

MARIE

May 2003 Status – Science Data Comments

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

During May 2003, the MARIE instrument provided radiation data from 1st through the 31st with few intermittent breaks due to data down load and erase sequence. In the month of May, the MARIE instrument was in science mode, acquiring data, about ~ 84% of the time, corresponding to ~ 26 days.

Radiation dose-rate measurements from MARIE data during the period from May 1st through 31st indicate that the background GCR dose-rate was 21 ± 2 mrad/day, within 10% of the model calculations. For the month of May, the predicted model estimate of *quiet-time* GCR was 22.11 mrad/day while the MARIE measured May month average *quiet-time* GCR was 21.32 mrad/day. Thus, the MARIE measurements are within 3.57% of the predicted model calculations, however, uncertainties in the MARIE measured data are anticipated to be $\pm 5\%$. The data from the month of May consists of mostly the *quiet-time* GCR. Towards the end of May (29th and 31st) we have MARIE observations of dose-rate enhancements due to SPE. The average dose-rate including SPE during the month of May (GCR+SPE) is ~ 25.09 mrad/day.

The average Earth-Sun-Mars angle during May was about 36.36° with Earth at 1.01 AU and Mars at 1.45 AU.

MARIE Recent Observations: From early November 2002 through mid-March 2003, there were no SPE enhanced dose-rate was observed. This is the longest period without an SPE since March 2002 in the Odyssey mapping phase. A particularly interesting SPE was observed on March 18-19, 2003; analysis of that data has been a top priority of the science team. April 2003 data consists of *quiet time* GCR measurements only. May 2003 consists of mostly *quiet time* GCR and a sharply raising SPE enhanced dose-rate during the 29th and the 31st.

May 2003: Model Predictions for MARIE
(As of 06/10/03: PS/FC)

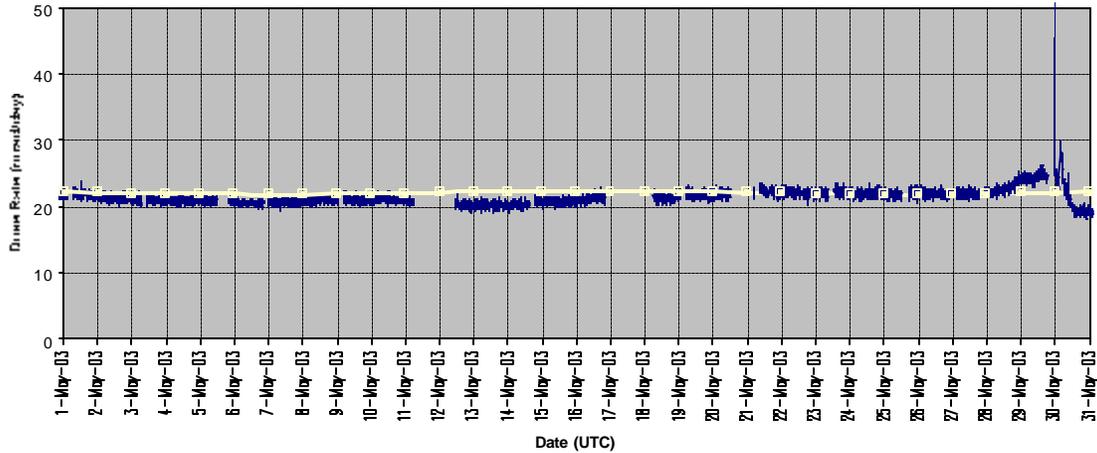


Figure-1: Radiation dose-rate from the GCR contribution in the Martian orbit during May 2003. Dose-rate (mrad/day) measurements from the MARIE instrument (blue discrete line) are shown along with the model predictions (yellow dotted line). Average dose-rate is within 3.5% of the model predictions. Also, see Figure-2.

May 2003: Model Predictions for MARIE
(As of 06/10/03: PS/FC)

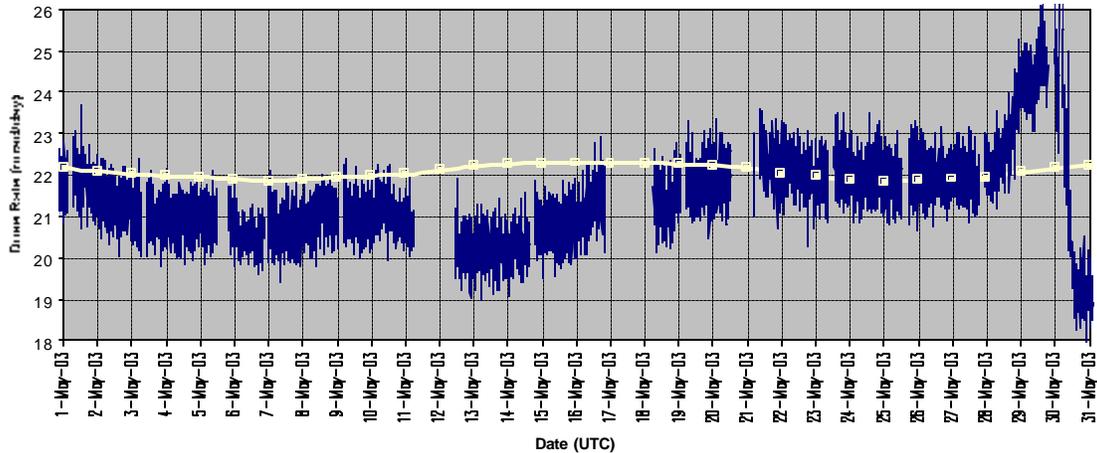


Figure-2 (Close-up view of Figure-1): Radiation dose-rate from the GCR contribution in the Martian orbit during May 2003. Dose-rate (mrad/day) measurements from the MARIE instrument (blue discrete line) are shown along with the model predictions (yellow dotted line). Short-term GCR modulation of the MARIE measurements are in concert with the model predicted variations.

