



## **Holocene paleo-hydrology of North western Alps during the last 10 000 years recorded in Lake Le Bourget sediments**

M. Debret (1,4), F. Arnaud (1), M. Desmet, E. Chapron (3), A. Trentesaux (2), O., Magand (4), M. Rolland-Revel (5), V. Bout-Roumazeilles (2)

(1) EDYTEM Laboratory, UMR 5204, University of Savoie, CISM, Campus Scientifique F-73376 Le Bourget du Lac Cedex, France. (2) PBDS Laboratory, UMR 8110 CNRS, University of Lille 1, 59 655 Villeneuve d'Ascq, France (3) Geological Institute, ETH Zürich, CH-8092 Zürich, Switzerland. (4) UMR CNRS 5183, LGGE, 54, rue Molière F-38402 Saint Martin d'Hères cedex (5) Geosciences Azur, University of Nice UMR6526, Parc Valrose, 28 Av. de Valrose BP2135 06108 Nice cedex 2, France. [debret@lgge.obs.ujf-grenoble.fr](mailto:debret@lgge.obs.ujf-grenoble.fr)

A 14-meter long core was taken in Lake Le Bourget in order to provide a continuous record of Rhône river flooding events during the Holocene. A multi-proxy approach was used to track the origin of detritism and to identify periods of higher hydrological activity. Among these methods, the study of clay fraction (especially Illite cristallinity) allowed to locate the origin of detritism in the higher watershed of river Arve which drains the glaciers of Mont-Blanc range. This suggests that detritism fluctuations in Lake Bourget may provide information about the glacial fluctuations in Mont-Blanc Range. To confirm this hypothesis, the sedimentary records are compared to records of glacier fluctuations over different time-scales (150, 3500, 10 000 years) and with a regional synthesis of lake level fluctuation. The good concordance with data from the northern part of the alps (from French Alps to Austria) highlights the Lake Bourget detrital record as one of the most continuous reflecting the Holocene hydrological history of northern alps. The correlation with residual  $^{14}\text{C}$  and sunspot number during Little Ice Age confirmed that hydrological activity is almost partly driven by sun activity.