

The Radon Measurement Programs at Cape Grim, Mauna Loa, and other Global Atmospheric Monitoring Sites

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Measurement of radon-222 at international monitoring sites aids in the interpretation of changes in atmospheric composition, tracking of movements in greenhouse gases and other trace species, and the evaluation of regional and global transport models. As radon provides an unambiguous indication of the degree of recent terrestrial influences on an air mass, it is an ideal tracer for a range of applications at baseline, high-elevation, and remote stations such as the Cape Grim Baseline Air Pollution Station (CGBAPS) in Tasmania. The Cape Grim Radon Program, operated jointly by the Australian Nuclear Science and Technology Organisation (ANSTO) and the Australian Bureau of Meteorology, is one of the premier atmospheric radon monitoring programs worldwide. The dual-flow-loop, two-filter detector design pioneered by ANSTO scientists is recognized within the WMO Global Atmosphere Watch (WMO-GAW) community as providing the international benchmark in radon monitoring for global and regional atmospheric composition studies, and the detectors used at CGBAPS are specifically designed to meet stringent requirements for accuracy and reliability at this demanding location.

ANSTO's radon group extends its contribution to WMO-GAW science by participating in other GAW-related observational programs. By forming and maintaining partnerships with leading international players such as Earth System Research Laboratory Global Monitoring Division (ESRL/GMD), we have been able to collaboratively operate a number of long-term radon measurement programs at other major stations in the WMO-GAW network. As a result of such arrangements, multi-year radon data sets are available from the Mauna Loa Observatory in Hawaii (ESRL/GMD), Cape Point in South Africa (SAWS), Gosan in Korea (Jeju Uni), and Jungfraujoch in the Swiss Alps (Uni Basel). In recent years, there has also been an effort to "fill gaps" in the coverage of radon observations in data-poor regions of the Southern Hemisphere, by establishing new measurement programs at existing and newly-established GAW stations. Collaborations with the Australian Antarctic Division, Commonwealth Scientific and Industrial Research Organisation (CSIRO), and the Korean Polar Research Institute have led to the establishment of radon programs at Macquarie Island, aboard the *RV Investigator*, and two sites on the Antarctic coastline.

The ongoing fruitful relationships between ANSTO and its many partners within the WMO-GAW community have enabled the development of new applications for radon in the atmospheric sciences, and allowed participation in a large number of productive collaborative research studies using radon data from Cape Grim, Mauna Loa, and other GAW-related stations.

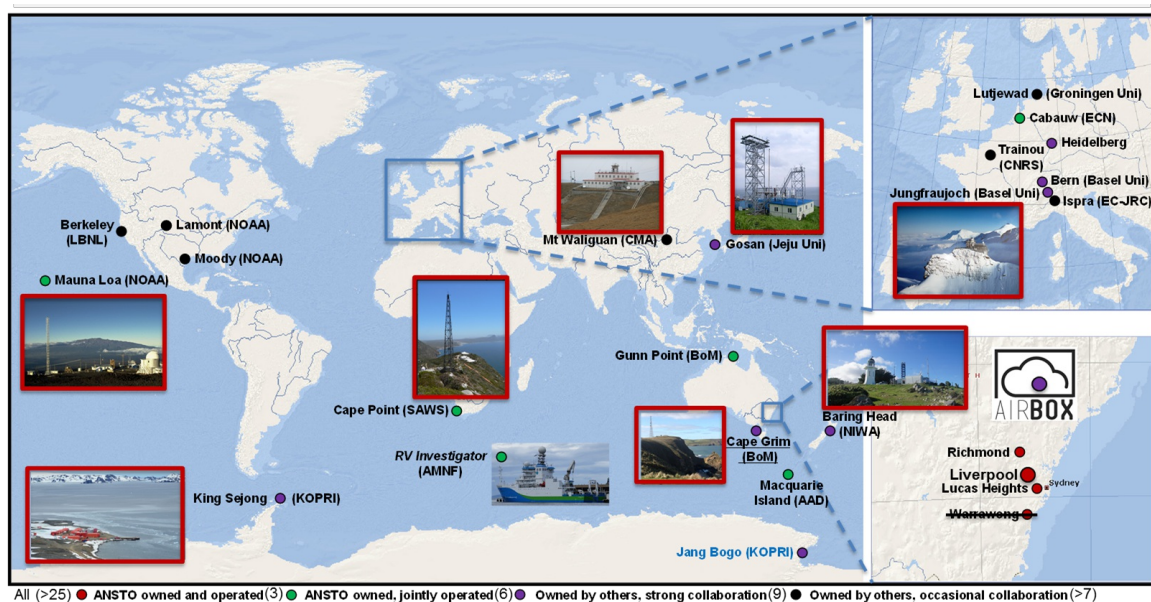


Figure 1. Global network of ANSTO-built dual-flow-loop two-filter radon detectors. WMO-GAW baseline stations are indicated by photos with red borders.