Lithologies and stratigraphy of GHB cores drilled at Cape Three Points area in the Birimian Supergroup, Ghana

*Shiono Sakai[1], Shoichi Kiyokawa[1], Takashi Ito[2], Minoru Ikehara[3], Kosei E. Yamaguchi[4], Tetsuji Onoue[5], Satoshi Yoshimaru[1], Tsubasa Miki[1], George M Tetteh[6], Frank K Nyame[7]

1. Department of Earth and Planetary Sciences, Graduate School of Sciences, Kyusyu University., 2. Faculty of Education, Ibaraki University, 3. Center for Advanced Marine Core Research, Kochi University, 4. Toho University and NASA Astrobiology Institute, 5. Earth and Environmental Sciences, Graduate School of Science and Technology, Kumamoto University, 6. University of Mining and Technology,Ghana, 7. University of Ghana

The early Proterozoic (ca. 2.5-2.1Ga) is well known as a big turning point for global cooling caused by photosynthesis, Great Oxidation Event (GOE) which greatly changed redox environments of earth’ s surface
and formation of initial continent (van Kranendonk, 2012). This studyis on to ascertain the lithologies and stratigraphy of GHB cores which were drilled in the Birimian Supergroup in Ghana in that is considered to have been deposited in deep sea flooron early earth’ s surface.
Southwestern Ghana holds Birimian Supergroup which formed during 2.2 - 2.1 Ga, and is affected by Eburnean orogeny. The green metavolcanic rocks which are over 1000m thick (Perrouty et al., 2012). There are continuous outcrops of deep sea sedimentary rocks along the shore at Ezile Bay area near Cape Three Points where GHB cores were drilled.The area occurs in the Ashanti belt, which is part of the upper Sefwi Group (Latitude: 4˚45'23"N, Longitude,Longitude: 2˚02'15"E). After easuring magnetic susceptibility and CT scan GHB cores, were halved for description of stratigraphy and lithologies. Especially, thin section examination of representative parts were done using polarization microscope.
The results show that GHB cores hold good continuous strata from the bottom to the top withno deformations . There are 4 units from bottom to the top. twith exception of the 0-30m which is highly weathered. Unit 1 (at 30 –60 m) is composed of thin layers of silty sandstones, black shales and green volcaniclastics. The volcaniclastics have fine quartz, amphibole, and plagioclase. Occasionally thin layers of tuffaceous sandstones which are cherty occur. Unit 2 (at 61 –120 m) consists of massive green volcaniclastics, thin layers of greenish gray volcaniclastics and thin layers of silty sandstones. These are intruded by about 20 m of igneous rocks. Unit 3 (at 120 –174 m) is consists of silty sandstones and shales with organic black shales. Spots of organic carbon occur. Interbedded are millimeter scale laminations by fine grained greenish gray volcaniclastics. Unit 4 (at 175 –195 m) is made up of green volcaniclastics, shales and organic black shales. Theyform repeated thin layers of up to cm thickness composed of fine grains. opaque minerals (pyrite) were observed in organic layers. Their distribution does not correspond with that of carbonaceous materials. these carbonaceous bands are absent in the upper or lower green volcaniclastic layers.
The following is a summary of the above. GHB cores hold good continuous strata from the bottom to the top (about 165m excepted for 0-30m which is highly weathered). They are mainly composed of cherty green volcaniclastics. They are suffered from a little metamorphism and changed into carbonates, but hold mm scale of laminations very well. Besides, shales, silty sandstones and organic black shales are contained as main components. Unit 1 to Unit 2 are mainly composed of green volcaniclastics, and sometimes repeat massive green volcaniclastics. In this phase, supply of volcaniclastics by adjacent volcanos can have been increased. In the Unit 3 to Unit 4, shale and silty sandstone layers increased and showed the fining-upward sequence. This might be caused by changing into pelagic or deep sea environment than lower volcanic sequence.

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