

# Revisiting lunar weather measurements from Apollo 12, 14 & 15

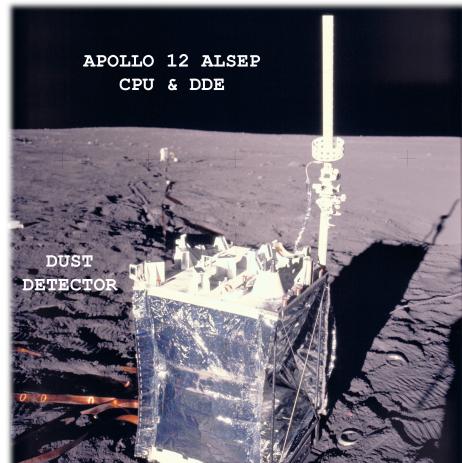
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## Abstract.

We have revisited archives of measurements from the first lunar weather stations, matchbox-sized, 270 g Apollo Dust Detector Experiments (DDEs) about 100 cm above the surface of the Moon near Apollo 12, 14 and 15 landing sites<sup>2</sup>. The measurements included dust accretion, charged particle radiation, and temperature changes – three environmental factors proved during Apollo to affect technical systems deployed on the Moon. A major finding was that over the period of 5-6 years, covered solar cells, protected from low-energy particle radiation, were more degraded by dust accumulation than by particle radiation, but the converse was true for bare solar cells. We also provide the first direct measured long-term net accretion of dust with an upper limit of order 100 Micrograms cm<sup>-2</sup> yr<sup>-1</sup>, equivalent to a layer 1mm thick in 1000 years, with caveats arising from using simulated MLS-1 dust particles.



Apollo 12 Dust Detector Experiment (DDE) situated 100cm above the lunar surface on the Central Processing Unit (CPU)<sup>1</sup>

<sup>1</sup> Source: NASA Apollo Image Atlas, AS12-47-6927

<sup>2</sup>Hollick, M., and B. J. O'Brien (2013), Lunar weather measurements at three Apollo sites 1969-1976, *Space Weather*, 11, doi:10.1002/2013SW000978.