Geophysical Research Abstracts
Vol. 12, EGU2010-10568, 2010
EGU General Assembly 2010

Catastrophic flood of the Mediterranean after the Messinian Salinity Crisis. Insights from river incision models and geophysical evidence.

Daniel Garcia-Castellanos (1), Ferran Estrada (2), Ivone Jiménez-Munt (1), Christian Gorini (3), Manel Fernàndez (1), Jaume Vergés (1), and Raquel De Vicente (1)

(1) Inst. Ciencias de la Tierra Jaume Almera - ICTJA-CSIC, Barcelona, Spain (danielgc@ictja.csic.es), (2) Inst. Ciències del Mar, CSIC, Barcelona, Spain , (3) Université Pierre et Marie Curie, Paris, France

The Mediterranean Sea was disconnected from the world's oceans for hundreds of thousands of years during the Messinian Salinity Crisis, when it became largely empty by evaporation. The flood that put an end to this desiccation is the largest known in Earth's history, yet its abruptness and evolution remain poorly constrained. Borehole and seismic data show >250 m-deep incisions on both sides of the Gibraltar Strait that have been previously attributed to fluvial erosion during the desiccation. Here we show the continuity of this 200 km-long channel across the strait and explain its morphology as the result of erosion by the flooding waters, adopting an incision model validated in mountain rivers. This model in turn allows an estimation of the duration of the flood. Feedback between water flow and incision in the early stages of flooding implied discharges of about 10^8 m3 s-1 (three orders of magnitude larger than the present Amazon River) and incision rates above 0.4 m/day. Although the flood started at low water discharges that may have lasted for up to several thousand years, 90% of the water was transferred in a short period ranging from a few months to 2 years.