Geophysical Research Abstracts
Vol. 21, EGU2019-16106, 2019
EGU General Assembly 2019

Tectonic forces and sediment influx grain size changes during the evolution of a young rift: new data from IODP Expedition 381 (Gulf of Corinth, Greece)

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The evolution of young rifts and their sedimentary sequences are expected to be directly controlled by the combined action of tectonic and climatic processes, yet few and discontinuous geological records exist to confirm this hypothesis and to assess the impact of these processes through time. International Ocean Discovery Program (IODP) Expedition 381 has recently recovered an unprecedented continuous and long sequence of syn-rift deposits from the young rift of the Gulf of Corinth (Greece). This sequence provides a unique high-resolution record of sediment flux and paleoenvironmental changes when a young rift system begins to connect to the global oceans. Here we report results from anisotropy of magnetic susceptibility (AMS), anisotropy of anhysteretic remanent magnetization (AARM), and partial anhysteretic remanent magnetization (pARM) acquisition curves from Hole M0078A (central Gulf of Corinth) showing the variation of tectonic strain and grain size of the magnetic minerals over the last ~750,000 years, when the Corinth basin repeatedly switched back and forth between isolated to marine conditions due to Quaternary sea level fluctuation. While, on the one hand, AMS and AARM data have allowed for the first time a high-resolution reconstruction of the evolution of the tectonic regime associated with the evolution of a young rift, on the other hand the pARM data have been instrumental to constrain (and test) the expected climate-driven variation of grain size in marine (i.e. inter-glacial) and isolated (i.e. glacial) units.