Overshooting convection is known to affect the thermal structure, chemical composition and the humidity of the tropical tropopause layer (TTL). Yet, the extent to which it influences those characteristics relative to other transport processes hasn't been entirely reconciled. Appropriate measurements of deep convection that penetrate the TTL are therefore important in helping to constrain this degree of influence as some of these storms have been observed to reach into the lower stratosphere (~19 km). Ground-based radar, with its relatively rapid scanning, has the potential to quantify the statistics of convection overshooting the TTL, including its frequency of occurrence and depth. However, the veracity of these statistics are affected by uncertainties associated with the observing platform itself and the imposed scanning strategy, which can significantly influence the degree of observability of the TTL region.

In this study, results from high-resolution Weather Research and Forecasting (WRF) model simulations of convection during the Tropical Warm Pool International Cloud Experiment (TWP-ICE, Darwin 2006) are sampled using an algorithm designed to mimic the scanning strategy and observational constraints of the C-POL radar in Darwin. This idealized approach, akin to a simple observing system simulation experiment (OSSE), is used to assess the observability of convection overshooting the TTL. Two different scanning strategies are explored and their usefulness in detecting overshooting events in the TTL will be discussed.

The statistics of reflectivity and echo-top heights derived from these 'synthetic radar' observations of the TTL are also used to quantify the uncertainties associated with those results obtained from actual radar measurements of overshooting events made during the campaign.