Observing System Simulation Experiment for a Multi-Angle Polarimeter
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Aerosols, Clouds, Convection, and Precipitation (A-CCP) Decadal Survey Mission Study
The 2017-2027 Decadal Survey for Earth Science and Applications from Space (ESAS 2017) laid out several high priority objectives that led to the inclusion of Aerosols (A) and Cloud, Convection and Precipitation (CCP) as Designated Observables (DO).

The A-CCP mission study was formed to define objectives for an A-CCP observing system, the desired capabilities associated with these observables, and observing system approaches to achieve them.

This poster shows an evaluation of a multi-angle polarimeter with respect to the desired capabilities needed to address the Aerosol science objectives determined by the A-CCP Mission Study.

The GEOS-5 Nature Run (G5NR)

OSSE Methodology
Figure 2 below shows the OSSE methodology used for a polar orbiting multi-angle polarimeter. First, surface and atmosphere properties are sampled along the orbit from the G5NR and MODIS land surface datasets. This provides the “ground truth” with which to compare the retrieved parameters. The VLIDORT radiative transfer model is used to generate synthetic observations of TOA I, Q, & U, which are fed into GRASP.

Results (Preliminary)
Figure 3 below shows a relative assessment of expected aerosol property retrieval accuracies for simulated observations over a dark surface. The box plots depict the distribution of retrieval errors normalized by the A-CCP target uncertainties for the corresponding variables. This result is for one candidate polarimeter configuration; the system is easily extensible to other instruments and analysis will continue for other surface types.