
Basic analysis of moonquake waveforms from the Apollo missions

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Seismic phenomena on the Moon, known as moonquakes, have been recorded by seismometers deployed during NASA's Apollo missions, and these data are now publicly available. While the long duration and scattering-dominated nature of lunar seismic signals are well established, their implications for structural engineering in future lunar development have not been systematically assessed. In this study, we first review the acquisition and processing of Apollo seismic records and then analyze their characteristics with a focus on engineering-relevant metrics. The results show that shallow moonquakes exhibit dominant seismic energy in the 3–6 Hz band, consistent with earlier seismological findings, and further demonstrate that the distance attenuation of peak ground velocity (PGV) is broadly compatible with empirical attenuation relationships derived for terrestrial earthquakes. This consistency suggests that PGV, a standard engineering intensity measure on Earth, can also serve as a meaningful index for evaluating seismic demands on lunar structures. Based on these findings, we discuss the potential impact of moonquakes on future lunar infrastructure and highlight the need to integrate lunar seismology with earthquake engineering approaches.
