The DISCOVER-AQ (Deriving Information on Surface Conditions from Column and Vertically Resolved Observations Relevant to Air Quality) mission conducted its second field deployment in the California San Joaquin Valley region during January and February 2013. The mission’s overarching goal is to better understand how remotely sensed column measurements can be used to diagnose near-surface air quality. To achieve this objective, the DISCOVER-AQ sampling strategy requires extensive probing of the vertical structure of the lower troposphere as it relates to both trace gases and aerosols. This strategy was implemented by using the NASA P-3B aircraft to perform three circuits of spirals from 0.3 to ~3 km over 6 air quality monitoring ground sites at three different times of the day (mid-morning, midday, and mid-afternoon local time). In addition, missed approach maneuvers were performed at 7 airports along the flight path (5 of which were located near profile sites), which provided profile data from as low as 25 m up through the 0.3 km bottom limit of the spirals. A total of 170 spirals and 157 missed approaches were flown, which generated detailed vertical distributions for a large variety of trace gases, aerosol properties, and meteorological variables.

**Identification of BLHTs**

- BLHT assessment was based on the P-3B aircraft observations, primarily of meteorological parameters.
- Primary criteria for BLHT identification include a sharp change from constant to increasing potential temperature (i.e. theta) with increasing height and a distinct trend change in temperature and relative humidity vertical profiles.
- If necessary, BLHTs were refined using vertical profiles of trace gas concentrations and aerosol properties.

**Goals of this poster**

- Identify evolution of the height of the boundary layer (BLHT) from day to day across the campaign.
- Evaluate variability and trends in boundary layer concentrations and vertical gradients of trace gas concentrations and aerosol parameters.

**Summary and Future Directions**

Future Investigations:
- Incorporate balloon-borne measurements from Huron and Porterville to refine current BLHTs and potentially to help identify additional BLHTs at those sites.
- Find the cause of the higher afternoon boundary layer heights later in the campaign, possibly through back-trajectory analysis, and analyze its effects on BL concentrations.
- Evaluate any trends in boundary layer height or vertical gradients among the six profile sites.

**Acknowledgments**

This research was funded by NASA’s Earth Venture-1 Program through the Earth Science Systems Pathfinder (ESSP) Program Office. We wish to thank the ESSP Program Office for their support. We also would like to thank the pilots and flight crew of the NASA P-3B through the NASA Wallops Flight Facility for their support and important contributions.