

LUNAR SCIENCE FROM LUNAR LASER RANGING
J. G. Williams, X X Newhall, and J. O. Dickey
Jet Propulsion Laboratory, Pasadena, CA 91109

Seventeen years of lunar laser ranging data have been analyzed to determine lunar second-degree moment differences, third-degree gravitational harmonics, Love number, rotational dissipation, and retroreflector coordinates. The range accuracy improves through the time span until 3-5 cm accuracies have been achieved since 1985. The retroreflectors were located at the Apollo 11, 14, and 15 sites and the Lunakhod 2 site. The results from the solution are:

	Value	Error
	Units 10 ⁻⁶	
(C-A)/B	631.93	0.76
(B-A)/C	227.95	0.06
C30	-8.3	0.7
C31	35.2	12.
S31	2.9	3.4
C32	4.812	0.035
S32	1.682	0.019
C33	1.66	0.22
S33	-0.30	0.07

A more accurate value of C31 is available from previous analyses of lunar orbiting satellite Doppler tracking data. Two additional lunar solution parameters are the potential Love number, $k = 0.027 \pm 0.006$, and the rotational dissipation, $kT = 0.0048 \pm 0.0002$ days. The coordinates of the retroreflectors were determined with accuracies of a few meters. These results are to be published in the proceedings of the international symposium titled Figure and Dynamics of the Earth, Moon, and Planets.