

# WATER, MAGMA AND TECTONICS AT ELYSIUM REGION, MARS: A REVIEW

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## Abstract

The Elysium volcanic province is located within the martian lowlands where ancient oceans and lakes are reported to have existed during distinct periods of geologic activity on Mars (e.g. Baker *et al.*, 1991, Scott *et al.*, 1995; Fairén *et al.*, 2003). In and near this water-enriched province, several feature types collectively indicate recent geologic activity, including magma-triggered hydrologic activity. Such putative recent activity is highlighted by pristine lava flows with few if any superposed impact craters (e.g. Plescia, 2002), tectonic structures that cut Amazonian materials (eg., Greeley & Guest, 1987; Tanaka *et al.*, 1992), and structurally-controlled releases of water that resulted in distinct fluvially-etched landscapes, such as at Marte Vallis southeast of Elysium (e.g., Burr *et al.*, 2002); Marte is a channel system that sourced from a large basement structure in relatively recent geological time (estimated within the last few million years). Other notable recent interactions of magma, water, and tectonism reported for this region include possible lava and mud flows near Cerberus Rupes fossae system at Southeast part of Elysium volcanic edifice (e.g. Plescia 2003, Sakimoto & Gregg, 2004), and possible lahars that were emplaced within the Southeast part of the Utopia basin from the Elysium volcanic province and deformed terrain in the Galaxias Chaos region (e.g. DeHon *et al.*, 1999; Skinner & Tanaka, 2001; Hoffman & Tanaka, 2002; Peitersen & Bare, 2002; Russell & Head, 2003).

Within the scope of this geological investigation, a synthesis of previous works that report the magmatic-driven activity in this dynamic region of Mars form the basis for establishing prime locations for future exploration where interactions of magma, tectonism, and/or water are clear. Coupled with the synthesis of past works, we are performing small-scale geological mapping using new available data in order to help resolve remaining questions about the relation between magma, tectonism, and water (de Pablo *et al.*, 2005).

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