Origin and burial of organic carbon depending upon the environmental setting in the southwestern East/Japan Sea

H.J. CHA[1]* AND M.S. CHOI[2]

[1]Chungnam National University/Research Institute of Marine Sciences, , Daejeon, Republic Of Korea (*correspondence: hcha80@chol.com)

[2]Chungnam National University/Department of Oceanography/Graduate School of Analytical Science and Technology, Daejeon, Republic Of Korea, (mschoi@cnu.ac.kr)

Box core sediment samples were collected from the southwestern part of the East/Japan Sea and analyzed for sediment chemical composition, organic carbon, C/N and C/P ratios and C and N isotopes ratios together with pore water dissolved species. The southwestern East/Japan Sea, consists of continental shelf, continental slope and deep ocean basin. Sediments of the southwestern East/Japan Sea, especially over the Ulleung Basin, are characterized in high organic carbon concentrations (0.3 to 4.1%) and very high organic carbon burial flux (2.7 - 11.5 gC. m^{-2}. yr^{-1}) considering that the sea is a hemipelagic sedimentary setting and there is no large river entering into the sea.

From C/N and C/P ratios and C and N isotopes of the sediments, sediments of the southwestern East/Japan Sea are thought mostly of marine origin except those over the Korean coasts and some volcanic islands. where C/N, C/P ratios and C and N isotopes show more or less terrestrial input.

After deposited, organic carbon is decomposed by both aerobic and anaerobic processes (reduction of Fe/Mn-oxides and/or sulfate depending upon the environmental setting). Even though the sediments of the southwestern East/Japan experience oxidation of organic carbon by sulfate reduction, burial fluxes of organic carbon is still very high in the sediment(2.7 - 11.5 gC. m^{-2}. yr^{-1}) compared to other areas with similar water depth.

The recovering of weathering propagation rates from the analysis of 238U-234U-230Th-226Ra nuclides in regoliths

FRANÇOIS CHABAUX, ERIC PELT, RAPHAEL DI CHIARA-ROUPERT, SOPHIE RIHS AND PETER STILLE

The potential of U-series nuclides for investigating weathering processes has been recognized since the 1960s. It results from the dual property of the nuclides to be fractionated during water-rock interactions and to have radioactive periods of the same order of magnitude as the time constants of many weathering processes. The recent progression in this field of research is clearly related to the analytical developments made over the last decades in measuring the 238U series nuclides with intermediate half-lives (i.e., 234U-230Th-226Ra). The majority of studies made in this field of research has been based up to now on the analysis of 238U - 234U - 230Th nuclides and the use of the three activity ratios (234U/238U) - (230Th/234U) - (230Th/232Th). They provided important theoretical elements for the determination of regolith production rates in weathering profiles (e.g., Dequincey et al., 2002; Chabaux et al., 2003; 2013 ; Pelt et al., 2007 ; Dosseto et al., 2008; Ma et al., 2010).

Here we propose to present the principle of the approach developed for recovering the regolith propagation rates from the analysis of U-series nuclides in a series of samples collected along the main weathering direction of the system. We will especially show how a simple modeling of U-series nuclides, based on mathematical formalism assuming a continuous gain and loss of the different U-series nuclides within a weathering profile, allows ones to recover such propagation rates. We will also highlight that the use of the 238U-234U-230Th nuclides together with the 226Ra nuclide allows for a better determination of the regolith production rate than together with the 232Th nuclide. Based on the results obtained by this approach it is suggested that the weathering and erosion processes in humid tropical or equatorial contexts are close to steady state, which would be not the case in area affected by important quaternary climatic variations (dry tropical or temperate context) or for soil systems significantly modified by human activity.

[1] Chabaux et al. 2003. Comptes Rendus Geosciences 335, 1219-1231. [2] Chabaux et al. (2013). GCA, 100, 73-95 [3] Dequincey et al. 2002. Geochimica et Cosmochimica Acta 66, 1197-1210. [4] Dosseto, A., Turner, S.P., Chappell, J., 2008. Earth and Planetary Science Letters 274, 359-371. [5] Ma, L., Chabaux, F., Pelt, E., Blaes, E., Jin, L., Brantley, S.L., 2010. Earth and Planetary Science Letters 297, 211-225. [6] Pelt, E., Chabaux, F., Innocent, C., Navarre-Sitchler, A.K., Sak, P.B., Brantley, S.L., 2008. Earth and Planetary Science Letters 276, 98-105.