

Algorithm Status Report

MCST depends primarily on delivery of calibration plan and algorithms from SBRC, not due until October 1992.

Most of the basic algorithms to be supplied by the science team have been peer reviewed in the literature. An imcomplete list is:

- Abel, et al.
- Gordon, et al.
- Kaufman, et al.
- Menzel, et al.
- Slater, et al.

Above methods are being refined and further tested.

A detailed review of algorithm status was not conducted due to the pressure of other issues.

We hope to avoid this situation in the future by attending quarterly and other design reviews to the extent that time permits.

Tentative MCST Peer Review Panel

Slater (chair)
Carder (oceans)
Clark (oceans)
Johnson (NIST - external)
Kaufman (atmospheres)
Kieffer (USGS - external)
Menzel (atmospheres)
Muller (land)
Vanderbilt (land)

Land group liaison with Calibration Working Group

Huete
Wan

MODIS Calibration Working Group, 13 April 1992

Action items:

1. Discuss with Jim Young the choice of an integrating sphere vs field lens image plane for location of the filtered detectors in the SDSM.
2. Request Jim Young include the monitoring the radiance (white light) mode of operation of the SRCA as part of normal calibration operations. This would help characterize the transition from preflight to in-flight calibrations.
3. Request SBRC characterize the memory (long term WITHIN one scan line) effect preflight.
4. Discussion between SBRC (Pagano), Guenther, Slater, and Barker about appropriate solar spectral irradiance (the "Eos standard spectrum" from Barkstrom and higher spectral resolution data (lower accuracy!) from UofA group).
5. SBRC study the quantization noise in bands 31 and 32 vs gain-change strategy.
6. Biggar and Young scope the scheduling problem of preflight cross-calibration of the AM and PM MODIS-N sensors.
7. Weber to determine if there is an inconsistency between the image registration requirements and the MTF requirements, etc.
8. Guenther needs to insure that the instrument managers build-in time for cross-calibration activities (radiometers, etc) at both the instrument vendors and at GE.
9. SBRC, GE, and EOS project together need to provide Muller the pointing vector through the focal point of MODIS as a function of time in WGS84 coordinates. Muller needs to describe exactly what he wants in terms that everyone else understands.

MODIS Calibration Working Group, 13 April 1992

Prompts:

1. Discuss calibration changes with thermal vacuum cycling with Jim Young.
2. Pagano and Slater discuss rationale for radiance calibration of the solar diffuser on MODIS-N vs use of SDSM.
3. Biggar provide computed atmospheric polarization data to SBRC.
4. Biggar, C. Johnson, and Guenther need to examine requirements for having cross-calibration radiometers operate *in vacuo* at GE, following the proposed June 8 GE meeting

MODIS Calibration Working Group, 14 April 1992
Contamination meeting (1530-1745)

Conclusions:

The most recent study by June Tveekrem showed:

1. that the contamination thicknesses estimates are about one third of the original estimates.
2. the uniformity of contamination is much higher resulting in less than a one percent variation in reflectance across the mirror.

It was agreed that none of the proposed on-board hardware solutions were sufficiently accurate, reliable and comprehensive enough to be worthwhile to measure the changes in reflectance caused by contamination.

Although Barker has shown that band(s) with high S/N can be affected by mirror contamination, it was agreed that the effects on reflectance, polarization, and scattering could not be reliably modeled mathematically or through the measurement of artificially contaminated surfaces.

A number of solutions were suggested, that separately or together, could lead to an adequate characterization of the scan mirror contamination.

1. Because of the wavelength sensitivity of the polarization effects, the SRCA could be used to differentiate the polarization effects from spectral absorption changes.

The following are mainly for monitoring reflectance changes of the mirror:

2. The NASIC spectrometer on the ER-2 as currently use for AVHRR calibration could be used to monitor the change in reflectance of the mirror. Improvements to NASIC would be necessary to provide the required sensitivity and accuracy. The spatial registration and stability are the two factors needing the most improvement.

3. A second spacecraft sensor could scan the same scene to determine if the scan mirror reflectance has changed. An example would be GOES or the PM MODIS (30 months after the AM launch). A suitable scene could be the southeast region of the Libyan desert.

4. The "global averaging method" by Brest and Rossow for AVHRR calibration trend analysis could be used.

We were reminded that contamination in space is not the only contamination problem. The anechoic chamber and the presence of volatiles at integration and test at GE are significant potential sources of contamination.

Action Item:

Guenther to request project support for inclusion of one Quartz contamination monitor (QCM) to be mounted externally close to the MODIS view port and one QCM to be mounted in the MODIS scan cavity.

MODIS Science Team meeting, 14 April 1992

Action Items:

1. SBRC should investigate the use of the solar diffuser for calibration of the 3.75 μm band.
2. Biggar should supply BRDF and reflectance data at 3.75 μm for Spectralon.
3. Slater to contact Bruegge, Ono, and Young about the instrument builder procuring additional filter sets **WITH** the flight filters. This will include cost estimates. Slater will then contact Weber and others about funding for said filter sets. Slater will inform Guenther about the responses.

Prompts:

1. Barker supply to SBRC information on thermal transient analysis.

MODIS Calibration Working Group, April 16, 1992

Action Items:

1. Slater to remind Kieffer about the F number effect on the filters for the lunar calibration project.
2. Young to examine the stray light on the solar diffuser inside the scan cavity.
3. Barnes to write a memo to project indicating that two to four lunar views per year for calibration and backup monitoring of the solar diffuser are sufficient. (SeaWiFS and DOD activities should prove the lunar calibration concept.)
4. Barker to compile a list of calibration related end-of-life sensor experiments.
5. Bruce Guenther to arrange for presentations and discussions at the Utah State Cal/Val meeting regarding blackbody and thermal band calibration accuracies, hopefully to involve experts on AVHRR, ATSR, and MSSL thermal calibration. This is to address the continued concerns of Ian Barton and others of the oceans group regarding MODIS thermal calibration accuracy.
6. Everyone is reminded about the EOS Cal/Val and thermal IR meeting September 14-18, 1992 in Logan, UT.
7. Slater to present filter purchase request at the next ASTER Science Team meeting in June 1992.

General concerns and comments

The Cal working group would greatly benefit from increased representation from the Science Discipline Groups.

MCST activities are understaffed and we recommend a full-time civil servant be added.

Cross-calibration equipment will be available for the SBRC sphere source for SeaWIFS.

AM platform filter sets (multiple sets of 25.4 mm diameter filters) should be procured with the flight filters.