

## **CO<sub>2</sub> degassing from Danish lakes and streams**

The fresh waters are playing a central role in the global and Danish carbon circuit and in CO<sub>2</sub> degassing to the atmosphere. 20 years ago fresh waters were considered as passive transport ways of water and carbon from land to sea. Since then, more and better measurements have shown that on the contrary there is a considerable emission of carbon and deposit along the way and a quite important CO<sub>2</sub> degassing to the atmosphere. The project will, with more and better measuring of CO<sub>2</sub> degassing with new test chambers present a total budget for Denmark and assess the importance of soil type and cultivation form.

Kaj Sand-Jensen, Professor and Kenneth Martinsen, Research Assistant, Biological Institute at University of Copenhagen, have developed new chambers for CO<sub>2</sub> measuring and developed mathematic tools to set up the Danish CO<sub>2</sub> budget.

### **CO<sub>2</sub> degassing – how, where and how much?**

The new measurements of CO<sub>2</sub> degassing will in particular be in small lakes (below 1 ha) and in newly established lakes, because data is missing. The new floating chambers with a small built-in CO<sub>2</sub> meter has proved to be precise and cheap, can deliver many tests and gives a good database. Small lakes are very numerous, there are thousands or more than 50 times more than large lakes and they are thus expected to contribute considerably to the total degassing. There are only around 100 new lakes, but they can still be expected to have a very large degassing when decomposing the organic matter in the submerged agricultural land, but they have not been examined before. There will also be supplementary measuring of CO<sub>2</sub> degassing from streams to make quality assurance of the developed degassing models.

The national budget will hereafter be set up based on type and size of lakes and streams and their location in Denmark in areas with different soil types and utilization. The national budget for freshwater will be assessed compared to the CO<sub>2</sub> balance for the soil and the emission from the Danes' different activities.

### **News value and relevance**

The new aspect of this study is that we determine the CO<sub>2</sub> degassing for different lakes and streams and put a figure on how large a part of the decomposition in the soil is emitted to freshwater both as supersaturated CO<sub>2</sub> and as dissolve carbon ions after decay of chalk and clay minerals in the soil.

The setup of a national carbon budget is important for the assessment of climate adaption by identifying areas with very high or low carbon loss. The project is thus important for planning the present and future area use in view of a sustainable climate.