

## THE PLANETARY FOURIER SPECTROMETER RESULTS AT MARS

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PFS experiment on board MEX has now ( at the time of the conference ) been active for 1.5 Earth's year . It has acquired a number ( >150 000 ) of spectra at different latitudes longitudes and local times. Nadir pointing inertial and limb measurements have been performed allowing the achievements of numerous important results.

We shall discuss first a complete spectrum SW + LW to identify the spectral region of major interest. From the LW channel we derive the vertical temperature profile, the dust opacity at 10 microns, the soil temperature and the ice opacity. The temperature fields are used to compute thermal winds. Unusual temperature profiles and winds are observed over the big volcanoes where also often are observed water ice clouds.

Minor species results are : CO mixing ratios ( 900 – 1500 ppm ) with an average latitudinal variation ( larger concentrations on the northern winter polar region).

Water mixing ratios ( 10 precipitable microns) uniform and well mixed at 10-15 Km ( LW channel ) and non uniform with local enhancements ( up to 35- 40 precipitable microns ) in the boundary layer ( SW channel) . A correlation of these enhancements with the HEND Odyssey results points to the source of the underground permafrost.

As minor species in the atmosphere we have identified methane ( 11 +/- 2 ppbv ) . Formaldehyde has been measured to be at 130 +/- 50 ppbv . Both these gases seem to vary from place to place and they vary together . In practice Formaldehyde seems to be the oxydate state of methane . The possible source of these gases points to underground life.

Three acids have been identified in the martian atmosphere : HF – HCl – HBr they all have a mixing ratio of 150 – 200 ppbv .

Non LTE emissions in the upper Martian atmosphere are normally seen in Nadir pointing in the 4.3 microns band. In the limb measurements we see also CO and CO<sub>2</sub> ( and an isotopic CO<sub>2</sub> band) in emission at altitudes up to 180 Km. In other occasions we also see Oxygen produced by ozone breaking by UV emitting a number of lines ( up to 32 lines have been counted and their intensity has been measured ).

The dust opacity is measured at 3 different wavenumbers and therefore allows us to put constraints on its size distribution and mineralogic composition.

Polar cap ice composition studies fitting the measured spectra allow us to make important conclusions on the CO<sub>2</sub> grain size on the percentage of the water ice present and on the amount of dust revealed.