

# Seal bulls in the service of science

June 2 2010

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Gustavo is carrying a transmitter. Credit: Joachim Plötz, Alfred Wegener Institute

"Gustavo" is an imposing bull always in search of the best feeding grounds. The elephant seal weighing 3 tons and measuring 4 metres in length belongs to a group of 14 animals that serve researchers of the Alfred Wegener Institute as scientific assistants since recently. At the beginning of the Antarctic winter - from mid-March to the end of April - the mighty elephant seal bulls were tagged with state-of-the-art satellite transmitters at the Dallmann Laboratory on King George Island. In the coming months marine biologists Dr. Joachim Plotz and Dr. Horst Bornemann can now follow from their desk in Bremerhaven where the animals migrate, where they find prey at what depth and under what oceanographic conditions the food supply is exceptionally good in the Southern Ocean.

"We have just returned from the [Antarctic Peninsula](#) and still have fresh impressions of the incredible experience when you have numerous elephant seal bulls with their loud deep roar in front of you and imagine attaching a [satellite transmitter](#) the size of your palm to some of these huge creatures," Joachim Plötz describes a not entirely everyday situation even for the experienced seal researcher. Every year from March to April the males of the only reproduction colony of the Southern elephant seal in the Antarctic come to the South Shetland Islands, a group that also includes King George Island, for moulting. The scientists from the Alfred Wegener Institute for Polar and Marine Research in the Helmholtz Association took advantage of this narrow time window to furnish some of the animals with transmitters that operate using the satellite-aided ARGOS location system. Once moulting is over after three weeks, the bulls go back to their migratory life and do not return to land until six months later to mate with the females in the Antarctic spring.

During the annual migrations to their oceanic feeding grounds elephant seals cover thousands of kilometres. They dive down to depths of over 2000 metres and remain under water for periods of over an hour. When a seal with a transmitter dives, it collects data - even under the ice - and then appears on the surface again to breathe after some time. While it breathes fresh air, the recorded data package is sent to a satellite that passes on the signals received. With a little luck the transmitter will continuously transfer data for a year. When the next moulting takes place, the wonder of microelectronics developed by the Scottish Sea Mammal Research Unit will then fall off. Immediately after evaluation the measured data from this German-Argentinian-South African joint project will be made available to other world data centres via the Publishing Network for Geoscientific & Environmental Data (PANGAEA) at the Alfred Wegener Institute and used by various international cooperative scientific ventures.

During the extended travels through the Southern Ocean the transmitters not only send the geographic position and diving depth of the respective seal, but at the same time data on the temperature and salt concentration of the body of water through which the animal is swimming and thus important physical parameters from which, for example, conclusions can be drawn on the currents in the ocean. "Elephant seals mainly feed on fish and squid," Plötz's colleague Horst Bornemann explains why the researchers can draw conclusions regarding the spatial and temporal distribution of particularly productive zones in the Southern Ocean based on seal migrations. "They lead a nomadic life in the ice desert of the Antarctic Ocean and are always looking for regions with ample prey. Based on seasonal changes in the migration behaviour of seals, we thus obtain indications of when, where and at what depth exceptionally high numbers of fish and squid occur and with what oceanographic conditions a good supply of food correlates."

Even though the transmitters can hold out for a year, the data in the coming months are especially sought after. During this period the Antarctic winter prevails, the [Southern Ocean](#) is covered with ice and continuous measured data, particularly from the winter months, are rare. "Research vessels cannot yet sail continuously in the Antarctic Ocean at this time. Our seals," say Plötz and Bornemann full of conviction, "are therefore genuine pioneers of research."

Provided by Helmholtz Association of German Research Centres

Citation: Seal bulls in the service of science (2010, June 2) retrieved 23 April 2024 from <https://phys.org/news/2010-06-bulls-science.html>

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