

WRF Modelling of ozone transport over the West Pacific Warm Pool

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The CAST campaign, along with sister campaigns CONTRAST and ATTREX, was an aircraft and field campaign based in Guam and Manus Island, Papua New Guinea between January and March 2014. The field campaign in Manus Island consisted of ground measurements and ozonesonde launches. One of the observations from the ozonesonde data was a low-ozone event in the tropical tropopause layer on 21 – 23 February, which was traced to the outflow from a marine convective system that pumped ozone-deficient air into the tropopause region. This air was advected by an easterly jet over Manus Island, where it was measured by the ozonesondes.

This low-ozone event has prompted further investigation using the Weather Research and Forecasting (WRF) model. The model has been run for the period between 17 – 23 February to investigate its ability to reproduce the conditions that produced the low-ozone event. The model output was compared with the ground measurements and ozonesonde measurements from Manus, and tracers were used to understand how efficient the convective systems are at lifting air from the surface or lower troposphere into the tropopause. Furthermore, the sensitivity of particular physics options to the experiment was investigated. Future work will be focused on finding other instances of the low-ozone phenomenon in the tropopause layer in order to determine their typical frequency, size and longevity.