



Magnetic field of Mars

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The MAG-ER experiment on board the Mars Global Surveyor spacecraft revealed strong and localized magnetic field anomalies of lithospheric origin. These are the relics of a now extinct, ancient and presumably Earth-like, planetary magnetic field. On the Earth, paleomagnetic studies on rock samples allow the past behavior of the dynamo to be characterized. On Mars, the case is different, as one relies only on altitude measurements of the magnetic field, completed by few analysis on SNCs. The past behavior of the Martian dynamo is thus blurred. The largest impact craters, as well as the volcanic provinces, are devoid of significant magnetic fields. This mean that these destructive events took place after the Martian dynamo had shut down. More knowledge can be gained from the study of magnetization contrasts between magnetized and de-magnetized regions, such as impact craters. Relative timing of the dynamo can accessed through a careful analysis of the impact signatures. Other properties, such as the magnetic paleopole locations, can be inferred. These provide unique views into the early thermal evolution of Mars, and are essential to evaluate what has been the fate of water on Mars.