THERMOKARST IN HYDRAE CHASMA, MARS. D. Baioni[1-2] and O. Nesci[1-2], [1]Dipartimento di Scienze Pure e Applicate Università degli Studi di Urbino "Carlo Bo", Campus Scientifico "E.Mattei" località Crocicchia, 61029 Urbino, Italy, davide.baioni@uniurb.it.[2]Planetary Geomorphology Group, Associazione Italiana Geografia Fisica e Geomorfologia (AIGeo).

Introduction: Mars is currently a hyperarid, hypothermal desert and its largest reservoirs of surficial water ice are located at the poles. However, analysis of most recently acquired high-resolution satellite images provided evidence for the possible presence of ice in the planet's tropical and equatorial regions have been found [1] and features attributed to present or previous permafrost or ground ice-related processes at low latitudes or/and equatorial areas of the planet have been identified [2]. Canyon troughs are useful targets for the identification of periglacial features because their interiors function as cold traps, shielding volatile elements from the ablative effects of insolation or wind and preserving icy bodies that would otherwise be removed in an open plain [1].

Hydrae Chasma is one of the smaller chasma of Valles Marineris. It is a circular depression approximately 50 kilometers across and 4 kilometers deep, located to the north of Coprates Chasma and south of Juventae Chasma. The bottom of the chasma is is characterized by the widespread presence of shallow depression morphologies that display different shapes and sizes, whose origin is still unknown. A morphological survey of these landforms within Hydrae Chasma through an analysis of the available Mars images was performed. The features of the landforms were investigated through an integrated analysis of Reconnaissance Orbiter (MRO) High Resolution Imaging Science Experiment (HiRISE) and Context Camera (CTX) data. HiRISE images (included enhanced RGB, IRB and derived stereo anaglyphs images) give enough detail to observe even small characteristics of the landforms.

Results: The analysis highlighted the presence of landforms interpreted as due to thermokarst processes, resembling similarly ice-related landforms found both in the cold-climate non-glacial regions of Earth, and in other areas of Mars. The thermokarst depressions display a variety of plan forms ranging from rounded, elliptical, to drop-like. The depressions have both symmetrical and asymmetrical sides with steep sloping to almost vertical walls The floors are apparently flat, and in some case the floors appear slightly shifted toward one side of the depressions. It can be observed two main kinds of depressions. The bigger depressions display well-defined, continuous and sharp margins and the sides appear to lack slope processes at the foot (Fig. 1). In contrast, smaller depressions have more degraded margins and show slope processes due to erosion at the foot. Moreover, some smaller depressions display channel features with linear or sinuous trends (Fig. 2).

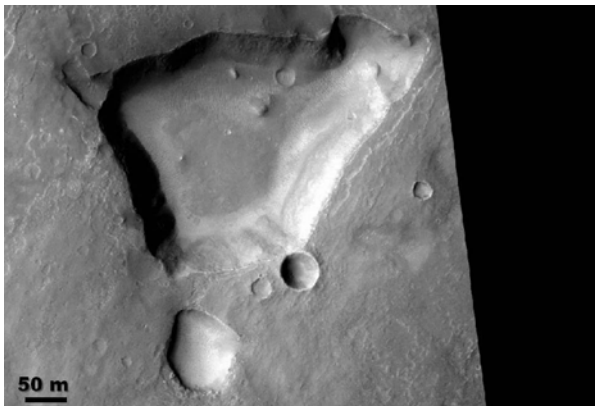

Figure 1: Large thermokarst depression displaying sharp margins. (Image CTX G03_19336_1734; north toward up).

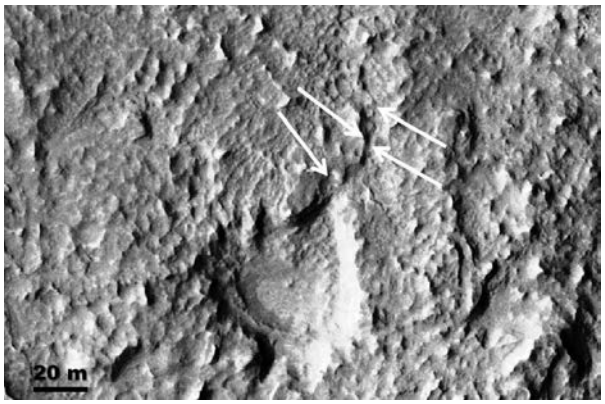

Figure 2: Smaller thermokarst depression displaying eroded margins and outflow channel (white arrows). (Image CTX G03_19336_1734; north toward up).

Summary: Based on their similarities with features on the Earth and Mars, and after to discard other possible origins we interpreted the investigated landforms in Hydrae Chsma as thermokarst. We believe that the formation of the investigated landforms is consistent with the occurrence of ice-rich regolith and periglacial processes. These landforms suggest a response to climatologic change. Thus, they highlight the presence of ice at this latitude, probably in the Amazonian period.

References: [1] Shean D.E. (2010) *GRL, 37, L24202*. [2] Warner N. et al. (2010) *Geology, 32,* 71-74.