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Quantifying Knick Point Migration Rates Related to the Messinian Crisis. The Case of the Nile River

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The Messinian crisis is a temporally well-constrained period between 5.3 my and 5.9 my, when the strait of Gibraltar was tectonically closed and the Mediterranean Sea had consequently desiccated. This dramatic base level drop by about 1500 vertical meters had a profound influence on the geomorphic evolution of the major drainages surrounding the Mediterranean basin. In particular, it caused substantial knickpoints in the major rivers including the Rhone, the Ebro, the Po and the Nile. While the knickpoints of the Rhone and Ebro have been studied previously and the knickpoints created by the Po may lie today underneath the Po plains, the knickpoint and its migration along the Nile has not been studied and would have migrated along its current river channel. In this contribution we focus on numerical modelling of the knickpoint migration in the Nile and use our modelling results in comparison with the present day morphological analyses of the river to constrain absolute migration rates. We suspect that the first Nile cataract near Assuan, some 1000 km upstream of today's river mouth may be the relict of the Messinian salinity crisis making it to one of the fastest migrating knickpoints in the world.