

Survival of rapidly fluctuating natural low winter temperatures by High Arctic soil invertebrates - project on AB-329/829 Arctic Winter Ecology.

(based on Convey *et al.* 2014 and with additional 2015 course data)



The terrestrial arthropod fauna in High Arctic Svalbard is:-

- relatively robust to changes in temperature that are likely to be a consequence of changes in patterns of snow fall and accumulation as predicted under current climate change scenarios.
- future studies must include the quantification of additional stressors such as surface icing events.
- this study also illustrates the difficulty of generalising from laboratory experiments based on a small number of species to community-level responses to different patterns of exposure to low temperatures and, hence the need for large-scale complementary field studies.

PROJECT

- To assess survival of High Arctic soil invertebrate communities to natural winter temperature variations.
- The overwintering temperatures they experience were manipulated by selecting locations with varying snow accumulation: No Snow, (UNIS roof), Shallow Snow (30cm) and Deep Snow (120cm).
- UNIS course AB-329/829 Arctic Winter Ecology.
- 2012/13 project published as Convey *et al.* 2014 *Journal of Thermal Biology* (2014) DOI: 10.1016/j.jtherbio.2014.07.009



Air temperatures during the winter period fluctuated frequently between +3 and -24°C (Fig. 1) and the No snow soil temperatures reflected this variation closely. Under 30cm of snow (Shallow snow), soil temperatures varied less and did not decrease below -12°C. Those at the Deep snow site were even more stable and did not decline below -2°C.

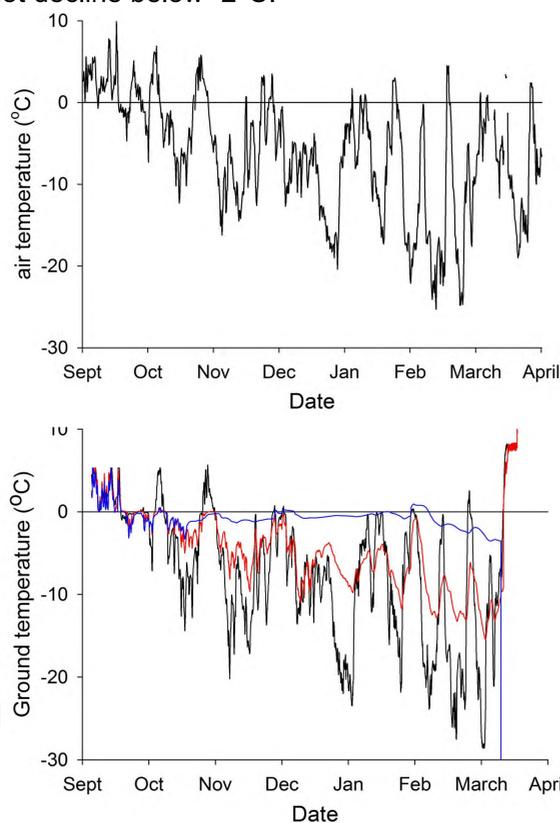


Fig. 1. Air temperatures (top panel) during winter and early spring 2014-15. Lower panel. Soil sample temperatures, black=No snow, red=Shallow snow, and blue=Deep snow.

Despite these striking differences in winter thermal regimes, there were no clear differences in survival of the invertebrate fauna between treatments (Fig. 2) between the pre-winter sampling date in September 2014 and the recovery date in March 2015.

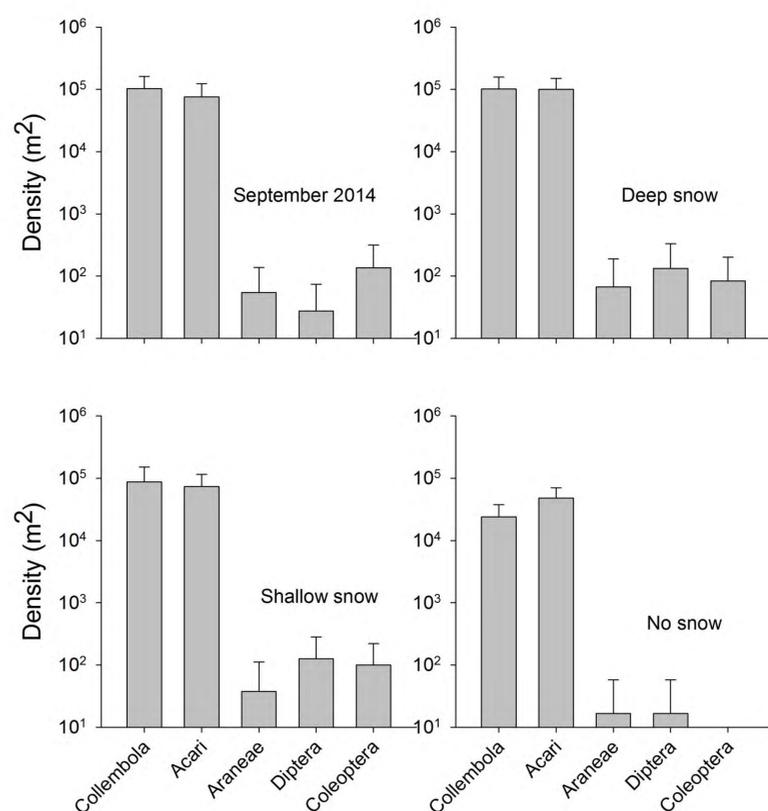


Fig. 2. Mean survival of soil invertebrates in March 2015 compared to initial densities in September 2014.

This poster summarizes results from the AB:329/829 Arctic Winter Ecology 2012/13 and appearing in *Journal of Thermal Biology* (2014) DOI: 10.1016/j.jtherbio.2014.07.009 Convey P., Abbandonato, H.D.A., Bergan, F., Beumer, L.T., Biersma, E.M., Bråthen, V.S., D'Imperio, L., Jensen, C.K., Nilsen, S., Paquin, K., Stenkewitz, U., Svoen, M.E., Winkler, J., Müller E & Coulson S.J. with additional data from the 2015 course:- Alvestad R. J., Ársælsdóttir L., Beatty J.L., Eischeid I., Hjermstad-Sollerud H., Kaljulaid M., Kleiven E.F., Kuehn M., Lorentzen J.R., Pop A., Voswinkel T.C. Course leader 2012/13: Dr. Eike Müller. Course leader 2015: Prof. Ingibjörg Svala Jónsdóttir



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