Fuegian Peatlands: Recorders of Environmental Changes since the last deglaciation.

François De Vleeschouwer*†[1], Heleen Vanneste[2], Natalia Piotrowska[3], Sébastien Bertrand[4], Andrea Coronato[5], Dmitri Mauquoy[6], and Gael Le Roux[7]

[1]EcoLab, Laboratoire d'Ecologie Fonctionnelle et Environnement, ECOLAB, Université de Toulouse, CNRS, INPT, UPS, Toulouse – CNRS : UMR5245 – France

[2]Laboratoire de Géologie de Lyon, Ecole normale supérieure de Lyon – CNRS : UMR5276 – France

[3]Department of Radioisotopes - GADAM Centre Institute of Physics - CSE Silesian University of Technology – Poland

[4]Renard Centre of Marine Geology, Ghent University – Belgium

[5]CADIC-CONICET, Laboratorio de Geomorfología y Cuaternario, Ushuaia – Argentina

[6]University of Aberdeen – Department of Geography Environment, School of Geosciences, University of Aberdeen, Elphinstone Road, Aberdeen, AB24 3UF, United Kingdom

[7]EcoLab, Laboratoire d'Ecologie Fonctionnelle et Environnement, ECOLAB, Université de Toulouse, CNRS, INPT, UPS, Toulouse – CNRS : UMR5245 – 31326 Castanet Tolosan, France

Abstract

Little attention has been given to Holocene pre-anthropogenic dust records in terrestrial environments, especially in the Southern Hemisphere. Yet they are important to 1/ better understand variations in particle provenance, 2/ tackle the linkage between atmospheric dust loads and climate change and 3/ better understand the impact of dust onpalaeoclimate and palaeoenvironments in an area critical for ocean productivity. Here, we explored the use of trace elements and radiogenic isotopes (Pb, Nd) as dust proxies in three peat bogs from southern Patagonia and Tierra del Fuego to assess dust-climate interactions in southern South America since the deglaciation. The distribution of trace elements within the cores indicates, besides tephra layers, episodes of increased mineral dust deposition during the Holocene and beyond. Our main results show that, after an infcreased dust flux during the Antarctic Cold Reversal and the Younger Dryas, the glacial-interglacial transition can be observed in the oldest record (at ca. 11,500 cal yr BP), marked by a drop in dust flux from 102 g.m-2.yr-1 to 10 g.m-2.yr-1. The most significant episode of mineral dust deposition during the Holocene is concentrated at _˜1,600 cal yr BP with a maximum dust flux of 108 g.m-2.yr-1. Its neodymium isotopic signature of -1 suggests crustal admixing, compared to the ϵNd values of $\sim$2 for tephra layers. This episode is related to neoglacial activities in the Cordillera Darwin (southern Andes). Our results show not only that Fuegian peatlands are efficient recorders of dust fluxes over time, but also that variations in the dust fluxes and provenance can provide clues on paleoclimatic and paleoenvironmental changes.

*Speaker

†Corresponding author: francois.devleeschouwer@ensat.fr