Geophysical Research Abstracts
Vol. 20, EGU2018-1677, 2018
EGU General Assembly 2018

Compositional evolution of glauconite within the Upper Cretaceous Bagh Group of sediments, India

Udita Bansal (1,2), Santanu Banerjee (2), and Dhiren Kumar Ruidas (2)

(1) Department of Earth Sciences, Indian Institute of Technology Roorkee, Roorkee, India (udita.pdfes2017@iitr.ac.in), (2) Department of Earth Sciences, Indian Institute of Technology Bombay, Mumbai, India (uditabansal.geo@gmail.com)

Glauconite is rarely found in carbonate sequences. The study of glauconite within the Bagh Group, Narmada basin, is therefore, likely to provide crucial information regarding its formation and stratigraphic significance within a carbonate succession. An integrated approach involving detailed petrography, XRD, spectroscopy, mineral chemistry and REE analysis examines the geochemical characteristics of glauconite within the littoral-originated carbonate deposits of the Bagh Group. The roughly 10 m thick Bagh Group gradationally overlies the overall deepening upward Nimar Sandstone Formation and passes unconformably into the Lameta Formation. It comprises of two Formations, the ∼6.5 m thick Nodular Limestone Formation at the base and the ∼3.5 m thick Bryozoan Limestone Formation at the top. The Nodular Limestone Formation exhibits alteration of plane laminated marly shale and biomictric limestone, frequently exhibiting nodular geometry. The Bryozoan Limestone Formation consists of cross-stratified limestone, planar laminated limestone with marl alteration and oyster-rich marly beds containing glauconitic layers. The Nodular Limestone Formation exhibits a shallowing upward trend, which continues within the Bryozoan Limestone Formation. These two Formations, therefore forms a highstand systems tract (HST) overlying the transgressive systems tract (TST) comprising of the Nimar Sandstone Formation. The carbonates of the Bagh Group are highly fossiliferous containing bryozoa, bivalves, echinoids, brachiopods, gastropods and ammonites. This investigation reports glauconite within the broken bioclasts in the planar laminated marl and limestone beds of the Bryozoan Limestone Formation. The glauconite grains constitute up to ∼30% by volume. Glauconite occurs in two principal modes, as altered form of feldspars and as infillings within pores of bioclasts, referred to as glauconitic infillings. Detailed petrographic investigation reveals the presence of tiny feldspars enclosed within clayey matrix of the infillings. XRD studies reflect characteristic peak of 10Å from basal (001) reflection of glauconite. The glauconites are characterized by high K_2O and moderate Fe_2O_3(total). The K_2O content of feldspar-altered glauconites vary from 6.13% to 8.16% while the same for glauconitic infillings vary from 6.22% to 7.94%. The K_2O content of the glauconite suggests ‘evolved’ to ‘highly-evolved’ stage of maturation. The high Kcontent is related to the replacement of K-feldspar by glauconite. The Fe_2O_3 (total) content of feldspar-altered glauconites varies from 14.54% to 19.89% and for glauconitic infillings it varies from 13.89% to 20.48%. The moderate Fe_2O_3 (total) content attests to its formation in shallow littoral depositional condition restricting the mobility of Fe ions. The PASS-normalized patterns exhibit a ‘hat-shape’ confirming the authigenic origin of glauconites. Major findings of the study include a) glauconite formed in the littoral deposits of HST within a carbonate sequence, b) the consistently high K_2O content of glauconite relates to the K-feldspar substrate, and is unrelated to stratigraphic condensation, and c) a moderate Fe_2O_3content characterizes shallow littoral glauconites.

Keywords: Glauconite, Carbonate, Highstand systems tract, Cretaceous, Littoral