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Letter to François Alphonse FOREL (1841-1912) from the Swiss Geoscience Meeting 2012

Limnogeology and the interdisciplinary study of lacustrine sediments: Crystalizing F.A. FOREL vision

Stéphanie GIRARDCLOS^{1,2}, Adrian GILLI³ and Mario MORELLON⁴

Dear François Alphonse,

We are just coming back from the annual 'Swiss Geoscience Meeting' in Bern held on November 17th, 2012, where we organized a session about lakes and their sediments. It was very well attended and over 35 persons listened to the very stimulating presentations. You would not believe the large interest in this topic nowadays. Indeed, the field has become so broad that researchers need to specialize to discover new concepts. Among these new fields, limnogeology explores all geological and sedimentological aspects of lakes with a wide variety of questions and approaches. Nevertheless, the science community strongly relies on the basic concepts you discovered more than hundred years ago. Your book '*Le Léman*' is still considered as THE classic reference in limnology and thousands of researchers, who investigate lakes around the world, continue to read and cite your work. But, now, we would like to tell you more about the different subjects discussed at the meeting.

In our session, seven talks and ten posters were presented on lakes studied in Argentina, Finland, Germany, The Netherlands, Russia, Spain, Sweden and Switzerland. Research themes focused on lacustrine processes and sediment archives. We believe you would have especially liked the numerical circulation model calculated by Le et al., which maps and explains the main current and circulation patterns of

your beloved Lake Geneva, and you would have discovered that Corella et al. and Arantegui et al. do not agree with your theory on the differential aggradation of the Rhone delta in Lake Geneva. They showed that sudden events (mass movements, floods) and erosion play a key role in the Rhone canyon formation.

There were several presentations exploring processes occurring within the sediments, such as the formation of Mn and Fe-oxides (Och et al.), the release of dissolved organic carbon from wetland sediments (Filella et al.), fatty acids as possible indicators of methane fluxes in lakes (Stötter et al.), and the fate of pollutants in a Lake Geneva bay (Graham and Loizeau). These studies contribute to key environmental issues of the 21st century, such as the emission of greenhouse gases and CO₂ sequestration, or the quantification of environmental pollution.

Scientific advances during the 20th century revealed that lacustrine sediments are recording past climates, geological events and human impact, and, thus, can be used as natural archives of the past. In our session, lake deposits were used to reconstruct summer precipitation (Amann et al.) and flood chronology during the last 2500 years in the Swiss Alps (Glur et al.), to define earthquake and tectonic activity of the Lake Neuchâtel region (Reusch et al.)

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and to identify prehistoric earthquakes in the Eastern Swiss Alps (Bellwald et al.). They also revealed a 10-fold increase in sediment input due to the Aare river deviation in Lake Biel in 1878 (Jeannet et al.). There were even follow-ups of your own research: a giant turbidite, deposited as a consequence of the 563 AD Tauredunum event, was found at the bottom of Lake Geneva (Kremer et al.) and the Great Lisbon Earthquake (1755) seems to have been recorded in a Bavarian lake (Schönbächler et al.).

The study of lacustrine sediments also brings new knowledge in ecology: Decrouy linked ostracod fossil assemblages of the 20th century with ostracod species you described and could conclude that the observed changes are due to the different steps in Lake Geneva eutrophication history. Recasens et al. reconstructed climatic changes of Patagonia from diatom assem-

blages and van Hardenbroek et al. investigated the feeding ecology of Cladocera and Bryozoa from the isotopic signature of their resting stages. As you can see from range of these topics, you have numerous scientific successors!

To finish this letter, we have to report to you that, in Italy, six scientists were recently accused of being too reassuring about the risk of an earthquake, by not predicting a deadly temblor in L'Aquila in 2009. They were condemned with a manslaughter verdict. We are sure you would agree with us that this is simply a crazy development in the 21st century!

With warm memories, we remain respectfully yours,

THREE LIMNOGEOLOGISTS IN 2012

List of contributions

- **AMANN B, MAUCHLE F, GROSJEAN M.** Varved Lake Oeschinen: quantitative assessment of climate signal in the sediments.
- **ARANTEGUI A, CORELLA JP, LOIZEAU J-L, ANSELMETTI FS, STARK N, DEL SONTRO T, LE DANTEC N, GIRARDCLOS S.** Sedimentological processes in the Rhone Delta subaquatic canyons (France-Switzerland).
- **BELLWALD B, ANSELMETTI FS, GILLI A.** Paleoseismologic implications of the sediment stratigraphy in Lake Silvaplana (Engadine, Eastern Switzerland).
- **CORELLA JP, LOIZEAU J-L, HILBE M, LE DANTEC N, SASTRE V, ANSELMETTI FS, STARK N, DEL SONTRO T, GIRARDCLOS S.** Triggering mechanisms and geomorphological implications of debris flows in subaquatic canyons: The Rhone delta (Lake Geneva, Switzerland-France).
- **DECROUY L.** Evolution of the ostracod fauna in Lake Geneva since the pioneer work of F.-A. Forel.
- **FILELLA M, RODRÍGUEZ-MURILLO JC.** Carbon fluxes from sediments of a Mediterranean semiarid freshwater wetland and comparison with other continental sediments.
- **GLUR L, WIRTH SB, ANSELMETTI FS, GILLI A.** Enhanced occurrence of extreme precipitation events during periods with cool summers: A 2500-year long Northern Alpine flood reconstruction.
- **GRAHAM N, LOIZEAU J-L.** Advection of particle-bound contaminants in Vidy Bay, Lake Geneva, Switzerland.
- **JEANNET A, CORELLA JP, KREMER K, GIRARDCLOS S.** Lake Biel sediment record during the last 7500 years and impact of the Aare river deviation in 1878 AD.
- **KREMER K, CORELLA JP, GIRARDCLOS S.** Lake Geneva sediments as archive for past environmental changes and human activity during the last 3000 years.
- **LE AD, DE PASCALIS F, UMGIESSER G, WILDI W.** Thermal structure and circulation patterns of Lake Geneva (Lac Léman).
- **OCH LM, MÜLLER B, VOEGELIN A, ULRICH A, GÖTLICHER J, STEINIGER R, MANGOLD S, VOLOGINA EG, STURM M.** New insights into the formation and burial of Fe/Mn accumulations in Lake Baikal sediments.
- **RECASENS C, ARIZTEGUI D, MAIDANA NI AND THE PASADO SCIENCE TEAM.** The PASADO sediment record: paleoclimatic and paleoenvironmental changes in Southern Patagonia since the Late Pleistocene.
- **REUSCH A, MOERNAUT J, CLERC N, HILBE M, GORIN G, MOSAR J, ANSELMETTI FS, STRASSER M.** Subaquatic landslides and sediment deformation structures within the geologic archive of Lake Neuchâtel.
- **SCHÖNBÄCHLER HB, ANSELMETTI FS, MAYR C, OHLENDORF C, ZOLITSCHKA B.** Traces of the Great Lisbon Earthquake (AD 1755) in the sediments of Walchensee (Bavaria, Germany)?
- **STÖTTER T, VAN HARDENBROEK M, RINTA P, SCHILDER J, SCHUBERT CJ, HEIRI O.** Can lipids help to reconstruct changes in methane availability and methane fluxes in lakes?
- **VAN HARDENBROEK M, WOOLLER MJ, RINTA P, SCHILDER J, STÖTTER T, HEIRI O.** Exploring stable isotope composition of Cladocera and Bryozoa using flotsam from lakes.