Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

SEM37-P05 会場:3 階ポスター会場 時間:4 月 30 日 18:15-19:30

岩石磁気学的手法による火山砕屑性堆積物 (IODP Site U1397, 1398) の堆積過程の検討
Emplacement mechanism of marine volcaniclastic sediments (IODP Site U1397, 1398) based on rock magnetic properties

齋藤 武士 [1*] ; 片岡 香子 [2]
SAITO, Takeshi[1*] ; KATAOKA, Kyoko S.[2]

[1] 信州大学理学部, [2] 新潟大学災害・復興科学研究所
[1]Faculty of Science, Shinshu University, [2]Research Institute for Natural Hazards and Disaster Recovery, Niigata University

Large numbers of marine volcaniclastic sediments with various origins were recovered from the sites U1397 and U1398 during IODP Expedition 340. They were most likely derived from volcanoes on Martinique and possibly from Dominica, Lesser Antilles volcanic arc. Some volcaniclastic units were transported and deposited as turbidites, some were as thin tephra fall deposits and others show both characteristics. They contain various amounts of bioclastic component, pumice and lithic fragments and hemipelagic mud clasts. Therefore, these volcaniclastic sediments are suitable for investigating transport and emplacement mechanisms of volcanic materials and the resultant sedimentary and petro-facies in marine settings. This study focuses on magnetic minerals in the marine volcaniclastic sediments and carried out rock magnetic measurements.

Thermomagnetic measurements showed almost reversible curves and induced magnetization decayed to almost zero below 580 ℃, suggesting little contribution of maghemite or hematite. Two Curie temperatures (Tc) with 350-400 ℃ and 500-550 ℃ indicate that the main magnetic carriers are Ti-rich titanomagnetite and Ti-poor titanomagnetite. The proportion of low-Tc titanomagnetite in central and bottom part of thick turbidite units was larger than that in hemipelagic sediments and in the topmost part of turbidite units, suggesting Ti-rich titanomagnetite is derived from volcanic events. Tephra fall deposits also showed large contributions of Ti-poor titanomagnetite, resulted from large amount of volcanic materials. On the other hand, thin turbidite units showed small contributions of Ti-poor titanomagnetite. This suggests that thin turbidite units are derived from diluted flows which contain few heavy Fe-bearing magnetic minerals.

Magnetic susceptibility and hysteresis measurements showed that heavy and large magnetic minerals in most thick turbidite units were concentrated at the lower part of the unit. Samples from the topmost and bottom part of turbidites showed higher degrees of anisotropy than those from the central part, indicating strong influence of suspension settling at the topmost part and shearing at the bottom part. Bottom parts of fall units contain heavy and large magnetic minerals, whereas upper parts of fall units contain fine magnetic minerals. On the other hand, in thin turbidite units such features cannot be observed and hysteresis parameters and susceptibility values were almost concentrated. Probably thin turbidite units did not experience segregation of specific particles during transportation and settling under the relatively calm condition.

These preliminary results suggest that magnetic minerals are useful indicators of volcanic events and rock magnetic approaches can identify various types of depositional processes about marine volcaniclastic sediments.

キーワード: タービダイト, 降下火砕物, 水中堆積物, チタノマグネタイト, 磁性鉱物
Keywords: turbidite, fall deposit, marine sediment, titanomagnetite, magnetic mineral