORING BIRDS AND MAMMALS IN SOUTHERN OCEAN AND ANTARCTICA

Preliminary Results And Challenges

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2014

LONG-TERM MONITORING OF WILDLIFE AND ITS HABITATS IN ANTARCTICA -PHASE II

33rd *Indian Scientific Expedition to Antarctica* (Dec 2013- Apr 2014)

Project Investigators: Dr. K. Sivakumar & Dr. S. Sathyakumar

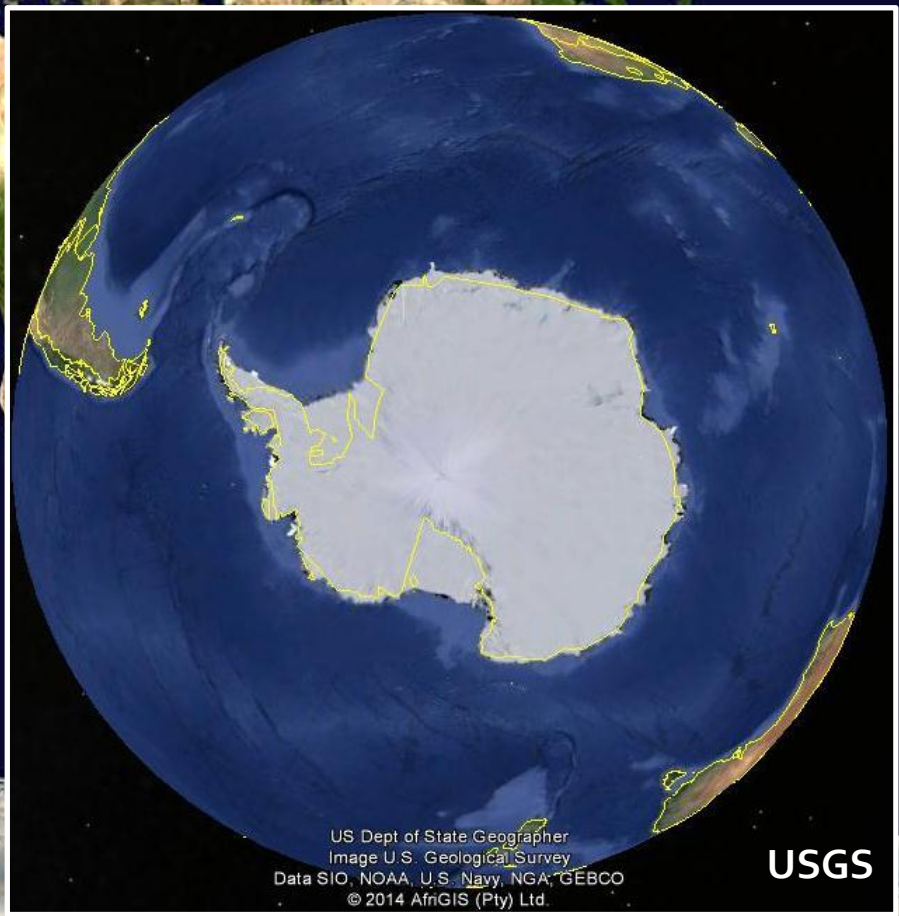
Ministry of Earth Sciences

National Centre for Antarctic and Ocean Research

BACKGROUND

BACKGROUND

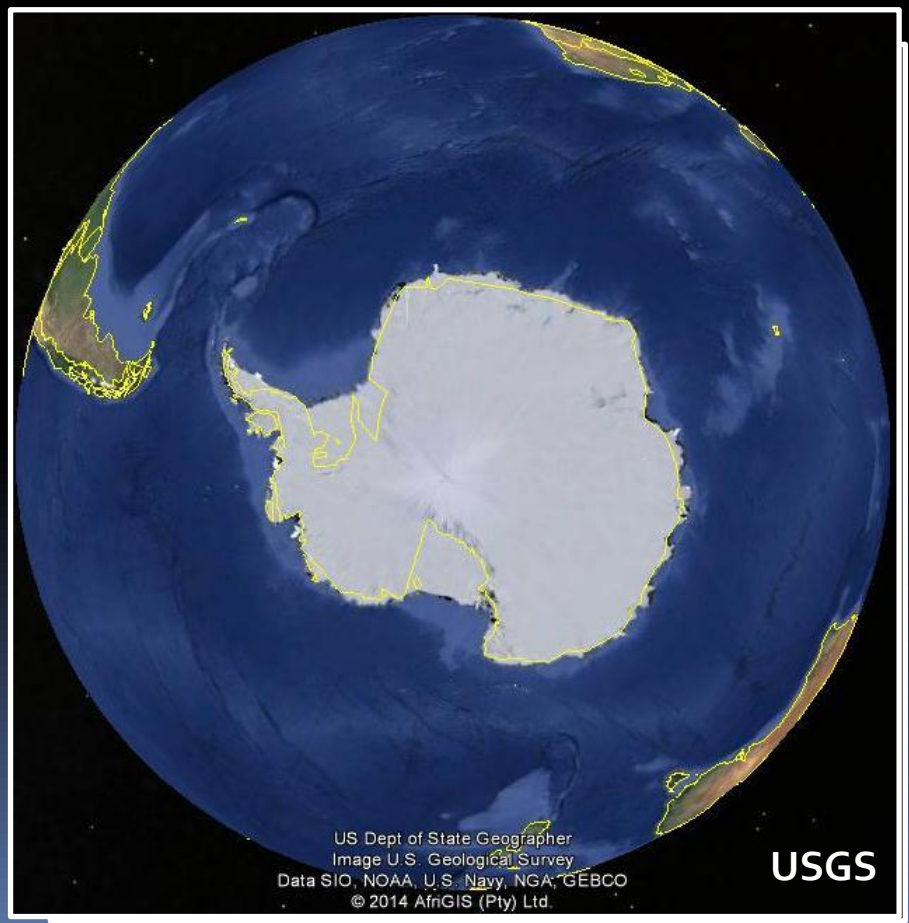
- Twice the size of Australia – 5th largest continent
- Covered by hard ice – avg. 2000 m thickness
- Coldest…….at - 89.4 ° C
- Windiest….. over 300 km/h
- Highest….. 2500 m avg. elevation



BACKGROUND contd……..

- **Protected under the Antarctic Treaty of 1959**
- **No mining in Antarctica, *Natural Reserve devoted to Peace and Science***

Austral Summer

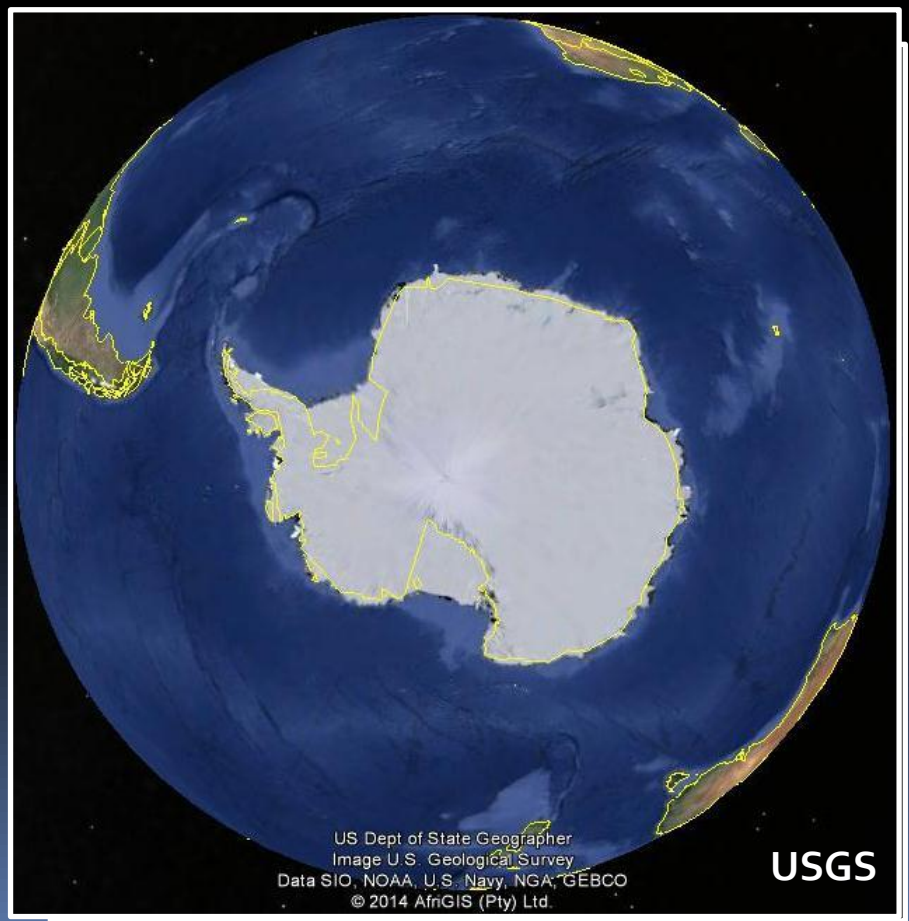


BACKGROUND contd.....

