The Baluti Formation of Kurdistan, Iraq: Correlation from the Outcrop Type Section to the Subsurface and the Implications for Local and Regional Stratigraphy

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ABSTRACT

The Baluti Formation is a lithostratigraphic unit defined at outcrop in Kurdistan, North Iraq. Its age is poorly constrained in original type section definition, but is herein firmly established as Carnian, the upper beds probably extend into the Norian. The Baluti occurs below the Sarki and above the Kurra Chine formations, both also defined at outcrop. In the subsurface, an additional formation, the Butmah, is defined that has long been considered directly correlative to the Sarki, but new dating reveals the subsurface shale correlative to the Baluti occurs well above the base of the type Butmah. That renders the Butmah untenable as its definition overlaps that of the Baluti and Kurra Chine. We propose usage of Sarki is extended to the subsurface and Butmah abandoned. The fact that the Sarki and Butmah are not directly correlative has wider regional implications: Definition of maximum flooding surface Tr80 (Sharland et al 2001) assumes base Sarki and base Butmah are the same horizon – they are not. MFS Tr80 was intended to capture the flooding surface associated with the Sefidar Dolomite of Iran. The Sefidar has a distinctive clean GR log character that can be correlated widely across the Middle East. In Iraq, it correlates to the Kurra Chine A (KCA) dolostone, shown herein to be Carnian in age and below the Baluti, rather than the basal Sarki dolostone in which MFS Tr80 is defined. Other regional correlatives are the “Muss”/Mulussa D Marker (Syria), clean dolostones in the upper Abu Ruweis (Jordan), in the Jilh (Kuwait, Saudi Arabia, Oman), and base of the upper Gulailah Formation (UAE). We place MFS Tr80 near the base of the KCA dolostone and revise its age to latest Carnian. Two MFS events in the overlying Lower Sarki which are conflated in Sharland et al’s definition of MFS Tr80 are here termed MFS Tr90 (late Norian) and MFS Tr100 (?Rhaetian). Dating suggests a significant regional unconformity between the Baluti and Sarki spanning much of the lower to mid Norian, equivalent to the sub-Minjur unconformity further south. It is also noteworthy that the level of the Jurassic/Triassic boundary is now accurately determined within the Sarki and is used to divide the Formation into Upper and Lower Members. It is a sequence boundary, correlative at least locally to the sub-Neyriz unconformity in Iran. A further significant sequence boundary is identified at the base of the Upper Sarki evaporites that equates to the sub-Marrat unconformity of Kuwait.