Late-Holocene tropical moist-forests of southeastern Cameroon: some insight from soil charcoal analysis

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Tropical forests of Central Africa constitute the second most important block of moist forest of the world. Little is known, however, about past vegetation in this region that remains underexplored (Vleminckx et al. 2014; Morin-Rivat et al. 2014). Determining the past specific composition of these forests could allow bringing insights into their evolution over time and providing data about their resilience capacity facing global change. We performed a pedoanthracological analysis in the semi-deciduous forests of southeastern Cameroon. We excavated 53 test pits of 53 50 × 50 × 60 cm in plots of botanical inventory along a NS 80-km long mega-transect that followed a vegetation gradient. We sorted and quantified charred macrobotanical remains by layers of 10 cm, then identified species from wood charcoals. We used the InsideWood database, implemented with 163 new anatomical descriptions of woods present in the study area by using the reference collection of African woods of the Royal Museum for Central Africa (Belgium). Finally, we obtained 25 radiocarbon dates on charcoals and oil palm endocarps. Results showed that repeated fire events occurred across the study area during the last 2500 years, soon after the well-documented "rainforest crisis" (e.g. Lézine et al. 2013). The analyzed charcoals are likely human-induced regarding evidence of associated human settlements (e.g. potsherds). Aged were distributed into two time periods: the Early Iron Age (2300-1300 BP) and the Late Iron Age (700-100 BP) with an intermediate hiatus in human occupation (see e.g. Wotzka 2006; Morin-Rivat et al. 2014). Specific composition during both periods did not strongly differ from current composition, which is now dominated by light-demanding canopy trees belonging to old-growth semi-deciduous Celtis forests (Gond et al. 2013; Fayolle et al. 2014). This argues in favor of the maintenance of light-demanding tree species by anthropogenic activities, such as slash-and-burn shifting cultivation. We conclude that moist forests have a good resilience capacity regarding moderate and scattered disturbances. These forests can nonetheless be deeply impacted by land-use intensification (e.g. degraded forests along roads and close to cities; Gond et al. 2013).

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