India in Antarctica

- *First Indian Expedition in 1981*
- *33 expeditions so far*
- *Two Research stations*
  - *MAITRI – 1988 onwards*
  - *BHARATI – 2012 onwards*
  - *DAKSHIN GANGOTRI- Abandoned in 1988*

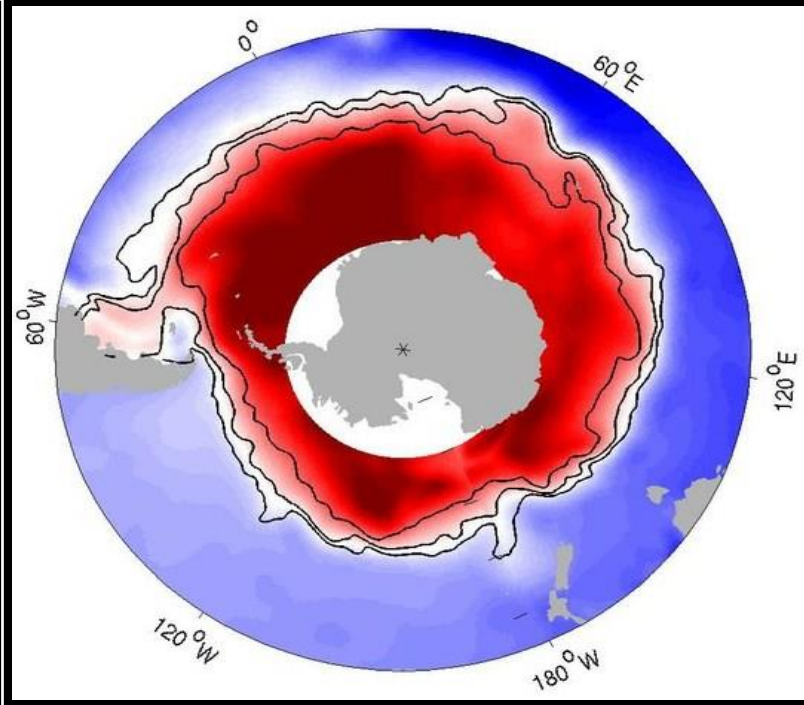
Winter Sea Ice Extent



PROCESSES

❑ Southern Ocean

- **Sub-tropical Zone –**
  - **Agulhas and Benguela currents**
- **Sub-Antarctic Zone -**
  - **Antarctic Circumpolar Current (Deakens 1984)**
- **Antarctic Zone - Ice-water interface**



Sallee et al 2008

❑ Coastal Antarctica

- **Antarctic Coastal Current**
- **Marginal Ice Zones (Commins et al 2013)**
- **High snow drift**

WII's PARTICIPATION in ANTARCTIC EXPEDITIONS

14th Expedition (1994-95) – S. Sathyakumar

15th Expedition (1995-96) – Y.V. Bhatnagar

16th Expedition (1996-97) – S.A. Hussain & Ajai Saxena

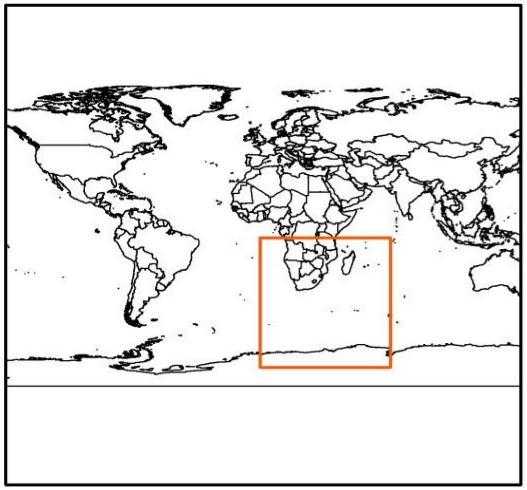
28th Expedition (2008-09) – S. Sathyakumar & K. Sivakumar

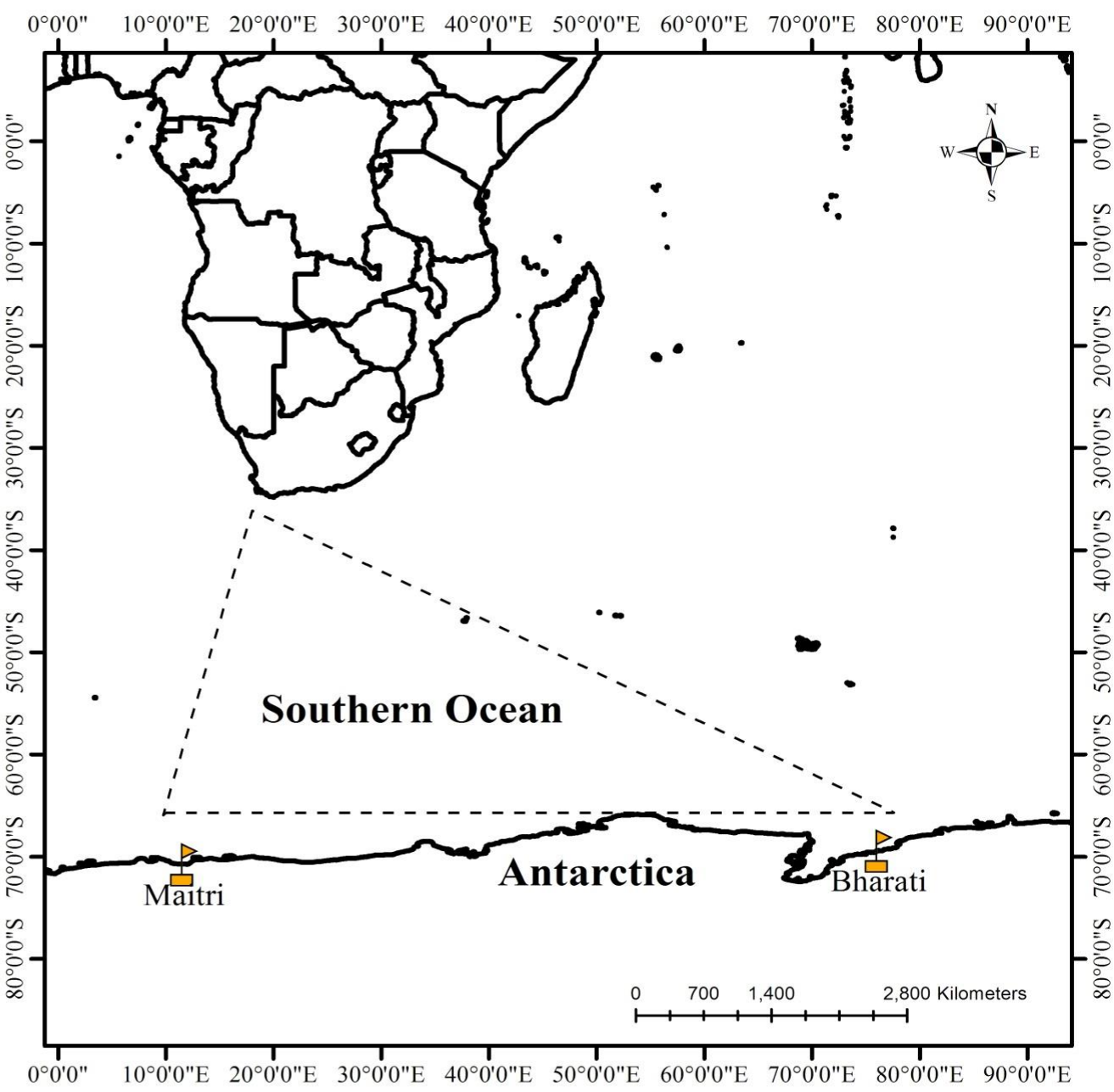
29th Expedition (2009-10) – K. Suresh Kumar & J.A. Johnson

33rd Expedition (2013-14) – Anant Pande

STUDY AREA

STUDY AREA : Southern Ocean* and Coastal Antarctica





Legend

- Indian Research Station
- Continent Boundary
- Voyage Route

PROJECT OBJECTIVES – *Phase II*

- **Long term monitoring of status and distribution pattern and community structure of pelagic seabirds in Southern ocean and Antarctica**
- **Evaluate the habitat use of birds and mammals in Antarctica and identify key threat**
- **Monitor indicator species such as penguins and seals in the Indian sector of operation in Antarctica**

Larsemann Hills

India Bay

METHODS

METHODS- Voyage Surveys

- Southern Ocean
  - Ship-based seabird counts

snapshot method
(Tasker et al 1984)

10 minute

300 m

  - Instant scan of 300 m strip width, 90° from bow
  - Daylight hours, good weather days (sea state < 5, visibility > 500 m)
  - Marine Mammals counted as and when seen during seabird survey

METHODS- Aerial Surveys

- **Coastal Antarctica**
  - **Aerial surveys for seals and penguins, India Bay and Larsemann Hills (**Bester et al 2002)
  - **Straight line surveys from Antarctic coast up to ice-water edge, total counts**
  - **Bell-type helicopter, 70-100 m altitude, speed ~ 80 Km/h**
  - **Species, number, age-class (adult or pup), location, distance (approx.), reaction, photograph**
  - **1000- 1600 hours, good weather (sunny /partly cloudy), wind < 45 km/h**

