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Geodynamics of deep basins

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This contribution is focussed on the geodynamics of episutural basins, which are developed on a thickened continental crust and have undergone a large subsidence driven by processes other than the classic extension with rifting and break-up. A key target area to understand the geodynamics of these deep basins and related processes is the Western Mediterranean. The Western Mediterranean basins and their margins show distinctive characteristics: a) they can be floored either by oceanic or continental crust; b) they developed within a convergent tectonic setting and are surrounded by a collisional belt; c) they evolved in a variable tectonic regime resulting in a diversity of structural styles dominated by wrench tectonics; d) they show narrow shelves and steep slopes; e) they show a large seismic activity; and f) they show widespread volcanism with different geodynamic signature. The integration of recent geological and geophysical studies allows us to better understand the mechanisms that generated the basins and that operated during their evolution, as well as the interaction between deep and shallow proceses, which is a major theme in the EUROMARGINS programme. An overview of the state of the art of geodynamic models, as well as the main related goals pursued by the projects under the EUROMARGINS framework, is presented. Among the key questions that deserve further studies are: a) the continuity of the Iberian and North-African forelands beneath the Gibraltar Arc System (GAS); b) the location of the ocean-continental boundaries in the Atlantic and the Mediterranean domains; c) the interaction between the Atlas range and the GAS; and d) the geodynamic engine that triggered the ENE-WSW extension since 27 Ma to 7 Ma, and which is responsible for the formation of the GAS.