Studies of Recalibrated Observations from the Lunar Reconnaissance Orbiter's Lunar Exploration Neutron Detector. A. M. Parsons[1] (ann.m.parsons@nasa.gov), T. P. McClanahan[1], I. Mitrofanov[2], W. V. Boynton[3], G. Chin[1], M. Litvak[2], T. Livengood[4], A. Sanin[2], R. D. Starr[3], J. Su[4], D. Hamara[3], K. Harshman[3], [1]NASA Goddard Space Flight Center, Bldg. 34 Room W216, Greenbelt, MD 20771 USA. [2]Institute for Space Research, Moscow, Russia, [3]Lunar and Planet. Lab., Univ. Ariz., Tucson AZ USA, [3]The Catholic Univ. Wash. D.C. USA, [4]Univ. of Maryland, College Park MD USA.

There continues to be intense interest in looking for evidence of possible entrainment of volatiles in the lunar regolith. Attention has been focused on the determination of the location and quantity of hydrogen (H) to be found at the Moon's poles, due to the critical role that hydrogen concentrations play as a resource for human exploration. Neutron-detecting instrumentation such as the Lunar Exploration Neutron Detector (LEND), presently operating on the Lunar Reconnaissance Orbiter (LRO), are especially important for mapping the concentration of H over the lunar surface because the emission of epithermal neutrons is suppressed over regions that contain high concentrations of H.

Recent detailed neutron and charged particle transport modeling studies of LEND have yielded a significantly improved understanding of the instrument [1], as well as a more accurate calibration of its ^{3}He proportional counter epithermal neutron detectors [1,2,3]. With this new calibration, a greatly improved, full-mission time history of LEND's Collimated Sensor for EpiThermal Neutrons (CSETN) is now available. Additionally, this new modeling of the behavior of LEND's ^{3}He detectors has allowed the successful calibration and recovery of data from LEND's uncollimated Sensor for EpiThermal Neutrons (SETN). The newly recalibrated LRO/LEND dataset now includes an almost continuous record of the Moon's epithermal neutron emission at two spatial resolution scales over the eight-plus years that the LRO mission has been in lunar orbit.

We will use this recalibrated lunar dataset to perform a variety of new studies. For example, the recovery of six-plus years of SETN observations and the revival of the SETN observational campaign will allow us to perform new comparative studies by splitting the observations by time, altitude or other factors into statistically independent maps useful for comparing the importance of these properties over the lunar surface. Other studies, such as a more detailed and complete exploration of the H concentrations at the lunar North Pole, are now possible. At this meeting, we will present results from a variety of such studies to better understand the behavior of sequestered lunar volatiles.

References: [1] Su *et al*. *LPSC* #49 #TBD [2] Mitrofanov *et a*l. (2010) *Sp. Sci. Rev., 150(1-4)* [3] Chin *et al., Sp. Sci Rev.* (129)-4 (2010).