May 2003: Model Predictions for MARIE
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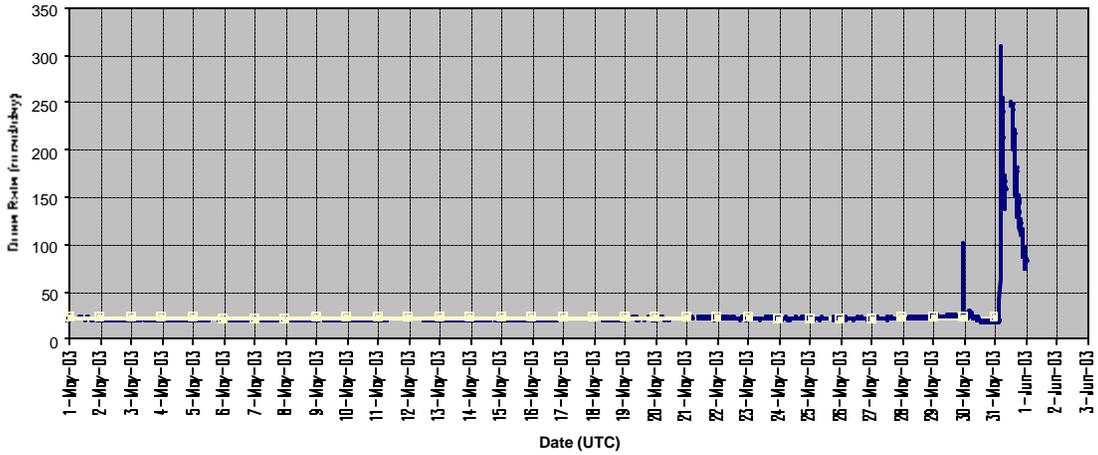


Figure-3 Radiation dose-rate from the background GCR and SPE contribution during May 2003 and early part of June 2003. Dose-rate (mrad/day) measurements from the MARIE instrument (blue discrete line) are shown along with the model predictions (yellow dotted line). Based on the A1 detector count rate of the MARIE instrument, an enhanced dose-rate of 14.5 times (~ 310 mrad/day) to that of the background GCR (~ 21 mrad/day) was noted during the May 31st SPE. The duration of this SPE enhanced dose-rate lasted for less than a day (see Figure-4).

May 2003: Model Predictions for MARIE
(As of 06/10/03: PS/FC)

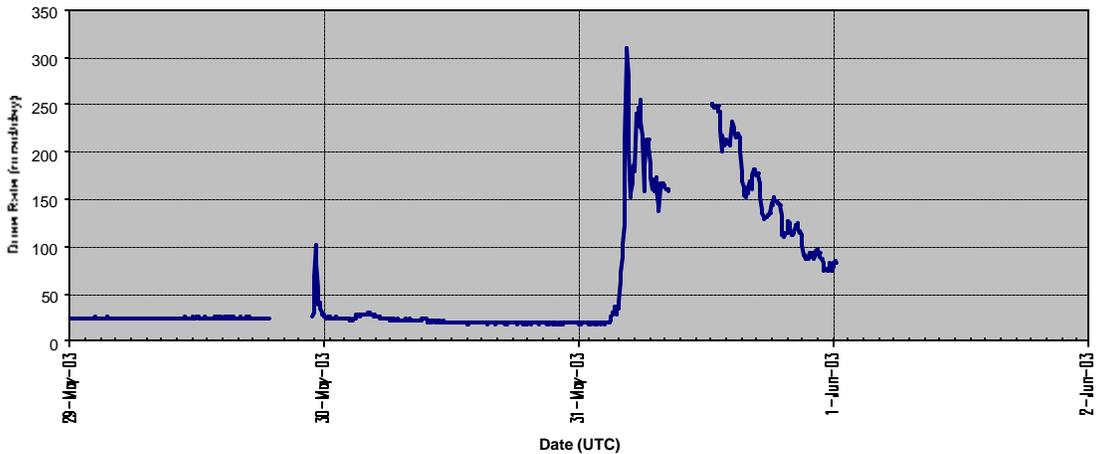


Figure-4 (Close-up view of Figure-3): Both the SPE enhanced dose-rates (29th and 31st) are shown. The event on the 29th lasted for few hours (with a peak at ~ 100 mrad/day) and the event on the 31st lasted for less than a day (with a peak at ~ 300 mrad/day). The intermittent break during the 31st event was due to data download and erase sequence.