



## **Antarctic experience on a permafrost region to test REMS (Rover Environmental Monitoring Station-Mars Science laboratory) sensors**

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The present climatic characteristics of Mars induce the extensive presence of permafrost areas in this lonely planet. Therefore environmental parameters that are included in Martian rover missions are aimed for monitoring thermal characteristics and soil surface evolution in order to study the active layer thickness (probably very thin) and the energy balance between the soil-atmosphere boundary limit layer. These studies will be able to find out the actual thermodynamical state directly observed in the soil-atmosphere system which could be consistent with sporadic episodes of water liquid near the soil surface. In other hand, the knowledge of the UV incoming radiation onto soil level is necessary for facing the very important challenge of Mars habitability. The REMS (Rover Environmental Monitoring Station) is an environmental station designed by the Centro de Astrobiología (Spain) with the collaboration of national and international partners (CRISA/EADS, UPC and FMI), which is part of the payload of the MSL (Mars Science Laboratory) NASA mission to Mars (<http://mars.jpl.nasa.gov/msl/overview/>). This mission is expected to be launched in the final months of 2009, and mainly consists of a rover, with a complete set of scientific instruments; the rover will carry the biggest, most advanced suite of instruments for scientific studies ever sent to the Martian surface. Five sensors compose the REMS instrument: ground (GT-REMS) and air temperatures, wind speed and direction, pressure, humidity and ultraviolet radiation (UV-REMS). A simplified model of the REMS GT and UV sensors are part of the experiment deployed on Antarctica in the surround-

ings of the Spanish Antarctic Stations on Livingston and Deception Islands (Maritime Antarctica) where the permafrost distribution is well-known. The experiment tries to check REMS's sensors response against hard environmental conditions and calibrates their measures with standard Antarctic devices. This experiment is composed by some standard meteorological sensors and the photodiodes and thermopiles corresponding to the REMS model. All the sensors are mounting in an 1.8 m mast and include; a Pt100 air temperature with shield solar protection on the mast top, a Kipp and Zonnen CNR1 net radiometer for measuring infrared (CG3) and short wave solar (CM3) radiation at 1.5 m high, REMS GT and UV sensors and its amplification box at 0.7 m high and finally two Pt100 sensors are in close contact with the soil surface in the angle of view of the GT-REMS thermopiles. In this work we present the structure of the experiment and the preliminary data obtained in the Antarctic field campaign.