



Idealised Modelling of Orographic Rainbands

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Idealised numerical simulations have been used to investigate the environmental conditions leading to the formation of orographic rainbands. Although relatively small in scale (a few tens of km across by up to ~ 100 km in length), these often poorly forecast bands can cause localised flooding due to intense, quasi-stationary precipitation anchored in place by the orography. The theoretical dependence of the partitioning of dry flow over and around mountains on the non-dimensional mountain height is well understood. Here we examine the effect of this dependence on rainband formation in a moist environment with the aim of producing a regime diagram.

The simulations were performed in a three-dimensional channel and at a grid spacing of 1 km to enable the banded features to be resolved. In the control simulation, with a non-dimensional mountain height of 0.6, a band initiates to the lee of the isolated Gaussian mountain and propagates downstream for ~ 100 km. Results will be shown from simulations with a range of non-dimensional mountain heights to demonstrate the effect of this parameter on the presence, duration, structure and intensity of the rainbands produced.