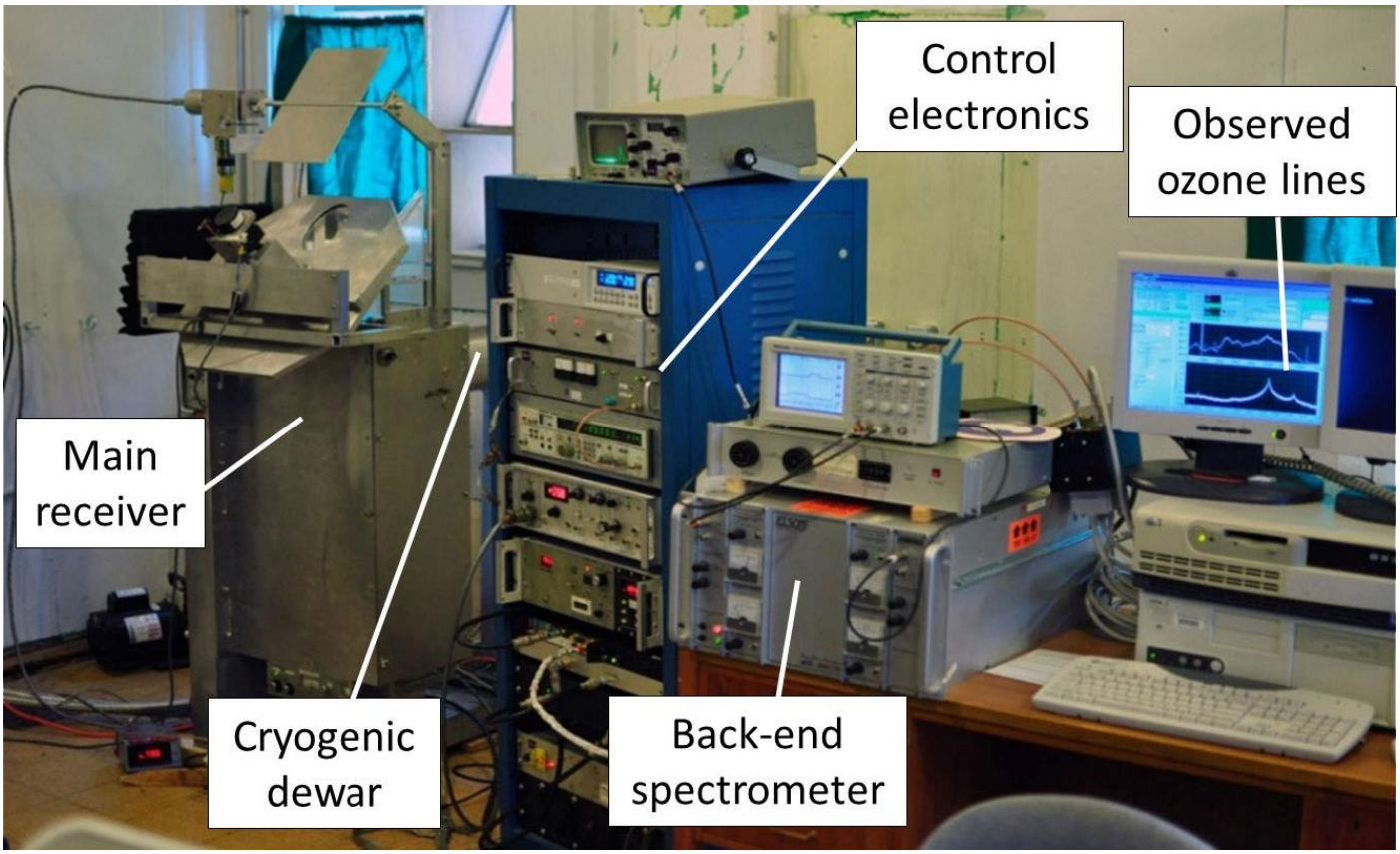
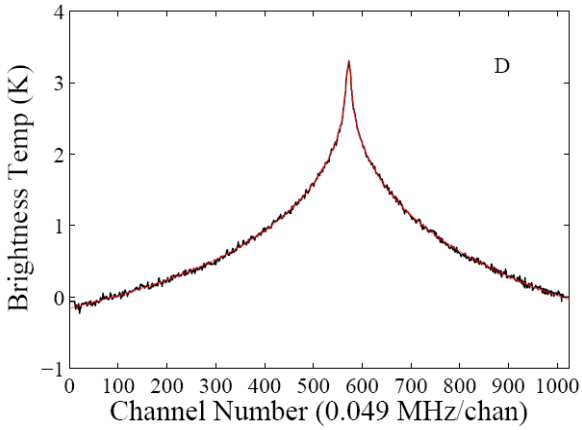
Ground-Based Millimeter-wave Spectrometer (GBMS)

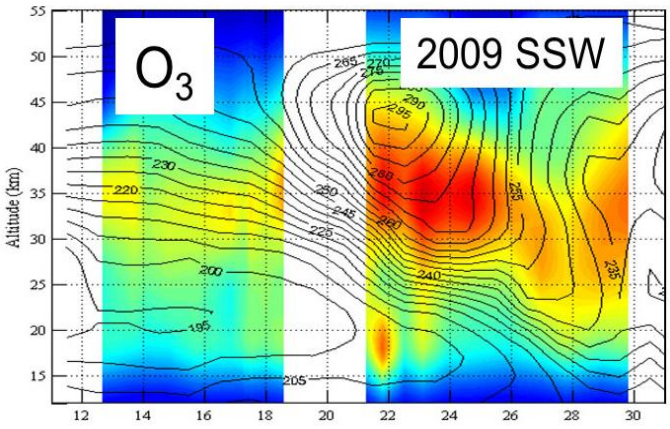



The GBMS measures stratospheric and mesospheric concentration vertical profiles of O3, CO, N2O and HNO3 during the Polar winter and spring seasons. These datasets are employed for studying chemical and physical stratospheric processes that are pivotal in the ozone seasonal cycle.

Vertical profiles are derived from measuring the spectral emission of the mentioned species with a passband of 500 MHz tunable in the 230-280 GHz frequency range. The pressure broadening characteristics of spectral lines allow us to estimate the vertical distribution of a specific compound by studying its spectral line shape.

The GBMS was custom-designed and built at the Stony Brook University (USA) and was installed at the Thule High Arctic Atmospheric Observatory (THAAO, http://www.thuleatmos-it.it/) in 2009 by the Italian INGV, which manages and operates the spectrometer since then.




Left: The O3 emission line at 269 GHz. Right: Time series of O3 concentration vertical profiles (in color) and temperature (solid black lines, from radiosonde and lidar data) from Jan 11 to Feb 1, 2009, when a large Sudden Stratospheric Warming (SSW) occurred in the Arctic stratosphere.

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