



## Two Sheveluch volcano eruptions (Kamchatka, Russia) dated by dendrochronology

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Sheveluch (N 56.8, E 161.6, H=3395 m) is one of the most active volcano in Kamchatka. The last big eruption occurred in 2004-2005, others, dated by instrumental, historical,  $^{14}\text{C}$  and tephrochronological methods, occurred in BC2866, BC807, AD614( $\text{SH}_3$ ), 1021( $\text{SH}_2$ ), ~1430, ~1530, ~1650( $\text{SH}_1$ ), 1719(1739?), between 1790 and 1810, 1854, 1879-1883, 1897-1898, 1905, 1927-1929, 1944-1950, 1964 (Melekestsev et al., 1991). Several of them (ca 2000 years BP, AD1854, AD1964) are recorded in the Greenland ice cores (Simkin et al., 1981; Zielinski et al., 1994).

Most dates of eruptions before AD1854 are obtained by tephrochronology and constrained by radiocarbon dating with the range of several decades or centuries. In 2003 we found eight logs, killed during an eruption and buried in the pyroclastic flow of Sheveluch volcano in Baidarnaya valley. The age of the pyroclastic flow (20 km long and up to 10 m thick) was estimated previously by tephrochronology as AD1641 ( $265 \pm 18$   $^{14}\text{C}$  years BP) (Ponomareva et al., 1998). Though the logs are partly burned, we were able to measure ring widths using standard tree-ring equipment (2 sections) or photographs (5 samples), cross-date these samples against a larch ring-width chronology (Solomina et al., 2005) and estimate the date of the outer rings, which is close to the date of the eruption. The outer rings date back as AD1708, 1713, 1725, 1730, 1735, 1750, 1766. The difference in the age is explained by the loss of some outer rings burned away. Therefore the date of the eruption and pyroclastic flow is close to the youngest age (AD1766). The inner part of wood is better preserved and the inner rings date back as AD1680, 1670, 1668, 1645, 1640, 1640, 1640. The oldest age

(AD1640) marks the beginning of colonization of the floor of the valley by forest after the previous eruption. Undisturbed growth between AD1640 and AD1766 marks the interval of “dormant” Sheveluch. The pyroclastic flow (AD1766) is covered by spruce forest. The oldest tree found on the surface of the flow dates back as AD1793, i.e. it corresponds to the date of the deposition plus 27 years for colonization lag. The oldest larch tree found at the upper tree limit of Sheveluch dates back to AD1695 and may be connected to the colonization of the territory after the eruption occurred in the middle of 17<sup>th</sup> century.

In summer 2006 we visited Kamenskaya valley of Sheveluch volcano and found 30 more samples buried in the pyroclastic deposits. After the processing of these samples we will be able to refine the initial findings described here. The study was supported by the ISTC grant 2947.