REMS (MSL METEOROLOGICAL STATION) METHODOLOGY TESTED IN EARTH ANALOGS. F. Gómez[1] , J. Gómez-Elvira[1], M.P. Zorzano-Mier[1], C. Armiens-Aparicio[1], J. A. Rodrígez-Manfredi[1], E. Sebastián[1], [1]Centro de Astrobiología (INTA-CSIC) Carretera de Ajalvir km 4 Torrejón de Ardoz 28850 Madrid Spain (gomezgf@cab.inta-csic.es).

Introduction: Curiosity is the next NASA rover for the exploration of Mars. Mars Science Laboratory (MSL) mission is scheduled to be launch in the fall of 2011. Rover Environmental Monitoring Station, REMS, is an instrument that will fly to Mars as part of the payload of this rover. REMS is basically a meteorological station, composed of a suite of sensors aimed at measuring ground and air temperatures, wind speed and direction, pressure, humidity and ultraviolet radiation. Most of these sensors are accommodated on two booms, which are located on the rover mast at a height of approximately 1.5 meters. The ultraviolet and pressure sensor are located on the rover deck.

Slow Motion Tests: Several field campaigns for testing REMS methodology (similar meteorological station (Figure 1) deployed in the field) and some REMS components have been tested during the last two years to some Earth Analogs (Atacama and Chott El Jerid Deserts). These experiences were concived as Slow Motion Test, as part of the training of the REMS science team.

Atacama Desert is considered to be the driest place on Earth. Salar Grand is an interesting place where to test the interations between atmosphere and salt depoistes. This was the first place where "Habitability" studies with the metereological station were developed.

Tunisia Chott El Jerid is also a salty desert with low water activity in salt depostis and high UV doses at the surface.

Habitability studies in both Deserts were developed by the selection of a 36 square meters area where an atmospheric station was installed. The following parameters were measured: UV radiation, atmosphere temperature, ground temperature at three different depths, wind direction. Samples at the pre-selected depths were taken in order to develop microbiological studies in the laboratory.

REMS Ground Temperature Sensor (GTS) [1], a radiometer which measures infrared radiation emitted from the surface and from this measurement tries to estimate ground temperature, was tested in Chot El Jerid. Results will also be presented.

Science objectives for habitability studies are the following:

. Climate studies: with special emphasis in environmental monitoring stations for space missions testing.

. Mineralogy associated with the salty desert and its comparison with salty deposits identified in the Mars surface.

. Microbiology of the area: isolation and characterization of extremophiles with optimal growth on such a harsh dryness conditions.

. Sedimentology of these salt deposits environments

. 3 m deep drilling for sampling for mineralogy and microbiological analysis

. Structure of the first 3 m of the column using sounding electrical techniques (Figure 2)

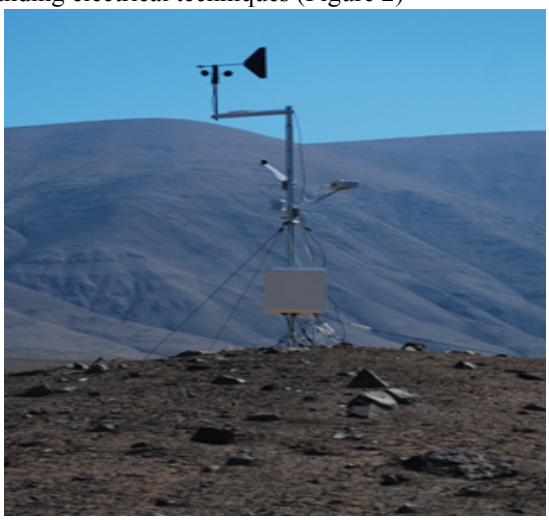

Figure 1: Metereological station in Atacama Desert.

Results: Interesting results that will be presented in this paper were obtained as decreasing levels of life presence along the core profile or exothermic superficial processes probably drove by water deliquescence inside salt deposit which were represented as a modification of the ground temperature. Those modifications would be easy to follow during Mars surface exploration by MSL.

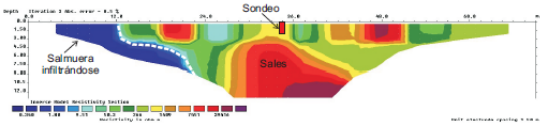

Figure 2: Resistivity map of Chott El Jerid subsurface. Structural model of the first subsurface meters can be extrapolated from these data.

References:

[1] Sebastián, E., Armiens, C. and Gómez-Elvira, J. (2010) Applied Thermal Engineering. 30 2403-2411.