



## A 3-dimensional composite study of cyclone structure and evolution

Helen Dacre and Marc Stringer

University of Reading, Department of Meteorology, Reading, United Kingdom ([h.f.dacre@reading.ac.uk](mailto:h.f.dacre@reading.ac.uk))

Cyclones generated in the east Atlantic have a large impact on the day-to-day weather in western Europe through their associated wind and precipitation patterns. They often develop rapidly and are small in scale, making them difficult to forecast. At present factors controlling the development of these cyclones are not well understood although there is some evidence that latent heat release may be more important for the genesis of these cyclones than for those generated in the west Atlantic. Furthermore, there is evidence to suggest that the number and intensity of east Atlantic cyclones may increase in the future and that the role of latent heating may play a more important role.

The composite structures of evolving extratropical cyclones have been created by combining a database containing cyclone tracks from ERA-Interim with the full 3D ERA-Interim reanalysis fields. Vertical and horizontal composites of cyclone structure for cyclones generated in the west and east Atlantic have been compared. For west Atlantic cyclones, the circulation is initially strongest at low-levels as a result of strong thermal advection, whereas for east Atlantic cyclones, the circulation is initially strongest at upper-levels as a result of strong vorticity advection. This suggests that the mechanism responsible for the development of west and east Atlantic cyclones is different. Results assessing the impact of latent heat release on the development of west and east Atlantic cyclones will be presented.