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Conditions leading to downslope windstorms observed in the Snæfellsnes Experiment (SNEX)

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A collection of downslope windstorms observed by the Snæfellsnes Experiment (SNEX) during the period 1999-2004 reveals that there is very limited direct correlation between the upstream winds, the nondimensional Froude number and the downslope windstorms. Yet, these facors are often considered as predictors for downslope windstorms. The SNEX windstorms appear to be of two distinct types, both related to the vertical profile of the lower troposphere. Type A occurs if there is a thermal inversion at mountain top level and type B is associated with a reverse windshear in the lower or middle troposphere. Both type A and B can be explained by referring to gravity waves. In the A case, the waves can be of large amplitude, while in the B case the waves break below the reverse windshear. In both cases strong and gusty winds are generated at the surface of the downstream slopes. The results are of substantial value for the prediction of the windstorms.