

research highlights

PLANETARY SCIENCE

Floods in Hesperian Mars

Icarus (in the press); preprint at <https://arxiv.org/abs/1701.07886> (2017)

The presence of large outflow channels around the Chryse Planitia region in the northern hemisphere of Mars is evidence that the planet experienced catastrophic floods generated by the release of groundwater in the Late Hesperian epoch (3.6–3.1 Gyr ago). The Late Hesperian was cold and dry, leading eventually to present-state Mars, but the question of the climatic impact of these localized floods arises: could it be that all this liquid water on the surface and its subsequent evaporation induced a wet and warm climate relatively late in Mars's history, albeit transient? Martin Turbet and collaborators investigate this possibility by means of a state-of-the-art general circulation model.

Within the model, Turbet *et al.* create a sudden discharge of liquid water in the Chryse Planitia region and follow its influence on the Martian environment with time. This task is complicated by our lack of knowledge of the actual conditions of the Late Hesperian atmosphere, so numerous combinations of atmospheric and orbital parameters (surface pressure, radiative effect of clouds, obliquity, and so on) had to be tested. The result, however, is unequivocal: the climatic effect of the floods is very short-term at best and confined to the northern plains, without triggering global warm periods. □

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