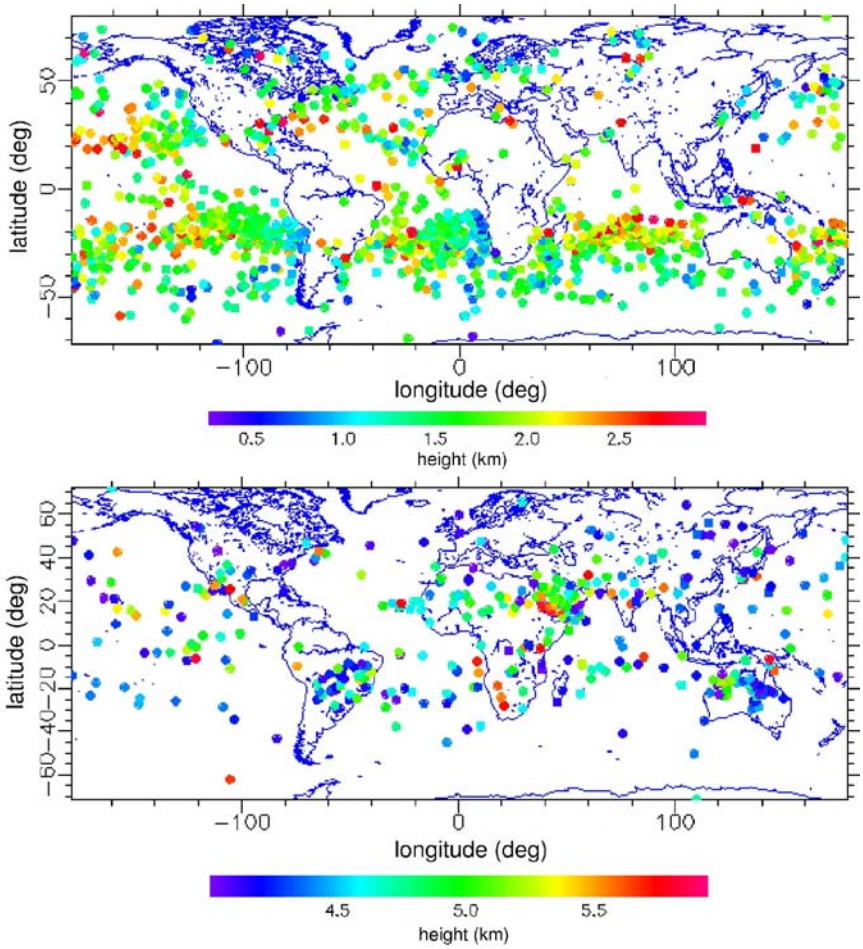
Determining heights of strong inversion layers (depth of the boundary layer) from COSMIC

For each COSMIC-retrieved profile the strongest inversion layer is estimated based on criterion: $|\Delta\alpha(\Delta\alpha/\Delta z)| = \max$, where $\Delta\alpha$ and Δz are the bending angle and the height lapses across the layer (Sokolovskiy et al., GRL, 34, L18802, doi:10.1029/2007GL030458, 2007).

The maximal bending angle lapse Δz and the median height of the layer z are included as scalar variables *balmax* and *zbalmax* in *atmPrf* files. They are also included in the database and available for users in the CDAAC Low Level Data Interface in the *cosmicrt_occt_atmprf* table.

By selecting occultations that meet different criteria i.e., by restricting $\Delta\alpha$ and z to specific intervals, it is possible to reveal different structures in global distribution of the inversion layers. In particular, over the oceans, within several kilometers above the sea level, the most strong inversion layer commonly corresponds to the top of the atmospheric boundary layer. An example of global distributions of strong inversion layers made by use of the CDAAC Low Level Data Interface is shown below.



Global distribution of COSMIC RO profiles in September 2006 showing (top) a sharp ABL top ($\Delta\alpha > 1.2\cdot10^{-2}$ rad, $z < 3$ km) and (bottom) elevated inversion layers ($\Delta\alpha > 6\cdot10^{-3}$ rad, 4 km $< z <$ 6 km). Color codes show the heights z of the inversion layers.