

# Application of Geodesy for Meteorological Multi-Instrument Campaigns

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Here we present the methodology for the application of geodesy in the collocation of observations made between meteorological radars and atmospheric research aircraft and balloon-based platforms. The case studies used in this study are from two campaigns: PICASSO (Parameterising Ice Clouds using Airborne obServationS and triple-frequency dOppler radar) project based in the south of England and CONCIRO (CONvection, CIRrus and tropical Tropopause layer over the Indian Ocean) based at the Maito Observatory in La Reunion. Previous methods have relied on statistics to make up for observations that are not collocated, which gives rise to further uncertainties. This analysis showcases how geodesy can be implemented prior to observations and during post analysis to provide the best observations, improving collocation by a factor of  $10^2$ .

Keywords: Geodesics, Precision Uncertainty, Collocation, High-Resolution, Observations, Software Package