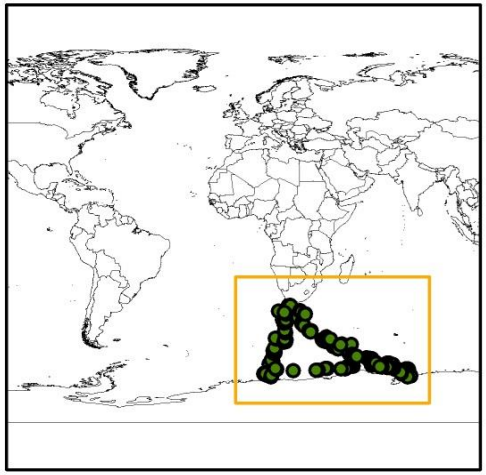
PRELIMINARY RESULTS

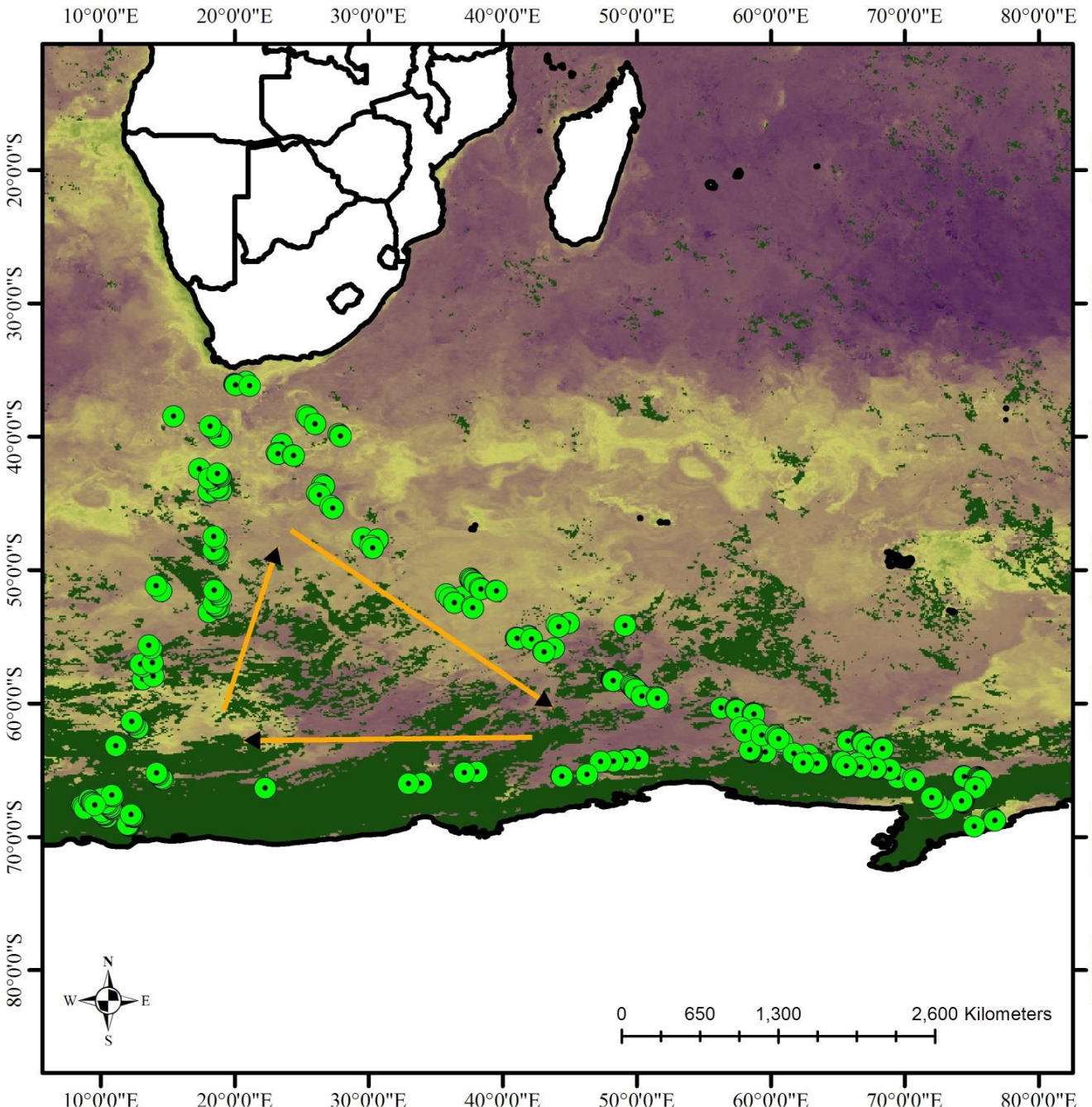
RESULTS - Voyage Surveys

- Two voyages conducted during the expedition
- 45 species of seabirds in 1433 sightings (n= 7133)
- 8 families, one-third species *globally threatened* (IUCN 2014)

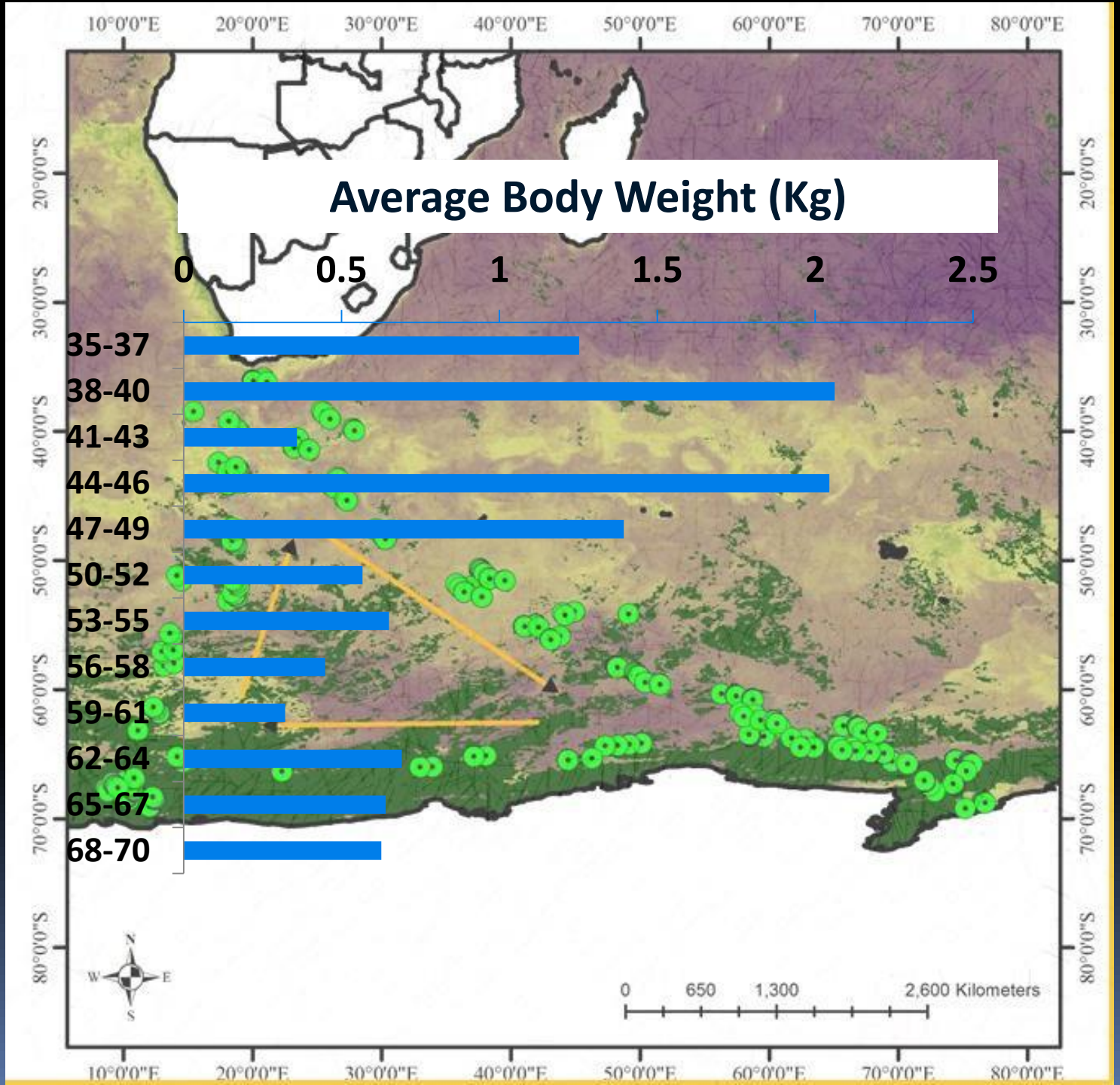
Family	# Species	# Sightings	Counts	% Freq. of Occurrence
Diomedeidae	8	165	222	3.11
Hydrobatidae	3	28	38	0.53
Laridae	1	11	47	0.66
Pelecanoididae	1	6	7	0.1
Procellariidae	27	1115	6320	88.6
Spheniscidae	4	88	456	6.39
Stercorariidae	3	11	11	0.15
Sulidae	1	9	32	0.45

RESULTS – Voyage Surveys contd.



