

Quantitative detection of event deposits in the piston core of Beppu Bay, central Kyushu, Japan

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Particle transportation and deposition is repeated by various phenomena to be caused by constant cycle of water and atmosphere (non-event) and sudden phenomenon (event) such as earthquake, volcanic eruption, flood, and a stratum is formed. Therefore we can know paleo-disaster or climate change from the stratum. In addition, because the deposit caused by event (event deposits; Shiki, 1998) supplied a lot at a time, it is very important for solving formation process of the stratum. In recent years, due to analysis technique development high resolution/precision study in sedimentology is increasing (Katsuta *et al.*, 2007). For this reason, details of the sedimentation mechanism and the environmental change are more clearly, but on the other hand influence of development on age models and various analyses is actualized. Therefore clear distinction of event and non-event is one of the important problems.

In Beppu Bay, the detailed age model to omit major events was constructed by Kuwae *et al.*(2012). Event deposits were identified by sighting based on facies, CT images, magnetic susceptibility and wet bulk density. This method can identify event deposits seamlessly, but it is a problem to depend on the personal experience and to have difficult to quantitative detection. Therefore we tried quantitative detection of event deposits by the statistical method and compared the detection result and the sighting result in Kuwae *et al.*(2012). The BP09-3 core (about 9.3 m long) using this study which was used in Kuwae *et al.*(2012) was obtained at the deepest place in the head of Beppu Bay.

Generally, because the source and sedimentation process of event deposits are greatly different from non-event deposits, chemical composition, particle composition or other profiles have difference. Therefore, in this study, we defined event deposits as “ the sediment which has significantly different composition or physical properties ” , we tied the quantitative detection of the event sediment using test for outliers. Analysis data are particle composition of very fine sand which sampled every 2 cm from the core, and we used MSD method (Wada, 2010) which is the robust and multivariate method for test. As a result, 47 events were detected. The detected event in this study and the sighting event in Kuwae *et al.*(2012) are relatively congruent, so it is thought that detective method using this study is useful for quantitative detection of event deposits. However, there are problems that 1) one is not to be able to detect minute event sediments enough and 2) the other is difficult to recognize the border of event deposit and non-event deposit. Because the event layer which was not able to detect is thin relative to sampling interval, it is thought that event layer was diluted by non-event deposits. Because there is no a meaningful difference in composition of the neighborhood of border, clear border detection using only test for outliers is difficult. It is necessary to evaluate and reflect event attenuation (vertical change) and preservation potential to solve these problems.

Keywords: Beppu Bay, Event deposits, Quantitative detection, Particle composition