



Comparison of ASTER, MASTER, Landsat, and ground-based radiance measurements

J.C. Ritchie(1), T.J. Schmugge(2), and A. Hsu(1)

(1) USDA ARS Hydrology and Remote Sensing Lab., BARC-West, Beltsville, MD 20705 USA, (2) Gerald W. Thomas Professor of Water Resources, College of Agriculture, New Mexico State University, Las Cruces NM 88003 USA (jritchie@hydrolab.arsusda.gov/ Phone +1-310-504-7490)

ASTER (Advanced Spaceborne Thermal Emission and Reflection radiometer), MASTER (MODIS/ASTER airborne simulator), Landsat-7, and ASD (Analytical Spectral Devices Spectroradiometer-ground based) radiance measurements were taken over the Jornada Experimental Range (Jornada) in southern New Mexico USA. These data provide unique opportunities to compare remote sensing data for arid rangelands collected from different platforms and at different scales. The ASD visible and near infrared radiance data (0.4 to 2.5 microns) for May 12, 2001, October 6, 2002, and May 2, 2003 were analyzed and integrated to match the 21 MASTER and 9 ASTER visible and near infrared bandwidths for three different vegetation communities (shrub-mesquite, grass, and shrub-grass transition) at the Jornada. A strong positive correlation with a slope near one between the measurements indicated that the three sensors were measuring similar absolute values from the three vegetation communities. Similar ASD radiance values integrated for the four Landsat-7 visible and near infrared bandwidths for the three dates also indicated that the two sensors were measuring similar absolute values from different vegetation communities. Radiance was highest from the shrub community, where there was much exposed soil, and lowest from the grass community with the shrub-grass transition being intermediate. This has implications for the energy and water budgets of the Jornada where shrub communities are invading and replacing grass communities.