



Objectively classifying Southern Hemisphere extratropical cyclones

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There has been a long tradition in attempting to separate extratropical cyclones into different classes depending on their cloud signatures, airflows, synoptic precursors, or upper-level flow features. Depending on these features, the cyclones may have different impacts, for example in their precipitation intensity. It is important, therefore, to understand how the distribution of different cyclone classes may change in the future. Many of the previous classifications have been performed manually. In order to be able to evaluate climate models and understand how extratropical cyclones might change in the future, we need to be able to use an automated method to classify cyclones.

Extratropical cyclones have been identified in the Southern Hemisphere from the ERA-Interim reanalysis dataset with a commonly used identification and tracking algorithm that employs 850 hPa relative vorticity. A clustering method applied to large-scale fields from ERA-Interim at the time of cyclone genesis (when the cyclone is first detected), has been used to objectively classify identified cyclones. The results are compared to the manual classification of Sinclair and Revell (2000) and the four objectively identified classes shown in this presentation are found to match well. The relative importance of diabatic heating in the clusters is investigated, as well as the differing precipitation characteristics. The success of the objective classification shows its utility in climate model evaluation and climate change studies.