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Recipes for orographic generation of local temperature extremes

Haraldur Ólafsson
University of Iceland and the Icelandic Meteorological Office, Iceland (haraldur68@gmail.com)

Orographic flow features and processes that contribute to temperature extremes may be quite different in nature and their contribution to the extremes may at first glance be negative as well as positive. The strength of the föhn wind may for instance contribute to descent of warm air, but at the same time prevent the formation of a super-adiabatic warm surface layer under sunny conditions. Strong winds impinging a mountain are generally considered a prerequisite for warm föhn, but these winds may also help cold low-level airmasses to ascend the mountain and contribute to not-so-hot downslope flow. Strong advection of cold air from high-latitude cold reservoirs may be considered favorable for a low temperature extreme, but the strong winds may hamper the formation of a surface inversion and a thick cold airmass over warm sea will develop convection that may also reduce the likelihood of surface inversions near the sea.

The presentation shows how several orographic processes acting at different scales may lead to surface temperature extremes. This is illustrated with examples from Iceland and the Faroe Islands.