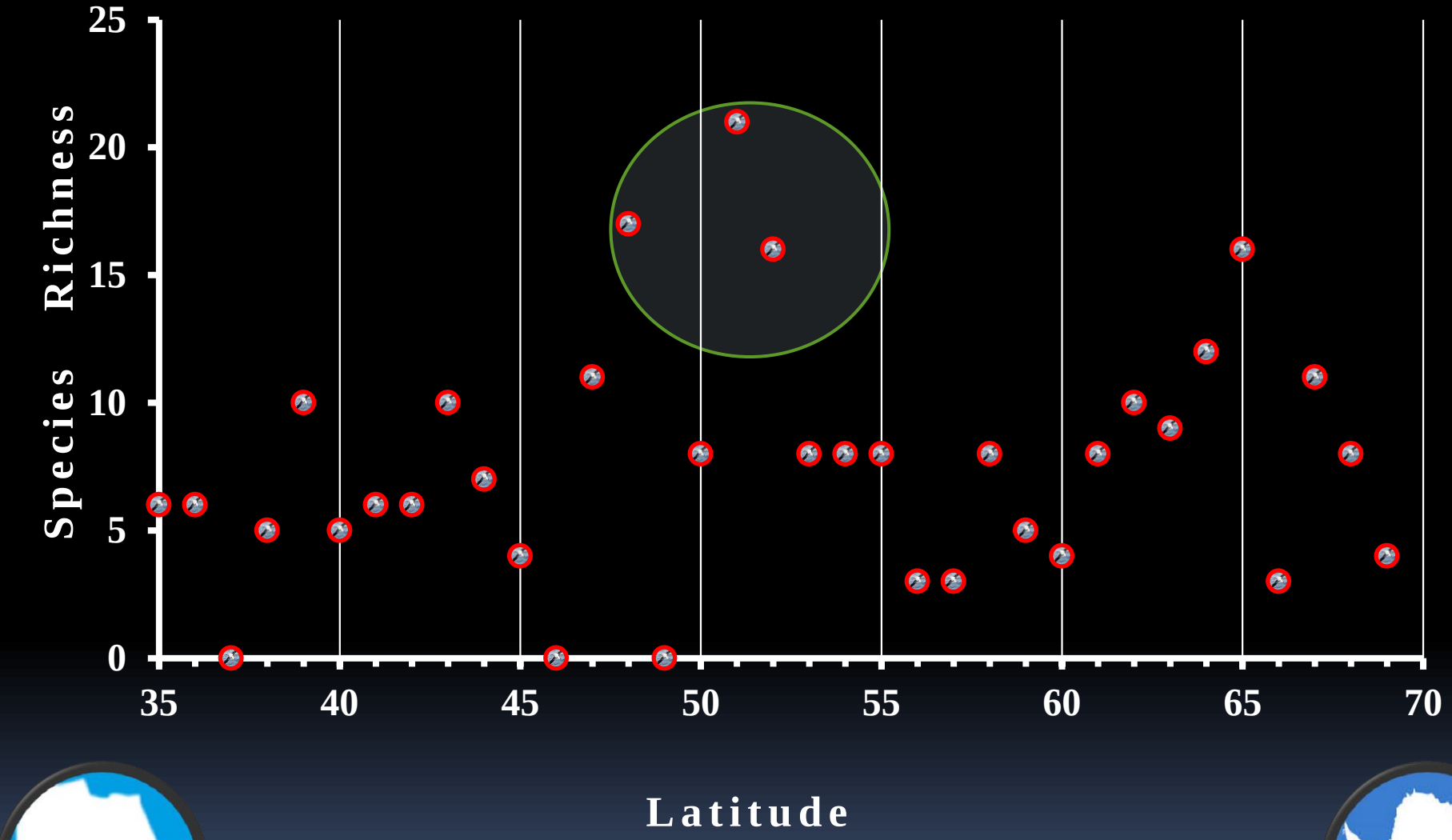


3 degrees Latitude class



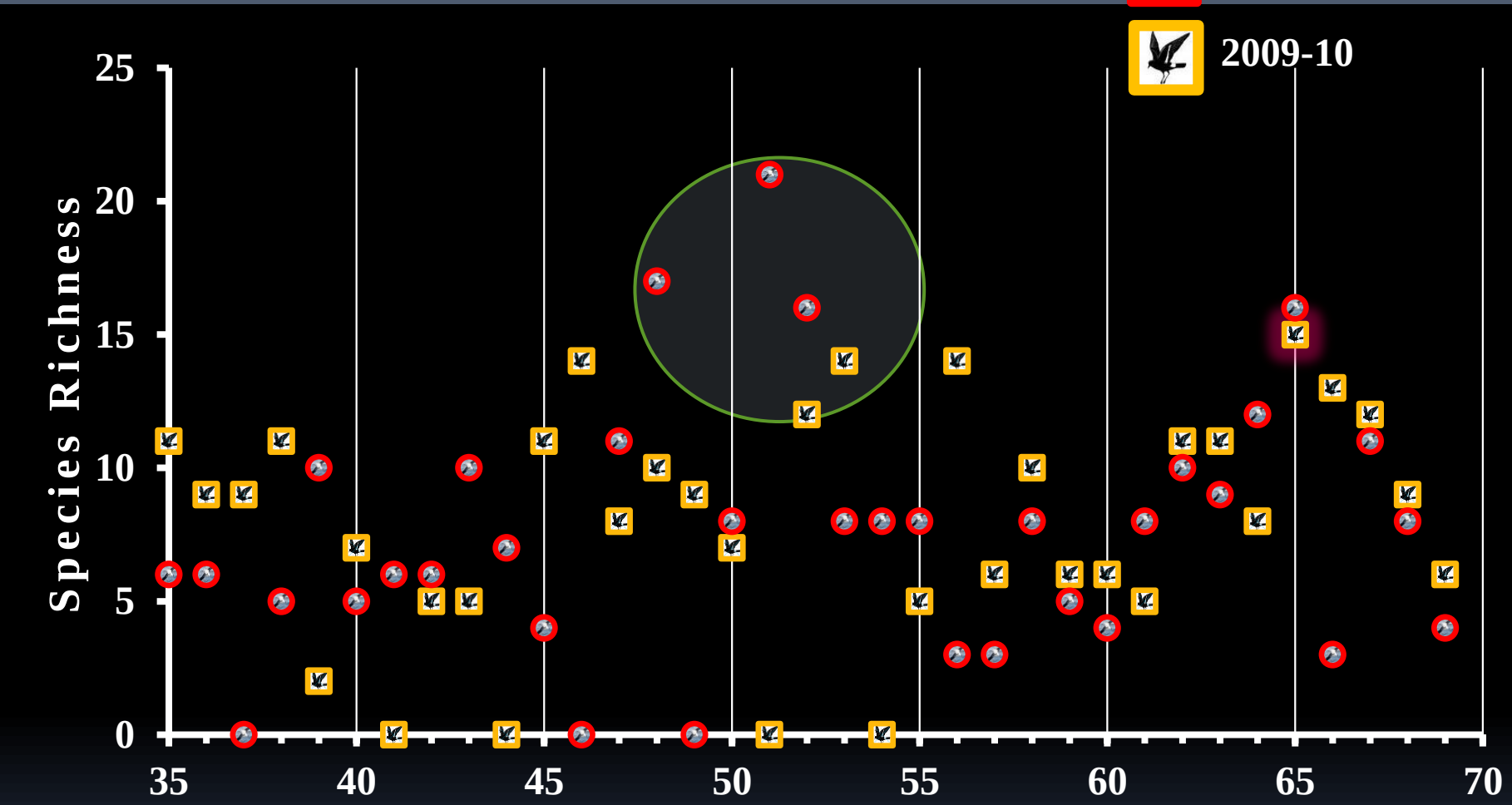
RESULTS – Voyage Surveys contd.

2013-14



Latitudinal Gradient of Species Richness during Austral Summer

RESULTS – Voyage Surveys contd.

