Estimation of amount of erosion and uplifting by geochemical character of the Neogene siliceous rock in Horonobe, Hokkaido(2)

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This article presents the results of the estimated amount of erosion and uplifting based on mineralogy and organic geochemical characters of the Neogene siliceous rock (Wakkanai and Koetoi Formations) in Horonobe in succession to last year's article(Takahashi et al., 2005a).

As a result of the borehole investigations (HDB-1 to 11), the transformational change of silica minerals (opal A to opal CT) is recognized around horizon of Wakkanai Formation / Koetoi Formation boundary. The palaeo-geothermal gradient of the URL site was assumed to be about 3.5C/100 m. By assuming that the surface temperature was 6.2C and 15C, the burial depths of transforming to opal CT from opal A are estimated about 1,110 m and 860 m respectively. The amount of the erosion can be estimated as a difference between the burial depth and the present depth of opal A / opal CT boundary. The amount of the erosion at the positions of each borehole are estimated to be about 1,070 to 670 m for 6.2C and 820 to 420 m for 15 C at the surface temperature.

On the other hand, according to the biomarker analysis of core sample (HDB- 9 to 11), sterene decreased and sterane increased from shallow part to deeper part. The present depth of each core sample was converted into maximum palaeo-geothermal temperature based on the present depth of opal A / opal CT boundary and the palaeo-geothermal gradient. As a result, positive significant correlation was observed between the palaeo-geothermal temperature and the sterane / sterene ratio. The amount of the erosion was estimated by using the sterane / sterene ratio obtained from the core samples in the shallower part (H15-1-01 and H15-1-07 boreholes) in the Hokushin area. The amount of the erosion by using the sterane / sterene ratio corresponded with that from the contour map (Takahashi et al., 2005a, b). Therefore, the sterane / sterene ratio is effective measure to estimate the palaeo-geothermal temperature. The estimation of the maximum burial depth of each level of Wakkanai and Koetoi Formations in high resolution becomes possible by comparison of the sterane / sterene ratio with the palaeo-geothermal temperature.