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The persistency of gravity waves over Hofsjökull glacier during the FLOHOF experiment

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Recent downscaling of the climate of Iceland has indicated that climatological wind maxima are not found at the top of mountains and offshore, but above the slopes of the main glaciers, downstream of the peaks. So far, no observations have been available to verify this. During the FLOHOF field campaign that took place in July and August 2008, flow over Hofsjökull glacier was observed with a network of automatic weather stations. The observations reveal a persistent pattern of downstream shift of the wind maximum, as in an internal gravity wave in a stratified fluid. This pattern occurs not only in strong windstorms, but for a wide range of wind speeds, giving values of the non-dimensional mountain height (Nh/U) ranging from well above 1 to less than 1. The feature of downstream shift of the wind maximum appears consequently not to be very sensitive to the flow regime. The FLOHOF data does not only support the idea of a downslope climatological wind maximum, but it also lends credibility to numerical downscaling of the atmosphere to describe the regional climate.