



## **Effect of Horizontal Resolution on the Representation of Tropical Convection and Transport to the Tropical Tropopause Layer in Global and Mesoscale Models.**

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The composition of air in the Upper Troposphere-Lower Stratosphere (UTLS) region is strongly influenced by the transport of atmospheric constituents across the Tropical Tropopause Layer (TTL). Convection and large scale processes both contribute to vertical transport; however while large scale transport is generally well represented in global models, convection occurs at spatial scales which are too small for models to resolve and therefore convective transport is usually parametrised.

In this work we investigate the ability of models with parametrised convective schemes to represent deep tropical convection and the associated vertical transport to the TTL and above. Global and mesoscale simulations using the Met Office Unified Model (UM), were performed at a variety of horizontal resolutions ranging from  $\sim 60$ km (for the global model) down to a convective-permitting resolution of  $\sim 1$ km (centred on the Tiwi Islands, North Australia). A demonstrative strong tropical storm on the 30<sup>th</sup> of November 2005 (with peak heights of  $\sim 19$  km) has been selected for this study. The characteristic features of this particular convective system are well documented as part of the ACTIVE and SCOUT-O3 tropical field campaigns, which took place in Nov-Dec 2005.

Results from the different model resolutions are analysed and additionally compared with satellite and campaign data.