Sea Mammal Research Unit

University of St Andrews

NATURAL ENVIRONMENT RESEARCH COUNCIL

natural scotland SCOTTISH GOVERNMENT

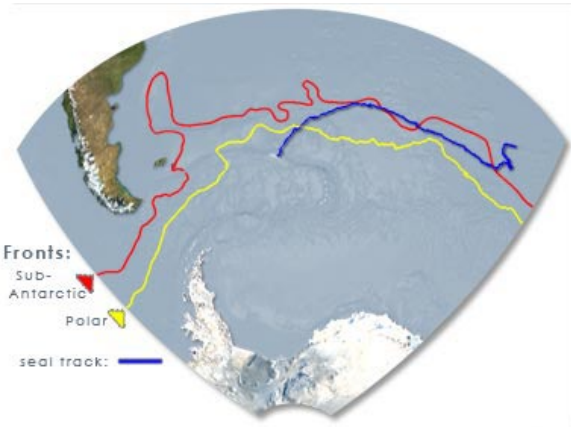
SCOTTISH NATURAL HERITAGE

Marine mammals as oceanographers

Many marine mammals undertake long journeys throughout the oceans. During these journeys they may travel to places where oceanographic survey ships rarely venture. They may also visit areas during times when ships cannot go there because of storms or ice.

Southern elephant seal with SMRU tag

Southern elephant seals are particularly interesting to us as biologists. They range widely across the oceans and dive to great depths (more than 1200m). However, in some areas their numbers are declining and in some areas they are increasing. Scientists at SMRU have developed special tags that can be harmlessly attached to the seals so we can follow their behaviour when they are at sea and find out more about where they feed. These tags also take measurements of the properties of the water around the seals.



Seal track (recorded with SMRU tag) in relation to ocean fronts

This additional data is very interesting to oceanographers.

The SEaOS (Southern Elephant Seals as Oceanographic Samplers) study has described the movement and diving habits of elephant seals. They tend to forage where ocean conditions are likely to lead to the biggest numbers of their favourite food - squid. These specific conditions are close to breeding grounds in regions where elephant seal numbers have been increasing. However, where the numbers have been declining the seals have to travel much further to find their food. This study has also shown that tags on marine mammals can sample the properties of the ocean in inaccessible regions.

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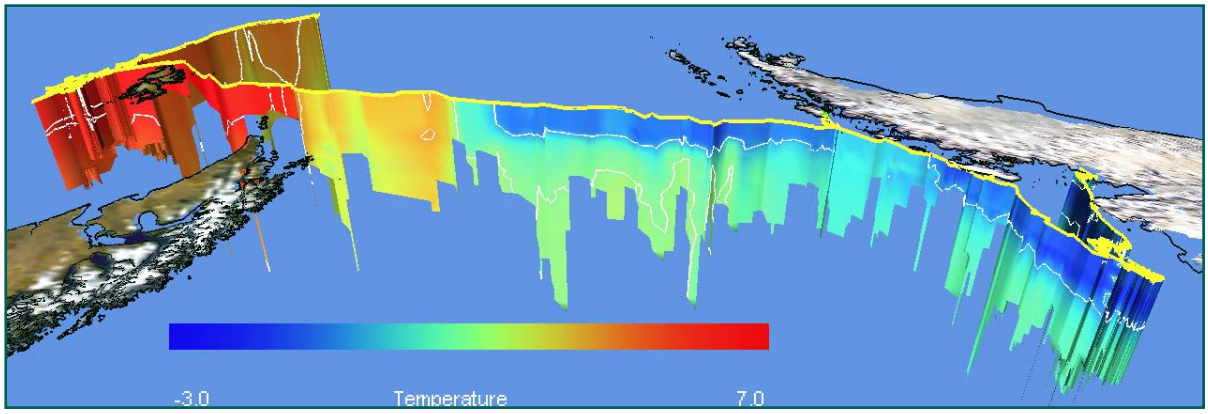

Southern elephant seal (yellow track) crossing the Drake Passage

The SEaOS project is interdisciplinary, bringing together the interests of both biologists and oceanographers from across the globe.

SMRU tags

The tags are moulded resin blocks containing tiny computers designed and built by SMRU. While the seals are swimming sensors take continuous measurements of the water temperature, conductivity and depth. This allows us to calculate water salinity and density. These are important oceanographic features; as variations in density determine the ocean currents. Computers in the tags compress the data and relay it back to us via satellite.

The tags are fixed harmlessly to the fur of the seals. They are small and light-weight which means that the behaviour of the animals is not affected. After a period of typically several months the tags drop off during the seals annual moult when they lose their old fur.

To provide a 'front-row-seat-view' of the behaviour of the tagged animals when in the wild we have developed a 3D visualisation computer program called MamVisAD.

This program allows biologists and oceanographers to interactively explore, both in time and space, the complex datasets recorded by the tags.

Further information

http://biology.st-andrews.ac.uk/seoas/index.html

Weddell seal with SMRU tag

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