

An early Pleistocene tephra associated with Shirakawa-Kumado pyroclastic flow derived from Aizu area, northeast Japan

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Caldera volcanoes active during early Quaternary in north-east Japan had produced large-scale co-ignimbrite ash-fall deposits associated with pyroclastic flow. Study on these tephras plays an important role for reconstruction of eruptive history of the calderas in NE Japan and establishment of the tephrostratigraphy of this age. This study shows the correlation of Shirakawa-Kumado pyroclastic flow deposit in the Aizu area of Fukushima Prefecture, northeast Japan, with tephras in Kanto area. A tephra referred to here as Shirakawa-Kumado Tephra (Sr-Kmd) derived from the Ono caldera located in the Aizu area is the lowest ignimbrite of the Shirakawa Pyroclastic Flow Group. Lower part of Sr-Kmd at the type locality is non-welded and is composed of bubble-walled and fiber types of volcanic glass shards, orthopyroxene, clinopyroxene and quartz. Refractive indices of volcanic glass shards and orthopyroxene are 1.500-1.502 and 1.713-1.722, respectively. Chemical compositions of major and rare earth elements of glass shards are SiO₂: 78.7wt%, TiO₂: 0.3wt%, Al₂O₃: 11.8wt%, FeO: 1.4wt%, CaO: 0.7wt%, K₂O: 3.4wt%, Na₂O: 3.4 wt%, Ba: 602ppm, La: 14ppm, Y: 33ppm. The age of Sr-Kmd was estimated to be ca.1.4 Ma based on fission-track dating, K-Ar age and magnetic polarity (Yamamoto, 2006). On the basis of characteristic properties, a vitric tephra 10 m above of Kd22 in Kiwada Formation of Kazusa Group in Boso peninsula and a vitric tephra between Ob4c and Ob5a in Obama Formation of Inubo Group at Byobugaura are correlative to Sr-Kmd. Shape of volcanic glass shards indicate that Sr-Kmd identified at 230 km south of the source caldera is co-ignimbrite ash-fall deposit. The age of Sr-Kmd is estimated to be 1.50-1.55 Ma referring to stratigraphic relationship with calcareous nannofossil datum 10 and 11.