Non-Traditional GIS Datasets: Using JMARS for Visualization and Analysis Shay Carter[1], Scott Dickenshied[1], Dale Noss[1], and Saadat Anwar[1], [1]Mars Space Flight Facility, 201 E Orange Mall, Arizona State University, Tempe, AZ, 85287, USA, help@jmars.asu.edu

Introduction: Geospatial information system (GIS) tools are used to visualize and analyze data. Java Mission-planning and Analysis for Remote Sensing (JMARS) is a GIS system built specifically to work with remote sensing data on planetary bodies. Typically, this data presents itself as maps or individual images collected by remote sensing instruments aboard spacecraft. Another common form of analysis in GIS tools is allowing the user to define their own shapes – points, lines, and polygons – and determine statistics or other calculations based on their data. JMARS has been capable of working with data in each of these forms by using map, stamp, and shape layers, respectively.

In addition to these more traditional forms of analysis, JMARS is capable of visualizing and studying other, more advanced, types of data.

Discussion: JMARS has advanced capabilities for working with non-traditional datasets. Some of these, such as spectral data or ground penetrating radar, are represented in stamp layers and are treated similarly to individual image observations. Spectrometers supported in JMARS include TES, OTES and OVIRS (although not publicly available now, the latter two are used by the OSIRIS-Rex science team), with limited support for CRISM as well. JMARS can access and analyze the individual spectral data on an observation by observation basis, or perform simultaneous computation and visualization based on many records in a geographical region. Radar datasets include SHARAD and MARSIS. These datasets contain ground penetrating radargrams which are viewable at full resolution as well as scaled images. JMARS allows for creation of radar horizons and calculations which can be used to compute subsurface depths.

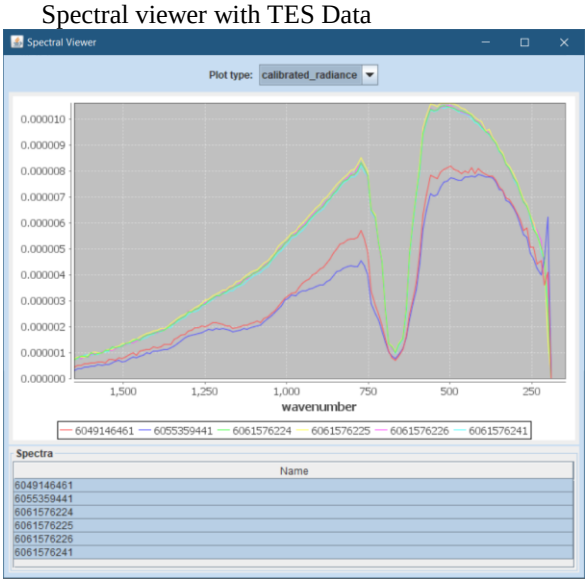
Recently, the JMARS team has been adding support for new layers to make it easy to interact with climate modeling tools such as KRC and the Mars Climate Database (MCD). Within the tool, a user can calculate diurnal or seasonal temperature curves for any given point using both KRC and MCD. The MCD layer also provides output for temperatures at varying heights above the surface. Both these layers have several editable parameters a user can adjust to see the corresponding model outputs.

All these advanced analysis techniques provide exporting capabilities so that the data analysis can be shared with collaborators and used in external programs. High resolution images can be generated, original, raw data can be accessed, and technical information can be exported as comma separated value (CSV) files.

