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3D thermal history and maturity modelling of the Levant Basin and Margin

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The gas discoveries recorded in the Levant Basin in the last decade have redirected the industrial and academic communities' interest to this frontier basin and its surroundings. The reported gas in Miocene reservoirs has been assumed to be derived from biogenic sources, although little data has been published so far. The thickness of the sedimentary column and the presence of direct hydrocarbon indicators (DHI) observed in the seismic data suggest the presence of promising prospective thermogenic petroleum systems in deeper intervals in the Levant Basin and along its Margin.

In this study we present a large scale 3D thermal history and maturity model of the Levant Basin and Margin, integrating all available calibration data, source rock information collected from onshore Lebanon, and published data. In the first part we will present the main input and assumptions that were made in terms of thicknesses, lithologies, and boundary conditions. In the second part we will discuss the analysed source rocks, their petroleum generation potential and their kinetics. In the third part we will present modelling results including depth maps for key isotherms in addition to transformation ratio and vitrinite reflectance maps for proven and speculative source rocks at different time steps. This will provide a comprehensive assessment of the potential thermogenic petroleum systems in the study area, and allow us to illustrate and discuss the differences between the basinal, marginal, and onshore part of the study area as well as the potential of the northern vis a vis the southern offshore Levant Basin.

This model will also allow us to analyse the sensitivity of the system to the various poorly constrained parameters in frontier basins (e.g. crustal thickness, rifting phases, lithologies) and thus identify the most critical data to be collected for future exploration and de-risking strategies.