Characterization and Origin of 1:1 Phyllosilicates within Peloids of the Recent, Holocene and Miocene Deposits of the Congo Basin

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Abstract: The grey-green peloids from the Miocene period to Recent fine-grained deposits on the continental shelf close to Congo-Zaîire River mouth were studied by X-ray transmission diffractometry (XRD), SEM and by EDAX. The peloids have multiphase heterogenous mineral composition. Their most important constituents are detrital minerals like kaolinite, quartz, goethite, 7 Å phases with $d(001) \approx 7.3$ Å, and in more maturated grains—nontronite. The $d(060)$ values were used to estimate the general composition of phyllosilicate phases to compare with the composition determined by EDAX. It has been found that $d(060)$ equal to 1.504 Å is common for Fe^{3+}-bearing kaolinite, which is quite abundant for the Recent peloids. The $d(060)$ equal to 1.535 Å and 1.55 Å is characteristic for the di-trioctahedral and trioctahedral 1:l phases, which are abundant within the more evolved Miocene peloids. Nontronite is characterized by $d(060)$ equal to 1.524 Å within concordance with its highly ferrous composition, and partly by its potassic interlayer. It shows cabbage-like nannostructures proving neoformational origin of this mineral in the marine environment.

It has been shown that areas of the low sedimentation rate within the Congo Basin were favorable for the mineral changes and neoformation. For the Holocene vertical profile, we observed levels of slower sedimentation rates. The evolution is expressed by the disappearance of kaolinite at the expense of other 7 Å phases and nontronite. Although more advanced stages of maturation of the studied phases were observed in older peloids (10^4 to 10^7 y), one cannot detect a linear relationship of these processes with burial.

Key Words: 1:1 phyllosilicate • Chemical composition • Nontronite • Peloids • X-ray diffraction

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