

Quaternary underground geology and activity of the West Aizu Basin Fault Zone in the Aizu basin, Northeast Japan

Takehiko Suzuki^{1*}, Haruka Saito¹, Toshifumi Imaizumi²

¹Tokyo Metropolitan Univ., ²Tohoku Univ.

Aizu Basin is one of tectonic basins aligning with north-south direction in the south part of Northeast Japan. Along the west margin of the basin, the West Aizu Basin Fault Zone (WABF), an active reverse fault, stretches facing the West Aizu Basin Hills. Geomorphic development of the basin since Miocene has been discussed by Suzuki et al. (1977), Yamamoto et al. (1977) and so on. Activity of WABF during the last a few ten thousands years was reported by Fukushima Prefecture (2002). However, detailed geomorphic development of the basin and the activity of WABF in Middle Pleistocene to Holocene are not well clarified because of the lack of underground geology under the basin floor.

Kuriyama and Suzuki (2012) detected the TG Tephra (129 ka; Suzuki et al., 2004; Aoki et al., 2008) in the West Aizu Basin Hills and sediments under the basin floor, providing significant data for construction of geomorphic development and estimation of activity of WABF. Suzuki et al. (2013) reported the results of all-core boring survey (AB-12-1 core with a depth of 29 m and AB-12-2 core with a depth of 99.5 m) for the consideration on the deformation by older faulting in the basin floor. In this report, we show new identification of the tephra together with description by Suzuki et al. (2013).

AB-12-2 core

AB-12-2 core was collected at Nakaiwata (179.09 m asl), Aizu Bange Town, located 900 m east from the fault zone. This core comprises several gravel beds with depths at 48-50.46 m, 54.49-56.47 m, 76.81-84.74 m, 88.76-98.59 m, silt, peat, sands, and many tephra layers. Due to the characteristic properties (chemical composition of glass shards and refractive indices) of several tephra layers were identified as follows (depth, tephra name and age), 4.09 m: Nm-NM (5.4 ka), 17.05 m: AT (29-30 ka), 30.12 m: DKP (62 ka), 31.63 m: Nm-KN (62-65 ka), 36.82 m: Ag-OK, 45.75 m: TG (129 ka), 88.34 m: Sn-MT (180-260 ka). All are fallout-tephras except TG and Sn-MT formed as ignimbrite or lahar.

AB-12-1 core

AB-12-1 core was collected at Joguchi (177.32 m asl), Aizu Bange Town, located 2.5 km east from the fault zone. Tephra identified by chemical composition of glass shards and refractive indices from this core is only AT positioned at the depth of 14.72 m. Absence of Nm-NM identified in AB-12-2 core is explained by the difference in geomorphic surface between these sites, that is, Nm-NM at AB-12-1 was eroded with the deposition of sands and gravels of which basal level is 6.7 m in depth.

Accumulation rate of the sediments at AB-12-2 are 0.50 m/kyr between ground surface and Nm-KN, and 0.22 m/kyr between Nm-KN and TG, showing similarity to the accumulation rate estimated by Kuriyama and Suzuki (2012). Assuming that the age of Sn-MT is 220 ka, the accumulation rate between TG and Sn-MT is 0.35 m/kyr. This means no evident change in the accumulation rate between the period TG to Sn-MT and the period TG to present. If the accumulation in the basin corresponds to the activity of WABF, there is no evident change in vertical slip rate since 0.2 Ma.

This boring survey was financially supported by Grants-in-Aid for Science Research from the Ministry of Education, Science, Sports, and Culture (Research Project Number: 21240074).

Keywords: Aizu basin, tephra, active fault, Middle Pleistocene, underground geology