Tephras and fossil pollen stratigraphy of all-cores drilled in the eastern margin of the Aizu basin, Northeast Japan

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1. Introduction

Aizu Basin is one of tectonic basins aligning with north-south direction in the south part of Northeast Japan. Along the west and east margin of the basin, the West Aizu Basin Fault Zone and the East Aizu Basin Fault Zone, active reverse faults, stretches respectively (e.g. Ikeda *et al*., 2002). Geomorphic development of the basin since Miocene has been discussed by Suzuki *et al*. (1977), Yamamoto (2006) and so on. Activity of both fault zones during the last a few ten thousand years was reported by Fukushima Prefecture (2002) and AIST (2007). Kuriyama and Suzuki (2012) and Suzuki *et al*. (2016) discussed late Quaternary tephrostratigraphy based on analysis of a drilling core (AB-12-2 core, 179.08 m asl) and another boring cores in the western part of the basin.

In this study, we drilled two all-cores (GS-SOK-1, 175.99 m asl, 130 m depth; GS-AZU-1, 208.36 m asl, 100 m depth) in the eastern margin of the Aizu basin. Ishihara et al. (2015) reported analysis of tephras and radiocarbon ages of the GS-SOK-1 core. In this report, we show fossil pollen stratigraphy of the GS-SOK-1 core, and lithofacies of the GS-AZU-1 core and detected tephras.

2. Fossil pollen stratigraphy of the GS-SOK-1 core

15 muddy sediment samples were collected from GS-SOK-1. The Pleistocene sediments in the GS-SOK-1 were divided into 10 local pollen assemblage zones (SOK-I, -II…, and –X, in ascending order) an informal nomenclature by a distinctive assemblage of taxa, indicating local environmental conditions as a rudimentary biostratigraphic classification. We compared these zones with local fossil pollen assemblage zones of Nanaorezaka Formation (lower Pleistocene) and Todera Formation (middle Pleistocene) in the western margin of the Aizu Basin (Suzuki *et al*., 1990).

Because Tertiary flora (*Metasequoia*, *Keteleeria*, *Carya*, *Liquidambar*) are slightly included in the SOK-I zone (the depth of 111.1 ~ 126.8 m), the SOK-I zone can be correlated with TD-I zone (Nanaorezaka Formation; Suzuki *et al*., 1990). SOK-II, -III, and -IV zones (78.1 ~ 104.3 m depth) can be compared with TD-II ~ -IV, -V ~ -VI, and -VII zones (Todera Formation; Suzuki *et al*., 1990), respectively. SOK-V ~ -X zones (23.5 ~ 72.9 m depth) includes *Fagus* and *Quercus* dominantly (except SOK-V zone), whereas Pinaceae are detected dominantly in the upper part of Todera Formation in Suzuki *et al*. (1990). Thus, it is suggested that these zones are younger formation than the Todera Formation.

3. Lithofacies of the GS-AZU-1 core and detected tephras

In the depth from surface to 52.5 m, dark grey or green grey silt, peat, and sand are dominant excepting gravel layer in the depth of 36.5 ~ 41.6 m. Several volcanic ash and pumice layer are detected. Characteristics of volcanic glass shards and containing colored mineral indicates that AT (29-30 ka; Machida, 2011) is included in the depth of 13.35 ~ 13.38 m and Aso-4 (87 ka; Aoki *et al*., 2008) is in 30.25 ~ 30.30 m. A lot of biotite are contained in a pumice layer (34.10 ~ 35.10 m) and a volcanic ash layer (52.35 ~ 52.40 m), indicating that they were supplied from the Oku-Aizu (Numazawa or Sunagohara) Caldera.

From 52.5 m to 91.3 m depth, green grey or yellow brown sandy silt or sand with pumices and phenocrysts mineral such as quartz are dominant and a thin gravel layer is at the depth of 76.3 ~ 78.7 m. It is suggested that these sandy silt and sand layers are pyroclastic flow sediments and

their rework sediments. Below 91.3 m the core consists of yellow brown or grey white volcanic sand and silt. The pyroclastic flow sediments can be correlated with the Shirakawa pyroclastic flow units (lower Pleistocene; Yoshida and Takahashi, 1991; Yamamoto, 2006) if above volcanic ash layer is the tephra from the Oku-Aizu Caldera.

Keywords: Aizu Basin, Boring, Tephra, Fossil pollen, Quaternary

