



Impacts of Increased Vertical Resolution in the Met Office UK Model

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As computing resources increase, NWP models continue to move to finer grid resolutions in order to improve the representation of small scale atmospheric processes. While improvements resulting from increasing horizontal resolution are often obviously linked to the better orographic representation and finer scale land use data, the benefits seen from an increased vertical resolution can be more subtle and the underlying mechanisms complex to understand.

Increasing the number of vertical levels from 70 to 120, we performed a number of case studies with the Met Office's 1.5km horizontal resolution UK model (UKV). Statistical analyses show a slight, but systematic decrease in low rain rates and high-level cloud amount. The most significant impact can be seen in the representation of widespread low-level cloud. While there is little change to cloud top heights, the cloud base lifts in runs with the new vertical level set. The resulting thinned cloud layers are more prone to break up, offering a better agreement with low cloud cover seen in satellite imagery. Ongoing work aims to fully understand the mechanisms leading to the changes in the vertical humidity distribution and the enhanced decoupling seen within the boundary layer.