Japan Geoscience Union Meeting 2010
(May 23-28 2010 at Makuhari, Chiba, Japan)

BPO021-04 会場: 301B 時間: 5月25日09:45-10:00

秩父帯の遠洋性チャートから発見された宇宙塵の鉱物組成・化学組成と降下量

Mineralogy, chemistry, and accretion rate of micrometeorites from Middle Triassic chert in the Chichibu Terrane, Japan

尾上 哲治[1*], 原之園 岳志[1], 中村 智樹[2]

Tetsuji Onoue[1*], Takeshi Haranosono[1], Tomoki Nakamura[2]

[1]鹿児島大学, [2]九州大学

[1]Kagoshima University, [2]Kyushu University

We report the textures, major element compositions and mineral assemblages of well-preserved micrometeorites from the Middle Triassic radiolarian chert of the Shakumasan Group, part of a Middle to Late Jurassic subduction-related accretionary complex in the Chichibu Terrane, Southwest Japan. We found 152 cosmic spherules in the size range 5-125 microns and three unmelted micrometeorites. The collection of cosmic spherules consists of 93% iron-type (I-type) spherules and 4% stony-type (S-type) spherules. I-type spherules are dominated by Fe oxide with minor amounts of Fe-Ni oxide. Presence of metalic iron and nickel in I-type spherules indicate them as extraterrestrial origin. Extraterrestrial stony spherules in the Middle Triassic chert are the oldest preserved stony spherules in the sedimentary record. Their bulk chemistries indicate systematic depletions of Na, S, and P, reflecting the effect of vaporization during atmospheric entry, but other major elements have chondoritic composition. Unmelted micrometeorite consists of olivine, low-Ca pyroxene, and maghemite. Its characteristic mineral assemblages and chondritic proportions of Mg, Al, Si, Fe and Ni are strong evidence of extraterrestrial origin. We calculated the accretion rate of I-type spherules onto the Earth during Anisian time. If the flux of cosmic spherules were constant over the Earth, the estimated accretion rate for Anisian I-type spherules is 760(+-)140 tons year-1. As compared to the spherule collections from deep-sea sediments, the estimated accretion rate of I-type spherules are almost the same as estimates of the Pleistocene to the present accretion rate.