FINE SCALE SPATIAL VARIATIONS OF HYDROGEN PRESENCE FROM NEUTRON COUNTING OVER LUNAR NSR'S. R. Sagdeev[1], I.G. Mitrofanov[2], W.V. Boynton[3], G. Chin[4], G. Droege[3], L.G. Evans[4,6], J. Garvin[4], K. Harshman[3], M.L. Litvak[2], A. Malakhov[2], T.P. McClanahan[4], G.M. Milikh[1], M. Namkung[1], G. Nandikotkur[1], G. Neumann[1], A. G. Sanin[2], R.D. Starr[4,5], J.I. Trombka[1,4], [1]Space Physics Department, University of Maryland, College Park, MD, USA, [2]Inst. for Space Research, Moscow, Russia, [3]Lunar and Planetary Laboratory, University of Arizona, Tucson, AZ, USA, [4]Space Exploration Division, NASA Goddard Space Flight Center, Greenbelt, MD, USA, [5]Catholic Univ., Washington, DC, USA, [6]Computer Sciences Corp., Glenn Dale, MD, USA.

The regions of a highest suppression in neutron counting around the poles (Cabeus, Shoemaker) provide sufficient statistical data to look for a fine scale spatial variations. Here we demonstrate the results obtained with the use of LEND's [1] collimated sensors as applied to few selected target areas with spatial resolution within 10 km for Hydrogen presence in Lunar soil. Important distinction is brought by the dependence on the altitude of actual measurements. At the same time the focusing at such target spots serves to validate the calibration of LEND's collimation capability. These results are compared with the collimation model, based on several factors including: 1) geometry of the LEND collimated detector system, 2) the lunar neutron production due to the current epoch of GCR flux. As a reference set of GCR parameters (and of resulting neutron flux), we use the Apollo 17 neutron experiment (December, 1972) and [2]. The recent LEND measurements were taken at a historic low for solar activity subsequent increased lunar neutron flux than in the reference case. We quantify the increase neutron production rate due to higher GCR flux.

References: [1] I.G. Mitrofanov at al., Science, Vol. 330, Issue 603, pg. 483, doi:10.1126/scince.1185696, 2010; [2] G.W. McKinney, D.J. Lawrence et al., J. Geophys. Res., 2005, Vol. 111, EO6004, doi:10.1029/2005JE002551, 2006.