Improving MODIS thermal emissive bands on-orbit calibration and image quality using crosstalk correction algorithms and correction coefficients derived from on-orbit lunar observations.
References:

Data Sources: All sensor calibration raw data and the data used to generate the images are from NASA GSFC Level 1 and Atmosphere Archive and Distribution System (LAADS). The L1B calibration and crosstalk correction algorithms and their corresponding coefficients are derived by the NASA MODIS Characterization Support Team (MCST).

Technical Description of Figures:
Figure 1: Sample L1B images from Aqua MODIS band 24 (data granules from 2016). Top: before applying crosstalk correction, showing striping; bottom: after crosstalk correction with striping significantly reduced.
Figure 2: Intensity profiles corresponding, from top to bottom, to the images in Figure 1, from left to right (black/red is before/after crosstalk correction). The profiles were extracted from the regions marked with red vertical lines in Figure 1.

Scientific significance, societal relevance, and relationships to future missions: Terra and Aqua MODIS have successfully operated for more than 17 and 15 years since their launch in December 1999 and May 2002, respectively. MODIS data products have been widely used for studies of many critical environmental parameters of the earth’s system. Electronic crosstalk was initially identified pre-launch in MODIS thermal emissive bands (TEB) and, over the course of the mission, its impact have become more server or non-negligible for several bands. Improved crosstalk correction algorithms have been developed recently and extensively tested. The implementation of crosstalk correction will be made in Terra MODIS C6.1 as an effort to improve its LWIR spectral bands (27-30) calibration and image quality. Methodologies developed and lessons from MODIS crosstalk characterization have potential applications for other earth-observing sensors, such as JPSS VIIRS and GOES-R ABI.