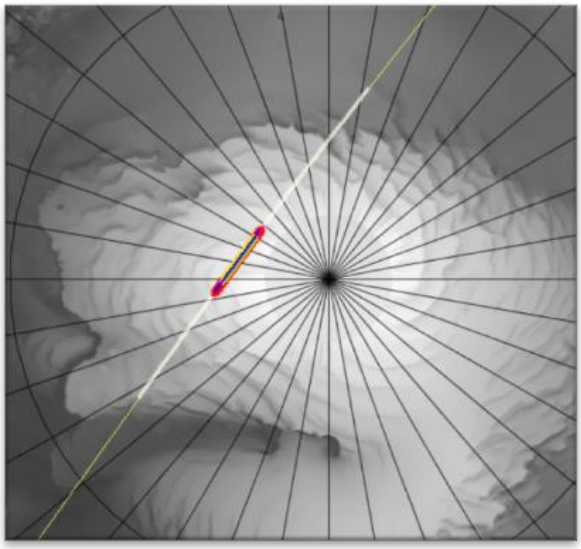
Conclusion: JMARS is a powerful planetary GIS software platform that can be used to access traditional as well as advanced remote sensing datasets. In addition to traditional GIS capabilities, JMARS also supports spectral analysis, radargram investigation, and climate model comparison and predictions.

Figures:

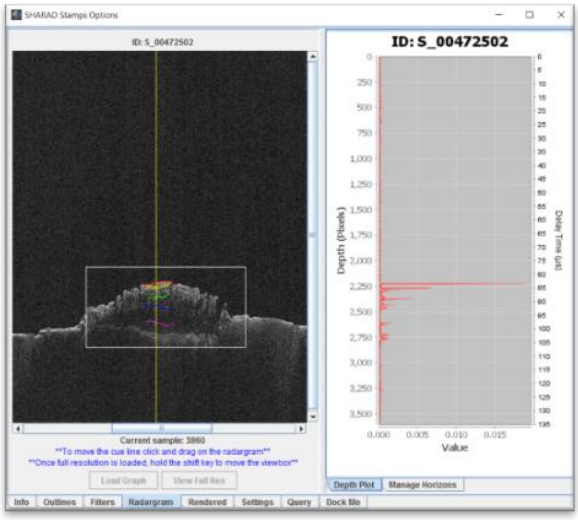
Spectral viewer with TES Data



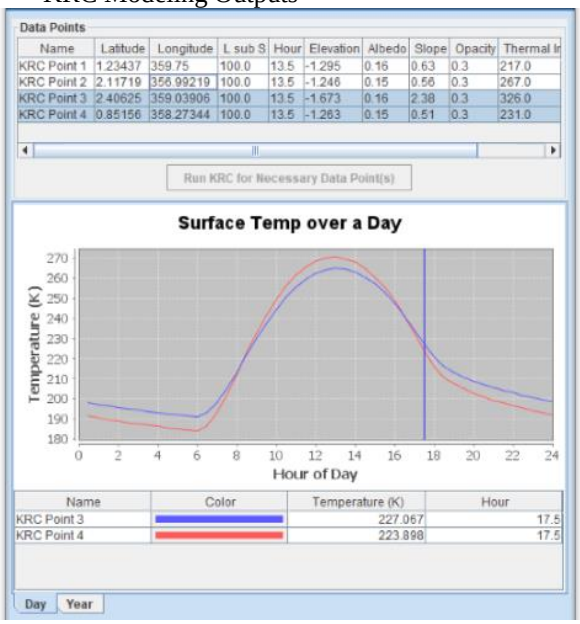
SHARAD Radargram Geospatial Footprint Viewing at the North Pole

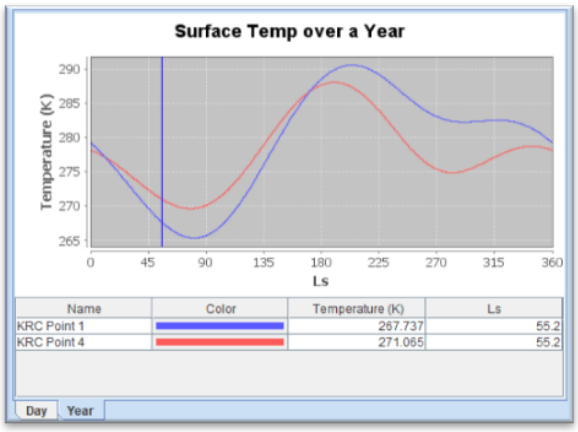


SHARAD Radargram Analysis



KRC Modeling Outputs





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