

**EARLY RESULTS OF THE MARS ODYSSEY GAMMA-RAY SPECTROMETER (GRS): ICE AND OTHER COOL STUFF.**

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**Introduction:** The Mars Odyssey Mission arrived at Mars on October 23, 2001. After several months of orbit adjustment via aerobraking, the mission went into mapping mode on February 18, 2002. The GRS is a suite of three instruments: the neutron spectrometer (NS), the High-Energy Neutron Spectrometer (HEND), and the gamma subsystem (GSS). The NS and HEND are both in their final configurations, and both are working very well. The GSS is mounted on the end of a 6-m boom, which has not yet been extended. We plan on erecting the boom in mid May of this year. In the current configuration, the GSS is close to the spacecraft and is getting a significant gamma-ray background from some elements in the spacecraft.

**Early H Data:** Even though we are not in our optimum configuration, we can already see a strong signal from some elements that are clearly above the spacecraft background. Perhaps the most important of these is hydrogen. We have a clear, strong signal at 2223 keV due the prompt gamma emission following neutron capture on hydrogen. This signal is strongest in the south polar region and indicates a significant amount of ice in the upper few tens of centimeters. The data from the neutron instruments, which are sensitive to H content greater depths different than those of the gamma emission indicate that the hydrogen is concentrated beneath the surface. The strong H signal correlates well with predictions of regions with sub-surface ice stability. The correlation with the predicted ice stability regions and the non-uniform distribution with depth argue that the hydrogen is in the form of ice. No other explanation can explain the strong correlation of enhanced hydrogen and regions of predicted low temperatures.

**Other elements:** We are hopeful that the boom erection will proceed as planned and that we may have some early data on other elements to discuss at the meeting.