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ABSTRACTS

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SUMMER TEMPERATURES IN NORTHERN YAKUTIA SINCE AD 1400

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We describe the development of a millennial annual-resolution reconstruction of summer temperature in far north-eastern Eurasia, at the center of the largest longitudinal sector of the Arctic lacking such a record. The annual rings of larch trees from the Lena-Indigirka coastal lowlands contain a remarkably clear and strong summer temperature signal. 66% of the variance of summer temperature is accounted for by the tree ring width index series. We have established a tree-ring series for this region back to AD 1200, and a temperature reconstruction back to AD 1400. We also sampled wood preserved in permafrost identified as being from several earlier periods, particularly the first millennium AD and the first millennium BC.

Extending this reconstruction to two or more thousand years length will allow us to place natural climate variability in Arctic summer conditions in the context of time scales from interannual to centennial. The preliminary analysis of the reconstruction of summer temperature in northern Yakutia since AD 1400 revealed several features that merit further analysis, and which will prompt detailed examination of the planned longer reconstruction. These include: i) a strong association between the coldest reconstructed summer temperatures of the last 600 years in northern Yakutia and known periods of explosive volcanic activity. ii) A sharp downward step in temperature in the late 1970s, at the same time as other steps in climate and oceanographic phenomena over much of the Pacific Basin that have been described as a regime shift. iii) The tree rings track decadal scale temperature variation in the instrumental period well, and there is evidence that such variability is especially important in the Arctic. Several of the decade-scale features identified in this reconstruction are shared with others, some on other continents. iv) 'Unprecedented warmth' is found in the early and mid-twentieth century, and a nineteenth - century warming trend commences several decades earlier than reconstructed by Briffa et al for the Polar Urals.