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Plio-Quaternary Reorganization of the Arabia-Eurasia Collision

Structural traps in petroleum provinces of the Arabia-Eurasia collision zone commonly developed since ~ 5 Ma. This category includes folds of the Zagros and the South Caspian Basin. Trap development coincided with a major reorganisation in the collision zone in the last 5 million years, shown by the initiation of deformation or acceleration of strain rates in many regions. Major fold growth in the Zagros Simple Folded Zone and in the South Caspian Basin began at ~ 3-5 Ma. This is the same time as the start of westward extrusion of Anatolia, between the North and East Anatolian faults, and roughly coincident with an increase in exhumation rates in the Greater Caucasus. Slip rates on the Dead Sea Fault System doubled in the early Pliocene-Quaternary interval, to ~ 10 mm/yr. There are several possible explanations for this reorganisation. (1) Arabia accelerated from Africa at ~ 5 Ma, as oceanic spreading began in the Red Sea. (2) Prior to 5 Ma, strain may have been taken up in northern parts of the Arabian margin, now imbricated within the High Zagros. (3) Construction of the Turkish-Iranian Plateau took place in the late Miocene, but ceased at about 5 Ma, possibly because it became easier to shorten and thicken the crust in peripheral areas of the collision zone than to continue uplifting the plateau. Quantification of this tectonic reorganisation is important for understanding the evolution of hydrocarbon systems on the Arabian plate and in southwest Eurasia.