

The polar summer tropopause inversion layer observed by COSMIC

Bill Randel
NCAR

COSMIC GPS temperature profiles and radiosonde data reveal a strong and persistent inversion layer associated with the polar summer tropopause. This inversion layer is characterized by a temperature increase of ~ 8 K in the first few km above the tropopause, and is observed throughout summer polar latitudes in both hemispheres. We use the dense sampling of COSMIC to document observed characteristics of the inversion layer, including its seasonal variability and modulation by synoptic dynamic systems (cyclones and anticyclones). Based on radiative heating calculations, we propose that the inversion layer is a radiatively forced phenomenon, linked to enhanced water vapor near the tropopause during polar summer.