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The role of increasing vertical resolution on the detection and attribution of North Atlantic storms

Erin Walker¹, Daniel Mitchell¹, William Seviour¹, Paul Valdes¹, and Mat Collins²

¹University of Bristol, School of Geographical Sciences, United Kingdom of Great Britain and Northern Ireland

²University of Exeter, Mathematics, United Kingdom of Great Britain and Northern Ireland

Accurately determining extratropical cyclone paths is key in determining regional impacts associated with precipitation and wind. It is known that the stratosphere plays an important role in atmospheric dynamics and can extend its influence down to the surface. Despite this, many attribution studies have not included a stratosphere in their experiments. We believe that not considering the stratosphere could affect the results of these experiments, so the role it has on North Atlantic storm tracks is analysed using an idealised, atmospheric only model named Isca. With the aim of identifying clear implications of including the stratosphere in storm track analysis in the North Atlantic basin, a large ensemble formed of 4 separate experiments is set up for the winter of 2013/2014. The four experiments are as follows; 1) no vertical layers in the stratosphere, 2) vertical levels extended to the upper stratosphere, 3) doubling of vertical levels throughout the atmosphere, and finally, 4) an increase of vertical levels at the tropopause. We expect that including the stratosphere, in addition to increasing vertical resolution, will help improve model representation of storm tracks and their intensities during the 2013/2014 winter. The results of this study hope to highlight how the inclusion of the stratosphere and increased vertical resolution can lead to the improvement in modelling storm track statistics, which in turn will help to make more reliable attribution statements in the future.