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The predictability of weather regime transitions in the ensemble forecasts.

Thomas Frame (1,2), John Methven (1), Suzanne Gray (1), and Maarten Ambaum (1)
(1) The University of Reading, meteorology, Reading, United Kingdom (T.H.A.Frame@Reading.ac.uk), (2) NCAS-Weather

The existence of weather regimes has long been invoked to explain the observation that weather conditions seem to persist longer than the passage of individual weather systems. Regimes are typically characterised by large scale flow patterns which persist for timescales on the order of a week or more, and begin and end abruptly on timescales on the order of a day or two. It is speculated that such behaviour is linked to the non-linearity of the dynamical equations , and is analogous to that observed in low dimensional non-linear systems (e.g. the Lorenz equations), although the connection between the two remains somewhat ambiguous. In medium range weather forecasting, ensembles are used to account for the effects of non-linearity on the forecast accuracy. Ensemble forecasting systems should therefore make skillful predictions of regime transitions.

The work to be presented forms part of an investigation into the predictability of regime transitions in medium range ensemble forecasting. The TIGGE database is used to assess the extent to which ensemble forecasts are able to predict shifts in the North Atlantic eddy-driven jet, and under what circumstance these shifts are more or less predictable. Clustering techniques are used to define "objective measure of belonging" to a particular jet regime. The skill of the ensemble forecasting system in predicting the transitions between regimes is then assessed. It is found that there is sufficient information in the forecasts to identify jet regime transitions five days in advance, with some predictive ability out to ten days. The extent to which these jet regime transitions imply multi-modal probability distributions for other predicted variables is assessed.