Geophysical Research Abstracts, Vol. 9, 11137, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-11137

Protecting the scientific integrity of Mars

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The Heisenberg's Principle states that it is not possible to observe a physical system without changing its condition. Does a similar principle hold true for biological systems? Certainly not in an absolute sense – but it does hold true in a very practical way. Robotic and human explorers carry with them the indigenous biological burden (= bioburden) of their home. This has lead to the death of native tribes during the ages of discoveries and is still endangering biological systems today through cross-contamination by marine vessels. The same applies to exploration activities carried out in the solar system. The more advanced our messengers into the solar system get, the more difficult it becomes to control the bioburden of these machines. The greatest challenge in this respect is a human endeavor to search for life. Concerns about the biological integrity of solar system bodies was already raised at about the same time mankind set its first step into space – the late 50's. The uncertainty about the existence and distribution of extraterrestrial life only shifted but is by no means closer to a solution today. This presentation will discuss to what extend the search for pre-biotic chemistry, the origin of life and the distribution of life on other plants depends on strict planetary protection constraints.