G119-P006 **Room: Poster Session Hall** **Time: May 19**

Volcanogenesis and tectonics of the back-arc rift basins of Niigata, NE Japan(Part 1); Inferred basaltic magma source

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Resolution of the syn-rift basin structure associated with back-arc rifting in the Niigata district has required estimation of the beginning of the syn-rift stage. This has been achieved by identification of facies and/or compositional changes in the volcanic and volcaniclastic successions of the Green Tuff.

Shuto et al.(1997) and Yagi et al.(2001) identified several volcanic stages within Green Tuff successions in Niigata and Akita-Yamagata, based on the compositional characteristics of surface outcrop and subsurface basaltic rocks, which were correlated with, radiometric and microbiostratigraphic age data, and Nd and Sr isotopic ratio in Green Tuff (whole rock) basalt samples.

Classifying tectonic stage: Yagi et al.(2005) identified vertical compositional variations in Green Tuff rock successions in the Niigata-Chuetsu Basin, based on the study of 800 core and cuttings samples from 80 boreholes. Subsequently, Baba et al.(2005) proposed 4 tectonic stages related to back-arc rifting, based on seismic profile data from Japan Sea to Chuetsu, and inferred variations in rock chemistries, comprising: (a) Land-arc Stage (35-20Ma); (b) Initiation Stage (20-18Ma); (c) Rotation Stage (18-16.5Ma); and (d) Drifting Stage of the Syn-rift (16.5-13.5Ma). The basic rocks of Land-arc Stage are composed mainly of andesite, whilst high-Ti alkali basalt and high-Al basalt characterize the Initiation Stage. High-Al basalt is dominant in the Rotation Stage, with low-alkali tholeiitic basalt most common in the Drifting Stage.

Origin of basaltic magma source: Detailed petrography, major/trace element geochemistry, and Nd and Sr isotopic analysis of basaltic rocks interbedded with rhyolites at Mt. Yudono, Iwafune, Tsugaw, Tadami, Sado, and Joetsu was undertaken to correlate the Green Tuff stratigraphy in surface outcrop and boreholes of the Niigata-Chuetsu Basin. The 4 tectonic stages of Baba et al. (2005) were assigned to the regional stratigraphic correlation.

Petrological examination of the basalts and detailed geochemical analysis reveal all tectonic stages are represented in the basin side of the back-arc rift basin. On the other hand, high $FeO*/MgO$ ratio and Ti-rich basalts of the Land arc to Rotation Stages, are main dominant in the hinterlands. This means that the main volcanic activities shifted from the hinterlands to the basin area after the Rotation Stage of back-arc rifting. A Nb reverse anomaly is recognized for volcanic rocks which erupted after the Rotation Stage, which indicates island arc related volcanism started after the Rotation Stage.

Basaltic rocks of Land arc Stage have high SrI and low NdI, which overlap values for basement rocks of the Niigata basin, and point to a genetic relationship between the source of basaltic magma in the Land arc Stage and the basement rocks. Basaltic rocks from the Initiation to Rotation Stages show a wide range of isotopic ratios, from high SrI and low NdI, to low SrI and high NdI. This indicates that the basaltic magma source could have derived by mixing uppermost lithospheric mantle and asthenospheric depleted mantle. Rock from the Drifting Stage have low SrI and high NdI, with ratios similar to MORB, such that there is a strong possibility of the source of basaltic magma having been subjected to the effects of asthenospheric depleted mantle.

Basaltic rock compositions are most depleted from the Drifting Stage, with Nd-Sr isotopic ratio data indicating crustal thinning from the Land arc to Drifting Stage, and reflecting basaltic magma source evolution during rift volcanogenesis from the continental margin to the island arc.