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SEQUENCE STRATIGRAPHY OF THE EBERSWALDE FAN DELTA (MARS) M. Pondrelli[1], A. P. Rossi[2], L. Marinangeli[1], E. Hauber[3], K. Gwinner[3], A. Baliva[1], S. Di Lorenzo[1]. [1]IRSPS, viale Pindaro 42, Pescara, Italy. [2]RSSD, ESA-ESTEC, Keplerlaan 1, Noordwijk, The Netherlands. [3]DLR, Ruthefordstrasse 2, Berlin, Germany. monica@irsps.unich.it

Introduction: The Eberswalde crater is located immediately Northeast of the Holden crater [1]. The fan delta cropping out in the westernmost part of the crater, extending over an area of about 138 km^2, is the most outstanding feature inside the crater [2-8]. Our aim is to contribute to the debate about the formation of the sedimentary deposits. In order to achieve these results, a detailed geological analysis has been performed. MOC narrow angle images are available across all of the study area, while HRSC images with a resolution up to 12.5 m/pix allow detailed analysis even in the areas not covered by MOC narrow angle. Moreover, a recently released HiRise image covers part of the delta-like feature. Topographic reconstruction has been highly improved by the HRSC DEM, but MOLA data have been also used.

Morphofacies analysis: Delta plain, delta front and prodelta depositional environments can be distinguished in the fan delta [8]. In the delta plain, distributary channels, mainly meandering but also rectilinear and possibly braided, and interdistributary areas, in which crevasse splays are particularly well exposed, are present. "Normal" traction processes, suggested by the presence of point bars and crevasse splays appear to have been dominant in the delta plain.

In the delta front, layers which gently dip toward the basin in the delta plain become more inclined, then again sub-horizontal to connect with the crater floor. This pattern represents the topset-foreset-bottomset geometry which is typical of some kind of fan deltas [8].

Sequence stratigraphy: The relative stratigraphy of the five recognized deltaic lobes has been assessed using cross-cutting relationships and a tentative reconstruction of the depositional architecture has been carried in order to try and understand the evolution of the depositional environments through time (Fig. 1).

The reconstructed depositional architecture has been interpreted in terms of base level change in order to infer the water table fluctuation. Depositional sequences have been hypothesized considering the geometries of the layers, such as onlap, offlap and downlap, the distal extension and the depth of the different lobes and the morphology of the relative distributary channels and delta front deposits.

We speculate that the depositional architecture consists of three major cycles, which we tentatively interpret as depositional sequences, formed between two episodes of water level drop (Fig. 2). The overall trend appears to show a decreasing of the water level through time (Fig. 2).

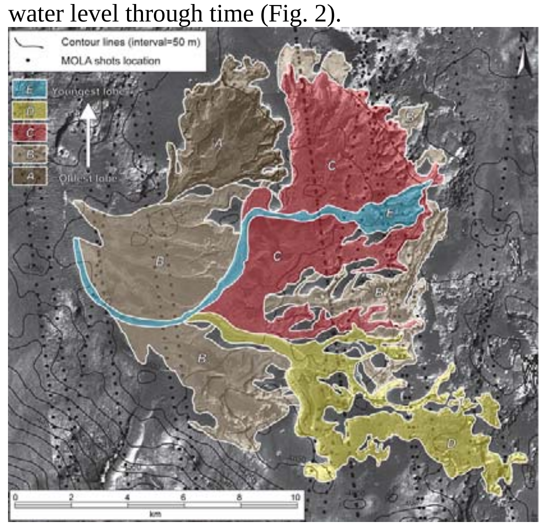

Figure 1. Map of the different lobes of the Eberswalde fan delta. Each lobe correspond to a different stage of the evolution of the delta and consequently of the putative lake. Relative stratigraphy of the lobes has been inferred through the evaluation of cross cutting relationships.

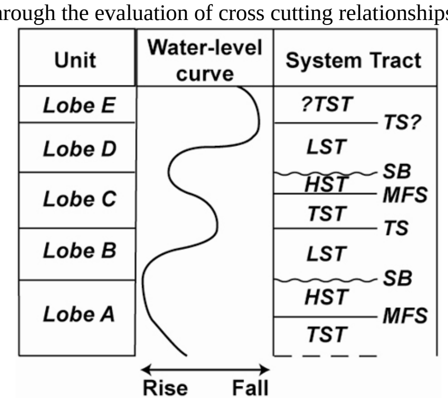

Figure 2. Tentative reconstruction of the depositional architecture and the related water-level fluctuations.

According to this scenario the evolution of the Eberswalde fan delta appears to be controlled by allogenic processes which would cause fluctuations of the level of the water table in the lake and consequently switching among the deltaic lobes.

References: [1] Pondrelli, M. et al. (2005) *JGR, 110*, E04016. [2] Malin, M.C. and K.S. Edgett, (2003) *Science, 302,* 1931-1934. [3] Moore, J.M. et al. (2003) *GRL, 30,* 24, 2292. [4] Jerolmack, D.J. et al. (2004) *GRL, 31*, L21701. [5] Bhattacharya, J.P. et al. (2005) *GRL, 32*, L10201. [6] Lewis, K.W., Aharanson, O. (2006) *JGR*, 111, E06001, doi: 10.1029/2005JE002558. [7] Wood L.J. (2006) *GSA Bulletin,* 118, 557-566; doi: 10.1130/B25822.1. [8] Pondrelli, M. et al. (2006) *Lunar Planet. Sci.*, 37, Abstract 1555.