Wetland extension in Eastern Europe over the past 40 kyr: A view from biomarkers in the Black Sea

Frauke Rostek*[1] and Edouard Bard[2]

[1]CEREGE – CNRS, Univ. Aix-Marseille, Collège de France, IRD, – Europôle de l'Arbois, 13545 Aix-en-Provence, France

[2]CEREGE – CNRS, Univ. Aix-Marseille, Collège de France, IRD, – Technopôle de l'Arbois, 13545 Aix-en-Provence, France

Résumé

The Black Sea is a catchment basin for large areas of the European Russian Plain, the Alps and southeastern Europe. In order to study the hydrological changes in this basin over the last 40 kyr, we measured a continous series of terrestrial long-chain n-alkan-2-ones and n-alkanes as paleoclimate proxies in well dated glacial lacustrine to Holocene marine sediments from the NW Black Sea. Two specific molecules of these homologuous series are normalized to total organic carbon (TOC), respectively Ket27/TOC for n-alkan-2-ones and C23/TOC for n-alkanes and interpreted as characteristic biomarkers for Sphagnum mosses, a dominant vegetation component in wetlands. Decreased concentrations of Sphagnum biomarkers are found for the North Atlantic icebergs surges and cooling events known as Heinrich Events, the Last Glacial Maximum and the Younger Dryas. These drops are pointing to low erosional input to the Black Sea with cold and dry climate conditions. Increased biomarker inputs characterize the mild climate phases known as Dansgaard/Oeschger Interstadials, pointing to increased erosion due to permafrost degradation and/or wetland extension on the Russian Plain. The final retreat of the Fennoscandian ice sheet is concomitant with Heinrich Event 1 and expressed by increased biomarker concentrations in the so-called Red Layers, a typical series of deglacial clay layers. The two biomarker signals are decoupled at the start of the Bølling/Allerød: C23/TOC is decreasing whereas Ket27/TOC variations are in phase with the major climate events like the Bølling/Allerød, the Younger Dryas event and the early Holocene. The paleoclimatic record is interrupted by the final reconnection of the Black Sea with the Mediterranean Sea which led to marine conditions.

*Intervenant