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Observational and numerical evidence of strong gravity wave breaking over Greenland

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Several numerical studies have indicated that orographically generated gravity waves may break and cause severe atmospheric turbulence at high elevations. However, there are hardly any observations of such wave breaking including some major observational campaigns of flows past mountains. On 6 December 2005, observations were made of severe turbulence in a region where gravity wave breaking is reproduced by numerical simulations. The wave breaking took place in easterly flow over S-Greenland. The conditions for generation, vertical propagation and breaking of gravity waves were very favourable; there was strong low level flow, little changes in wind direction in the troposphere and a reverse wind shear close to the tropopause where the turbulence was observed. Successful simulations of this case as well as other cases of waves over Greenland have launched plans to monitor the region with high-resolution numerical simulations to serve the air traffic.