

Soil evolution through climate change: insights from the EPR dating of Western Ghâts (India) laterites

M. MATHIAN^{1*}, T. ALLARD¹, E. FRITSCH¹, J. RIOTTE²,
J.J. BRAUN²

¹Institut de minéralogie, de physique des matériaux et de cosmochimie, UMR CNRS 7590, Université Pierre et Marie Curie, 4 Place Jussieu, 75005, France (*
correspondance: maximilien.mathian@impmc.upmc.fr)

²Géosciences environnement Toulouse, Observatoire Midi-Pyrénées, 14 avenue E.Belin, 31400, Toulouse (jean-jacques.braun@ird.fr)

Laterites are commonly considered as old tropical soils and can be used as a record of paleoclimate changes. The Indian lateritic landscape from the Western Ghâts escarpment is a major feature of Indian geomorphology and experienced different paleoclimates since the late Jurassic, due to the subcontinent drift. The first dating of local laterite profiles using a weathering mass balance shows that they are quite young (1-2 Ma). However, the $^{40}\text{Ar}/^{39}\text{Ar}$ dating of some northern laterites duricrusts shows ages ranging from 2 to around 50 Ma. In order to specify the ages of the lateritic regolith located along the Western Ghâts scarp in the western part of the Kabini River Basin (Karnataka Plateau), and to infer the impact of possible climate changes on their evolution, the dating of kaolinites by electron paramagnetic resonance spectroscopy was carried out on 16 samples from a laterite profile of this region.

The resulting ages vary between 7 and 0.2 Ma. The samples can be divided in 3 groups with an average age of 1 Ma, 2.5 Ma and 6.8 Ma. These ages do not vary linearly between the surface and the parent gneiss because of the strong heterogeneity of this rock. The oldest age group coincides with the beginning of the southern Asian monsoon system at around 8 Ma, the second can be linked to a weathering peaks due to the uplift of the Tibetan plateau around 2.5 Ma. The last group can be correlated with a present weathering event observed with the mass balance dating performed in this basin.