

Scientific registration n° : 0667

Symposium n° : 16

Presentation : poster

Phytoliths, particle translocation and paleoenvironmental records in soils

Phytolithes, translocation de particules et enregistrements environnementaux dans les sols

ALEXANDRE Anne (1), MEUNIER Jean Dominique (1), MARIOTTI André (2), PIRONON Jacques (3), SOUBIES François (4)

(1) CEREGE, Université d'Aix-Marseille III, BP 80 13545 Aix en Provence Cedex 4, France

(2) UPMC, INRA, Lab. de Biogéochimie Isotopique, Case 120, 4, Place Jussieu, 75252 Paris Cedex 05, France

(3) GDR CNRS-CREGU 77, BP 23, 54501 Vandœuvre lès Nancy, France

(4) ORSTOM, Laboratoire de Minéralogie, UPS, 39 Allée Jules Guesde, 31000 Toulouse, France

Phytoliths are opal-A particles precipitated in plant tissues. They may have morphological taxonomic significance useful for paleovegetation reconstructions. In soils, however, paleoenvironmental reconstructions are faced with pedogenic processes, e.g. particle dissolution, particle upwards and/or downwards translocation and soil matter accumulation due to bioturbation and/or colluviation. In order to more fully understand the particle dynamics in soils and the potentiality of soil phytolith assemblages to trace paleovegetation changes, phytoliths from a weathering profile of Southern Central Brazil are studied. Results are compared with dated charcoals (Vernet et al., 1994) and organic $\delta^{13}\text{C}$ from the soil and with pollen data from a dated nearby peat (Ledru, 1993). The phytolith content is composed of a mixing between a young pool of phytoliths, in dynamic equilibrium with the litter input which decreases downwards and of an older pool of stable phytoliths which remains constant with depth. The resultant mean age of phytolith assemblages increases with depth. The main vegetation changes recorded by phytoliths are in agreement with organic matter $\delta^{13}\text{C}$ and the pollen data. They indicate the setting up of a tree or shrub tall grass savanna after ca. 6300yr B.P., and a significant increase of the trees or shrubs density ca. 3600yr B.P., when fire occurrence indicated by charcoal abundance decreased. This study shows that paleoenvironment changes may be recorded using soil phytolith assemblages and other tracers as charcoals and organic matter $\delta^{13}\text{C}$, in spite of complex pedogenic processes.

This work was supported by the french programs CNRS-ORSTOM PEGI and ECOFIT, by a grant of the department ORSTOM TOA (Action Incitative Salitre), and in Brazil by a FAPESP program : Projeto tematico proceso 91/3518-0.

References

Ledru, M.P., 1993. Late quaternary environmental and climatic changes in Central Brazil. *Quaternary Research*, 39, 90-98.

Vernet, J.L., Wengler, L., Solari, M.E., Ceccantini, G., Fournier, M., Ledru, M.P., and Soubies, F., 1994. Feux, climats et végétations au Brésil central durant l'Holocène : les données d'un profil de sol à charbons de bois (Salitre, Manas Gerais), C.R. Acad. Sci. Paris, 319(II): 1391-1397.

Key words: tracer, paleoenvironment, biogeochemical process

Mots clés : traceur, paléoenvironnement, processus biogéochimique