The TWPICE campaign centred on Darwin (12°S, 131°E) in northern Australia in January-February 2006 provided an opportunity to study gravity wave generation by convection and the associated wave propagation and momentum transport. The project used a variety of radars to study the spatial and temporal variability of rainfall and the associated latent heat release during large convective storms. A high-resolution numerical model utilized the latent heat release to compute the spatial and geographic variation of gravity wave generation and propagation into the lower stratosphere. Gravity wave ray-tracing techniques were then used to estimate the wave flux penetrating to heights near 90 km, where the results were compared with direct measurements made using a meteor radar. An analysis of meteor radar (MR) detection techniques is used to assess the reliability of wave fluxes derived from MR observations. It is shown that, provided the meteor rates are high enough, wave energies can be reliably measured. This result is used to ‘calibrate’ the indirect fluxes from the model, including momentum fluxes and the associated wave drag. It is shown that wave fluxes have a high degree of temporal variability, with consequent variability in momentum flux deposition and wave drag. A number of events are studied in detail. Outcomes can be used to help constrain gravity wave parameterization schemes.