



The sensitivity of banded frontal clouds to deformation strain in idealised modelling experiments

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Multi-layered or banded clouds associated with multiple mesoscale circulations and slantwise convection are often found in frontal systems at extratropical latitudes. Observations have revealed the large spectrum of such circulations that exist in the atmosphere which range from single bands to multiple bands with spacings anywhere between 20 and 100 km. A clear understanding of the mechanisms controlling their evolution, dynamics and spatial distribution is crucial for accurate flood forecasting. However, the sensitivity of the nature, formation and maintenance of these bands to aspects such as the frontogenetic forcing and convective instability is not well understood.

Slantwise circulations have been simulated by applying a deformation strain field to a front in the idealised version of the operational (U.K.) Met Office forecast model. The circulations occur due to inertial adjustment following line convection (known as Delta-M adjustment). The number and strength of the circulations are found to be sensitive to the strength of the deformation field.