



A magnetic time line for Mars

B. Langlais (1), E. Thebault (2), and C. Milbury (1, 3)
(1) LPGNantes, CNRS and Université de Nantes, France;
(2) Institut de Physique du Globe de Paris, Paris Citrance;
(3) Department of Earth and Space Sciences, UCLA, USA.

Abstract

The martian magnetic field results from processes which successively magnetized and demagnetized the rocks of the crust. The fact that the giant impact basins (Hellas, Argyre, Utopia) as well as the northern plains or the large volcanic provinces are not magnetized has been interpreted as a proof that the Martian dynamo was not active when these events took place. This is however inconsistent with the magnetic signature of other smaller features, such as Apollinaris Patera, a shield volcano located close to the equator, or the impact basins Lowell and Antoniadi. These features are associated with magnetic fields with are significantly larger than the one measured in their vicinity. In this paper, we re-examine the magnetic signature of impact craters as it was measured by MGS. We carefully selected the measurements in order to isolate the spatial variations. We then compare the magnetic field observed directly above these volcanoes or basins to the one measured around them. We conclude that the martian dynamo was most likely active when they were formed, between 3.7 and 3.8 Gyrs ago.