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# Geomorphologic evidences of water level changes on Nepenthes Mensae, Mars.

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Water level changes on the ocean covering the northern plains of Mars is an old hypothesis (see Fairén *et al*. (2003) for a review) longer supported by different geomorphological, geological, and climatic evidences. The existence of different shorelines near the Martian dichotomy is one of those main evidences of water level decrease of this ocean and the derived seas and lakes in the Martian lowlands. A detailed analysis of some geomorphological features at Nepenthes Mensae, allowed us to propose the existence of sea level variations in this region of Mars, where the shorelines previously described for other martian regions are not geomorphologically recognizable here.

Nepenthes Mesae area (2.5ºN, 122ºE) on Mars, is characterized by the topographic scarp and abundant mesas and fretted terrain. Using MOC, THEMIS, MOLA and HRSC data from this area, we recognize two different deltaic deposits together the topographic scarp of the dichotomy and related with a channel coming from the highlands through a SW-NE fault. The most pristine delta is a Gilbert-type delta (Irwin et al., 2005; de Pablo & Pacifici, 2006) about 6 km in radius. Apron of this delta is located at -1790 meters in altitude with a high slope flank about 300 meters high. Its surface is only modified by few small impact craters and a narrow and shallow channel. This delta seems to be covering other possible fluvial delta 4 km long and 8 km wide. With those observations we propose a possible evolution of the water level in this Martian region. This evolution include two steps: (1) a first stage in which the water level increase until to reach an altitude something lower than the maximum level of Oceanus Borealis and the higher shoreline previously proposed (see Fairén *et al*. (2003) for a

review): -1680 meters. During this time, water coming through a channel from the highlands contributed with sediments for to built a flat delta about 10 km long. Water level increase, possibly related to the tectonic activity at the Nepenthes scarp (Watters, 2003), should happen in order to allow a new and abundant sedimentary deposition at the mouth of the channel forming a Gilbert-type delta. This type of delta is indicative of high differences in density between water of channel (higher) and sea (lower). (2) The second stage includes a fast water level decrease. The pristine morphology of the Gilbert-type delta agrees with this interpretation. There are not regional shorelines in this area of the Martian boundary indicating a gradual descent of water level.

This interpretation of the evolution of water sheet in this area is important for to contrast with other regional and local evidences of water level changes and for to understand the climatic and geologic history of Mars.

**References**

de Pablo & Pacifici, 2006. $1^{st}$ *EuroPlanet Meeting*. Abstract EPSC2006-A-00447.

Fairen *et al*., 2003. *Icarus*, 165. 53-67.

Irwin, et al., 2005. *JGR*, 110. 1029/2005JE002460

Watters, 2003. *Geology*, 31. 271-274.