

Abstract #309058

Radiosonde Observation Representativeness for Air Dispersion Potential in Complex Terrain —Preliminary Findings

Anthony J. Sadar and Jason Maranche, Allegheny County Health Department, Pittsburgh, PA

Worst case dispersion conditions in the atmospheric boundary layer (ABL) usually involve times when temperature increases with height from the surface of the earth (i.e., a “temperature inversion”). During such times, mixing of the atmosphere is suppressed, allowing contaminants released into the air to remain concentrated. Measurement of temperature inversion conditions is important to characterizing dispersion potential in the lower portions of the ABL, and a radiosonde is the instrument used to make such measurements.

Radiosonde observations are made twice a day throughout much of the world to help interpret weather conditions in the upper atmosphere. Across the contiguous U.S., there are about 70 radiosonde balloon launch sites where measurements are made. However, is the density of this network sufficient to represent air dispersion potential, including the presence of temperature inversions, at locations far removed from the launch sites, especially in complex terrain? Furthermore, are measurements that are typically made only twice daily at 12-hour intervals adequate to represent dispersion potential throughout the remaining 22 hours of the day?

To help answer these questions, several years of data -- both morning (12Z, or 7 a.m. EST) and evening (00Z, or 7 p.m. EST) observations -- were examined from upper-air measurements made at the Pittsburgh (PIT) National Weather Service in Moon Township, Pennsylvania. Moon Township is located in the far western suburbs of Allegheny County. The county is an area containing much complex terrain. The goal of the analysis was to determine the representativeness of the PIT radiosonde sounding data to all of Allegheny County, portions of which are as far away from the measurement site as 50 km.

Preliminary findings of this investigation will be presented in this paper/poster.