

## Arctic plankton will switch from sink to source in warmer oceans

**Mounting evidence confirming the effects of a 5°C increase in the Arctic Ocean temperature has led an international team of researchers to issue a stark warning about the perils the world faces in the near future.**



Credit: Stefan Hendricks, Alfred Wegener Institute

Research results from a series of eight cruises conducted between July 2007 and July 2012 allowed the annual metabolic balance of Arctic plankton communities, which determines their role as CO<sub>2</sub> sinks or sources, to be resolved for the first time.

The international scientific team was led by the Director of The University of Western Australia's Oceans Institute, Professor Carlos M Duarte, who said resolving the role of Arctic plankton as a source or sink for CO<sub>2</sub> was of major importance in considering the carbon budget of the planet.

‘This research revealed that the two-week spring algal bloom occurring in April as the Arctic emerges from its winter darkness and the sea-ice starts to thin is so productive it can fuel the food web for the entire year and remove significant amounts of CO<sub>2</sub> from the atmosphere on an annual basis,’ he said.

However, experiments involving temperature manipulations conducted in the Svalbard Islands (about 650 kilometres north of mainland Europe), indicated that the plankton community switches from acting as a sink to acting as a source of CO<sub>2</sub> to the atmosphere at seawater temperatures in excess of 5°C. The researchers noted that this temperature will be regularly observed in the European Sector of the Arctic Ocean over the coming decades.

‘Warmer temperatures enhance respiration rates by plankton organisms, particularly bacteria, leading to a shift in the size of photosynthetic plankton size, which decompose quickly and result in a major release of CO<sub>2</sub> from excess respiration,’ study co-author, UWA Oceans Institute and School of Plant Biology Professor Susana Agusti said.

Recently Professor Duarte's team reported findings from model analyses of polar food webs indicating that these are particularly vulnerable to disturbances that can trigger a cascade of extinctions in the ecosystem.

This year Professor Duarte's team will return to the Arctic for oceanographic cruises in April and July and a coastal experimental campaign in September in Greenland.

Professor Duarte will attend a workshop at the White House in Washington in late April to contribute to formulating a large research project on the future of the Arctic.

Source: UWA

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