

**Title:**

Change of the forest line ecotone in Torneträsk-Karesuando area, Northern Sweden over the last 100 years

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**Abstract:** (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will 'expand' over 2 pages as you add text/diagrams into it.)

Latitudinal and altitudinal relocation and change of forest lines and forest covered areas, have implications for terrestrial carbon sequestration, land-atmosphere energy balance, and regional biodiversity. Hence information on potential rates and causes of change are essential in scenarios for climate change responses. However, such data are scarce but can be obtained from comparisons of current and historical vegetation, using old geo-botanical descriptions and maps. In this study, extensive descriptions of vegetation conditions for Northern Sweden for the period 1905-1912, are compared with late 20<sup>th</sup> century map and satellite data to quantify change in the birch forest line ecotone. The ancient vegetation map included 10 vegetation types tailored to the needs of reindeer husbandry, at a scale of 1:200,000. Used recent data encompassed a vegetation map from 1982-3, aerial photographs and SPOT-images from 2008-2009. The results show an altitudinal birch forest advance of up to 100 meters since 1909 across northern Sweden. For the last three decades (1982-2009) an elevational advance of at the most 20-30 meters is indicated. The changes in the position of the northernmost birch forest line are considered to be a combined effect of a warming trend of ca 1.5 degrees over the analysed period, and changed reindeer herding system in the early 20<sup>th</sup> century leading to both reduced grazing pressure and reduced fire wood harvest at the forest line. The recorded altitudinal advance by approximately 1 meter per year over the last century has caused a large scale forest cover change, but its combined landuse and climate background needs consideration when applied in scenarios for future responses.

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