

Drivers of regional and local boreal forest dynamics during the Holocene

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Here I present the results of my PhD work that is based on three publications (Kuosmanen et al. 2014, 2015, submitted to *Boreas*). Fossil pollen and stomata records from lake and small hollow sites were used to investigate the Holocene history of western taiga forest in northern Europe and to assess the importance of climate, forest fires, local moisture conditions and human population size on the long-term boreal forest dynamics, at both regional (lake records) and local (small hollow records) scales. Statistical methods variation partitioning and wavelet coherence analyses were employed to assess the importance of these variables on long-term boreal vegetation dynamics.

The results demonstrate the constant Holocene presence of Siberian larch (*Larix sibirica*) and Norway spruce (*Picea Abies*) since 10 000 cal yr BP. The expansion of spruce population at 8000 - 7000 cal yr BP caused notable change in forest structure towards more dense spruce dominated forests and seems to mark the onset of the spruce migration into Fennoscandia.

Climate is the main driver of the long-term regional scale vegetation changes. However, at the stand-scale boreal forest dynamics the role of local factors increases indicating the important role of site-specific factors. Especially fires can have a significant effect on the short-term changes in individual tree taxa and have profound effect on forest structure at local scale. The importance of human population size on variation in long-term boreal vegetation was first time statistically assessed and the unexpectedly low importance is likely due to the bias caused by the differences in the spatial representativeness between the human population size data and the forest composition derived from pollen data.

References:

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