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Discussion on "Dextral transpression in Late Cretaceous continental collision, Sanandaj–Sirjan Zone, western Iran" [Journal of Structural Geology, 22(8) (2000) 1125–1139]

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The NW–SE trending Alpine Zagros Thrust Belt passes from southwest Iran into northeastern Iraq. Mohajjel and Fergusson contend in their work in Iran on the Sanandaj–Sirjan Zone (with a consistent Zagros trend) that collision of the Afro–Arabian continent and the Iranian microcontinent took place in the Late Cretaceous. It seems that tectono-stratigraphic evidence from the neighbouring Iraqi territories, namely the Zagros Thrust Belt in the northern part, the Foreland Belt and the Quasiplatform of the north and the Platform in the western and southern deserts (Fig. 1), chronicles the subductional history in this part of the world to a fair degree of accuracy. It rather provides for an Eocene age of the continental collision between Arabia and the Iranian microcontinent.

The first phase of folding in the Cretaceous succession in Iraq is related to the beginning of subduction beneath the Turkish and Iranian plates. It is marked in the northeastern part of Iraq by the Qulqula radiolarites, the Khwakurk Series (cherts with volcanics) and the Penjwin–Shlair Valley complex (pyroxene–biotite and tuffaceous schists together with amphibolites, andesitic porpherites and silty–clayey schists). Widespread Early Cretaceous folding has also been recorded in Iran (Stocklin, 1968). This folding phase in north and northeastern Iraq and in Iran corresponds to the Berriasian–Aptian haitus in the platform area in the western and southern deserts of Iraq (Tamar Agha et al., 1997). It also corresponds to the young Kimmerian orogenic phase of Stille in Europe (De Sitter, 1964). The obduction of the Iraqi suture zone ophiolites in the Aptian–Cenomanian interval (Numan, 1997) was concurrent with two phases of folding in the Late Albian and the Late Cenomanian. These two phases of folding correspond to the first and second Alpine orogenic phases of Stille in Europe (De Sitter, 1964). Evidence from sedimentary breaks in the Quasiplatform and Platform areas in Iraq suggests that the Late Cenomanian movements continued to the Early Campanian and were responsible for the Coniacian–Santonian haitus in the Platform area of the western and southern deserts of Iraq. This haitus was in our view induced by the additional compression on the passive continental margin of Arabia due to the 'roll-back' mechanism of the subducted slab underneath the active continental margin of Iran, together with the ensuing back-arc spreading in the manner described by Uyeda (1983) and Otsuki (1989), i.e. transformation from Chilean- to Mariana-type subduction.

Prevalence of subduction of the Neo-Tethyan oceanic crust over generation of new oceanic crust led to narrowing of the Neo-Tethyan ocean (Stonely, 1981). Uplifting of the Iranian and Turkish plate margins by the incessant under-riding of the oceanic crust led to the deposition of the Red Bed Series in the subduction zone.

The tectonic facies of the Naopurdan Group (marly shales, conglomerates, limestones and lava flows), the Walash Volcanics (shales, red mudstones, phyllites and basaltic pillow lavas together with agglomerates) and the Gimo–Qandil Group (phyllites, marbles, calc schists, pillow lavas and conglomerates) represent the fore-arc, arc and back-arc depositions, respectively, throughout the Paleocene and in the Eocene. The sedimentary record of the Foreland Belt of northern Iraq suggests that the Neo-Tethys ocean was finally closed in the Eocene, marking the beginning of the continent–continent collision, which was also coeval with the opening of the Red Sea (Bermert and Ormond, 1981). The rock successions on the active continental margins of the Turkish and Iranian plates and those on the passive Arabian continental margin were thus juxtaposed both sedimentationally and tectonically (Numan, 1997). During the Eocene, the continental Gercus Red Beds swept over from the overriding masses of Iran and Turkey onto the Arabian margin. Epicontinental seas and lagoons prevailed in the Foreland Belt of Iraq. The lagoonal Pilaspi Limestone Formation of Eocene age in the Iraqi Foreland Belt interfingers towards the suture zone with the continental Gercus Red Beds.

