

Science Weekly Debrief

For slides in ODOCS, click [here](#) then follow the path: Folders -> Documents and Drawings -> OSIRIS-REx Bennu Proximity Operations -> Science Status -> Science Weekly -> 2019-01-03.

Working group updates

- Shape model/AltWG – Olivier Barnouin

Olivier gave an overview of the Palmer 181227 (#14) and Gaskell 181217 (#13) shape models. The Palmer model is smoother and tends to suppress boulders and topography, whereas the Gaskell model is rougher and tends to enhance boulders and topography. The models differ slightly in volume and extent. Both have COF-COM offsets, which may be the source of what we previously interpreted as a wobble (however, there is still uncertainty in the pole, on the order of 0.2 degrees). Both models are too small, by about 0.5%, with the Palmer model being a little smaller than the Gaskell model. The Palmer model suppresses topography in favor of albedo, and vice versa for the Gaskell model. RMS errors range from 1.5 to 2.5 m. These shape models meet MRDs 124, 127, 129, 678, and 684; they do not satisfy MRDs 132, 680, or 682.

AltWG recommended that FDS use the smoother Palmer model, which is based on blessed code, as more “conservative” for operations. However, the PI noted that the rougher Gaskell model might actually be more “conservative” from an operational perspective. Per the PI, we do not need to use the same model for operations and science (namely, the Nature papers); we should independently select the model that is most appropriate for each. For the Nature paper usage, Mike Daly noted that it is a question not only of which is most useful for derived products (maybe Gaskell), but also which has the more defensible and readily explainable limitations (maybe Palmer). We might consider using Palmer for the global shape but including better-rendered, high-resolution zoom-ins on topography of interest. For site selection, AltWG recommends the Palmer model, as the roughness exaggeration in the Gaskell model might cause us to rule out potentially viable sites.

During STM14, AltWG will further refine the size bias of the models, and we will select a shape model to use for the Nature papers. We decided to wait to bless any shape model products until after STM14.

AltWG would like to collect non-targeted OLA data during Orbital A to improve the scale of the shape models. This proposal differs from their previous request (SOCR-139), which involved polar-targeted observations and was not feasible. **Action item:** Per Anjani Polit, AltWG will update SOCR-139 to request non-targeted ride-along observations. The SOCR should explain how these observations would enable us to meet requirements and justify why it would be worthwhile to obtain them a month earlier than planned.

- SAWG – Vicky Hamilton

All OVIRS L2 data have been blessed. An OVIRS L3a update is forthcoming. Vicky plans to submit a blessing request for all OTES Preliminary Survey data after this meeting.

- IPWG – Dani DellaGiustina

IPWG is using the Gaskell model described above to register color data. **Action item:** Dani will distribute a PNG of the latest global mosaic that can be ingested into the Small Body Mapping Tool.

Recently, IPWG determined that a substantial number of pixels in the MapCam v and w images are in a nonlinear regime (low DN or high DN/saturation). Some of the most interesting color results disappear when these pixels are scrubbed, reducing confidence in the findings from the IPWG workshop. This issue impacts photometry but not necessarily the albedo of the brightest spots. Dani has ongoing confidence in the 0.55-micron absorption and redder slope of the dark spot, but less confidence in the 0.7-micron feature; Detailed Survey will resolve this. Dani will provide a blessed set of scrubbed, photometrically corrected color products today. No interpretations regarding Bennu's color should be made outside of this set. This discovery (to be discussed further at STM14) motivates re-planning of exposure times for Detailed Survey.

Data product status – Jon Cutts

We discussed the color-coding of products in the MRD roll-up. Yellow indicates that a product is behind schedule. Orange indicates that a product is blessed with caveats—i.e., completed, but with different data or a different approach than originally planned. The lightcurves are an example of a product that should be blessed with caveats and coded orange.

In combination with previously discussed measures, we plan to avoid breaching of the Sampleability Map by hiring students to begin counting earlier. However, we will not update the dates or status of this product until those students have been not only hired but also trained and demonstrated effective.

See Jon's slides for the average durations of L1/L2 data blessing by instrument, the 1-month lookahead, and a summary of all products blessed to date.

LPSC abstracts – Mike Nolan and Dante Lauretta

Authors of LPSC abstracts should:

- Avoid using feature names (e.g., BenBen, DarkDark); give coordinates instead, using the existing coordinate system. We can mark notable features on a large map. **Action item:** Dani DellaGiustina will submit an LPSC abstract to establish a poster slot for this large map.
- Omit high-resolution imagery and major, newsworthy results that will be included in the Nature papers, so that we do not scoop ourselves or dilute the Nature papers' citation impact by making this information available. The imagery and major results can and should be presented at the conference, just not included in the abstracts. In lieu of giving major results, abstracts can discuss what kind of results will be presented. Abstracts do not have to have figures.

Upcoming meetings

The Science Weekly next week is replaced by STM14.