Nicholas
Jones
CU/LASP
Ed Thiemann,CU/LASP
Robert Sewell, CU/LASP
Katelynn Greer, CU/LASP
Poster
The OWLS instrument is a LASP-designed and built solar occultation instrument package that will resolve outstanding questions regarding the role of gravity waves in Earth’s thermosphere. Modelling groups have reached different conclusions on the degree of cooling induced by gravity wave dissipation in the thermosphere. OWLS will resolve this discrepancy by measuring gravity wave potential energy in the Mesosphere-Lower Thermosphere region and testing if this is correlated with an increase or decrease in thermospheric temperature. To better isolate the change in temperature associated with gravity wave activity, we must also measure and remove variability from planetary waves and tides that will be present in the dataset. Planetary waves and tides are perturbations in density and temperature acting on the background thermosphere. Solar asynchronous tides, to which solar occultations are sensitive, form a significant portion of thermospheric variability to which low Earth orbiting spacecraft are exposed. Characterizing these tides therefore becomes important beyond the specific science application of OWLS. Here, we present our work simulating planetary wave and tide parameter retrievals from the thermosphere, with the goal of assessing how orbit selection influences our ability to accurately retrieve the amplitude and phase of wave features. We consider a selection of Sun-synchronous orbits at different local times of the ascending node as the primary representatives of the OWLS orbit. We further augment our study to include the ISS orbit and select orbits of commercial constellations to provide insight into other possible deployments of solar occultation sensors.
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14
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