



The bimodal downslope windstorms at Kvísker

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Downslope windstorms at Kvísker in Southeast-Iceland are explored using a mesoscale model, observations and numerical analysis of the atmosphere. Two different types of gravity-wave induced windstorms are identified. Type S (Short) is a westerly windstorm which is confined to the lee-slopes of Mount Öräfajökull while a Type E (Extended) windstorm occurs in northerly flow and is not confined to the lee-slopes but continues some distance downstream of the mountain. The low-level flow in the Type E windstorm is of arctic origin and close to neutral with an inversion well above the mountain top level. At middle tropospheric levels there is a reverse vertical windshear. The Type S windstorm occurs in airmasses of southerly origin. It also has a well-mixed, but a shallower boundary-layer than the Type E windstorms. Aloft, the winds increase with height and there is an amplified gravity-wave. From a dynamic perspective, the Type S windstorm may be characterized as a more pure gravity wave generated windstorm, while the Type E bears a greater resemblance to local flow acceleration described by hydraulic theory, based on a flow transition from a supercritical to a subcritical state. Climate projections indicate a possible decrease in windstorm frequency to the year 2050.