Radon-222 observations for atmospheric transport, mixing and pollution studies: a review

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Abstract

Over the past century the simple source/sink mechanisms of Radon-222 (radon), and its 3.8-day half life, have led to its extensive use as a passive atmospheric tracer. This presentation will outline the main contemporary applications of radon in atmospheric research. Two of these applications – air mass transport, and vertical mixing in the lower atmosphere – will then be illustrated by four separate case studies: (1) Using radon to identify the geographical extent, strength and seasonal variability of land and oceanic emissions; (2) Using radon in pollution studies to improve the performance of clustering algorithms used for defining source regions; (3) Using hourly tower-based radon gradient observations to investigate mixing processes in the lower boundary layer and stable nocturnal boundary layer with changing atmospheric stability; and (4) Using vertical radon profile "snapshots" measured from light aircraft up to 4 km above ground level to contrast boundary layer entrainment rates between clear-sky, convective and stratiform cloud cases.