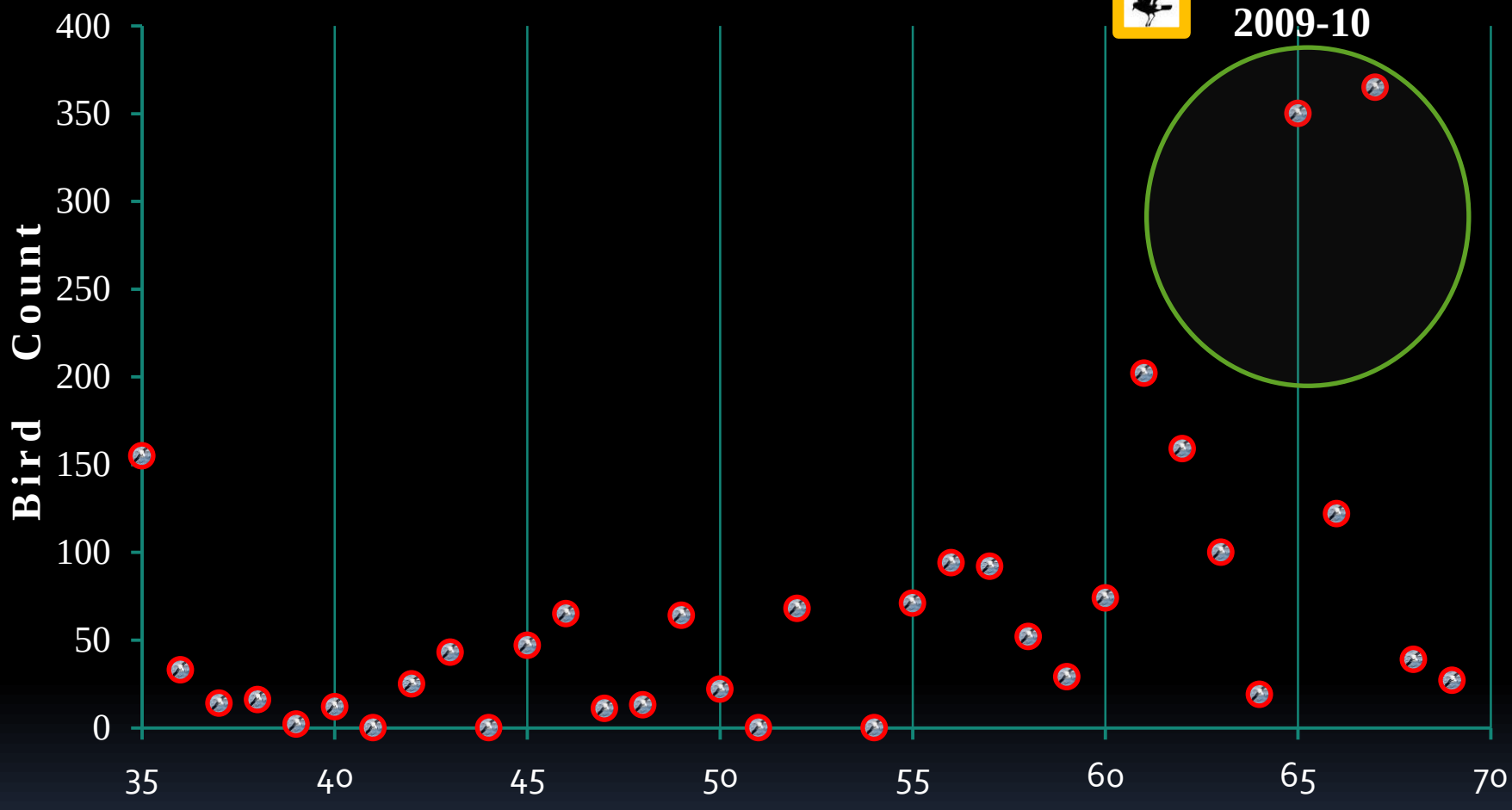


Latitudinal Gradient of Species Richness during two Austral Summers

RESULTS – Voyage Surveys contd.

2013-14

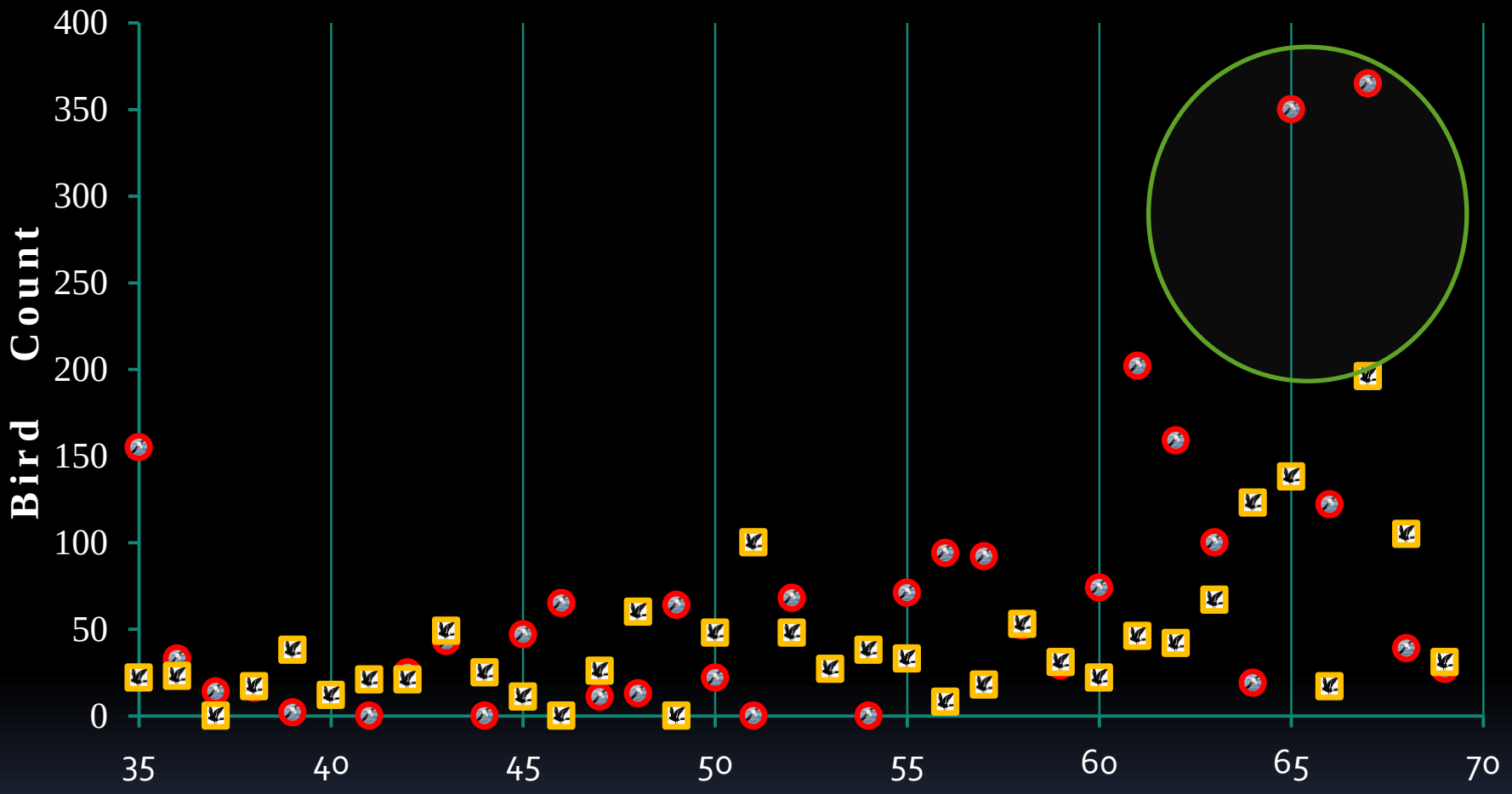
2009-10



Latitudinal Gradient of bird counts during two Austral Summers

RESULTS – Voyage Surveys contd.

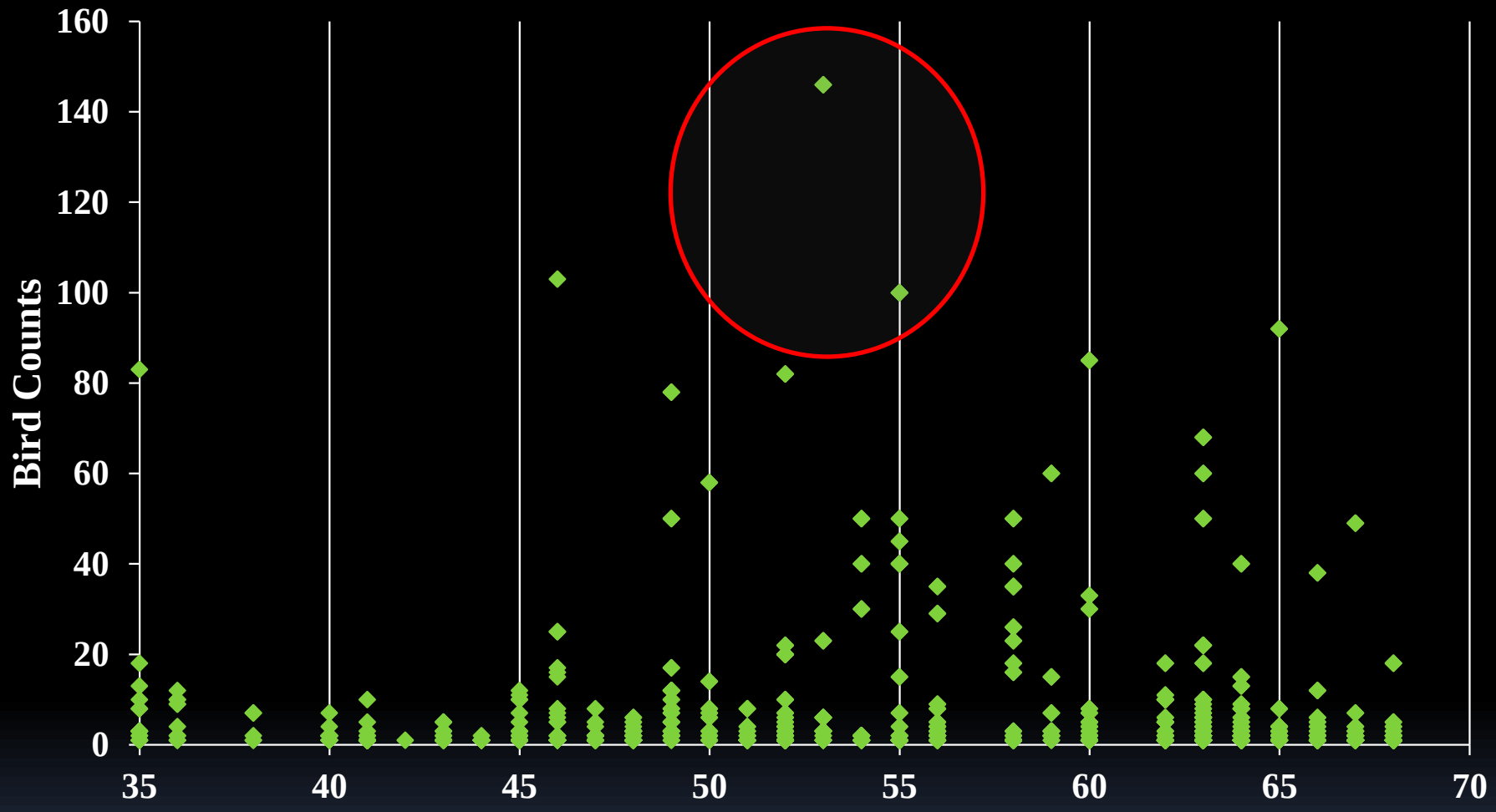
2013-14



Latitudinal Gradient of bird counts during Austral Summer

RESULTS – Voyage Surveys contd.

