Project title: **Regional climate of the past 2000 years in the Eastern Mediterranean, the Middle East and the Nile river basin based on COSMO-CLM**

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Abstract

The Eastern Mediterranean (EM), the Middle East (ME) and the Nile river basin (Nile) are affected by multiple large- and meso-scale atmospheric circulations as for example the Indian summer monsoon (ISM), the South Asian summer monsoon (SAM), the North Atlantic oscillation (NAO) and the Southern oscillation index (SoI). It also offers a broad spectrum of long high-quality instrumental time series, documentary information and natural archives, both in time and space. Yet, recent reviews revealed that the paleoclimate modelling with low horizontal resolution cannot fully help to understand the interactions of the multiple atmospheric patterns and bridge the climate with major social-historical events. Thus, there is a need for improving processes of the dynamical atmospheric circulation by integrating high-resolution regional climate modelling into paleo applications. Furthermore, close the gap between the coarse resolution of climate models and the regional to local scale covered by proxy and historical evidence. The RCM COSMO-CLM (CCLM) will be used in an adjusted palaeoclimate version (orbital, solar and volcanic forcing will be adjusted properly) and past climate greenhouse gas concentrations will be used in this project. Simulations will be performed with 0.44° and 0.11° spatial resolution on a domain including EM, ME and Nile that is embedded into the Cordex-MENA domain. Test-simulations with CCLM on Mistral have already shown good results compared to observational and reanalysis data sets.