Australian sea lions: invaluable oceanographic monitors of remote areas in the Great Australian Bight.

Bailleul, Frederic1*, Paul van Ruth1, Clive McMahon2,3, Robert Harcourt3, Laura Richardson4, John Middleton1, Nicole Patten1, Ana Redondo Rodriguez1, Mark Doubell1, Tim Ward1, Simon D. Goldsworthy1.

1,* SARDI Aquatic Sciences, 2 Hamra Avenue, South Australia 5024, Australia

2 Marine Predator Research Group, Department of Biological Sciences, Macquarie University, Sydney, Australia

3 IMOS Animal Tracking Facility, Sydney Institute of Marine Science, Mosman, NSW 2088, Australia

4 Research School of Earth Sciences, Australian National University, Canberra, ACT, Australia.

The use of marine animals as platforms for oceanographic sampling has been a “win/win” for biology and operational oceanography over the last decade in all the world’s oceans. The deployment of animal-borne electronic instruments has both revolutionised our understanding of how marine predators respond to their environment as well as providing crucial oceanographic data from regions where observations from conventional oceanographic methods are limited. The Great Australian Bight (GAB) represents a complex oceanographic system influenced by the circulation of diverse water masses. Conventional physical and biological oceanographic measurements in this region are scant, especially in the west, and limit our capacity to further understand the region’s oceanographic structure and ecological importance. However, the GAB also shelters the larger part of the world population of Australian sea lions (Neophoca cinerea) which forage benthically over the continental shelf year round, providing an unprecedented opportunity to investigate the oceanographic environment at a high spatio-temporal resolution. For the last 10 years, male Australian sea lions fitted with CTD tags have been collecting longitudinal hydrographic information over 1000km of the GAB continental shelf. A total of 54 individuals from 18 locations have been equipped over this period, providing ~20,000 TS and ~6000 fluorescence profiles, for up to 10 months of each year. Here we present an overview of the latest advances in the use of these data to better understand regional oceanography from water mass circulation, spatial and temporal distribution of upwelling, and the estimation of water column primary productivity.