



Estimating the source of the heat surplus of downslope winds from observations

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Twelve years of upper air data and surface observations across Iceland are used to investigate why the surface air is warmer in the lee than upstream of Iceland. The diurnal and annual cycles of temperature difference upstream and downstream are investigated and the temperature difference is compared to observed precipitation and the vertical profile of temperature and wind speed. In the summer, the temperature difference between the lee and the upstream sides is greater during daytime, than in the night and in the summer, this temperature difference is slightly greater than in the winter. There is very little correlation between observed precipitation upstream and the temperature difference upstream and downstream. The data indicates that the two most important factors contributing to higher air temperatures downstream than upstream are descent of potentially warm airmasses from upper levels and solar radiation. Unlike commonly considered and presented in many textbooks, the release of latent heat appears in general to be of little importance for raising the surface air temperature downstream of the Icelandic highlands.