

- **GC31B-1184: Warming Climate and Changing Societies – a Challenge or an Opportunity for Reindeer Herding?**

Jukka Käyhkö¹, Tim Horstkotte¹, Sonja Kivinen¹, Jarmo Vehmas¹, Lauri Oksanen¹, Bruce C. Forbes², Bernt Johansen³, Jane Uhd Jepsen⁴, Annamari Markkola⁵, Jouni Pulliainen⁶, Johan Olofsson⁷, Tarja Oksanen¹, Tove Aagnes Utsi⁸, Erkki Korpimäki¹, Cecile Menard⁶, Lars Ericson⁷ and Nordic Centre of Excellence 'Tundra', (1)University of Turku, Turku, Finland, (2)University of Lapland, Rovaniemi, Finland, (3)Norut Northern Research Institute, Tromsø, Norway, (4)Norwegian Institute for Nature Research (NINA), Tromsø, Norway, (5)University of Oulu, Oulu, Finland, (6)Finnish Meteorological Institute, Helsinki, Finland, (7)Umeå University, Umeå, Sweden, (8)University of Tromsø, Tromsø, Norway

The Arctic region will warm more rapidly than the global mean, influencing dramatically the northern ecosystems. Simultaneously, our societies transform towards urbanized, highly educated, service-based culture, where a decreasing population will gain its livelihood from primary production. We study various ecosystem interactions in a changing climate and integrate these with reindeer husbandry and the indigenous Sámi culture dependent on it¹. Potential climate impacts include the transformation of arctic-alpine tundra to dense scrubland with conceivable consequences to reindeer husbandry, but also global warming due to decreasing albedo. The social-ecological system (SES) of reindeer husbandry includes administrative and ecological processes that do not always correspond (Figure 1). Consequently, management priorities and administration may conflict with local social and ecological processes, bringing about risks of environmental degradation, loss of biodiversity and defeat of traditional livelihoods. We hypothesize the plausibility to support the indigenous reindeer herding livelihood against rapid external changes by utilizing the migratory reindeer grazing system of the Sámi as a management tool for sustaining the high-albedo tundra and mitigating global warming. Our first-of-a-kind satellite-based high resolution vegetation map covering Northern Fennoscandia allows detailed management plans. Our ecological research demonstrates the important role of herbivory on arctic vegetation communities. Interactive workshops with reindeer herders offer indigenous knowledge of state and changes of the ecosystems, and reflect the threats and expectations of the herders. We are currently building models of the complex social-ecological system of Northern Fennoscandia and will report the first findings of the exercise. ¹ www.ncoetundra.utu.fi



Figure 1. The scales of administrative and ecological processes do not always coincide. This may bring about challenges in managing the social-ecological systems.