

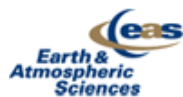


Understanding Circumpolar Ecosystems in a Changing World

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Advancement of the northern forest lines in northern Norway in the period 1914 – 2007

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The interface between the boreal forest and the arctic tundra is the Earth's largest vegetation transition zone and climate change as well as change in land use can alter its position. In order to detect changes in the arctic forest lines of birch and pine in northern Norway, we used old and new forest maps, topographic maps and remote sensing based imagery and maps. For the latter data we used both traditional spectral classification and "spectral unmixing" on imageries from Landsat and Quickbird for detection of forest lines. Comparison of the birch forest lines from 1914 and 2007 revealed a north-ward advancement of up to 11 km in the western part of the study area, 22 km in the middle parts, and 12 km in the eastern part. The advancement for the period 1980 to 2007 was less than 1 km in northern direction for most of the area. The analysis revealed only minor changes in the position of the pine forests for most of the study area and the period 1914-2007, except in the eastern part where it was up to 4-5 km over the study period. The changes in the position of the northernmost birch forest line are considered to be a combined effect of reduced grazing (reindeer, goats and sheep) and climate change. The recorded slower forest cover change rate seen for pine is, hypothetically, both related to species-specific response patterns and exploitation of the pine forests during World War II and the following decades.