WATER INTERACTIONS WITH LUNAR REGOLITH FROM LADEE OBSERVATIONS. D. M. Hurley[1], M. Benna[2], P. Mahaffy[2], R. Elphic[3], D. Goldstein[4], [1]Johns Hopkins University Applied Physics Laboratory (11100 Johns Hopkins Rd., Laurel MD 20723 USA; dana.hurley@jhuapl.edu), [2]NASA Goddard Space Flight Center (Greenbelt MD 20771 USA), [3]NASA Ames Research Center (Moffett Field CA 94035 USA), [3]University of Texas-Austin.

Introduction: When a spacecraft burns hydrazine, it releases vapor into the environment. The primary vapor constituents are N_2, H_2O, CO, and CO_2. Although exhaust velocities are greater than the escape speed on the Moon, with an initial component of velocity downward, some fraction of the exhaust will intersect the surface of the Moon. The details of the interaction are poorly known. Do the molecules adsorb to the surface? Do they thermalize to the local surface temperature, or do they bounce elastically? Therefore, we use data taken after engine burns to determine these surface interactions.

Events: We examine LADEE data during two engine burn events: the landing of Chang'e 3 on the surface of the Moon and LADEE's Orbital Maintenance Manuever (OMM) 21. LADEE, equipped with a neutral mass spectrometer, was able to detect water above background levels after the Chang'e 3 landing, indicating that the water does not completely adsorb to the surface. However, data from OMM-21, which occurred over the nightside of the Moon does not rule out adsorption of water to colder surfaces.

Model: We present model runs using our Monte Carlo model of the migration of water through the lunar exosphere. We bin the model results in terms of what is in the field of view of the LADEE NMS.

Conclusion: We are able to constrain the range of possible values for the adsorption fraction on pristine lunar regolith and on the thermalization factor for water with lunar regolith.