Evidence for a paleolake in Galaxias Chaos, NW Elysium Planitia, Mars. J. W. Nussbaumer, Johannes Gutenberg University, Mainz, Germany

Introduction: Galaxias Chaos is located on the northern border of the Elyisum volcanic complex. Chaos terrain (or chaotic terrain) is a planetary surface area where features such as ridges, cracks, and plains appear jumbled and enmeshed with one another (1). Some parts of chaotic terrains have not collapsed completely—they are still formed into large mesas, so they may still contain water ice. Galaxias Chaos has been attributed to ground disturbance due to sublimation in shallow subsurface ice-rich deposits (2).

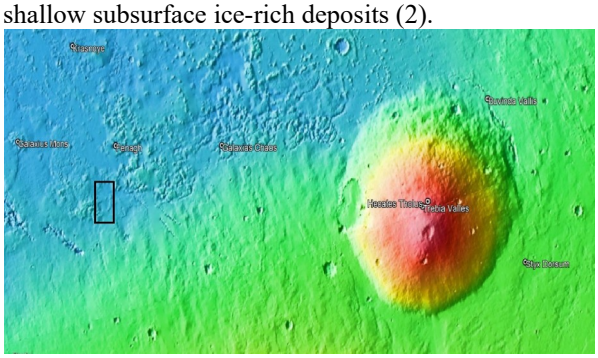

Fig. 1: Overview of the investigated area, the black rectangle represents the position of the hypothesized paleolake.

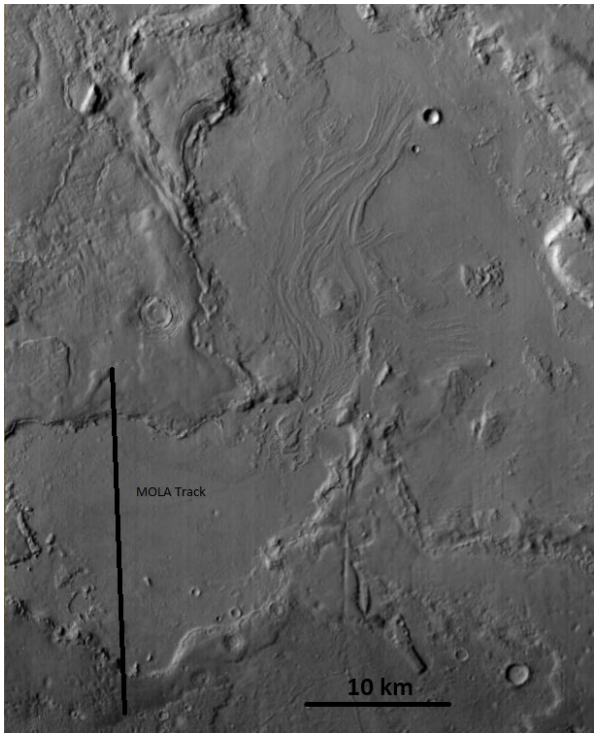

Fig. 2: Paleolake deposits west of Hecates Tholus volcano south of galaxias chaos. CTX image. The line marks the position of a MOLA profile (Fig. 3).

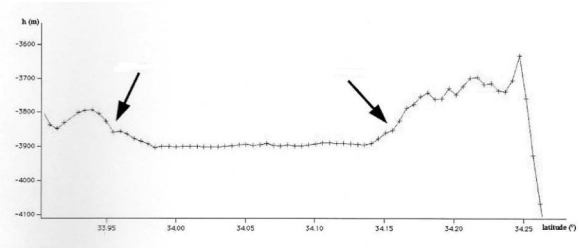

Fig. 3: Mars Orbiter laser altimeter (MOLA) profile across the proposed paleolake in Fig. 2 shows typical cross-sectional profiles of lakes in Fig 4.

A paleolake near the Hecates Tholus volcano

Due to volcanic and thermal activity, a lake formed west of the Hecates volcano from water reservoirs or lakes from Jokulhlaups (3). A Jokulhlaup is a sudden outbreak of water under a layer of ice. The word "Jokulhlaup" is Icelandic language and means catastrophic floods due to volcanic activity under glaciers. The leaked water flowed into a basin and formed a lake. There are similarities between the edges of this flat surface and shoreline complexes in Fig. 4. These are cross sections through paleolakes in arid zones. Varying hills mark paleo water levels.

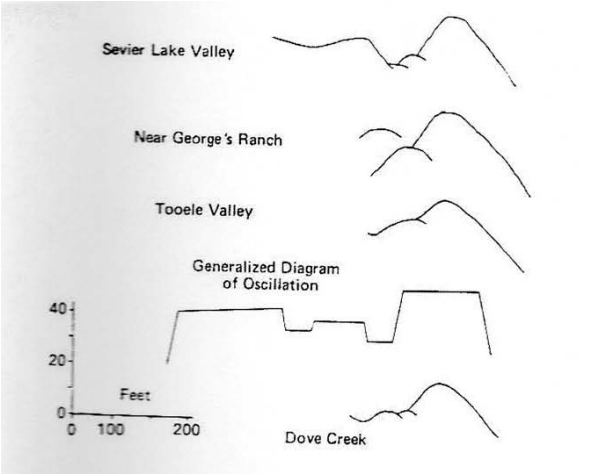

Fig. 4: Cross-sectional profiles of paleolakes on Earth.

References: [1] Wikipedia [2] Pedersen, G. B. M. and Head, J. W. (2011) Icarus 211, 316–329. [3] Mouginis Mark, P. (1985) Icarus 64, 265-284. [4] Gilbert, C. K. (1895) Journal of Geology, 3, 47-49.