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LEE VORTEX FORMATION BY SEPARATION OF POTENTIAL VORTICITY SHEETS

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ABSTRACT

Based on a generalized potential vorticity concept, a theory is outlined of how a wake with lee vortices can form in weakly dissipative flows past a mountain with a free-slip surface. Theoretical considerations and an analysis of a simulation show that baroclinicity can induce a potential vorticity sheet on the leeward surface of a mountain. Weak dissipative processes suffice to separate the potential vorticity sheet from the surface of the mountain and advect it downstream, thus giving rise to lee vortices. The separation of the baroclinically induced potential vorticity sheet from the leeward surface of the mountain is similar to the separation of a friction-induced vorticity sheet from an obstacle, except that the potential vorticity sheet can be induced by baroclinicity at the surface.

REFERENCES

Schneider, T., I. M. Held, and S. T. Garner, 2003: Boundary effects in potential vorticity dynamics. *J. Atmos. Sci.*, **60**, 1024–1040.

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