

## ***ON MODIS Level-1 GEOLOCATION AND CALIBRATION***

### ***MODLAND GROUP***

#### ***Experiences from NOAA AVHRR Applications***

- It has been noted [Brush, 1993, Intl. J. Remote Sens., 629-634] that NOAA-12 AVHRR channel 4 is subject to errors of a few °K where sunglint occurs because of its out-of-band (OOB) response.
  - the reflected solar beam radiation in 8-13 $\mu$ m is almost negligible;
  - solar radiation in the visible is  $10^2$  larger than thermal radiation at 300 °K in MODIS bands 31 and 32, and  $10^3$  larger than the thermal radiation in band 20, respectively.
- Uncertainties in the AVHRR geolocation may be up to 20-30km cross-track.
  - it is variable and depends on scanning angle;
  - uncertainties in spacecraft height and attitude may be the major error sources in the shown example for AVHRR data on 12/17/91, 01/09/92 and 04/13/92.

- On Geolocation
  - More attentions to geolocation uncertainties due to spacecraft position error and attitude knowledge error, and instrument pointing knowledge error.
  - It seems that the Earth location will be generated for each data frame of 10 spatial elements (Cal ATBD Appendix A). If 80% of the Earth location processing load is used by the terrain correction step, how about to add an optional output for each spatial elements in rugged areas so that this processing will be not repeated in generating level-2 (and higher) products and to assure consistence.
  - How to validate the geolocation accuracy in the night mode, is it possible to include band 1 in the night mode?

## ***Recommendations***

- On Calibration
  - It is necessary to include visible and near-infrared range in the system level out-of-band response of thermal infrared bands and to assure to meet the radiometric accuracy requirement (this is also a response to the SBRC memo Q02635 - SBRC Request for band 29 filter acceptance).
  - To find ways to calibrate thermal infrared bands for fire detection in the high temperature range, at least to make complete calibration characterization before launch.
  - To emphasize the necessities of measuring and modeling the characteristics (shift, variation, et al.) of complete spectral response function of thermal infrared bands at various conditions (including different radiation sources and blackbody temperatures for measurements in ambient and thermal vacuum).