

EGU21-6135

<https://doi.org/10.5194/egusphere-egu21-6135>

EGU General Assembly 2021

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



## Tectonic controls on the sedimentation patterns in the Danakil Depression, Afar, Ethiopia

Valentin Rime<sup>1</sup>, Anneleen Foubert<sup>1</sup>, Léa Perrochet<sup>1,2</sup>, David Jaramillo-Vogel<sup>1,3</sup>, Haileyesus Negga<sup>1</sup>, Balemwal Atnafu<sup>4</sup>, and Tesfaye Kidane<sup>4,5</sup>

<sup>1</sup>Department of Geosciences, University of Fribourg, Fribourg, Switzerland

<sup>2</sup>Centre for Hydrogeology and Geothermics (CHYN), University of Neuchâtel, Neuchâtel, Switzerland

<sup>3</sup>Particle Vision GmbH, Fribourg, Switzerland

<sup>4</sup>School of Earth Sciences, Addis Ababa University, Addis Ababa, Ethiopia

<sup>5</sup>School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal, Durban, South Africa

The Danakil depression in the northern part of the Afar is the only modern example of a rift undergoing the active transition from continental to marine settings, a crucial stage in rift and passive margin development. Thick evaporite deposits in its central part, and fringing Pleistocene coralgal reef terraces along its margins evidence at least four Red Sea incursions in to the basin and subsequent desiccation. The two youngest coralgal reef terraces were dated as respectively MIS 5e and MIS 7. Recent field expeditions measuring the paleo-shorelines' elevation provide a precious record of neotectonic activity in the basin. The margins show varied uplift while outcrops situated closer to the rift axis subsided below sea level. MIS 7 sediments at the northern, western margin, were uplifted up to 170 masl. Neotectonic movements are smaller on the eastern margin of the Danakil depression but moderate uplift was sufficient to avoid flooding of the depression during the Holocene. Syn-rift sedimentary patterns in the Danakil basin illustrate that the transition from continental to marine conditions is not gradual but marked by alternating marine and continental episodes. This alternation is controlled by the interaction between eustatic, tectonic and volcanic processes. Significant increase in accommodation space and sediment deposition can happen at very short time intervals.