

Eruptions during 6000 years at Nikko-shirane volcano, Central Japan

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Six tephra layers are recognized in the Nikko-shirane volcano, central Japan without 1872-73 and 1889-90 AD eruptions. The top tephra layer at the foot of Mt. Nikko-shirane (Nks-1) is considered to be produced by 1649 AD eruption, which is the biggest one of the record. We show geology, petrography and radioactive carbon dating of these tephra at summit and foot of the Mt.

Nikko-shirane, and discuss about the volcanic history in the last 6000 years. Mode compositions of tephra 250-500 μm in diameter were analyzed after washed out and separated into 250, 250-500, 500-1000 and >1000 μm particles by wet sieve.

At the foot of Mt. Nikko-shirane, four tephra layers from the Nikko-shirane volcano and three alien tephra layers were recognized. The Nikko-shirane tephra layers are named Nks-1, 2, 3, 4 downward (Okuno, 1993). We subdivide the Nks-1 tephra deposit into Nks-1a, 1b, 1c, 1d downward based on the color and grain size differences at the sampling point. The Nks-1a-d tephra contain vesicular and transparent-light-colored glass (pumice), non-vesicular and light-colored glass, non-vesicular and dark-colored glass, lithic clast, altered clast, and plagioclase, quartz, clinopyroxene and orthopyroxene crystals. The Nks-1a-c also contain a small amount of vesicular and dark-colored glass (scoria). The Nks-1 tephra deposit contains 16% pumice in maximum.

Two of three alien tephra layers are the Asama-B and Haruna-ikaho tephra deposits downward, and both are intercalated between the Nks-1 and 2 (Okuno, 1993; Tsutsui et al., 2005). We found an alien tephra layer just beneath the Nks-3 tephra. It is brownish silty ash with altered orangey pumice at the sampling point. The tephra contains 15% vesicular and colorless glass and they have similar major element composition to the Asama-D tephra.

At the summit of Mt. Nikko-shirane, we found a 0.17 m thick tephra layer beneath 0.07 m thick surface soil. Lower part of the tephra shows grayish white and the upper part shows yellowish brown ash. More than 80% components of the tephra are lithic clast, altered clast, and colorless minerals. Radioactive carbon dating of black soil beneath the tephra indicates 1686-1731 and 1808-1927 cal AD (^{14}C dating: 110 ± 20 yrBP). Based on the ^{14}C dating, the tephra layer would be produced by 1872-73 or 1889-90 eruption.

We propose that the Nks-1 might be magmatic eruption due to the Nks-1 tephra deposit contains 16% pumice in maximum. On the other hand, the tephra at the summit of Mt. Nikko-shirane should be the product of a phreatic eruption because of absence of pumice or scoria.

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