

"Animate exploration of the polar seas"

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What I would propose to talk about is the results from our recent project on Southern Elephant seals (SEaOS-Southern Elephant seals as Oceanographic Samplers) and how we hope to extend the approach to studying top predators from both the Antarctic and Arctic to gather data on their immediate ocean environment in connection with the so called International Polar Year (IPY). We have developed instruments that we can attach to seals that monitor their position and behaviour while simultaneously collecting oceanography information. In particular, the instruments collect and relay so called CTD profiles, one of the fundamental measures that oceanographers need to understand the structure of the water column and model ocean water movements. In the SEaOS project, 80 elephant seals we instrumented over two years these animals traveled over most of the southern ocean relaying data on their movements and behaviour while simultaneously providing an unprecedented amount of oceanographic data from undersampled parts of the Southern Ocean. This project was in our opinion a great success and has led to another proposed project MEOP (Marine mammal exploration of the Oceans, Pole to Pole which will be part of IPY). It is my intention to talk about the approach, how it works and give an overview of its biological and oceanographic results.

Animal as explorers and exploiters of the polar seas: monitoring behaviour, physiological condition and *in-situ* oceanography using animal-mounted platforms.

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Now that we can reliably track the movements of larger marine animals as they roam the seas, we want to be able describe in greater detail animals' foraging behaviour in relation to their immediate environment. We also need to place this detailed information in the context of the range of environmental conditions potentially available to the animals. Inevitably, this means questions will arise about what features of the ocean environment attract animals, how animals locate these places and what might happen to their physiological condition if the distribution or quality of these places change.

Because marine animals move in a complex and dynamic 4 dimensional environment where timely information about local conditions at an appropriate scale is often not available, data loggers that capture and relay information on the animals' behaviour and condition while simultaneously sampling their immediate environment can be extremely informative, helping us to understand how the environment influences the animals reproductive success and shapes their life histories. With these devices, we can also use the animals themselves as oceanographic explorers that report back on the conditions at their location while relaying data on their behaviour and physiological state. I will describe the development of the approach with examples of recent and proposed projects and discuss how we are trying to link the information we are collecting on the animals' behaviour and physiological states to the water masses they visit and ultimately to the form of their life history.

\*Southern Elephant seals as Oceanographic Samplers involving groups from France, Australia, the US and UK. See: <http://biology.st-andrews.ac.uk/seaos/>