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"Subduction initiation along a passive continental margin: Insights from the Mesozoic arc north of the Neo-Tethys in Iran"

Abstract:

Subduction is the major driver for plate movement, but how it initiates is poorly understood. Current understanding of the physics of subduction initiation is primarily based on numerical modeling of modern oceans, but the kinematics of how an intraoceanic system develops into a full-blown Andean-type margin are cryptic, unless the margin simply initiates along an old passive margin. The birth of a convergent margin of Andean-type is by far the least understood because there are no obvious on-going conversions of passive margins into active ones. We suggest that investigation of the rock record can be used for clarifying this important geodynamic problem. In particular, calc-alkaline magmatic suites preserved in continents are reliable indicators of the presence of ancient subduction zones. Within the greater Alpine-Himalayan collision belt information is now emerging for the Mesozoic Neo-Tethyan continental margin, along a major segment of the belt in Iran known as the Sanandaj-Sirjan belt. The ancient arc is remarkably well preserved in the forearc region of the younger Urumeiah-Doktor arc of Cenozoic age, and is thus ideal for investigating 1) the timing of subduction nucleation, 2) the propagation rates, and 3) the contributing external force.