Dear lunar modeling group –

We are getting back to you now with an appeal to restart the lunar model comparison exercise that was discussed in GSICS webmeetings in 2020 and 2021. Recall that the objective is to collect and compare the results from lunar model runs using the same set of inputs, to get a clearer picture of the differences in the model outputs when they are operated for various Moon observing conditions.

We would like to present the outcome of the cross-comparison at the upcoming GSICS/CEOS-IVOS lunar calibration workshop (LCWS4) to be held later this year at EUMETSAT in Darmstadt, Germany. Details will be forthcoming. We will prepare an informal report for review by the group prior to the workshop.

Please provide feedback on whether you are still interested in participating, and whether you anticipate any difficulty setting up your lunar model to run on the test dataset (details below).

We will assemble the outputs for successful model runs. The attached netCDF file is provided for convenience as a template for reporting results, although using this file is not required. However, some identifying parameters should be provided for all model runs:

- model operator name and contact info (email address is fine)
- name and version of the lunar model used
- phase and libration values, collated with the model outputs
- center wavelength for each “instrument” band
- model-generated lunar irradiances for each band and each geometry point
- units for wavelength and irradiance

To remind everyone of the status as of early 2021 - we had several discussions in the webmeetings and agreed several key points:

1) the task was defined - modeling teams would generate lunar irradiances using a specified grid of phase and libration angles, and a specified set of spectral response functions (SRFs).

2) the test grid of observation geometry parameters was defined in terms of phase angles and librations.

3) the "instrument" spectral bands were to be synthetic functions, 8 bands centered on 442, 550, 670, 765, 870, 1380, 1640 and 2350 nm. EUMETSAT produced the spectral response files in GIRO netCDF format.

Attached is the presentation given to the 2021 GSICS annual meeting, which was held virtually.

The test grid of geometry parameters is intended to capture an adequate range for Moon observations taken from LEO and GEO.

PLEASE NOTE: WE ARE PROPOSING TO REVISE THIS TEST GRID !!

The set of geometries originally agreed in 2021 was as follows:

- phase angles in degrees, both before and after Full Moon: 3 to 10 by 1 deg, 10 to 20 by 2 deg, 20 to 50 by 5 deg, and 50 to 90 by 10 deg
- sub-observer longitude libration angles: 0,+-4 deg, +- 8 deg, +-12 deg
- sub-observer latitude libration angles: 0,+-4 deg, +- 8 deg
- sub-solar longitude libration derived from the other parameters
- sub-solar latitude libration fixed at 0.0

This gives 2*(8+5+6+4) * 7 * 5 = 1610 total grid points.

During the time since our last communications, Hugh Kieffer has done much development and testing of his SLIMED model. Hugh determined that testing can be done adequately using fewer phase angles. Therefore, we propose revising the test grid to:

- phase angles in degrees, both before and after Full Moon: 3,5,7,10,15,25,40,55,70,90
- sub-solar and sub-observer libration angles as above, unchanged

This gives 2*(10) * 7 * 5 = 700 total grid points.

Note that it is not possible for the phase angle to be smaller than the separation between the sub-observer and sub-solar locations on the Moon. This test grid specifies 112 such points.

The revised geometry grid is provided in the attached ascii text file and IDL savefile, and it has been pre-installed in the optional netCDF results template. In all these files the impossible grid points are flagged with fill values of -999.0 for the sub-solar longitude.

Please feel free to comment on this revision, or any other items in this communication. If there are no major hurdles or objections, we can proceed with using this test grid for the exercise.

We look forward to hearing from you, and to seeing the results of comparing lunar model outputs.

Best regards,

Tom Stone
Seb Wagner
Hugh Kieffer

Attachments: 2021 webmeeting presentation; netCDF results template; test grid in ascii and .sav formats; .pdf copy of this email message