

Structure of gravity waves in windstorms

Hálfdán Ágústsson and Haraldur Ólafsson

University of Iceland, Icelandic Meteorological Office and Institute for Meteorological Research
halfdana@hi.is

The structure of gravity waves in three windstorms in Northwest-, East- and Southeast-Iceland is studied with satellite observations, ground-based wind observations and a high-resolution numerical simulation. In all three cases, there are strong waves over the mountains and the waves break in the NW- and in the SE-cases. In the NW-case, there is wave breaking over the ocean and the presence of the waves away from the mountains is supported by satellite imagery. In the E-case, there is only weak wave activity over the ocean, while in the SE-case there are no waves over the ocean. A probable explanation for this is associated with changes in wind direction with height. In the NW-case, winds above the boundary layer may be considered to advect wave energy over the ocean, while in the SE-case this can not be the case. In the E-case, the flow is not far from being uniform, as in linear theory, which does indeed predict some spread of wave energy perpendicular to the wind direction.