# Submitted Abstract

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## Abstract

The climatological frequency of deep moist convection is enhanced in the vicinity of mountainous regions, causing storms. Most studies to date focus on convection initiation (CI) on the windward side of mountains, but uplift and CI can also occur on their lee side. The factors controlling this phenomenon are only partially understood, but it is frequently hypothesized that a lee-side hydraulic jump may provide the uplift required to initiate lee-side convection.

Here we argue that lee-side CI is best understood as a consequence of low-level convergence along an orographic dryline. The dryline marks the boundary between relatively dry air descending from the mountains and conditionally unstable air over an adjacent plain. The stronger the convergence along the dryline, the more likely is CI to occur.

We initially focus on the atmospheric conditions leading to strong lee-side convergence and uplift in an unsaturated atmosphere. A variety of scenarios are investigated using an idealised modelling setup, ranging in linearity and hydrostaticity of the cross-mountain flow, and with varying surface fluxes. By computing a convergence budget, we determine the dominant forcings affecting lee-side convergence and how these vary across flow regimes. A relationship is determined between the level of hydrostaticity and linearity of the flow, the strength of lee side convergence, and the corresponding boundary-layer uplift.

We then turn to considering flows with a conditionally unstable leeside environment. We replicate the scenarios in which strong lee-side convergence and low-level uplift are expected, and we determine whether the uplift is actually sufficient to initiate deep moist convection.