



## **A glance at Model Production Flux ages on Mercury surface**

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Impact craters are the dominant surface features of the solid bodies of the Solar System, caused by asteroid and comet bombardment since the Solar System formation about 4.6 Gyr ago. The study of craters' statistical aspects has been applied successfully as the principal tool in dating planetary surfaces.

Recently, a new planetary chronology, called "Model Production Function (MPF) chronology", has been proposed by Marchi et al. (2009). It relies on an estimate of the crater size-frequency distribution for a specific planet on the basis of theoretical prediction of the impactor flux.

We have applied the MPF chronology to Mercury because of the renewed geologic interest on this planetary surface after the recent MESSENGER flybys that, along with the Mariner 10 acquisitions, allowed coverage of 97.7% of the planet. This extensive study has been carried out as part of the scientific activities within the project of STC/SIMBIOSYS in the BepiColombo mission.

In this context, we have selected some regions on Mercury acquired during the MESSENGER or Mariner 10 flybys. For each region, we mapped the geologic terrains inferring, where possible, their stratigraphic relationships, and we attempted to classify the craters on the basis of their origin (impact-vs-volcanic, primary vs secondary) and degradation. Afterwards, we performed crater counts region by region and derived age estimates by applying the MPF absolute-model chronology.

The results give important hints on the geological evolution of each region, demonstrating prolonged volcanic activity in several basins confirming the recent MESSENGER findings of a Hermean thermal state that could sustain volcanism despite contractional tectonics for a long time.

Ref.

Marchi, S., Mottola, S., Cremonese, G., Massironi, M., and Martellato, E., 2009. A new Chronology for the Moon and Mercury. *Astronomical Journal*, 137, 4936-4948.