

Suspended particles in reservoirs driven by pump storage operations

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Grimselsee and Oberaarsee, two reservoirs built in 1932 and 1950, respectively, are located in a glaciated catchment in the Central Alps and are since 1980 part of a pump storage operations scheme with annual water exchanges amounting to several times the reservoir volumes. The effect of hydropower activities on light regime and on primary production in downstream lakes has been studied recently [1, 2]. Another effect which was recognized is that sediments that would normally be carried downstream by the River Aare are retained in the reservoirs [3]. It is, however, not well understood, how such increased hydropower activities affect suspended particle load, particle characteristics and sedimentation processes, and whether they may affect also ecologic conditions downstream.

Investigations undertaken seasonally at different locations and depths of both reservoirs have shown a positive correlation of turbidity, particle mass concentration and particle size distribution. Furthermore, turbidity in both reservoirs was found to be higher in summer than in winter, when no river inflows and the reservoirs are covered by ice. Specific features have been observed to be related with the annual cycles of climate, runoff and pump storage operations. In summer, when the hypolimnion is characterized by similar conditions in both reservoirs, the epilimnion of Oberaarsee is clearer and warmer in comparison with that of Grimselsee, indicating that a stronger thermal stratification in Oberaarsee may favour the settling of the suspended particles. In winter, turbidity seems to increase due to power operations. In fact, turbidity was found at its highest amounts in the Eastern Basins, where the reservoirs are continuously exchanging water.

[1] Finger, D et al. (2007) *Aquatic Sciences* **69**, 240-256.

[2] Jaun, L., et al. (2007) *Aquatic Sciences* **69**, 212-226.

[3] Anselmetti, F. S. et al. (2007) *Aquatic Sciences* **69**, 179-198.