DETERMINING THE UNDERLYING STRUCTURES IN MODELLED OROGRAPHIC FLOW

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Abstract: The principal airfield in the Falkland Islands, South Atlantic, is Mount Pleasant Airfield (MPA), situated a few kilometres to the South of a substantial mountain range. The aviation operations at MPA can be severely restricted when the wind is Northerly, due to severe turbulence and rotor streaming events associated with the mountains to the North. In this study modelled atmospheric flows around MPA are analysed to determine their underlying structure. The model used was 3DVOM, a fully three-dimensional, linear model, employing terrain-following coordinates and a boundary layer scheme (with turbulence parametrised by a mixing length approach). An extensive series of 3DVOM runs was undertaken, initialised with radiosonde ascents made at MPA in 2000-2001. The surface pressure fields, and vertical velocities at mountain-top level, were subjected to a principal components analysis (PCA) which yielded several dominant modes of variability, which can be given physically meaningful interpretations. The vertical profiles of temperature used to initialise these model runs were also subject to a separate PCA; this reveals the underlying structures in the atmospheric stratification. The dominant modes from these two PC analyses will be discussed and compared to establish the relationship between the vertical temperature profile and the modelled response.