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On the sea breeze and the slope winds and their interaction

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Summer-time thermally driven flows are studied with a series of simulations of idealized and non-idealized atmospheric flow over a large high-latitude island. The simulations are compared to surface and upper-air observations in Iceland.

Several features are revealed and discussed:

a) The mountain slopes pull the sea breeze

b) The sea breeze accelerates the slope wind

c) The return flow above the sea breeze is not clear

d) Strong anticyclonic flow is generated aloft. This flow is inertially unstable.

e) There is speed-up on one side of peninsulas. This core of accelerated flow is slowly advected away from peninsula. This peninsula-effect is present in observations.

The above described winds determine to a great extent the summer climate of the coastal regions. They are poorly reproduced in climate simulations.