

B04-O04

IMPACTS OF CHANGING WINTER SNOW CONDITIONS FOR ARCTIC ECOSYSTEMS

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Winter snow conditions are already changing and are expected to change dramatically for Arctic ecosystems due to climate change. As snow provides insulation for many overwintering organisms against freezing winter conditions the persistence of an intact snow layer is vital. Changes in the snow pack depth, structure timing of snow build up and snow melt as a result of climate change may have major consequences for ecosystems. In this talk I aim to highlight the most recent examples of the impacts of changes in winter snow conditions for different components of the ecosystem and identify the current knowledge gaps where increased research focus is required.

For example, extreme winter warming events can lead to complete snow melt during the middle of winter and even induce spring like development in plants due to the above freezing temperatures. However, upon return of 'normal' winter freezing conditions the plants are no longer protected against the cold by a layer of snow and this can lead to reduced growth or even mortality in the following growth season. During a recent study in Tromso we identified that evergreen plants appear more vulnerable than deciduous plants to such changes winter snow conditions. This increased vulnerability was induced by the loss of the expression of frost resistant genes (CBF) and changes in the fatty acid composition of membranes. These results indicate that evergreen plants may be at a severe disadvantage in a future Arctic climate if extreme winter warming events become more frequent. This could have major implications for animal populations that depend on berries and leaves of evergreen plants as a food source and the forestry industry that depends on the successful winter survival of seedlings.

There is a pressing demand from ecologist for highly detailed projections of the temporal and spatial distribution of future Arctic snow cover if we want to understand the consequences for Arctic ecosystems.