
Long term plant community changes reconstructed from sediment DNA in an alpine lake

Wentao Chen^{*1}, Manon Bajard², Fabien Arnaud², Jérôme Poulénard², Pierre Sabatier², Pierre Taberlet¹, and Fransesco Gentile Ficetola¹

¹Laboratoire d'écologie alpine (LECA) – CNRS : UMR5553, Université Grenoble Alpes – LECA, BP 53
2233 Rue de la Piscine 38041 Grenoble Cedex 9, France

²Environnements, Dynamiques et Territoires de la Montagne (EDYTEM) – CNRS : UMR5204,
Université de Savoie – Université de Savoie, Campus scientifique, 73376 Le Bourget du Lac cedex,
France

Abstract

Understanding biodiversity changes under the impact of human activities over large timescales is a key challenge in paleoecology. To reconstruct past community changes, Sedimentary ancient DNA (SedaDNA) in lake has proven to be an effective tool alongside pollen and macroremains. Here we present an analysis on sedaDNA data to investigate the plant community evolution in the catchment of a high-elevation lake in the French-Italian Alps over the last 10000 years (Lake Verney). Combined with the occurrences of domestic animal inferred also from SedaDNA and estimated soil erosion rate, we found significant change in plant communities, related to the onset of pastoralism and increased soil erosion. Our analysis suggests a period of intense landscape modification by human, which started approximately 2000 years ago. This period is characterized by an increased erosion rate and a major change in vegetation composition. Our results highlight the potential and limitations of SedaDNA as a tool to reconstruct plant cover history. With future improvement in methodology, the potential of SedaDNA being integrated with other environmental proxies to yield unprecedented high-resolution environment history is promising.

*Speaker