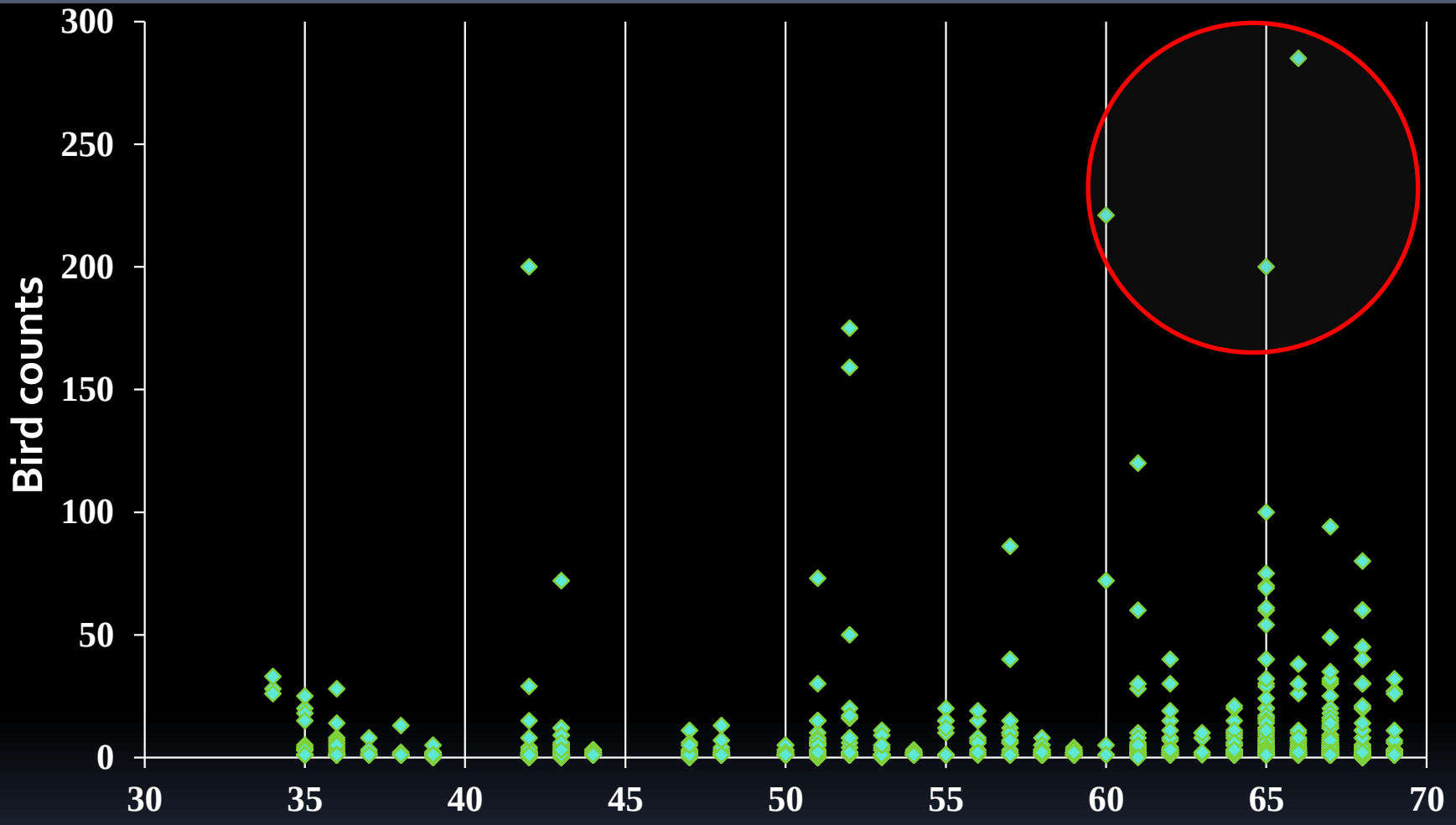
EARLY SUMMERS (Dec-Jan)



Latitudinal gradient in bird counts –within season

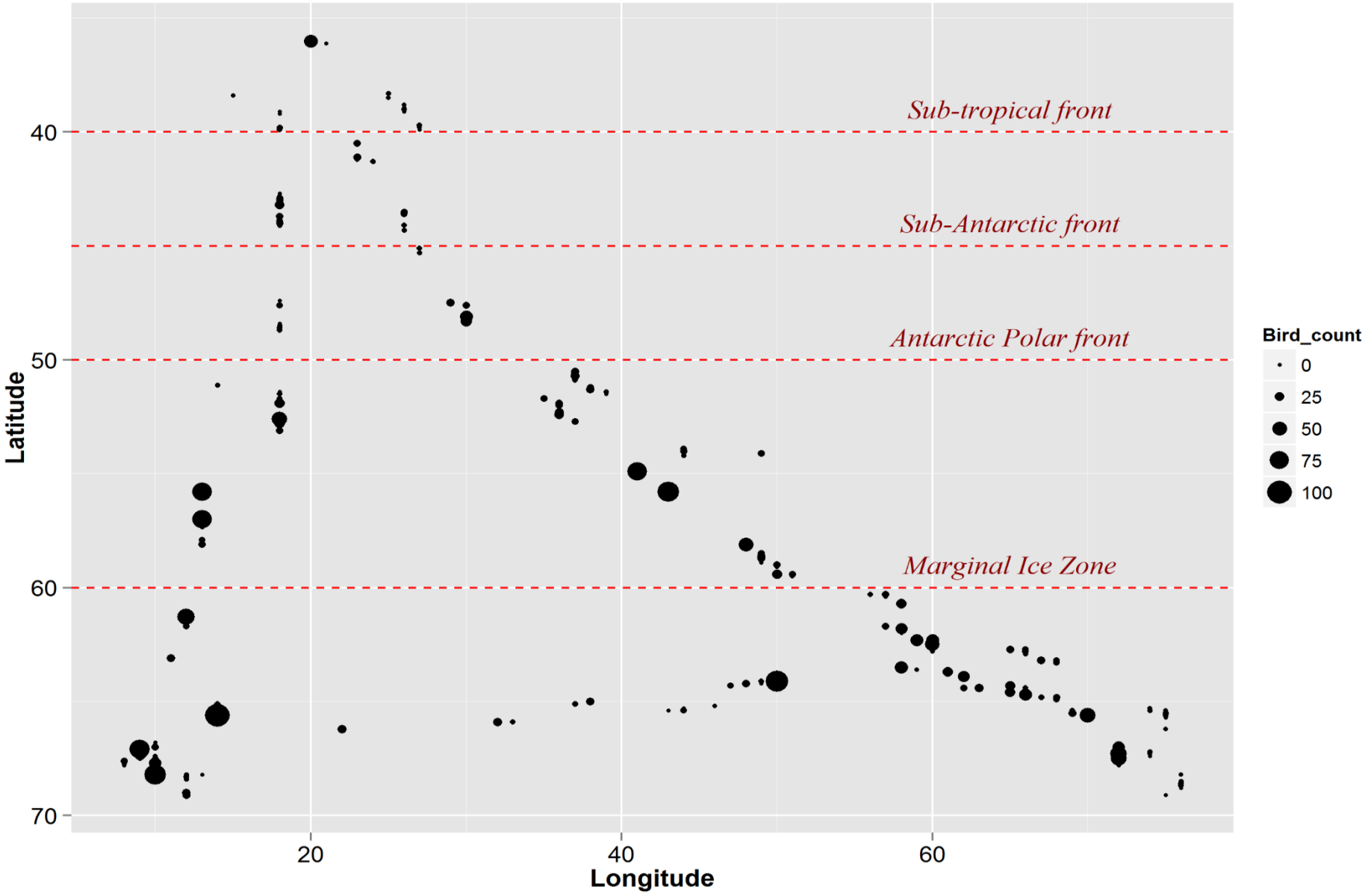
RESULTS – Voyage Surveys contd.

