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A new GLEON site? Lake Mývatn, Iceland

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Lake Myvatn in northeast Iceland has long been famous for the massive numbers of midges that it produces which swarm over the lakeshore during brief periods of the summer. For five years our research group has been studying how the midges influence the terrestrial ecosystem where many of them ultimately are deposited. We have recently secured funding from the Long Term Research in Environmental Biology (LTREB) Program of the US National Science Foundation (NSF). As part of our collaboration with Icelandic colleagues and our current and future efforts to understand processes occurring within the lake we are planning to install analytical equipment capable of monitoring the algal activity within the lake and its outflow. Our goals also comprise the inclusion of Lake Myvatn into GLEON to foster technical and scientific collaboration and interest in this amazing and unique system.

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Update from Lake Annie: storms, freezes and the terrible twos

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Alpine Lakes Observatory: a French network for studying lacustrine ecology and global change

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This network involves 3 French alpine lakes (Léman, Annecy and Bourget), corresponding to different situations with regard to the water quality and ecosystems status.

The main goal of the Observatory is to understand and to model the ecological status changes (structure, biodiversity, fluxes) of the lacustrine systems submitted to changes (in terms of nature and intensity) of the external drivers (anthropization, climate). Limnological surveys are organized since 1957 (Léman), 1980 (Annecy) and 1990 (Bourget). Measured environmental variables are physico-chemistry (water, meteo), Phyto-, Zoo-, Bacterio- and Virioplankton, fishes (stocks and dynamics). Collections of

biological elements are also organized (Fish scales; phytoplankton; algae). Data are gathered in a database.

The initial question of ALO was about phosphorus loads increase and eutrophication risk. But since 1960-1970 and the improvement of wastewater treatment, the main scientific questions are about 1/ the consequences of re–oligotrophication 2/ the consequences of global change (temperature, new pollutants, ..). Three main topics structure our research:

- To identify the links between the organization of plankton communities and lacustrine ecosystem functioning in order to understand the current status and evolution of trophic networks, in response to local or global environmental changes. A "retro observation" approach using paleolimnological data is also developed (BIOFEEL group).
- To study how communities and populations respond to habitat disturbances by developing a functional bioindication linked to risk assessment (including ecotoxicology approach) and by contributing to the management and bioconservation of fish stocks (RITOXE group).
- To study and to model the mechanisms and regulation process of suspensions, nutrients (dissolved, particulates) and contaminants of the rural catchment flowing into lakes (BV group).

Finally, the ALO has a strength cooperation with the lakes managers (water quality, fish stocks management,..).

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Interaction between internal waves, a sloping bathymetry and mixing patterns on a shallow shelf connected to a deep lake

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Cayuga Lake, second largest of the Finger Lakes in NY state, USA, is a long (60 km), narrow (4 km) and deep (120m) lake. It is a monomictic, mesotrophic system and serves as a drinking water source for several towns located along its shores. It also receives treated effluent from several municipal waste water treatment plants. The town of Ithaca (population 30,000), home to Cornell University and the largest urban community near the lake, is located at the southern tip of Cayuga Lake.

The southern part of the lake is comprised of a shallow (<8m) "shelf", several kilometers long, and a steep (~10%) slope leading down to depths >100m. The main axis of the lake is well aligned with the prevailing winds in the region, which leads to generation of large amplitude internal waves. This makes the lake an ideal outdoor laboratory to study the generation, evolution, and shoaling of large non-linear internal waves. The interaction of these waves with this slope have significant effects on the water quality and mixing patterns on the shelf.

The DeFrees Hydraulics Laboratory, School of Civil and Environmental Engineering at Cornell University has operated an Apprise RUSS station (cayugalake.cornell.edu) located in the southern part of the lake since 2001, and conducts a regular water sampling program in the lake. We are currently designing a major autonomous observation system that will include a bottom mounted, cabled to shore instrument platform with a profiling component and one or more solar powered buoy based systems.