A Network of Radon Detectors at Ground Stations in East Asia

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Hourly observations of atmospheric radon concentration were made at three ground stations in East Asia as part of the network observations for the ACE-Asia program: Hok Tsui (Hong Kong Island, China; 22.12°N, 114.15°'E), Gosan (Jeju Island, Korea; 33.18°N, 126.09°E) and Sado (Sado Island, Japan; 38.25°N, 138.4°E). These locations were chosen to span the latitudinal band within which most of the low level Asian continental outflow events to the Pacific occur (20-40°N), and coincide with ACE-Asia network sites and locations where campaign-style observations were made. Measurements at the Hok Tsui and Gosan sites commenced January 2001, and those at Sado commenced September 2001. These observations are presently ongoing with equipment recall foreseen after a minimum of 3-4 years of continuous data. This data set is already unique with respect to its spatial and temporal coverage and is well suited to air-mass characterization of a region that is a globally significant source of natural and anthropogenic pollution. These observations of low-level continental outflow events to the Pacific compliment simultaneous observations being made at the Mauna Loa Observatory (MLO) of upper-level outflow events across the Pacific. We derived fetch regions responsible for the greatest and least terrestrial influence using the radon observations and trajectory analysis. Figure 1 shows examples of seasonal radon-derived fetch regions. In this case, back trajectories corresponding to radon concentrations greater than (less than) the 90th (10th) percentile seasonal value point to areas where air masses experienced the greatest (least) terrestrial influence. These analyses indicate air masses arriving at the East Asian sites that have experienced the greatest terrestrial influence originating in Siberia and northeast China. These origins are distinct from those air masses arriving at MLO that have experienced the greatest terrestrial influence (central China). Also, we present some preliminary comparisons of observations with results from the regional Chemical Transport Model CFORS also made on several time scales.

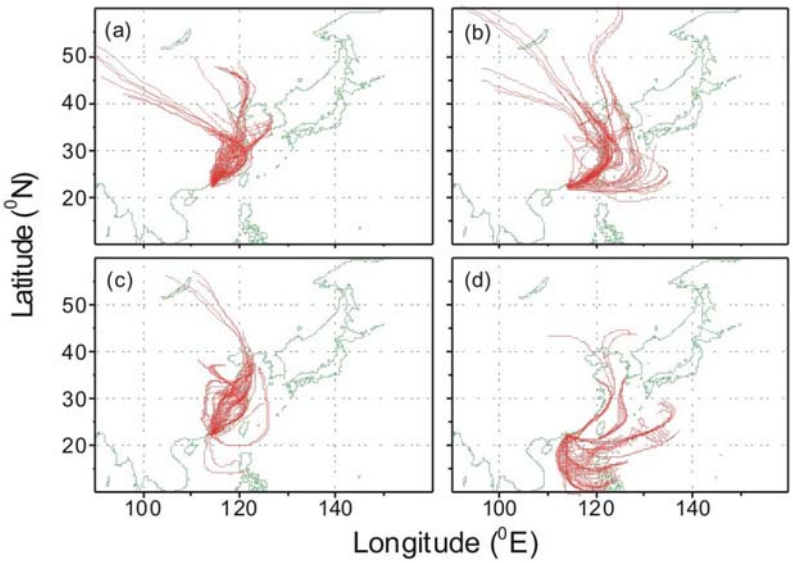

Figure 1. Five-day back trajectories from Hok Tsui of air masses with radon concentrations (a) above the winter 90th percentile value, (b) below the winter 10th percentile value, (c) above the spring 90th percentile value, and (d) below the spring 10th percentile value.