

Thermal Updrafts Leeward of a Mountain by Numerical Simulation

by

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Abstract

Under a strong wind condition, the area leeward of a mountain is dangerous for small aircraft, particularly for a sailplane, because of downdraft along the leeward slope of the mountain. On the other hand, cumulus clouds suggesting the existence of thermal updraft are occasionally observed on the leeward side of the mountain. In order to clarify the generation mechanism of the updraft leeward of the mountain, we have performed a numerical analysis of fluid dynamics. In our model, a heat source representing the absorption of solar radiation is put on the leeward slope of the mountain to produce thermal updraft, and the leeward effect of the mountain is simulated. It is confirmed by the simulation that the thermal updraft in the lee of the mountain is not easily blown away because of the presence of the mountain. Furthermore, the relationship between the leeward effect and the steepness of the slope of the mountain is clearly demonstrated. The present result suggests a possibility that the leeward side of a mountain is suitable for soaring under appropriate wind and sunshine conditions, and could be utilized for aerial sports.

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