Successful tracking of cyclonic features at 50km resolution

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Most operational global numerical models nowadays have a resolution of 25 to 50km, and indeed the resolution of many global ensemble systems is near to or within this range. One of the motivations for running at higher resolution is successful representation of some of the smaller scale cyclonic features, such as frontal waves, polar lows, and indeed smaller cyclonic windstorms. Successful identification and tracking of these features, to provide useful post-processed output for forecasters, requires algorithms that can work successfully at this resolution. In most of the existing literature input data is taken at a resolution of order hundreds of km, because higher resolution causes problems for the respective algorithms.

This talk will thus describe how a relatively new set of algorithms, developed over the last 10 years or so, is well-suited to the task of tracking at high resolution, and indeed has gone on to be used in conjunction with operational ensembles at both the Met Office and ECMWF to provide forecasters with real-time tracking-related products of various types. The specifics of the new approach that make it particularly amenable to use at high resolution will be discussed. The output made available to forecasters will also be illustrated using severe weather cases.

Though use with climate change scenario runs has hitherto been limited, the present algorithm set is also very well-suited to application in this field - for example with regional runs. This will be especially useful for policy makers in helping resolve some of the hitherto contradictory signals regarding increased or decreased mid-latitude storminess seen when other pre-existing algorithms are applied to the same dataset. The presentation will also discuss some of these issues, in the context of the 'IMILAST' storm tracking intercomparison project.

Reference will also be made to some verification issues - both to check the integrity of the algorithms (using a subjective 'truth') and to measure forecast skill (using automated tracking in model analyses as 'truth').