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# Snowpack Chemistry of Reactive Gases at Station Concordia, Antarctica

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During December 2012 a new experiment for the study of snow photochemical processes and surface gas exchange was installed at Dome Concordia, Antarctica. The experiment consists of two sampling manifolds ('snow tower') which facilitate the withdrawal of interstitial firn air from four depths in the snowpack and from above the surface. One of these snow towers can be shaded for investigation of the dependency of snow chemistry on solar radiation. A nearby 12 m meteorological tower facilitates above surface turbulence and trace gas gradient measurements. Temperature profiles and UV and IR light penetration are monitored in the snowpack. Air samples are directed through sampling lines to a nearby underground laboratory that houses the experiment control system and gas monitors. The system is fully automated, sampling gases from the array of inlet ports sequentially, and is intended to be operated continuously for a full annual cycle. The computerized control system can be accessed remotely for data retrieval and quality control and for configuring experimental details. Continuous gas measurements include ozone, nitrogen oxides, methane, carbon monoxide, and gaseous elemental mercury. Whole air samples were sampled on four occasions for volatile organic compound analysis. The objective of this research is the study of the year-round snowpack gas chemistry and its dependency on snowpack and above surface physical and environmental conditions. A particular emphasis will be the investigation of the effects of increased UV radiation during the occurrence of the stratospheric ozone hole. We will present the conceptual design of the experiment and data examples from the first three months of the experiment.