

Visualization of Near-Infrared Spectral Data of Eros Using the Small Body Mapping Tool

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One of the primary drivers for many missions visiting asteroids is to advance our understanding of their composition beyond what can be (and is) already measured by telescopes. Without sample return or lander missions, this task relies primarily on resolved near-infrared spectroscopic measurements. Scientific analysis using spectral data collected by point spectrometers is not as straightforward as for imaging spectrometers, where the local spatial context is immediately available. In the case of Eros and other highly non-spherical bodies, this problem becomes even more severe when trying to locate spectra that cross a mapped feature that bends over an irregularly shaped surface. Thus, it is often the case that outside of the mission teams, few from the community at large delve into these data sets, as they lack the tools necessary to incorporate the spectral information into geological analyses of the asteroids. Ultimately, we seek to make such spectral datasets, which NASA has invested significant amounts of money to obtain, more widely accessible and user-friendly. The Small Body Mapping Tool (SBMT) is a Java-based, interactive, three-dimensional visualization tool written and developed at APL to map and analyze features on irregularly shaped solar system bodies. The SBMT can be used to locate and then “drape” spacecraft images, spectra, and laser altimetry around the shape model of such bodies. It provides a means for rapid identification of available data in a region of interest and allows features to be mapped directly onto the shape model. The program allows the free rotation of a shape model (including any overlain data) in all directions, so that the correlation and distribution of mapped features can be easily and globally observed.

We will present the results of our work on the NEAR/Near-Infrared Spectrograph (NIS) data, including improvements to the calibration made by using the geometric information provided by the SBMT and improvements to the SBMT itself to allow spectral visualization, manipulation, and analysis of these data in a spatial context.

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