

東北日本弧, 仙岩地熱地域を給源とする 2.0 Ma に噴出した
大規模火砕流に伴う広域テフラ

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A 2.0 Ma Widespread Tephra Associated with a Large-Scale Pyroclastic Flow
from the Sengan Geothermal Area, Northeast Japan Arc

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A widespread tephra referred to here as Tamagawa-R4 Tephra (Tmg-R4) is newly recognized. Tmg-R4, derived from the Pre-Yakeyama caldera located in the Sengan geothermal area, the Northeast Japan arc, covers the area from Tohoku to Kanto, northeast of Honshu Island. At the type locality in the proximal area, Tmg-R4 comprises a non-welded pyroclastic flow deposit (ignimbrite) and an immediately overlying welded pyroclastic flow deposit (Kurasawayama Welded Tuff). Absence of plinian fall deposits in the area of ca. 25 km south of the source and the fine vitric ash nature of the distal ash-fall deposits of Tmg-R4 suggest that they are co-ignimbrite ash-fall deposits. Tmg-R4 was identified using a combination of refractive indices and chemical compositions of major and rare earth elements of glass shards ($n = 1.498\text{--}1.501$, SiO_2 : 78.3–78.6 wt%, K_2O : 4.2–4.5 wt%, Ba: 830–911 ppm), mineral content, refractive indices of hornblende ($n_2 = 1.665\text{--}1.686$). On the basis of these properties, Tmg-R4 was identified in Boso and Oga peninsulas, Choshi area, and in the core drilled on Musashino upland around 500 km south of the source. Calcareous nannofossil biostratigraphic (Calcareous nannofossil datum 13) and magneto-stratigraphic positions in Boso peninsula and Choshi, and paleomagnetic direction and many radiometric ages determined in the proximal area by previous studies indicate that the age of Tmg-R4 is ca. 2.0 Ma, positioned just below the base of the Olduvai Subchron. The distribution of Tmg-R4 showing emplacement of co-ignimbrite ash-fall deposit in the area 530 km south of the source, emphasizes the upwind transport direction relative to the prevailing westerly winds. This distribution shows similarity to those of a few co-ignimbrite ash-fall deposits derived from calderas in the Northeast Japan arc. As a key marker horizon in this age, the widespread occurrence of Tmg-R4 provides a tie line between many different sections over a distance of 530 km. Additionally, Kd44-Nk Tephra above Tmg-R4 is recognized in Boso peninsula, Choshi, Niigata and east Lake Biwa areas. Characteristic properties and stratigraphic positions indicate that Kd44-Nk possibly derived from the Sengan geothermal area occurred at 1.968–1.781 Ma.

Key words: Tamagawa-R4 Tephra, Kurasawayama Welded Tuff, caldera, widespread tephra, Olduvai Subchron

1. はじめに

日本列島において給源から 500 km 以上離れて広範囲に分布するテフラには、カルデラ形成に伴う大規模火砕流流下時に生産されるものがある。この様な広域テフラと呼ばれる大規模なテフラは、始良 Tn テフラ (AT) や

Aso-4 をはじめ多くは九州のカルデラに給源を求めることができる (町田・新井, 2003)。一方、東北日本弧のカルデラを給源とする広域テフラも少数であるが知られている。その例として、北海道の洞爺カルデラを給源とする洞爺テフラ (Toya, 112–115 ka; 町田・他, 1987; 町

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