

## MARIE

### January 2003 Status – Science Data Comments

The MARIE instrument is continuing to perform as expected and providing science data as anticipated.

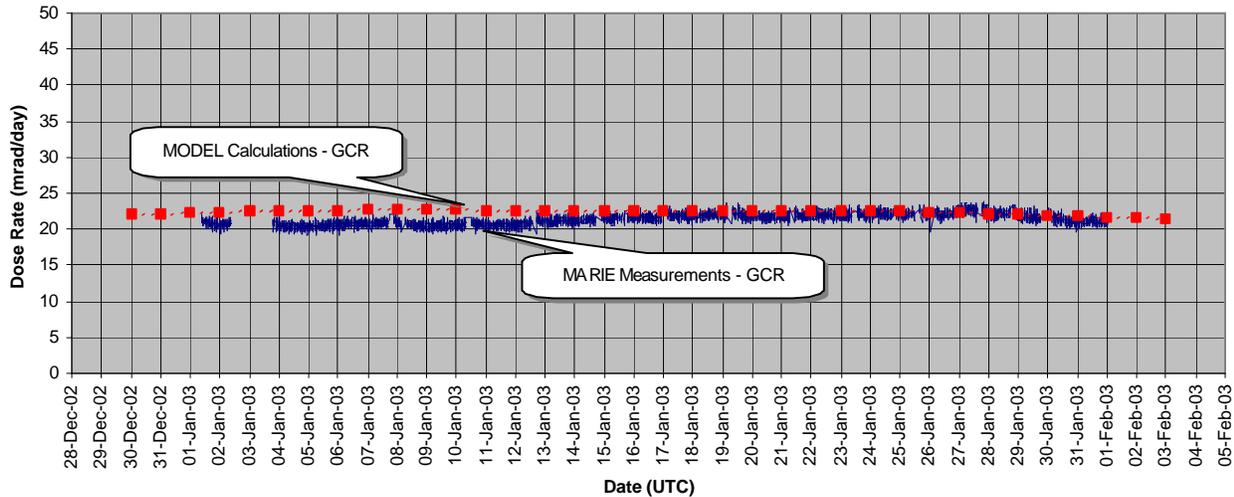
During January 2003, the MARIE instrument provided radiation data from 1<sup>st</sup> through the 31<sup>st</sup> with one major break from 2<sup>nd</sup> to 3<sup>rd</sup> due to the usual data down load and erase sequence. In the month of January, the MARIE instrument collected data for a total of ~ 25 days.

Radiation dose-rate measurements from MARIE instrument during the period from January 1<sup>st</sup> through 31<sup>st</sup> indicate that the background GCR dose-rate was  $21 \pm 2$  mrad/day, within 10% of the model predictions. The data from the month of January consists mostly of the *quiet-time* GCR. There is no indication of SPE enhanced dose-rate during the month of January. The average Earth-Sun-Mars angle during January was about 94° with Earth at 0.98 AU and Mars at 1.6 AU.

MARIE Events to Remember: The month of **June** was reported to be the first month without any SPE enhanced dose rate. The month of **July** showed the highest SPE enhanced dose-rate for the first time at Mars orbit during the current solar cycle since March-2002. At its peak, the dose-rate was observed to exceed 1000 mrad/day. In the month of **August**, the instrument was kept in *standby* mode for 20 days for the first time during the mapping phase since March 2002. In the month of **October**, MARIE observed two prominent SPE enhanced dose-rate events. This is a first observation for the MARIE instrument to obtain SPE enhanced dose-rates from two different strong events (~ 500 mrad/day around October 15<sup>th</sup> and > 1000 mrad/day around October 28<sup>th</sup>) in one month. These events were originated from the *farside* of the Sun (on the solar disk that is facing away from the Earth) and were not seen by near-Earth monitors such as GOES-8. **December-January** is the first time with no SPE enhanced activity for complete two months during the mapping phase.

Further analysis of the science data is in progress.

January 2003: MARIE Measurements and MODEL Calculations  
(As of 02/06//03: PS/FC)



**Figure- 1:** Radiation dose-rate from the GCR contribution in the Martian orbit during January 2003. Dose-rate (mrad/day) measurements from the MARIE instrument (blue discrete line) are shown along with the HZETRN model predictions (red dotted line). Measured dose-rate is within 10% of the model predictions.

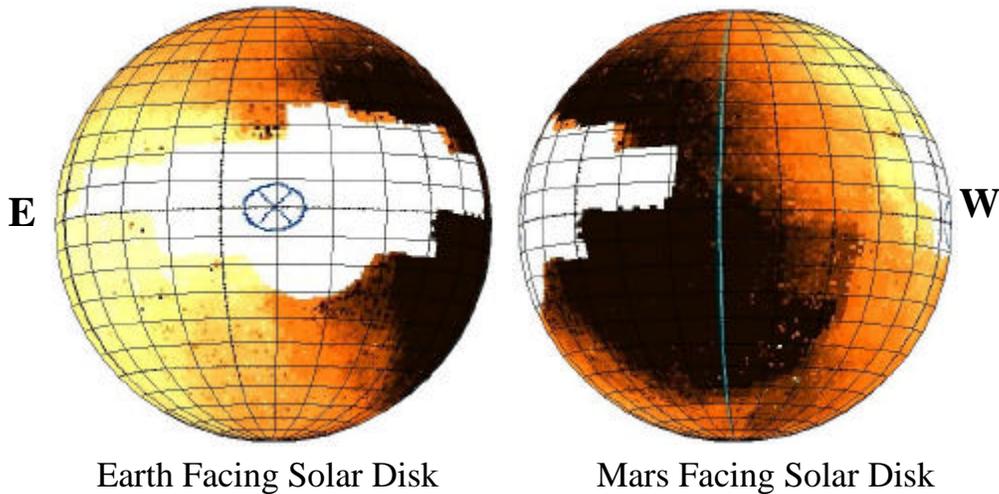
### Solar Disks (3D views)

January 15, 2003: Earth-Sun-Mars @ 94.19°

*Shown with Solar Beta*

$\beta = -4.55$

$\beta = -4.62$



*Note: data from SOHO and the visualization from SRHP*

**Figure-2:** Solar disks on January 15, 2003. Both the Earth facing (on the left) and the Mars facing (on the right) are shown in 3D. There are no active regions that are identified or numbered during this time on the Mars facing solar disk to indicate any concerns of SPE.