Phytoliths in modern plants and soils from Klasies River, Cape Region (South Africa): new findings for archaeological and paleoenvironmental purposes

Alice Novello*†[1,2], Marion Bamford‡[2], Yvette Van Wijk[3], and Sarah Wurz[2]

[1]University of Washington – University of Washington SEATTLE, États-Unis
[2]University of the Witwatersrand, Johannesburg – Afrique du Sud
[3]Rhodes University – Grahamstown, Afrique du Sud

Résumé

The archeological site of Klasies River (34◦S, 24◦E) is famous for the richness of its Middle Stone Age deposits, which offer the opportunity to document behaviors of early modern humans in Africa, as well as the paleoenvironmental context of their occupation of the area during the late Pleistocene. Klasies River is located at the meeting of three modern vegetation biomes: the Thicket, Fynbos, and Forest biomes, and under two different climate systems favoring high amounts of rainfall during the year (911mm/year, CRU records, 1961-1991). Some paleosols of the Main Cave (dated to 115 to 90 ka) include abundant plant remains such as seeds and charcoal, which suggests that micro-plant remains like phytoliths could also be present in the deposits. No phytolith reference collection based on both plant and soil material has been produced yet for Klasies, which complicated the interpretation of the phytoliths preserved in the cave deposits. One of our challenges was therefore to initiate a new and comprehensive phytolith reference collection of modern plants and soils occurring today in the vicinity of Klasies. For this purpose, we sampled $>$ 140 plants from 16 different vegetation patches located in a perimeter $<$ 5 km2 around the Cave sites. Phytolith extraction, description and counting have been limited so far to a set of 25 leaf specimens related to 13 different plant families, which were selected for their: i) ability to provide reliable paleoenvironmental information, and ii) potential to have been used by humans during their occupation of the area. Phytoliths from the soils were also analyzed to get a better perspective of the phytolith deposition in the area under natural conditions. Our analyses indicate that polygonal and/or ovate/orbicular phytoliths are the most recurrent and abundant morphotypes ($>$ 53% and up to 94%) produced in the leaf tissues of the Anacardiaceae, Asteraceae, Celastraceae, Ericaceae, Proteaceae, and Vitaceae species we studied, which are mainly woody species. Regarding the Cyperaceae, Poaceae, Restionaceae (all herbs), and one of the Proteaceae species (*Leucadendron spissifolium*, a fynbos shrub), they each produced a singular phytolith assemblage dominated by short cell phytoliths for Poaceae (92%), psilate and decorated globular phytoliths for Restionaceae (94%), and silicified papillae for both Cyperaceae (54%) and *L. spissifolium* (63%). These findings suggest that precautions must be taken while interpreting the occurrence of globular and papillae types in recent and past deposits from the area since these phytoliths may be easily confused with the commonly

*Intervenant
†Auteur correspondant: novelloalice@gmail.com
‡Auteur correspondant:

used tree/shrub and sedge phytolith indicators, respectively. Besides, both globular and papillae phytoliths were identified in the fynbos soil, where they account for 34% and 8%, respectively. Our analyses also show that polygonal and/or ovate/orbicular phytoliths occur in varying amounts in modern soils of the area (< 2%), although they look abundant in the leaf plant tissues we analyzed. Conversely, grass short cell phytoliths are found abundantly in the soils collected in close proximity to the cave (< 66%), where grasses do however occur sparsely in the current vegetation.

Mots-Clés: Cape Floristic Province, fynbos, thicket, silica, cave