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Intense weathering recorded in the Hara Formation deduced by soil structures and chemical weathering index

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Chemical composition of the mudstones in the Upper Miocene Hara Formation in Ena City, Gifu Prefecture, in central Japan, was studied together with sedimentology and clay mineral assemblage. The Hara Formation, which is correlative to the Porcelain Clay formations around Seto and Tono areas, is considered to have been deposited in flood plain and back marsh areas in braided river system. Soil structures including clay coating and clay filling are formed in several horizons in flood plain sediments. The quartz grains, which are frequently severely etched and corroded, are exclusively prevailed in the sandstones. In XRD analysis, most of the mudstones include high amount of kaolinite clay. The chemical composition of the mudstones having soil structures deposited in flood plain show high Al2O3 (>25 wt%) and very high CIA value (>90). Whereas mudstones deposited in lake and back marsh areas suggest relatively low Al2O3 (<20 wt%) and low CIA value (83). In central Japan, the correlative formation of the Porcelain Clay Formation were widely deposited as a fluvial sediments mainly from Late Miocene to Early Pliocene time. The significantly higher chemical weathering degree during these periods shows a remarkable warm and/or pluvial condition than present time.

Keywords: chemical weathering, paleosol, climatic change