Geological stratigraphy of a drilling core based on analysis of tephras and pollen assemblages in the western part of Aizu Basin, Northeast Japan

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1. Introduction

The Fukushima Renewable Energy Institute, AIST (FREA) has surveyed shallow subsurface geological analysis (ca. 100 m depth) in the Aizu basin as part of researches to compile a suitability map for installation of ground source heat pump system. Ishihara et al. (2015, 2016, 2017) reported 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 and Suzuki et al. (2016) reported a tephro-stratigraphy of AB-12-2 core drilled in the western margin of the Aizu basin. In this study the authors drilled a new all-core (GS-NT-1, 201.6 m asl, 100 m depth) in the Aizu-Misato town (former Niitsuru village), western part of the Aizu basin and show lithofacies, tephra and fossil pollen stratigraphy.

2. Description of GS-NT-1 core

Lithofacies: In the depth from surface to 30 m, dark grey or green grey silt and sand beds with 1-4 m thickness are dominant. Facies from 30 to 100 m consist of alternating beds of gravel (pebble), and sand and mud with 1-4 m thickness.

Tephra analysis: 5 tephra layers (volcanic glass or pumice sand beds) were detected from GS-NT-1 core on the basis of lithofacies, refractive index, and chemical compositions of volcanic glass shards and heavy minerals: Nm-NM (5.4 ka) in the depth of 2.30 to 3.90 m, AT (30 ka) in 25.58 to 25.62 m, Nm-KN in 38.70 to 38.90 m, TG (129 ka) in 51.90 to 52.20 m, and unnamed tephra in 99.90 to 100.00 m. The unnamed tephra also detected AB-12-2 core with the depth of 99.25 to 99.26 m drilled in the Aizu-Bange town, about 6 km NNW from GS-NT-1 core (Suzuki et al., 2016) and it is below Sn-MT tephra (180-260 ka).

Pollen analysis: 28 muddy sediment samples were collected from GS-NT-1 core for fossil pollen analysis. The Pleistocene-Holocene sediments in the GS-NT-1 core were divided into 11 local pollen assemblage zones (NT-1, -2···, and -11, in descending order). Pinaceae and *Betula* are dominant in NT-2, -5, and -7 zones and *Fagus* and *Quercus* are detected slightly, indicating that climate in these zones were relatively cool condition. NT-1, -4, -8, -10 zones, by contrast, were relatively warm climate condition because *Fagus* and *Quercus* are relatively dominant.

The authors correlated fossil pollen assemblage zones with Marine isotope stage (MIS) based on tephra ages; NT-1 zone is correlated to MIS 1, NT-2 zone to MIS 2-3, NT-3 and -4 zones to MIS 3, NT-5 zone to MIS 4, NT-6 zone to MIS 5, NT-7 zone to MIS 6, and NT-8 ~ -11 zones to MIS 7, respectively.

Keywords: Aizu Basin, subsurface stratigraphy, tephra, fossil pollen