Pollen-plante-climat relation in Sub-Saharan Africa

J. Watrin (1), A.-M. Lézine (1), K. Gajewski (2), A. Vincens (3) and A. Bar-Hen (4)

(1) Laboratoire des Sciences du Climat et de l'Environnement, CNRS-CEA, Orme des Merisiers, 91191 Gif-sur-Yvette cedex, France (2) Département de Géographie de l'Université d'Ottawa, Ottawa ON K1N 6N5, Canada (3) CEREGE, CNRS-Université Paul Cézanne, B. P. 80, 13545 Aix-en-Provence cedex 4, France (4) Institut National d'Agronomie, Paris, France

The aim of our study is to better understand the biological and climatological significance of pollen taxa used for past environmental reconstructions. In tropical Africa, pollen grains are rarely determined to the species level and a single pollen taxon may correspond to numerous plant species or genera with greatly different distributions or climate requirements. This difference may introduce biases between the distribution of the vegetation and the one of the corresponding pollen grains, and may lead to errors when fossil pollen taxa are used to reconstruct past environment or past climate. In this work, we selected 30 trees pollen taxa, mainly characteristics of dry forests and savannas of West Africa, and investigated for each of them the relation between present-day spatial distribution of pollen, plants and climate. The plant species repartition, illustrated in a climate space defined by total annual precipitations and mean annual temperature, is compared to the one of the corresponding pollen grains. From this comparison, we calculated for each taxon a confident score, in order to reflect the ability of pollen grains to correctly represent the corresponding plant species distribution. Taxa with high scores values (e.g. Alchornea, Lannea-type) are the most reliable for the environmental reconstructions, as they display close distributions between pollen grains and plant species. This method will help to weight the use of pollen taxa in paleo-reconstructions, and in our work, will be particularly useful to precise paleo-environments existing in the Sahara during the Holocene, as all the taxa selected for this study are found in the Saharan fossil records.