



Breaking wave downstream of Vatnajökull glacier in southeastern Iceland

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On 4 October 2017 a quasi-stationary breaking wave occurred downstream of Vatnajökull glacier in southeastern Iceland. The winds were persistent northeasterly, about 15 m/s, over the glacier and at the southern edge of the glaciers the wave broke, with downslope windstorm on the mountain side and a wind wake in the lee. Measurements were conducted with the Facilities for Airborne Atmospheric Measurements (FAAM) aircraft. Firstly, a leg at 9000 ft, perpendicular to the upstream wind direction, was measured three times, obtaining measurements of the breaking wave. The measurements show a deceleration of horizontal wind speed by about 10 m/s and an increase in potential temperature by 5 K from over the glacier and into the wave. In the wave breaking region the air was turbulent, vertical velocity varied between +/-5 m/s while the horizontal wind speed was low and the potential temperature decreased slowly towards its upstream value. Secondly, measurements were obtained at low levels inside the wind wake, at 800-4000 ft. These measurements confirmed the existence of a wind jet inside the wake as well as return flow at the lowest levels. Iceland has complex orography and winds are frequently distorted, enhanced and lowered by orography. For weather forecasting it is crucial that NWP models capture these complex wind patterns. As for this case, the measurements confirm that the NWP model HARMONIE-AROME run operationally in Iceland simulated this case relatively well. Further modelling is though required to study the breaking wave in details.