Krill discovered living in the Antarctic abyss

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Scientists have discovered Antarctic krill (Euphausia superba) living and feeding down to depths of 3000 metres in the waters around the Antarctic Peninsula. Until now this shrimp-like crustacean was thought to live only in the upper ocean. The discovery completely changes scientists' understanding of the major food source for fish, squid, penguins, seals and whales.

Reporting this week in the journal Current Biology, scientists from British Antarctic Survey (BAS) and the National Oceanography Centre, Southampton (NOCS) describe how they used a deep-diving, remotely operated vehicle (RoV) known as the Isis to film previously unknown behaviour of krill.

Professor Andrew Clarke of the British Antarctic Survey said,

"While most krill make their living in the ocean's surface waters, the new findings revise significantly our understanding of the depth distribution and ecology of Antarctic krill. It was a surprise to observe actively-feeding adult krill, including females that were apparently ready to spawn, close to the seabed in deep water."

Scientists have been studying krill since the 'Discovery' expeditions of the early 20th century. Oceanographic expeditions, using a combination of echo-sound techniques and collection samples in nets, indicated that the bulk of the population of adult krill is typically confined to the top 150 metres of the water column.

The grant to purchase the Isis RoV was led by Professor Paul A Tyler of NOCS. He says,

“Having the ability to use a deep-water ROV in Antarctica gave us a unique opportunity to observe the krill and also to observe the diversity of animals living at the deep-sea floor from depths of 500m down to 3500m. The importance of such observations is that, not only do we have the ability to identify species, but we can see the relations among individual species and their relationship to the ambient environment.”

The discovery holds some important lessons, Clarke continued.

“The behaviour of marine organisms - even quite 'primitive' ones - can be complex and more varied than we usually assume. There is still a great deal to learn about the deep sea and an important role for exploration in our attempts to understand the world we live in.”

Previously unseen movies of deep-sea krill swarms shot from the ROV are available from the BAS Press Office. Stills are available also The paper: Antarctic krill feeding at abyssal depths by Andrew Clarke and Paul Tyler is published this week in Current Biology.

Antarctic krill (Euphausia superba), feed on phytoplankton and are in turn eaten by a wide range of animals including fish, penguins, seals and whales. Phytoplankon are the starting point for the marine food chain and use photosynthesis to extract carbon from carbon dioxide.

Krill live in the open ocean, mainly in large swarms and reach particularly high numbers in Antarctica. Antarctic krill can grow up to a length of 6cm and can live for 5-6 years. They are one of the largest protein resources on Earth and can be fished easily with large nets for human consumption. The total weight of Antarctic krill is calculated between 50-150 million tonnes.

Numbers of Antarctic krill appear to have dropped by about 80% since the 1970s. The most likely explanation is a dramatic decline in winter sea-ice. Krill feed on the algae found under the surface of the sea-ice, which acts as a kind of 'nursery'. The Antarctic Peninsula, a key breeding ground for the krill, has warmed by 2.5°C in the last 50 years, with a striking decrease in sea-ice. It is not fully understood how the loss of sea-ice there is connected to the warming, but could be behind the decline in krill.

Source: British Antarctic Survey