Identification of Nantaisan Shichihon-sakura/Imaichi tephra (Nt-S/I) in the sediment core MD01-2421 collected off the Kashima coast, Japan

*Kaori Aoki[1], Takehiko Suzuki[2]

1.Rissho University, 2.Tokyo Metropolitan University

IMAGES core MD01-2421 (45.83 m) from the northwest Pacific Ocean off central Japan yielded twenty-three tephra beds. Descriptions of the twenty-three tephra beds have been made using the major-element composition of glass shards and refractive indices (RI) of glass shards and phenocrysts. As a result, at least seven on-land maker tephra layers have been identified. Two tephras, AT and Aso-4 come from Kyushu: Aira and Aso calderas. Four tephras come from central Honshu: Ag-KP from Mt. Akagi, Hk-TP from Hakone caldera, On-Pm1 from Mt. Ontake and Tt-D from Mt. Tateyama. One tephra, TG as the lowest layer of all, comes from northeast Honshu and are correlated around the coastline of southern Fukushima. Later, we have been studying the source volcanoes of remaining sixteen tephra beds. In this study, we report the new information on the source of Tephra 1 obtained recently.

Tephra 1 (925.6-933.1 cm) are characterized by coarse and bad selected volcanic sands consisting of white to pale brown pumice and black scoria which grain size is limited to 3 mm. Its thickness is 7.5 cm disturbed in liquid mud. The deposited age of this tephra is estimated at 17.7±1.38 ka based on the oxygen isotopic stratigraphy of the benthic foraminifera and the calendar ages of foraminiferal fossils calculated from the accelerator mass spectrometry (AMS) ^{14}C ages. Pumices are cross-foaming and include many microlites. Refractive index of volcanic glass shards exhibits bimodal as 1.498-1.503 and 503-1.509. Aoki et al. (2008) pointed out that 63-125 μm size particles consist of weathering minerals besides volcanic materials and geochemistry of 125-250 μm size volcanic glass shards indicated heterogeneity, hence there is a strong possibility that particles limited to 250 μm in this tephra bed included contaminant besides essential volcanic materials. To address this problem, we hand-picked 2-3mm size pumice grains, and crushed them for EPMA analysis. Consequently, it becomes clear that geochemistry of pumices are rhyolitic and rich in alkaline component elements relatively (SiO_2; 78.3wt%,NaO_2; 3.18wt%, K_2O; 3.79wt%). Next, geochemistry of Nantaisan Shichihon-sakura/Imaichi tephra (Nt-S/I), in some tephra erupted around 17.7+-1.38 ka,has slightly bimodal, and the group which K_2O content is rather little (SiO_2; 77.7wt%,NaO_2; 3.23wt%,K_2O; 3.97wt%) is similar to the geochemistry of pumices in Tephra1.

Nt-S/I is originated from Nantaisan, which belong to the Nikko volcanic area, west Tochigi Prefecture and consisting of Shichihon-sakura pumice unit (SP; Kanto Roam Kenkyu Group, 1965) as upper part and Imaichi pumice unit (IP; Kanto Roam Kenkyu Group, 1965) as lower part.These fall-out pumice units involving scoria distribute toward east from the source mainly, and its correlatives are found at the Kinu River Lowland area, around Mito and furthermore the Jyoban Coast (Machida and Arai, 2003; Suzuki, 2011).As Nt-S/I correlatives in Tephra 1 are almost pumice grains and there are much contaminated grains in fine materials of Tephra 1,it seems less possibly that Nt-S/I tephra fell out at this site off Kashima. We suppose, as a highly probable transportation process, that Nt-S/I pumice grains falling out at sea off Mito, or carried out to the Pacific by the Kinu River and the Naka River are transported off Kashima by marine current.

Then, Suzuki (2011) reported that Asama Itahana Yellow tephra (As-YP; Machida and Arai, 2003) found just under Nt-S/I around Nikko area. Twenty three tephra beds in this core Aoki (2008) reported are visible tephra beds, so As-YP would be bearing under Tephra 1 that correlated to Nt-S/I.

Keywords: Nantaisan Shichihon-sakura/Imaichi tephra, tephrostratigraphy, oxygen isotopic stratigraphy, IMAGES, marine core, off Kashima

