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10:00 A.M.
Bldg. 1520, Beech River Conference Room (Room 202)

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Arctic ecosystems: impacts of extreme winter warming events and how to measure roots from satellites

The Arctic is warming more than most other regions of the globe. The potential for considerable feedback to global climate from release of its vast stores of carbon, along with changes in energy and water balance is of major concern. However, while much research to date has focused on Arctic ecosystem responses to summer warming, the impacts of winter warming have been largely ignored – a major oversight given that the Arctic is predicted to warm more in the winter than summer. One of the most impressive of winter climate change phenomena are extreme winter warming events, where temperatures rapidly rise to above $0^{o}C$, causing snow melt at landscape scales and warming of ecosystems before rapid return of ambient extreme winter cold. Here I will report findings from the first field simulation of extreme winter warming events that show considerable damage to Arctic shrub species, and declines in biomass and productivity. I will also show support for the simulation study seen in the impacts of a recent real winter warming event that occurred in north-west Scandinavia showing damage at large scales.

While work on winter climate change impacts has previously been largely ignored, it is also true that in studying Arctic vegetation productivity and responses to warming, the below ground component (roots) has been received far less attention compared to the above ground component. Given that the majority of plant biomass in Arctic ecosystems is below ground, much more work on the productivity and turnover of Arctic root systems is needed if vegetation carbon dynamics are to be fully understood. Here I will present findings from recent work across multiple tundra vegetation types that has quantified fine root carbon and length, and their relationship with leaf area index (LAI), and relationships between root and leaf turnover rates. Coupling between these suggest that root carbon, length and turnover rates can be estimated from LAI, raising the possibility of estimating root parameters from remotely sensed measures of LAI.