



The Contribution of Lakes to the European Carbon Budget

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Lakes are important transfer points within the global carbon cycle connecting hydrosphere, atmosphere, geosphere and biosphere. Most lake sediments contain high amounts of carbon and therefore function as a carbon sink. On the other hand evasion of the greenhouse gases carbon dioxide and methane through the lake surface to the atmosphere can turn them into a net carbon source. The influence of lakes on the global carbon cycle is still controversially debated and usually not based on budgets and models. The aim of the study is to estimate these fluxes and to identify the main factors controlling the lake budget for entire Europe.

We compiled published and unpublished lake data and their catchment (e.g. soil, land use, vegetation, climate ect.) in a database covering a wide range of lake types and regions. Long term carbon burial was evaluated from published studies. Carbon fluxes between lake and atmosphere were indirectly calculated from surface water chemistry and wind speed data. The dataset was statistically tested in a GIS approach to identify main factors controlling the burial and evasion of carbon. Results are used to extrapolate lake carbon fluxes for whole Europe.

Preliminary results suggest that carbon evasion exceeds carbon burial several times. Carbonate sedimentation can highly increase the carbon burial but is absent in most boreal lakes. Buried organic carbon is predominantly of autochthonous origin. The bulk of lakes are most of the time carbon dioxide oversaturated with respect to the atmosphere. Anyway, sequestered carbon is withdrawn from the short time carbon cycle for a presumable long time.