EPSC Abstracts,
Vol. 2, EPSC2007-A-00076, 2007
European Planetary Science Congress 2007

Climate of the early Mars

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Morphological and mineralogical evidence for the presence of liquid water on the surface of Early Mars invokes the question of habitability and thus the emergence of life on Mars. Atmospheric models, however, encountered severe problems with Early Mars. It seems impossible for a pure CO_2-H_2O-atmosphere, even with up to 3bars of surface pressure, to produce the necessary greenhouse effect and thus allow water to be liquid on the surface. Using a new radiative-convective column model of the Early Mars atmosphere yielded a higher surface temperature than previous studies, but still less than the freezing point of water. These results, however, are encouraging insofar as that an additional methane greenhouse effect might be able to heat the surface sufficiently.