Lakes react differently to warmer climate, study finds

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A future warmer climate will produce different effects in different lakes. Researchers from Lund University in Sweden have now been able to explain that the effects of climate change depend on what organisms are dominant in the lake. Algal blooms will increase, especially of toxic blue-green algae.

The study in question has been carried out by a group of researchers at the Department of Biology at Lund University. The research team is specifically focusing on predictions regarding how our water resources will be like in the future, in terms of drinking water, recreation, fishing and biodiversity. They have now published findings on the impact of a warmer climate on lakes in the journal *Nature* Climate Change.

"The most interesting and unexpected result from the study is that the reaction to climate change will vary between lakes; this has been observed previously but has puzzled researchers. We have shown that the variation is dependent on what organisms are dominant in the lake", says Lars-Anders Hansson, Professor of Aquatic Ecology at Lund University.

In lakes without fish, a warmer climate will lead to clear water without algal blooms. However, the results will be different in lakes containing fish. There, the warmer climate will benefit the fish, which will eat up large quantities of crustaceans (zooplankton). These crustaceans keep the algae in check. When the number of crustaceans falls, the algae will be free to multiply, and algal blooms will increase.

"Since most lakes close to humans contain fish and are also already eutrophicated, we can expect to have to deal with algal blooms even more in the future", says Lars-Anders Hansson.

Conditions will be particularly favourable for the development of blue-green algae, and this is an even greater cause for concern, in the view of Lars-Anders Hansson. Blue-green algae, also known as cyanobacteria, are the type of algae that cause the most problems in lakes and oceans because they form very strong and often toxic algal blooms.

The researchers already know that climate change is expected to lead to a rise in temperatures of 2o C within the lifetime of the coming generation. An increase in leaching of humus-rich water from land and forests is also expected, which will at least double the brownness of the lake water.

"We know that we are going to see a change in the climate, but we are also seeing other major environmental changes taking place, for example 'brownification'. This means that we have several simultaneous changes that will interact and possibly create synergies", says Lars-Anders Hansson.

In the Future Water research project, a large experiment has been set up based on these conditions, in order to study what impact they may have on organisms and water quality in the future.

More information: www.nature.com/nclimate/journa … ll/nclimate1689.html

Provided by Lund University