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Past circulation of the Mediterranean Sea: Applying a hierarchy of models

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The Late Cenozoic sedimentary record of the Mediterranean region holds the clue to fundamental insight into the workings of the system comprised of lithosphere, ocean, and atmosphere. Straddling the boundary between two converging plates the region underwent profound changes in geometry. In the Early Miocene the Mediterranean Sea occupies a central position between the Atlantic Ocean and the Indian Ocean and is well connected to the various basins of the Paratethys. With time these connections change in nature and some disappear altogether. Understanding how the circulation and water properties of the Mediterranean Sea responded to these paleogeographical changes and how the evolving climate played a role in this, forms the focus on our work. More specifically, we aim to contribute insight by using quantitative models. In this talk I will use the complexity of the model as a guidance and show how models of increasing sophistication can be used to tackle a range of problems. In each case we will discuss possibilities as well as limitations of the type of model being employed and pay special attention to the link between model and geological observations.