Geophysical Research Abstracts, Vol. 8, 04760, 2006
SRef-ID: 1607-7962/gra/EGU06-A-04760
© European Geosciences Union 2006

Impact of sediment ingestion by Arenicola Marina on the generation of chlorite precursor

J-B. Peyaud, R. H. Worden

Department of Earth and Ocean Sciences, University of Liverpool, United Kingdom

Jean-Baptiste.Peyaud@liverpool.ac.uk / Fax: +44 151 794 5196 / Phone: +44 151 794 5429

Coatings of clay minerals, usually illite or chlorite, can preserve porosity by inhibiting quartz cement growth in deeply buried reservoirs. Illite coatings are usually associated either with transformation of smectite or kaolinite, or the dissolution of feldspars. However the origin of chlorite coatings is less evident, especially when the mineralogical composition of detrital grain mineralogy does not explain the occurrence of chlorite. Though it was demonstrated that Fe-rich chlorite can form through the evolution of precursor Fe-rich clay minerals, such as berthierine (Aagaard *et al.*, 2000), the origin of the precursor Fe-rich clay minerals remains uncertain. Recent studies (Needham *et al.*, 2005) demonstrated that the ingestion of fresh Fe-poor basalt by lugworms (*Arenicola marina*) resulted in the presence of potential precursor minerals in faecal casts though no berthierine was produced. A new series of experiments has been conducted using crushed rock, including granite, Triassic Fe-rich sandstone, and synthetic Fe-arkosic sand (composed of quartz, albite, and haematite). Lugworms were introduced into the new substratum and produced casts that were analysed using X-ray diffraction, FT-IR spectrometry and scanning electron microscope. These experiments have demonstrated that chlorite precursor Fe-rich clay minerals are produced due to sediment ingestion and excretion.

Aagaard, P., Jahren, J.S., Harstad, A.O., Nilsen, O., and Ramm, M. (2000) Formation of grain-coating chlorite in sandstones. Laboratory synthesized vs. natural occurrences. *Clay Minerals*, 35, 261-269.

Needham S. J., Worden R. H., McElroy D. (2005) Experimental production of clay rims by macrobiotic sediment ingestion and excretion processes. *Journal of Sedimentary Research*, 75, 1028–1037