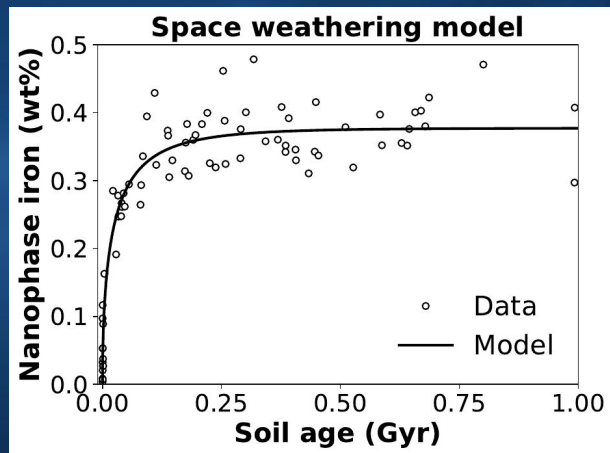


Modeling space weathering in the highlands of the Moon



The far side of Earth's Moon as seen using data from cameras aboard NASA's robotic LRO spacecraft. Credit: NASA/GSFC/ASU



This model (solid curve) reproduces measurements (circles) of the abundance of nanophase iron in the lunar highlands as a function of soil age up to one billion years old.

A recent study suggests that space weathering in the lunar highlands could be driven mainly by micrometeoroid impacts, with a possible contribution from dielectric breakdown (“sparking”).

- Micrometeoroid impacts, solar wind bombardment, and dielectric breakdown caused by solar energetic particles may all cause space weathering on the Moon, but their relative contributions are unknown.
- A team of research scientists created a model (bottom figure) that successfully reproduced orbital measurements of a key space weathering product—submicroscopic iron particles—in the lunar highlands (top figure).
- These modeling results are consistent with most of the submicroscopic iron being created by micrometeoroid impacts and possibly some contribution from dielectric breakdown.
- Results from this work will be applied to the lunar maria and will also aid the interpretation of space weathering observations taken from orbit, such as those collected by the Lunar Reconnaissance Orbiter (LRO).