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KARST LANDFORMS IN THE INTERIOR LAYERED DEPOSITS IN IANI CHAOS, MARS

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Iani Chaos is a large depression roughly 400 km in diameter located in the equatorial region of Mars (centred at 342.3°E; 2.0°S). Iani Chaos exhibits three main interior layered deposits that display dome-like morphology and an estimated thickness that range between 800 and 1,300 m. The mineralogical characteristic of these interior layered deposits have been previously determined by analysis of the OMEGA data. These deposits appear to consist of magnesium sulphate materials, showing clear signatures of kieserite and gypsum.

A morphological and morphometric survey of the interior layered deposits surface morphologies through an integrated analysis of the available Reconnaissance Orbiter (MRO) High Resolution Imaging Science Experiment (HiRISE) highlighted the presence of depressions of various shapes and sizes.

These closed rimless depressions surrounded entirely by unbroken plains are either bowl-shaped or rounded-elongate shaped, have diameters up of 50 m, display both symmetrical and asymmetrical walls, and concave-up or flat floor geometry.

These landforms lack evidence of wind action or erosional features associated with the evolution of impact craters. In fact, the analysis carried out suggests that they were not built or shaped by wind erosion, and they do not represent impact craters heavily eroded or reworked by geomorphic processes. Thus these morphologic features, are interpreted as doline of polygenetic origin. Moreover, these Martian landforms resemble similarly karst landforms that can be observed both in different karst terrains on the Earth and in other regions of Mars. The water necessary to shape and build these forms probably has been provided by the melting of ice or snow, that can be formed during periods of ice-snow-rich deposition that may occur as the result of changes in the obliquity of Mars.

The karst landforms observed, that appear to display a young erosional age, suggest a climatic change and the presence of liquid water in the late Amazonian age.

