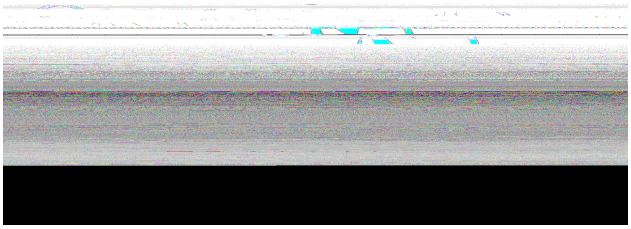
Press Release



42/2016

Calcification – does it pay off in the future ocean?

International research team has calculated the costs and benefits for phytoplankton

07.14.2016 / Kiel. Coccolithophores, single-celled phytoplankton, which plays a vital role in marine biogeochemical cycling, in marine food webs and in the global climate system, has developed a variety of calcareous shells to protect itself against predation and damage. But this requires a lot of energy – and the price for the artful armour could rise further due to global change. With the help of a new model, an international research team analysed the energetic costs and benefits of calcification. The results suggest that the ecological niche for calcifying algae will become narrower

So far, the high energetic costs have paid off: “Coccolithophorids have survived over 200 million years. But now it is questionable whether they are also able to withstand climate change,” says Professor Riebesell.

The 200 coccolithophore species produce up to ten per cent of the biomass in the oceans and keep the marine carbon cycle running. Stuck to their calcium carbonate platelets, organic matter sinks to the ocean floor – allowing surface layers to take up a new carbon dioxide from the atmosphere and process it.

Whether these unicellular multi-talented organisms will be able to fulfil their functions in the future, depends on how much extra energy they have to spend on calcification – and how their competitors in the food web react to ocean change. The amount of carbon dioxide dissolved in seawater is increasing due to fossil fuel emissions. This slightly stimulates photosynthesis.

On the other hand, the associated reduction in pH (ocean acidification) hampers calcification. “Compared to other planktonic organisms, coccolithophores will find themselves in a disadvantage. Their decline would also have an impact on the climate system,” says Dr

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