PACE Applications

Air Quality
Particulate Matter Concentration

How do we monitor air quality in regions where there are no ground measurements of **particulate matter concentration** (PM)?

Who Cares and Why?

Particulate matter (surface-level aerosols) are a major global cause of death and disease and are responsible for ~3.2 million deaths per year. It has been shown that small particles are especially harmful since they can penetrate deeper into the lung, and sometimes into the bloodstream. Children, elderly, and individuals with pre-existing heart/lung conditions are most at risk for adverse effects of particle pollution exposure.

In regions lacking ground measurements of PM, international and federal agencies like the Environmental Protection Agency (EPA) have limited knowledge of the extent of air pollution. An absence of proper air quality advisories places public health at serious risk of exposure. Satellite measurements of aerosol optical depth can be used to estimate PM, which can then inform public air quality advisories.

The NASA Reponse

HARP-2 & SPEXone

* *Multi-angle polarimeters*
* *440, 550, 670, 870 nm (HARP-2)*
* *386-770 nm (2-4 nm steps; SPEXone)*
* *3 km; 2.5 km at nadir*

PACE's two polarimeters will complement existing ground-based measurements, resulting in enhanced accuracy, and improved spatial coverage, of predicted PM levels.

PACE Ocean Color Instrument (OCI)

* *5 nm hyperspectral resolution*
* *UV (345 nm)- SWIR (2260 nm)*
* *1-2 day overpass*
* *1 km at nadir*

PACE OCI will provide measurements of total column aerosol amount. When combined with other data from instruments such as lidars, dropsondes or trajectory and chemical transport models we can better predict the impacts of air quality on human health.