



Atmospheric transport pathways to Antarctica and the remote Southern Ocean

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The atmospheric transport of pollutants or nutrients to coastal regions of Antarctica and the remote Southern Ocean is a matter of interdisciplinary interest. This can happen directly, as a result of synoptic transport within the marine boundary layer, or indirectly, as a result of subsiding tropospheric air that has experienced recent continental influences (e.g., through convection or frontal uplift). The gradually expanding international network of continuous atmospheric Radon-222 monitors in Antarctica and the Southern Ocean not only facilitates the characterisation of baseline (“clean”) air masses in these regions, but also enables the identification and quantification of recent (<3-weeks) terrestrial influences on non-baseline air masses. Furthermore, a simple technique was recently developed that enables a clear distinction to be made between long-term oceanic air masses and subsiding (recently-tropospheric) air masses at coastal Antarctic sites for their separate characterisation (Chambers et al. 2017, *JGR-Atmos*, 122, <https://doi.org/10.1002/2017JD026833>). Based on hourly radon, meteorological, and atmospheric composition observations at several coastal Antarctic stations we demonstrate strong contrasts in the degree of terrestrial influence on tropospheric air overlying these sites in summer, and compare concentrations of selected atmospheric constituents between marine boundary layer and subsiding tropospheric air masses. Lastly, based on a similar suite of observations aboard the CSIRO Research Vessel Investigator, we characterise the combined influences of direct and indirect transport of recently terrestrially influenced air masses on the remote Southern Ocean.