

O-buoy measurements of ozone, carbon dioxide and bromine oxide over frozen surface of Hudson Bay and Arctic Ocean

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Deployment of O-buoy 4
78.18139N and 112.06165W
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Greenhouse gases such as carbon dioxide and ozone affect climate by retaining heat near the earth's surface. Ozone is also the source of the main cleaning reagent of pollutants emitted and transported from middle latitudes to the Arctic atmosphere. Bromine monoxide presence leads to the destruction of ozone and the removal of elemental gaseous mercury from the Arctic air by transforming it into more reactive species that are subsequently deposited to snow and ice. Satellite measurements linked bromine monoxide areas to those of the first year sea ice. This indicates that bromine monoxide source is related to the increased sea salt concentration on the freezing sea ice surface. Conditions that lead to larger areas of melting ice and its refreezing over the Arctic might result in more extensive periods of ozone loss and mercury transformations. More data are required to improve our ability to forecast future developments and understand how they might impact the climate and human life. However, a vast area of Arctic Regions and in particular large water basins remain unexplored because of the difficulties imposed on researchers and equipment by the harsh Arctic environment. A novel approach is taken to monitor and study the chemical composition of the atmosphere over the Arctic Ocean. To that end a network of new buoys capable of continuous and long term observations of the atmospheric composition across the Arctic was initiated. O-buoy is new Arctic buoy, developed as part of the International Polar Year project "Ocean Atmosphere Sea Ice and Snow interactions in Polar regions" (OASIS) in collaboration with scientists from USA. It is an air sampling platform capable of measuring concentrations of carbon dioxide, ozone and bromine monoxide in the atmosphere over frozen Arctic Ocean surfaces, along with full set of meteorological parameters. A web camera provides snapshots of ice and sky conditions while a GPS device collect information on the drift of the surrounding ice. O-buoy is designed to operate at low temperatures on battery or solar radiation power in a fully automated way and to transfer data remotely by satellite communication to our laboratory. Two O-buoys owned by Environment Canada were deployed as part of this project in 2010. One of them measured the air composition over the ice of Hudson Bay at 60.12°N/90.70°W while the second one at 78.18°N /112.06°W. O-buoy collected meteorological data were provided to the World Meteorological Organization and along with the other information is available to the public on <http://obuoy.datatransport.org/monitor> within 24 hours. The data collected by all four O-buoys (owned by USA and Canada) are combined with those from coastal stations and they are under intensive analysis at the moment.