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Space weathering on Mercury: investigation of the spectra of recent impact craters

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Space weathering is the physical and chemical alteration of planetary surfaces caused by exposure to the space environment and specifically to the solar wind and to micrometeoroid impacts. It is currently the main process affecting the surface of Mercury.

Whereas on most of the surface space weathering appears to have reached saturation, the process is still ongoing in the youngest terrains on the planet: recent impact craters and their ejecta. The lesser degree of space weathering to which these surfaces have been subjected is evident from their higher albedo. However, current knowledge on the effect of space weathering on surface reflectance spectra is insufficient to use it to estimate surface age or establish a correspondence with the spatial distribution of its progenitors.

I present my ongoing study of the spectral properties of fresh impact craters on Mercury. In particular, I have attempted to train a neural network to distinguish crater ages on the basis of their spectra. The ultimate goal is to develop indicators of space weathering that may be used to more effectively quantify its effect across Mercury.

Astrophysics Field

Planetary science, Mercury, spectroscopy

Author: LISSONI, Michele (LIRA, Observatoire de Paris, Université PSL)

Co-auteurs: Dr DORESSOUNDIRAM, Alain (LIRA, Observatoire de Paris); Dr BESSE, Sebastien (ESAC, European Space Agency)

Orateur: LISSONI, Michele (LIRA, Observatoire de Paris, Université PSL)

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