

ON-ORBIT CHARACTERIZATION AND CALIBRATION OF THE RADIOMETRIC AND SPECTRAL PROPERTIES OF THE HYPERION SATELLITE SENSOR

R. O. Green(1), B. Pavri(1)

(1) Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA., 91109
rog@spectra.jpl.nasa.gov/Fax: 818-354-8887

The Hyperion satellite sensor is an imaging spectrometer onboard the NASA New Millennium Earth Observing 1 satellite that was launched on the 21st of November 2000. Hyperion is a pushbroom imaging spectrometer that measures spectra from 425 to 2400-nm with 10-nm sampling. Images are measured with 30-m spatial sampling and a 7.5-km image width. To obtain early on-orbit validation results with high sun-angle measurements a calibration and science campaign was organized in the Southern Hemisphere.

As part of this campaign, on the 7th of February 2001 a calibration experiment was orchestrated at a high altitude dry salt lake, Solar de Arizaro, in Argentina Andes Mountains. The 3800-m altitude, uniformity, dry climate make this an ideal calibration target. At the time of the Hyperion data acquisition over Arizaro, in situ measurements of the surface reflectance and atmospheric properties were acquired. Also, the NASA Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) measured data across the 7.5-km Hyperion image width. These in situ and AVIRIS data were analyzed to determine the on-orbit radiometric and spectral calibration across the Hyperion image width.

The derived on-orbit radiometric calibration parameters showed a 10-% difference in the visible and 20-% difference in the short-wavelength infrared with respect to the prelaunch values. The spectral calibration was shown to vary across the image width consistent with the pushbroom sensor design and alignment challenges. The complete measurements, analyses, and results of this validation experiment are reported in this paper.