Drift sediments recording bottom current history in NW Pacific

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We reported in detail deep-sea drift sediments collected from on an abyssal plain in NW Pacific. Four sediment core samples were collected using a 4-m piston corer system during the cruise KH-18-5; HFPC01–04. The sediment samples are composed of mostly diatomaceous silty clay layers with sandy layers. The sediment layers are interbedded with a volcanic ash layer. There are two lines of evidence on drift sediments on the basis of sedimentological and magnetical analyses as follows.
First, we counted sedimentary grains of 63–128 μm in diameter in 2 cm intervals. The sedimentary grains consist of quarts, pumice, volcanic glass, diatom, radiolaria and so on. Two types of pumice grains could be observed as dirty grains with mud cover and clear grains. The clear pumice and volcanic glass would be associated with volcanic eruption, whereas the dirty pumice has no correlation with those grains. There were spike peaks of dirty pumice grains cyclically throughout the core sediments. We consider that the dirty pumice might be washed out of surface sediments and transported with long-term flows as re-sedimentation processes.
Second, we measured magnetic properties in the sediment core samples; anisotropy of magnetic susceptibility (AMS) and paleomagnetism. In general, the AMS demonstrates the alignment patterns of magnetic grains in specimens. These anisotropy can be represented by magnetic ellipsoids with three magnetic axes; maximum, intermediate and minimum susceptibilities (hereafter Kmax, Kint, Kmin, respectively). Kmax generally indicates the alignment direction of the magnetic grains. In this case, sediment core samples were rotated during sampling operation, so that we could not understand the north direction of the samples. In order to determine the north direction, we measured paleomagnetic directions in the core samples. We used remenent magnetization data under the 200G alternating field demagnetization conditions. Thus, we measured alignments of magnetic grains using two magnetic methods. As a result, the Kmax direction of these sediment core samples were mostly E-W indicating sub-parallel to the present bottom current directions as shown in Fujio and Yamamoto (2005).
As mentioned above, the the magnetic grains in the sediment core samples in NW Pacific were alinged sub-parallel to the present bottom current directions. This indicates that these sediments were transported and deposited by the bottom currents as drift sediments and/or contourite deposits. At least, the sediments were closely related to the bottom currents. These sediments contained dirty pumice grains indicating probably a re-working process.

Keywords: Contourite, Bottom current, Anisotropy of magnetic susceptibility