LATE SUMMERS (Feb-Mar)



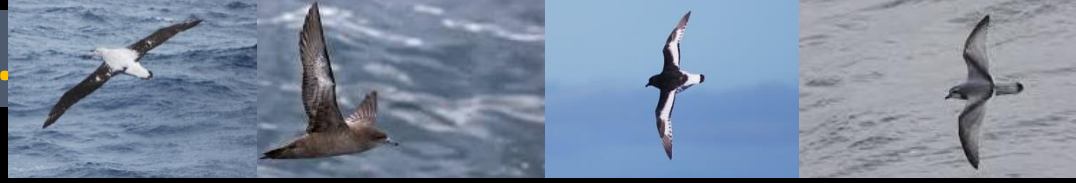
Latitudinal gradient in bird counts- within season

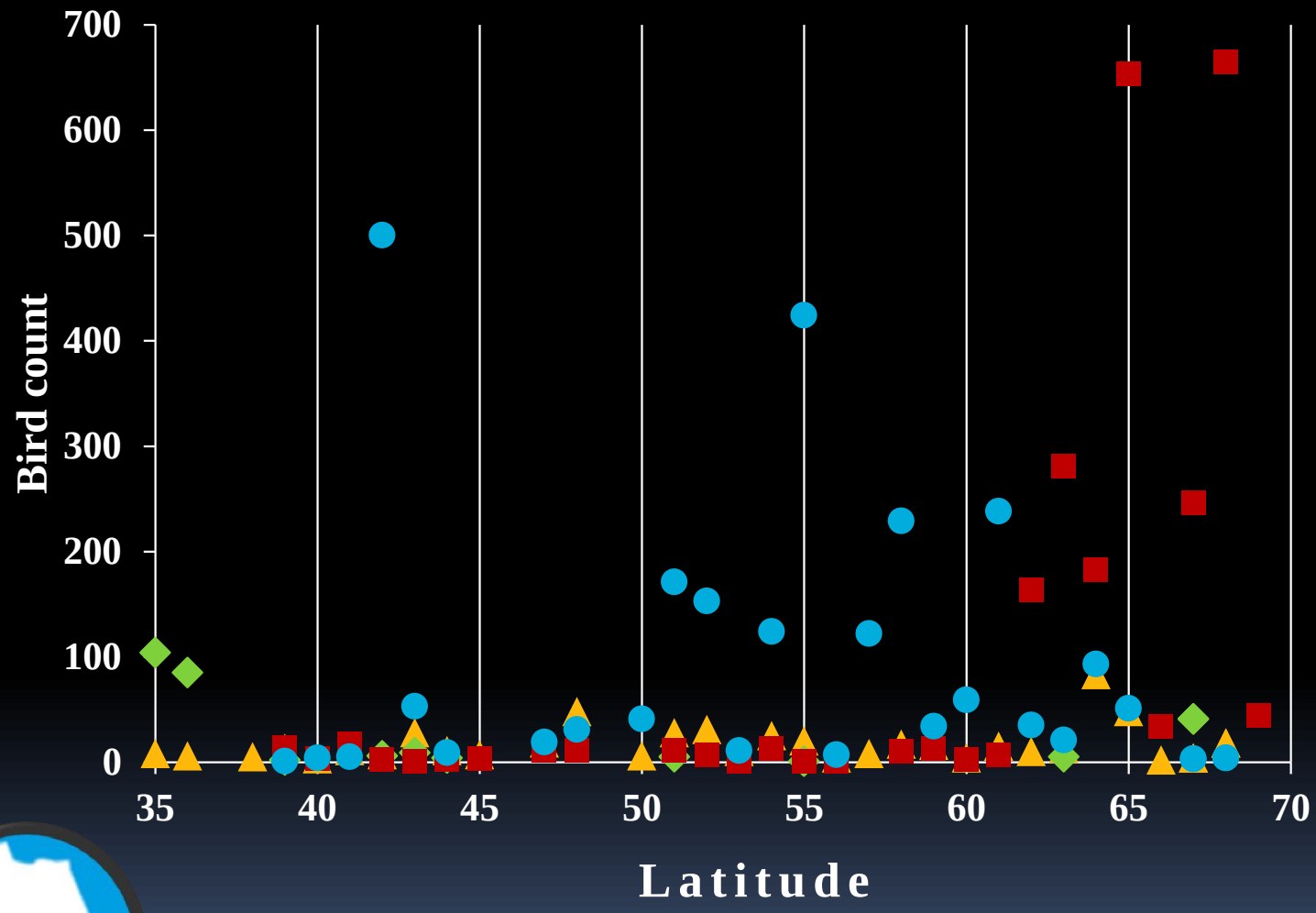
RESULTS – Voyage Surveys contd.



BIRD COUNT DISTRIBUTION ACROSS STUDY AREA (2013-14)

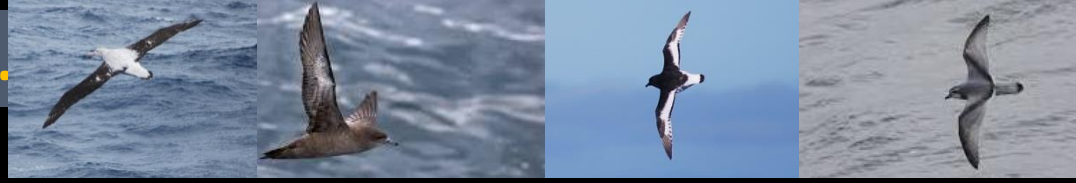
RESULTS – Voyage Surveys cont.

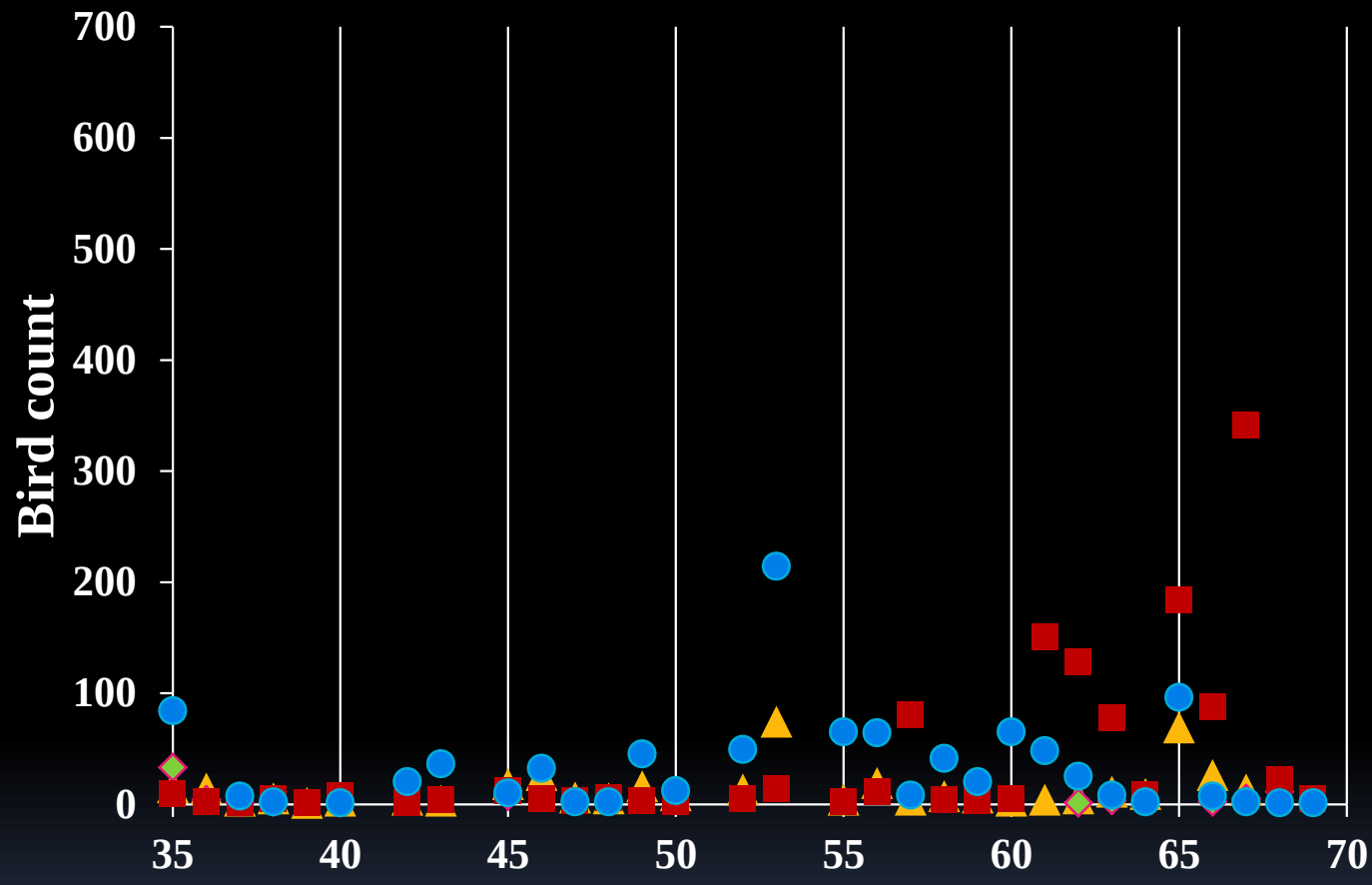




Latitudinal gradient in bird counts based on food type in 2013-14

RESULTS – Voyage Surveys cont.





