



Solar Energetic Proton Production of a Transient Water Exosphere on Ceres

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The variability of Ceres' water exosphere has been reported by telescopic observations at 1 AU by IUE, VLT, and HSO. The Dawn spacecraft in orbit about Ceres has also seen evidence for a transient exosphere twice, both times following the onset of solar energetic particle events. It is possible these energetic particles are releasing water at or near the surface via a sputtering process. Hence we analyzed the solar energetic proton flux during the earlier positive and negative sightings and found a positive correlation between the magnitude of the water vapor production rate at Ceres and the energetic proton flux recorded at 1 AU. To follow up on these findings, we are monitoring solar activity and are planning to conduct a reactive observing campaign. This could be successful since the Dawn observations suggested a one-week lifetime for the SEP-produced atmosphere. We review the observations to date and how we make a quantitative estimate of the water emitted through MHD modeling of the solar wind interaction.