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Diviner Lunar Radiometer Science Highlights and Data Products

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The Diviner Lunar Radiometer is the first infrared instrument to globally map the thermal emission from the moon's surface and its diurnal and seasonal variability. After over three and a half years in operation, analysis of Diviner's unprecedented dataset has revealed the extreme nature of the Moon's thermal environment, its thermophysical properties, and surface composition. This presentation will highlight contributions from many members of the Diviner Science Team addressing a diverse range of scientific questions with a focus on investigations of the lunar thermal environment and surface composition.

The Diviner Lunar Radiometer is a nine-channel, pushbroom mapping radiometer that has operated nearly continuously onboard the Lunar Reconnaissance Orbiter since July, 2009. Diviner measures broadband reflected solar radiation with two channels, and emitted thermal infrared radiation with seven infrared channels. The two solar channels, which both span 0.3 to 3 μm, are used to characterize the photometric properties of the lunar surface. The three shortest wavelength thermal infrared channels near 8 μm were specifically designed to characterize the mid-infrared "Christiansen Feature" emissivity maximum, which is sensitive to silicate composition. Diviner's longer wavelength thermal infrared channels span the mid- to far-infrared between 13 and 400 μm and are used to characterize the lunar thermal environment and thermophysical properties.

Diviner has now acquired observations over six complete diurnal cycles and three complete seasonal cycles. Diviner daytime and nighttime observations (12 hour time bins) have essentially global coverage, and more than 75% of the surface has been measured with at least 6 different local times. During the LRO circular mapping orbit, Diviner's spatial resolution was $\sim$200m. During the LRO elliptical extended mission orbit, Diviner's resolution varies between 150 m to 1300 m. Updated calibrated Diviner data are released to the PDS Geosciences Node every three months. On March 15, 2013, the Diviner team released updated global maps of visible brightness, brightness temperature, bolometric temperature, rock abundance, nighttime soil temperature, and silicate mineralogy that include two additional years of observations compared to the previous products (i.e. now cover July 5, 2009 through September 15, 2012). Beginning in Summer 2013, the Diviner team will release new gridded data products (tiled maps with observational backplanes, summary maps, and special observation datasets) that were specifically designed to foster use of the Diviner dataset by the scientific community.