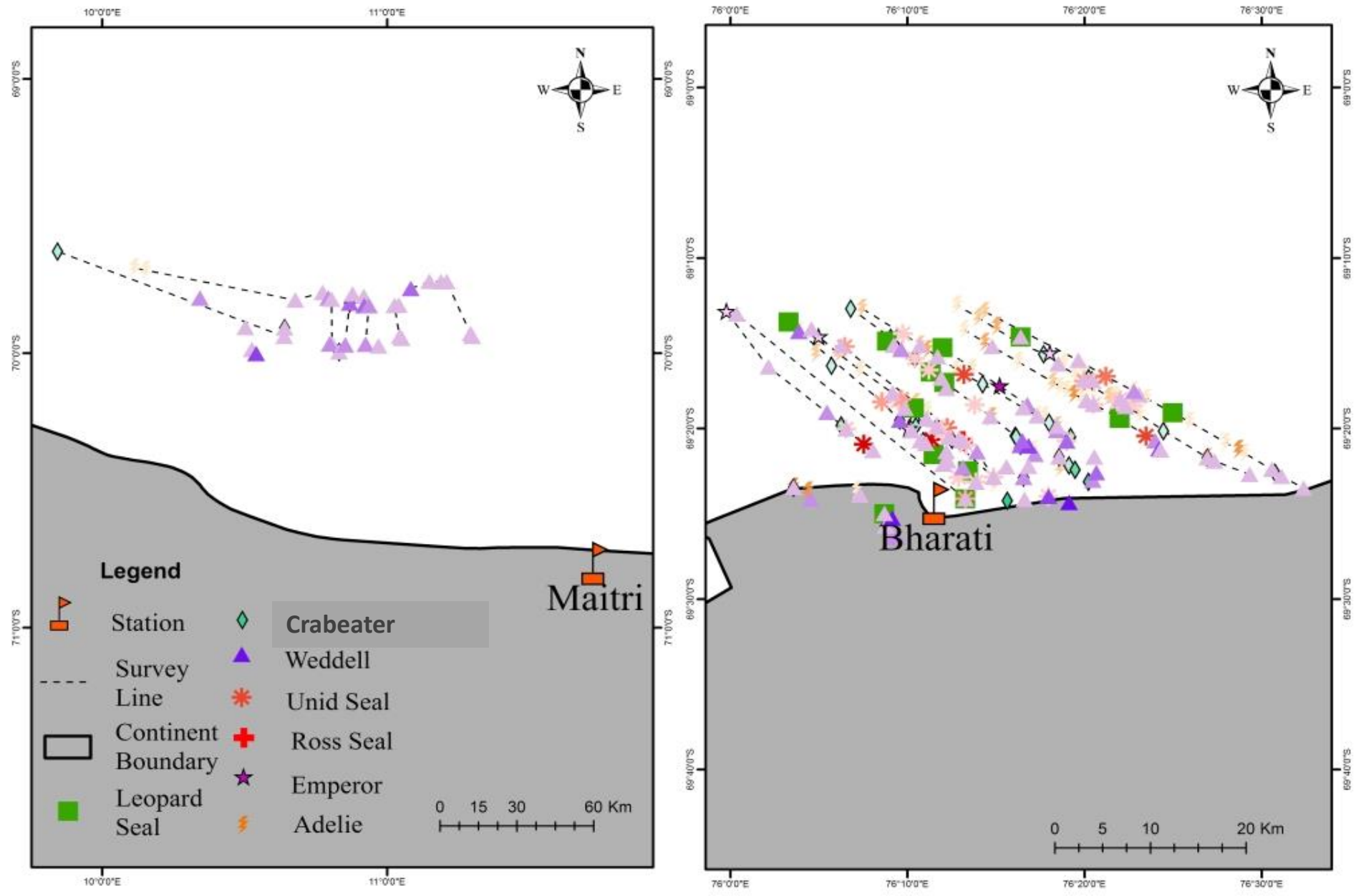
Latitudinal gradient in bird counts based on food type in 2009-10

RESULTS – Voyage Surveys cont.

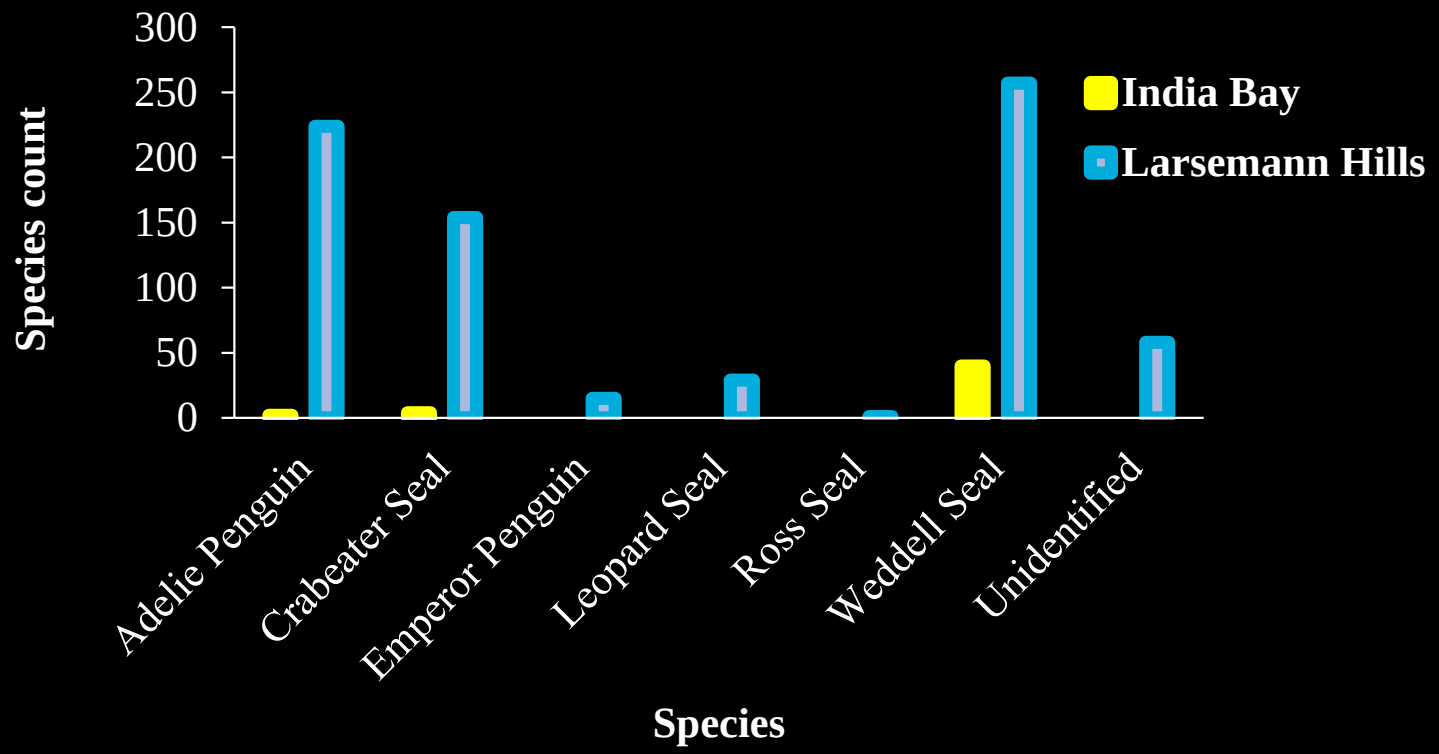
- **Marine Mammals**
  - 15 species of marine mammals seen during the two voyages
  - Sightings dominated by Humpback whale (> 50%) and Sperm whale
  - Two species of dolphins: Killer whale and Long-finned Pilot Whale

Antarctic Minke Whale

RESULTS – Aerial surveys contd.. Seal and Penguin Distribution



RESULTS – Aerial surveys contd.

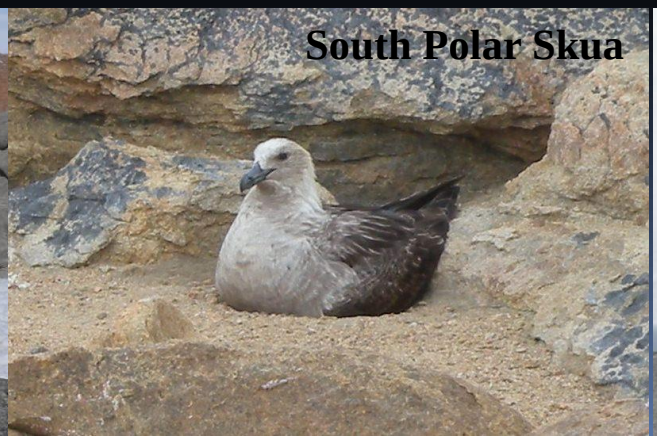


Weddell Seal

Adelie Penguin

RESULTS

- **Island Surveys**
  - **13 islands at Larsemann Hills surveyed**
  - **Five species of birds found nesting in 12 islands**



CHALLENGES/LIMITATIONS

ACKNOWLEDGEMENTS

- National Centre for Antarctic and Ocean Research
- Director and Dean, Wildlife Institute of India
- Faculty and Staff, WII

ONE-THIRD OF ALL SEABIRDS ARE GLOBALLY THREATENED


Thank You