Foraging areas of southern elephant seals of the Falklands: shopping close to home

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Introduction

Foraging at sea has been studied in most populations of southern elephant seal (SES hereafter) of the South Georgia stock. A notable exception are the Falkland Islands. SES are charismatic marine mammals, a very important component of the Falklands biodiversity, and a key species in the trophic chain of the South Atlantic Ocean. Moreover, the Falklands are experiencing a great momentum of economic development, related in particular to the oil extraction industry, that may greatly affect marine mammals. The lack of information about foraging areas of SES is a big gap in knowledge of the ecology and biodiversity of the Falklands, that we tried to fill by deploying satellite tags on SES breeding females at Sea Lion Island (SLI hereafter), the main SES breeding colony in the islands.

Methods

We deployed location-only satellite tags (SPOT5, Wildlife Computers) on 23 females during the 2009-2011 breeding seasons. All females were born on SLI and of known age. They were sedated with Zoletil (average dose 1.1 mg/kg). Tags were glued on the head of the subjects using two components epoxy glue (Fig. 1).

Fig. 1 – Female AXES and son just after the deployment of the satellite tag.

Locations were: a) retrieved from the Argos service; b) filtered with an algorithm based on swimming speed, distance between fixes and turning angle; c) plotted and analyzed in ArcGis 10.

Results

• Females spent at sea an average of 69.7 days before returning to land for the moult. Time at sea decreased from 2009 (76.8 days) to 2011 (63.5 days).
• Contrary to expectations from resights of marked seals, most (60.9%) females foraged close to SLI, on the continental shelf , and in small areas with shallow maximum depth (Fig. 2, Fig. 3 left).
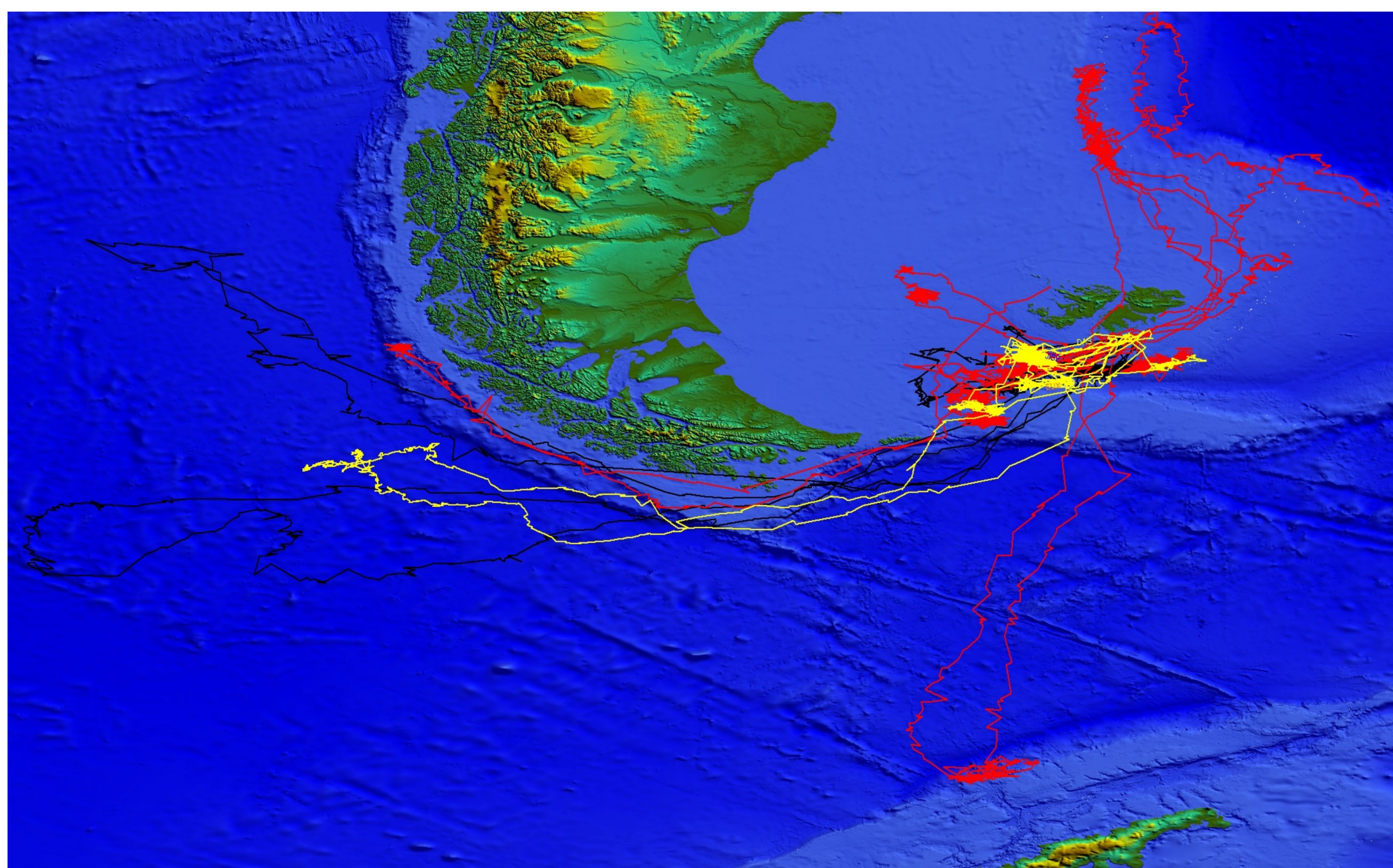

