



Comparative analysis between Payen and Daedalia Planum lava fields

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The Payen volcanic complex is a large Quaternary fissural structure belonging to the back-arc extensional area of the Andes in the Mendoza Province (Argentina). From the eastern portion of this volcanic structure huge pahoehoe lava flows were emitted, extending more than 180 km from the feeding vents. These huge flows propagated over the nearly flat surface of the Pampean foreland (ca. 0.3° slope). The very low viscosity of the olivine basalt lavas, coupled with the inflation process are the most probable explanation for their considerable length. In an inflation process a thin viscoelastic crust, produced at an early stage, is later inflated by the underlying fluid core, which remains hot and fluid thanks to the thermal-shield effect of the crust. The inflation shows some typical morphological fingerprints like tumuli, lava lobes, lava rises and lava ridges. In order to compare the morphology of the argentinian Payen flows with lava flows on Mars, MOLA, THEMIS, MOC, MRO/HIRISE, and MEX/OMEGA data have been analysed, providing a multi-scale characterisation of Martian flows. Mars Global Surveyor/MOLA data were used to investigate the topographic environment over which flows propagated on Mars in order to detect very low angle slopes where possibly inflation processes could have developed. Then Mars Odyssey/THEMIS and Mars Global Surveyor's MOC data were used to detect Martian lava flows with in-

flations “fingerprints”, whereas OMEGA data were used to obtain some inferences about their composition. In particular in Daedalia Planum, at about 300 km southwest of Arsia Mons, some lava flows with morphological similarities with the longest flows of the Payen lava fields were found. This work presents also the analysis of MRO/HIRISE images recently acquired, that provide further details and constraints on surface morphologies and lava fronts of the Daedalia flows. The analysis revealed striking morphological analogies between Martian lava flows and the Payen Matru basaltic flows, which will be further analysed by means of analytical and numerical models.