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Phoenix 07 MET Pressure Sensor: Instrument, Observations and Their Interpretation Using FMIs Mars Limited Area Model MLAM

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The Phoenix '07 Lander landed successfully in the Martian northern polar region on May 25, 2008. The mission is part of the National Aeronautics and Space Administration's (NASA's) Scout program. Its Canadian Meteorology experiment (MET) [1] was providing the first surface based observations of atmospheric pressure, temperature and wind as well as dust and ice particles in the Martian polar region above the polar circle.

The pressure observations were performed by an FMI instrument, based on micro machined Barocap capacitive pressure sensor heads manufactured by Vaisala Inc. Similar instruments have been used in several earlier missions (Mars-96, Mars Polar Lander, Beagle-2 and Huygens), Phoenix being the first successful landing on Mars. A similar instrument will be included in the Mars Science Laboratory '09 rover.

Pressure sensor technology, characteristics and data processing will be presented together with data of the first months on Mars.

The Mars Limited Area Model (MLAM) has been jointly developed by the Helsinki University and the Finnish Meteorological Institute to study mesoscale phenomena in the Martian Atmosphere [2]. It is based on the hydro-static dynamical core of the HIgh Resolution Limited Area Model (HIRLAM), an operational weather prediction model-analysis system used by several European countries. To support the Phoenix mission to high Martian latitudes, the model was optimized in its grid definition and the way carbon dioxide and water ice development is treated.

The MLAM based simulations were used to understand the conditions leading to the meteorological conditions as observed by Phoenix.

Initial comparisons of model runs for the actual landing location and season were in good agreement with the first pressure, temperature and wind data received from the instruments.

The results of more detailed studies will be presented, covering several months of data and conclusions drawn from the model comparisons.

References:
[1] Michelangeli, D.V., et al. (2006) Proc. of the 4th intern.conference on Mars polar science and exploration, pp 8014.
[2] Järvenoja, S., Kauhanen, J. and Savijärvi, H. (2003) HIRLAM Newsletter (43), 179-184