Fig. 2 – Tracks of SLI females. Black: 2009, red: 2010, yellow: 2011

• Only 21.7% of the females showed the very long migration loops typical of females of the South Georgia stock (Fig. 2); of these females four moved to the South Pacific ocean (Fig. 3 right), and only one female foraged near the Antarctic Peninsula.
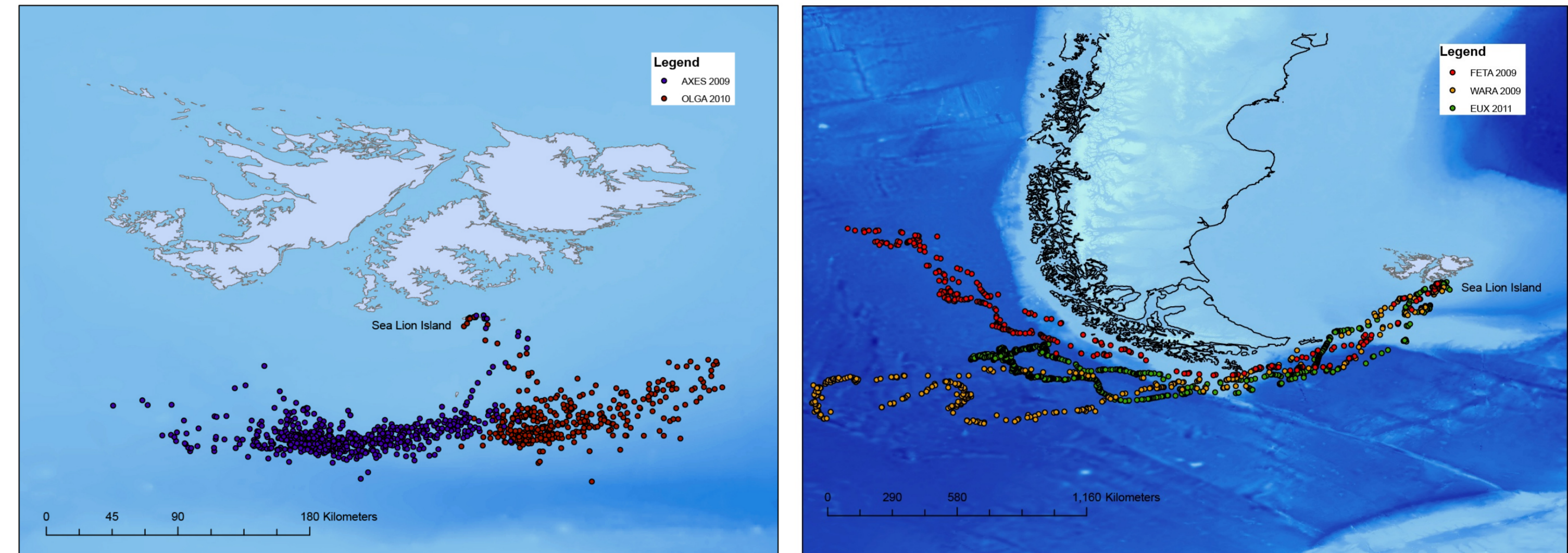

Fig. 3 – Fixes of two females foraging over shallow waters close to SLI (left) and of three females during long migrations to deep waters (right)

