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Sedimentological Characteristics Of The October 25, 2010, Mentawai Tsunami

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On October 25, 2010, at 9:42 pm local time, an Mw7.7 earthquake occurred off Mentawai islands, about 120 miles W of Bengkulu, Indonesia. The earthquake generated tsunami and caused severe damage at the coasts of the islands, and killed more than 450 people. From November 6 to 9, we carried out a post-tsunami field survey, as a part of SATREPS project 'Multi-disciplinary natural hazard reduction from earthquakes and volcanoes in Indonesia' supported by JST and JICA. The survey team consisted of four Japanese and five Indonesian scientists, and was led by Prof. Kenji Satake. We visited nine sites located along the western coast of North and South Pagai Island, and revealed that the tsunami heights are mostly between 4 and 7 m there. Here, we report result of our sedimentological study of the tsunami deposits at four sites in Pagai Islands: Sabeu Gunggung, Muntei Barubaru, Macaronis resort, and Tumalei. At each site, the thickness and sedimentary characteristics of the tsunami deposit were measured and observed along transect and samples for laboratory analysis were collected. The tsunami deposits at Sabeu Gunggung, Macaronis resort and Tumalei are mainly composed by medium to coarse sand-sized fragments of corals, shells of mollusca and foraminifera. At Muntei Barubaru, the tsunami deposits are mostly composed by very coarse sand and gravel-sized deposits. Thickness of the tsunami deposits are ranging from 5 to 26 cm. The tsunami deposits consist of two to five units, and the units show both fining upward and coarsening upward trends, with fining upward dominating. Cross bedding structures are present at Tumalei transect. Mud clasts are found at the most landward points at Macaronis resort. Local topography noticeably affects the thickness, number of layers, and distribution of tsunami deposits along transect. The tsunami deposits do not show consistent landward decrease in thickness, but the grain size shows finer landward. Erosion features widely occurred at Sabeu Gunggung and Muntei Batubaru. At all sites, *Amphistegina lessonii* and *Neorotalia calcar* dominating the foraminifera content. These two species live at the shallow depths of less than 30 m. These two species indicate that the tsunami likely entrained most of the sediment in shallow depth. The foraminifera assemblage and diversity varies at each point, along transect and at each transect. Thus, the Mentawai tsunami deposits show complex characteristics. Understanding of these modern tsunami deposit characteristics will improve the clue to the recognition of paleotsunamis.

Keywords: sedimentology, tsunami deposits, grain size, foraminifera, Mentawai