

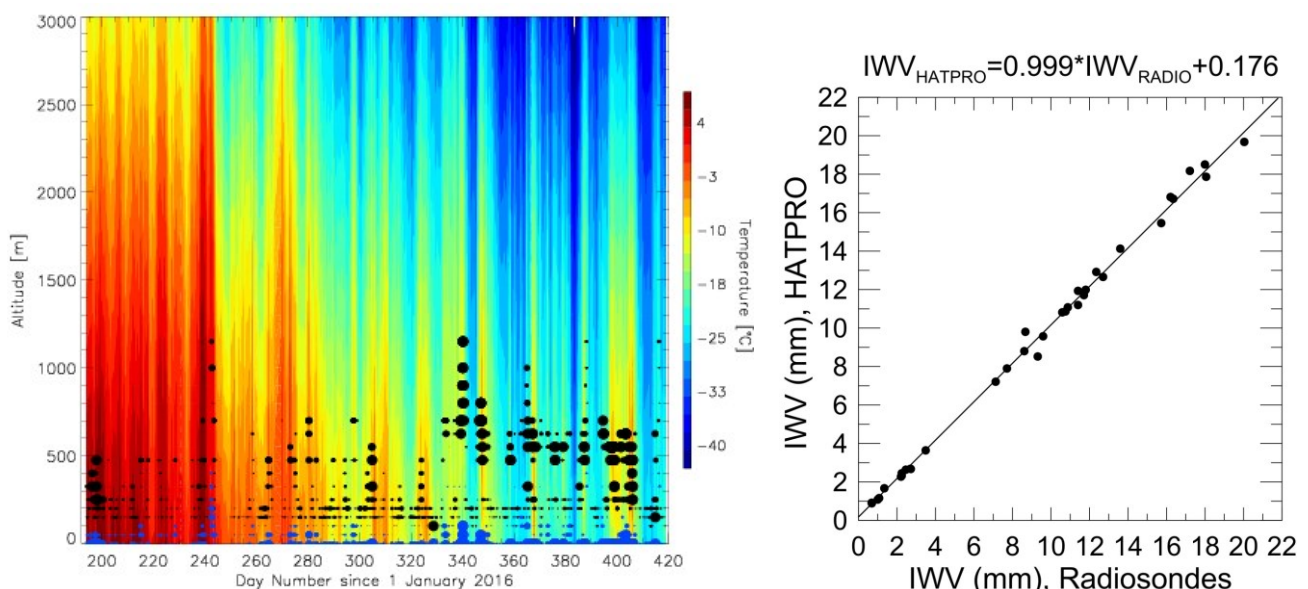
HATPRO microwave radiometer and Heitronics pyrometer



HATPRO microwave radiometer (left) and viewing port of the Heitronics pyrometer (right).

A RPG HATPRO-G2 microwave radiometer (MWR) was installed by ENEA during summer 2016, and has been operated since then in parallel with a Heitronics KT 19.85 II pyrometer. The MWR acquires radiation from the atmosphere looking at different angles in seven bands between 22 and 60 GHz. The pyrometer measures the radiation coming from the zenith in the spectral band 9.6-11.5 μm , in the infrared atmospheric window. Temperature vertical profiles are obtained almost continuously by combining the MWR signals from the different bands and at the different angles; in addition, the total water vapor column amount, and the cloud liquid water path are retrieved. The pyrometer provides information on the cloud occurrence and altitude.

These measurements are used to study the atmospheric vertical structure, and, together with the other observations made at THAOO, to assess the role of temperature inversions and clouds on the surface radiation budget and climate. The determination of these effects is particularly important in the fast changing Arctic climate.



Left: evolution of the temperature profile at THAOO between July 2016 and February 2017; black and blue dots indicate the altitude of temperature maxima and minima in case of temperature inversions; the dimension of the dots are proportional to the intensity of the inversion. Right: comparison between vertically integrated water vapor measured by MWR and by radiosondes at THAOO.

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