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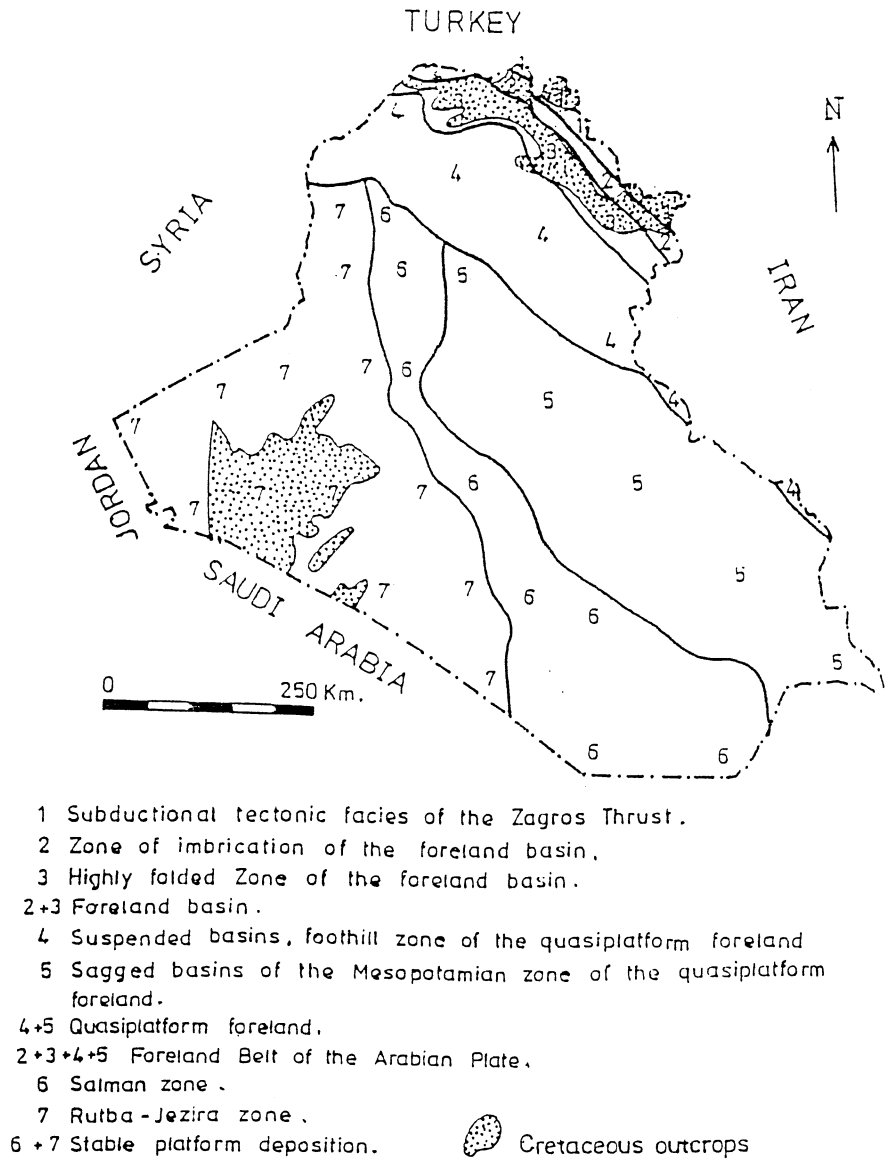

Fig. 1. Cretaceous outcrops and major tectonic divisions in Iraq.

Tectonically, it is interesting to note that Mohajjel and Fergusson's dextral transpression in the Iranian hinterland mirrors across the subduction zone into sinistral transpression in the Iraqi foreland as a result of oblique collision (Numan, 2000) and anticlockwise rotation of Arabia (Hancock and Atiya, 1979).

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