

NOAA Global Monitoring Division HIAPER Pole-to-Pole Observations (HIPPO) Data Past and Future: Transport and Chemistry in the Troposphere

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During the three-year National Science Foundation-sponsored HIPPO and START-08 campaigns, the NOAA Earth System Research Laboratory (ESRL) Global Monitoring Division maintained and took data from three basic instruments: 1) The NOAA Whole Air Sampler, 2) the Unmanned Aircraft System Chromatograph for Atmospheric Trace Species, and 3) the PAN and other Trace Hydrohalocarbon Experiment. In this presentation we highlight this data set. The vertical and temporal coverage provided by ten Pole-to-Pole transits over the Pacific is unique to the HIPPO data set. The measured trace gases within this data set have lifetimes that span the time scales of transport within and across the boundary layer, free troposphere, and stratosphere. Within each of these regions, multiple trace gases were measured with either their major source or sink being contained within that region. Vertical and horizontal gradients are evident in the data that are consistent with variances in the source and sink regions, coupled with the dominant transport features such as inter-hemispheric exchange, upwelling and mixing, boundary layer trapping, stratospheric down welling and intrusions, and transport of polluted air. This HIPPO Project focused on longer lived trace gas measurements. The new NASA proposed (HIPPO like) Airport detection and Tracking Of dangerous Materials by passive and active sensors arrays (ATOM) Project can add substantial new information on the shorter-lived chemistry driven picture in the troposphere.

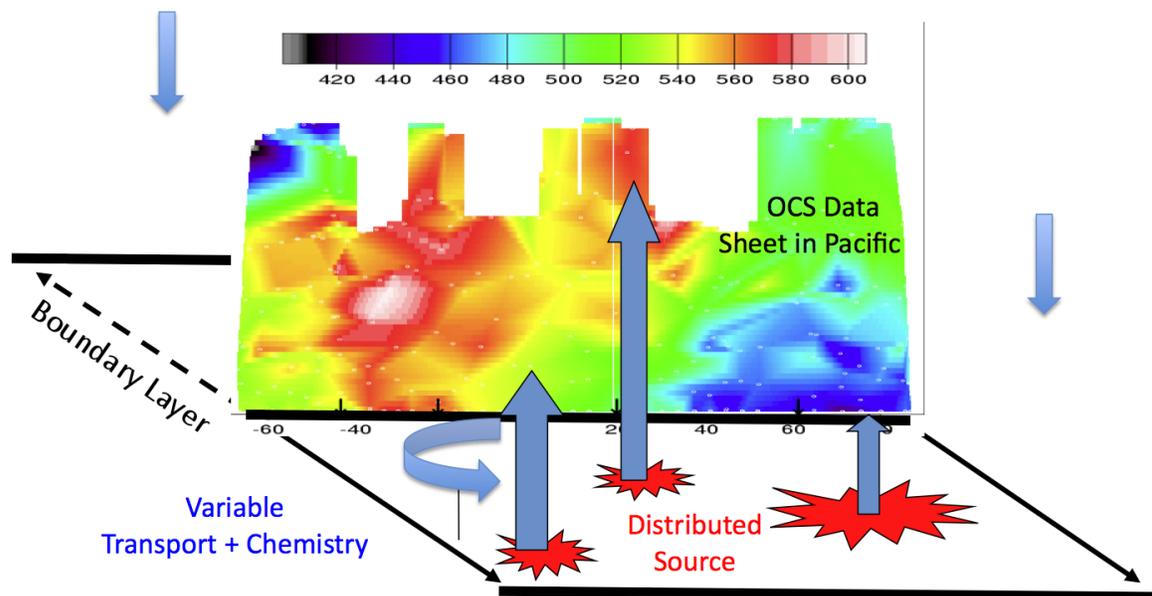


Figure 1. The challenge: Boundary layer source regions are distributed and in most cases uncertain. These sources are then coupled to the free troposphere with highly variable transport, and in many cases are acted upon with variable chemistry. This data set contains good latitudinal, vertical and seasonal coverage in the troposphere. Unfortunately there is little longitudinal coverage. The data is acquired only on a sheet (curtain) down the Pacific, which adds to the challenge.