THEME 4:
THE EARTH'S SURFACE:
Pollution, climate, anthropogenic effects

Session 4.64:
Radionuclides in the environment

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The flux of anthropogenic radionuclides to the environment has increased exponentially since the Manhattan project, 60 years ago. Thus, there is a vital need to understand and predict the consequences of anthropogenic contamination, relative to natural sources. At the same time, the very nature of both anthropogenic and natural radionuclides to decay, provides a valuable tool for determining time and space scales for key geo- and bio-geochemical processes. This session focuses on the processes that control radionuclide cycling and their consequences in natural and anthropogenic systems including: 1) Radionuclide speciation in water and atmosphere, including particulates and colloids and the role of biological processes in determining radionuclide mobility, oxidation state and degree of organic complexation; 2) Sources and sinks of radionuclides in the geosphere, including dissolution and sorption or incorporation into secondary phases; 3) Use of radiotracers for investigation of space and time scales in geo- and biogeochemical processes; 4) Geochemistry and geochronology of natural and anthropogenic archives; and 5) Geochemical controls on the dose to man and human health, relevant in population risk assessment and nuclear waste disposal safety.

4.64.11

Elements of the global Ocean Circulation inferred from the WOCE tritium and ^{14}C data sets

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The World Ocean Circulation Experiment (WOCE) provided the platform for collection of unprecedented tracer data sets including those for tritium (^{3}H) and radiocarbon (^{14}C). The several ten thousand data points obtained for the latter two isotopes allow us to map their 3-D distributions and to infer pathways of water masses in the global ocean, as well as first-order information on their mean residence times.

In this contribution we present and discuss elements of the WOCE tritium and ^{14}C data sets and discuss them in the context of deep and intermediate water formation and spreading, mean residence times of the deep and bottom waters in the main ocean basins, as well as interbasin exchange of water masses in the global ocean. Finally, we will discuss the utility of both tracers for calibration of OGCM's.