# Interpretation of discordant U-Pb data of zircon: Alteration and radiation-damage effects

K. HORIE[1] , H. HIDAKA[2]And F. GAUTHIER-LAFAYE[3]

[1]National Science Museum, Japan (Research Fellow of the JSPS)

[2]Department of Earth and Planetary Systems Science, Hiroshima University, Japan (kenjih@hiroshima-u.ac.jp), (hidaka@hiroshima-u.ac.jp)

[3]Ecole et Observatoire des Sciences de la Terre, UMR7517-CNRS-ULP, France (gauthier@illite.u-strasbg.fr)

The durability of zircon is decreased by the radiation damage caused by the α-decay of constituent actinides. The low crystallinity zircons are more susceptible to alteration and easily release Pb from the structure. U-Pb analysis of the low crystallinity zircon often shows discordant data. However U-Pb system and chemical stability of altered zircon is not well understood due to complex reaction process. In this study, we discussed the condition and timing of alteration event of zircon in the Franceville site from U-Pb geochronology and rare earth elements (REE) geochemistry of accessory minerals.

Samples were taken from Bidoudouma which is located 63km north from Oklo, the Republic of Gabon. Quantitative analysis of major elements was carried out by EPMA. *In-situ* U-Pb and REE analyses of apatite, titanite and zircon were performed by using a SHRIMP at Hiroshima Univ.

U-Pb data of the Franceville zircons show the maximum deposition age of 2083±6 Ma. As shown in Figure, some zircons show discordant U-Pb data and high content of non-formula elements, which indicates that U-Pb system of the zircon was disturbed around 500 Ma by alteration. Apatite grains which are euhedral and unaltered indicate the mineralization age of 2075±130 Ma, which is consistent with U-Pb data of the unaltered zircon. Some titanite grains show dissolved texture. Comparison of accessory minerals suggests that the alteration of zircon and titanite occurred through the interaction with alkaline hydrothermal fluid.