

MRD 126- Global Slope Map

See also the algorithm

description: https://sciwiki.lpl.arizona.edu/wiki/pages/r2v666/Slope_Map.html

Data Product Overview

The "global slope map" data product lists the slopes (the angular deviation from the local downward normal of the total acceleration vector due to gravity and rotation) over the current shape model.

Overview

This data product is used for sample site selection, science value, and long-term science.

This product will be delivered as a data table that contains location on Bennu and the associated slope value.

The scale of this output is set by the shape model - the slope is computed per facet of the shape model.

Inputs:

Asteroid Shape Model [[Shape model \(MRD-123\)](#)]

Mass Model [[Asteroid Mass Model \(MRD-133\)](#)]

Gravity Field [[Global gravity field map \(MRD-130\)](#)]

Spin State [[Pole location \(MRD-127\)](#), [wobble \(MRD-128\)](#) and [rotation period \(MRD-129\)](#)]

Mass Distribution Model

Gravity Surface Model

Geopotential Model

This product is derived purely from other data products, and as such doesn't directly use any observations. An initial version of this data product already exists in the DRA for the nominal Nolan model, thus it can be produced during all phases of the DRM whenever updates to the input data are received.

Time to produce varies from minutes to hours, depending mainly on the resolution of the shape model used.

Product will be delivered once per phase after updated shape model is made available.

Data Product Structure and Organization

This data product is delivered as an Ancillary File (see [Proposed Map-making Tools for Creating and Editing 3D Maps](#)), a FITS-formatted ASCII table. There will be one file that is updated as new input data is made available and processed.

Data Format Descriptions

The data will be distributed as an Ancillary File tied to a shape model, as described in the RSWG [SIS](#).

The header information will detail which input products were used to generate this data product.

Data Product Generation

This data product is generated by the Radio Science Working Group.

There are a wide range of different algorithms and approaches used to determine the surface environment. An introduction to, discussion of, and citations to relevant papers is found in the citation:

D.J. Scheeres, *Orbital Motion in Strongly Perturbed Environment: Applications to Asteroid, Comet and Planetary Satellite Orbiters*, Chapter 10, Springer, 2012.

The inputs to this algorithm are listed above.

Multiple versions of the product will be generated as more/new inputs become available, and as time passes. At any given time, however, there will be one official version of the data product. The cadence will vary as it depends on when new data appears, and how long it takes to process said data.

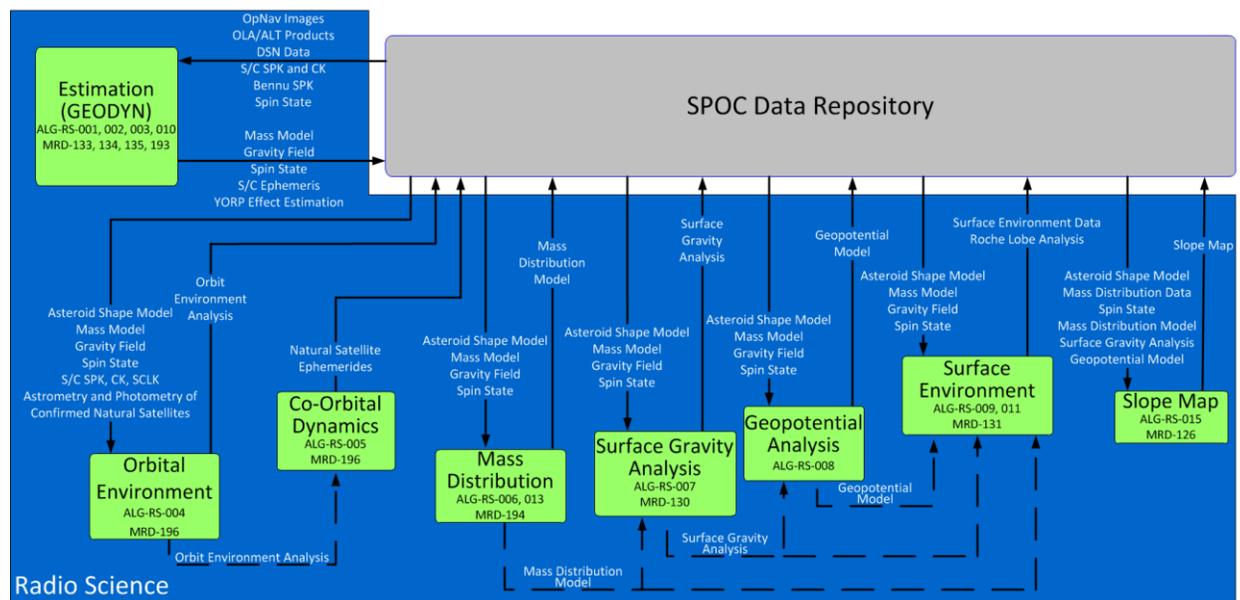
The algorithm used to create this product is outlined in the Science Wiki under Slope Map

Data Product Validation

Verification will be ascertained by comparison with legacy computations and analyses, with known models and analytically derived results.

Data Flow

In the current RSWG data flow diagram, shown below, the generation of this data product can be found in the rightmost box.



Data flow for this data product is simple: inputs come from the SPOC (or directly from other RSWG algorithms), go through our algorithm, and the data product is produced.

The file size for this product will be similar to that of the shape model file since the number of data points listed here is directly related to the shape model.

Standards used to generate data product

Standards are assumed through tying this data to the shape model.

Data is stored as a FITS ASCII table.