

Continuous non-destructive X-ray fluorescence analysis of fault zone core samples from TCDP Hole-B

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Continuous non-destructive X-ray fluorescence (XRF) analysis of the fault zone core samples from Hole-B of the Taiwan Chelungpu-fault Drilling Project (TCDP) was carried out by using the XRF Core Logger (XRFCL) TATSCAN-F2 at the Center for Advanced Marine Core Research, Kochi University/ Kochi Institute of Core Sample Research, JAMSTEC. The TATSCAN-F2 is an energy dispersive XRF analyzer, which enables to measure non-destructively and continuously core samples in an atmosphere of helium with 1 mm layer of air above the sample surface. For concentration of each element, quantification is performed by a fundamental parameter method of the analytical software installed for the machine, with corrections based on the results of measurements using the same method for geological standard samples of the AIST and laboratory standard samples that were quantified by a wavelength dispersive XRF analyzer. The targets for XRF measurement were three extents of 8 to 10 m long involving major fault zones that exist at the depths of about 1137 m, 1194 m and 1243 m. Collimator diameter for the incident X-ray beam was 7 mm. Measurement interval was 1 cm and measurement time for each point was 200 s (live time). Because many cracks are present originally in the cores and irregular surfaces are created due to splitting disturbance, some variations influenced by such roughness are seen in the profiles. These variations appear as underestimation in light elements such as Al and Si, and overestimation in heavy element like Fe. However, some characteristic variations independent to physical conditions of the sample surface are also recognized. Furthermore, when some ratios are applied, such characteristics become more apparent. For example, enrichment of Fe and Sr, and depletion of Mn are produced at the black materials that are intercalated in the main gouge of the each fault zone, We will show some preliminary results of the measurements by the XRFCL and discuss on a possibility of some elemental transfers in the fault zones.