

# **GPS Constraints on Continental Deformation in the Africa-Arabia-Eurasia Continental Collision Zone and Implications for the Dynamics of Plate Interactions**

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We Present a GPS-derived velocity field (1988-2005) for the zone of interaction of the Arabian, African (Nubian and Somalian) and Eurasian plates. The Velocity field indicates counterclockwise motion of a broad area of the Earth's surface that includes the Arabian plate, adjacent parts of the Zagros and Central Iran, Turkey and the Aegean at rates in the range of 20 – 30 mm/yr. This relatively rapid motion occurs within the framework of the slow-moving (<5 mm/yr relative motions) Eurasian, Nubian and Somalian plates. The circulatory pattern of motion increases in rate towards the Hellenic trench system, suggesting that subduction in the eastern Mediterranean is the dominant process responsible for regional deformation. Using seismic and other geophysical and geological information, we develop an elastic block model and use the GPS velocity field to estimate relative block motions. This model provides a reasonable fit to the observed motions with the principal block boundaries corresponding to known seismically active faults (e.g. Sinai and Marmara regions). The GPS observations for Sinai imply that the Sinai Peninsula and Levant region comprise a separate sub-plate sandwiched between the Arabian and Nubian plates.