• The average maximum distance from SLI was 266.5 km for the females that remained close to the Falklands, 714.3 km for the females that went north, and 1386.2 km for the females that went far from the Falklands.
• Almost all females foraged to the south or south west of the islands (87.0%), and just three females foraged to the north.
• There was no difference in either age, body mass or body length between the females adopting the main foraging strategy and the other females.
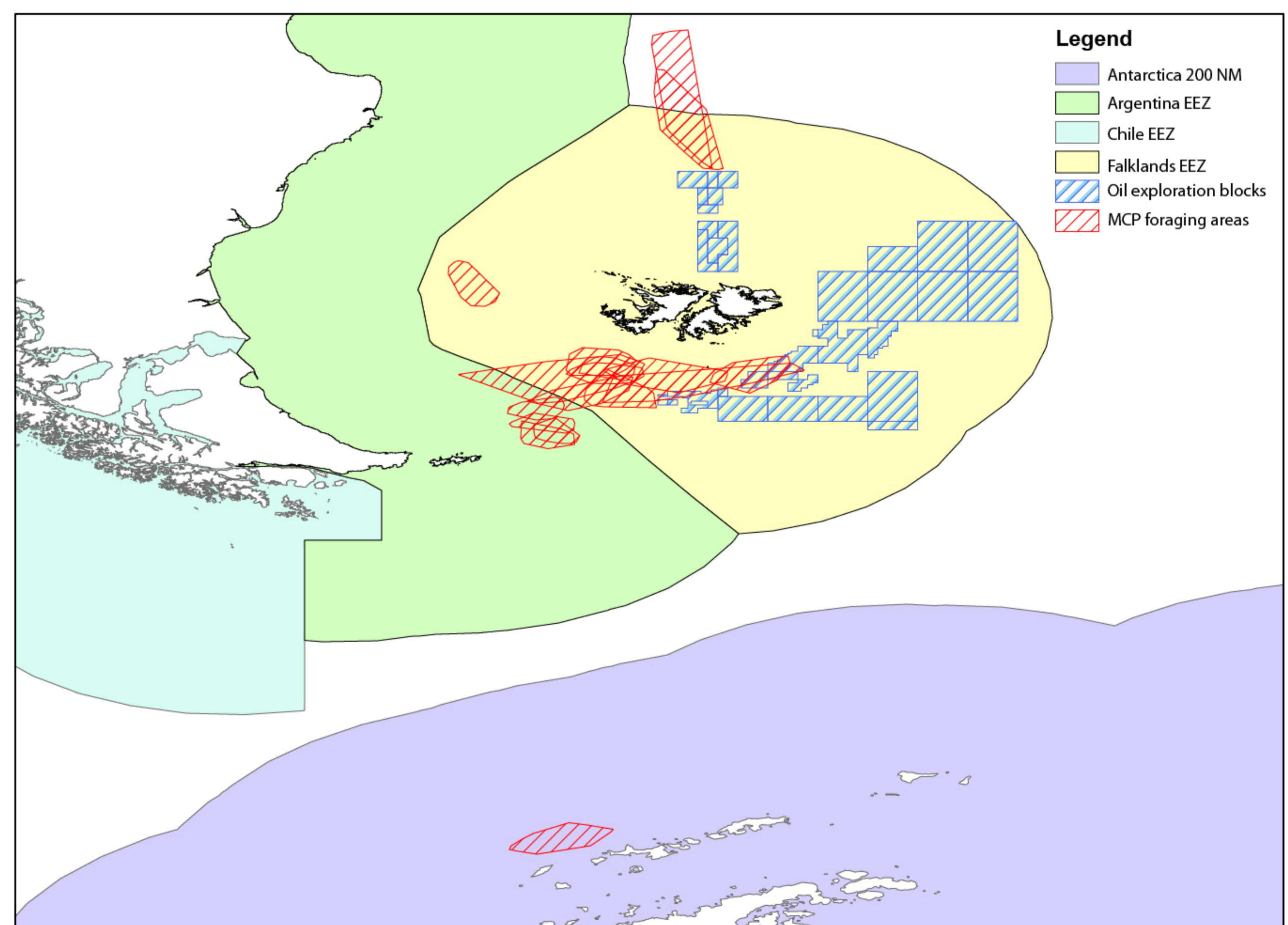

Fig. 4 – Foraging areas (Minimum Convex Polygon) of females using small areas.

• For the 17 females with small feeding areas, the average overlap of their foraging area was 63.2% with the Falkland's Exclusive Economic Zone, and 25.5% with Argentine's EEZ (Fig. 4).
• Of these females, 47.1% had their whole foraging area within the Falkland's EEZ.

Conclusions

• Most SLI females foraged on the continental shelf close to their breeding colony, in small and shallow areas, often within the Falklands Exclusive Economic Zone.
• Having good food close to home may improve the female energy budget, and explain the SLI population resilience to environmental change.
• This prevalent feeding strategy may also imply a greater risk of adverse interaction with human activities (e.g., oil extraction), and a greater responsibility of the Falklands authorities in the management and conservation of the species.