

Science Weekly Debrief

For slides and the WebEx recording on ODOCS, click here then follow the path: Folders -> Documents and Drawings -> OSIRIS-REx Bennu Proximity Operations -> Science Status -> Science Weekly -> 2019-03-28.

Baseball Diamond updates from working groups

- SAWG – Vicky Hamilton

Spectral variability is evident in the higher-resolution Baseball Diamond data. In particular, OTES data show variability in slope across the Si-O stretching band and emissivity from 700 to 525 cm^{-1} , and in the band depth at 440 cm^{-1} ; these variations appear to be linked. The Si-O stretching band depths are consistent irrespective of band minimum position. There is a lack of spread in the data at $>1100 \text{ cm}^{-1}$. Although previous analysis showed no variability in DCI, an updated analysis shows moderate variability. The next step will be to look for a spatial correlation between DCI and boulder size/density as a proxy for particle size. Some of the observed variation in the spectral data may be due to particle size, and some may be due to composition.

- TAWG – Josh Emery

Josh showed temperature maps from the Baseball Diamond stations. Observed temperature variations are probably related in part to incidence angle. The “hot spot” corresponding to DarkDark continues to be evident. It appears to smear off of the boulder’s northern edge and into fine sediment; this may be a resolution artifact because other analyses show the edge of the hot spot hugging the scarp more closely. Other high-relief boulders such as BenBen do not show the same temperature elevation. Detailed modeling with the shape will be needed to understand the hot spot.

- IPWG – Dathon Golish, Carina Bennett

Dathon and Carina presented the global mosaics generated from each flyby to date. The mosaics show good registration using only the kernels. The Flyby 1 mosaic has a patchy appearance, likely related to charge smear issues. A wide range of albedo is evident. The new record-holder for the brightest object identified thus far, “Tamatoa-2”, is about 1 by 1.5 m and has an albedo greater than 20%. Dani DellaGiustina has been analyzing color ratios from the Flyby 2 mosaic. Patterns emerge when overlaying the color ratios with albedo. These analyses will probably be available to the team next week. Flyby 3 produced the highest-quality mosaic (5 cm/pixel). Although it does not cover the entire asteroid, it lays well over the 3D shape model in SBMT. (Relatedly, the lien on imaging visualization will be closed because images can be viewed in SBMT on a Mac.)

Global mosaics can be found on the IPWG share drive (ipwg -> share -> deliveries -> 000_GlobalMosaicDeliveries) or on ODOCS (7.0 -> 7.4 SPOC -> OCAMSFlightProducts -> Downlink -> GlobalMosaics).

A radiance calibration update was recently pushed through for OCAMS. All data on SPOCflight have been reprocessed and are usable. IPWG expects to use this calibration through Equatorial Stations.

- RDWG – Kevin Walsh

RDWG is compiling the regions of interest (ROIs) for TAG. The structures posted on the [ROI wiki page](#) can be viewed in SBMT. Next week, RDWG will scour the Flyby 4 images for additional ROIs. Per Mike Nolan, we will wait to deliver the final list of ROIs until the Flyby 4 images have been reviewed.

RDWG can supply maps showing the fraction of the surface that is covered by boulders for a given albedo range.

Kevin showed side-by-side movies of Bennu's elevation at (a) current conditions and (b) a spin period of 8 hours. The purpose of creating such movies is to evaluate the range of spin rates that Bennu might have experienced in its lifetime. Where do the geopotential lows persist at different spin rates, and are those regions sampleable?

- X-Ray Science

The team has all of the Crab calibration data in hand and expects to obtain a good detector response function.

Science productivity and deliverables

- Data product status – Jon Cutts

See Jon's slides on ODOCS for the Gantt charts, MRD and major milestone status, 1-month look-ahead, and completions/slips to date. There were no updates to MRD completion this period. NFT is currently undergoing replanning, after which the MRD-728 progress criteria will be revised. The hybrid-technique deliverability maps will be removed from progress tracking once Jon receives confirmation that they are not needed. The Preliminary Survey version of TA-007 will be superseded by the Baseball Diamond version and has been removed from tracking. The tabulated deliverability map is expected to come in a few days earlier than scheduled. In the 1-month look-ahead, the task names for Baseball Diamond stations will be modified to avoid confusion with Equatorial Stations.

The OLA team has been blessing data "by hand", but a pipeline fix will soon be pushed to SPOC, after which data will be reprocessed and blessed in the usual way.

Upcoming deadlines

MetSoc travel requests are due to Rosie Munoz by 1 April (for those using OREX funds for travel). MetSoc abstracts are due to Sci Exec (pubs@orex.lpl.arizona.edu) by 17 April and to the conference by 24 April.

Upcoming meetings

The next Science Weekly meeting will be Thursday 4 April.