Ophiolites concept and evolution example from Muslim Bagh ophiolite complex, Balochistan, Pakistan

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Ophiolite studies are one of the leading topics that gathered a large number of geoscientists recurrently and these studies have played an important role in the progress of shaping opinions on the plate boundaries. The ophiolite concept started from the famous Penrose Definition of 1972 and then evolved through time by creating a stock of novel information on the topic until the Second Penrose Meeting on Ophiolites was conducted in 1998. Shortly, the scientific understanding of ophiolites had undergone a remarkable transformation since 1972. Later, it was defined and classified with some new and mandatory Ophiolite sequence to be preserved. The 1000 km^2 Muslim Bagh ophiolite complex ophiolite segments having a very preserved: 1) ophiolite sequence; from a thick mantle peridotite and dunite that grade upward to crustal section and are structurally underlain by the metamorphic sole rocks, and 2) a subduction-accretion- complex of Bagh complex that underlies the ophiolite sequence. The ophiolite complex is overlain by the rocks of the Flysch Belt rocks, and thrusted over the Indian platform sediments. Several past and present workers reported the Muslim Bagh Ophiolite Complex as an intrusive and extrusive complex. Based on field studies, limited laboratory studies, geochemistry, and age dating, it was interpreted to be formed in an oceanic ridge setting and a back-arc basin environment. Based on this data, the Muslim Bagh ophiolite yields crystallization age 80.2 ± 1.5 Ma and emplacement (K-Ar) age 80.5 ± 5.3 showing that this ophiolitic complex was young at the time of emplacement. The presence of a crustal section with less well-developed sheeted dyke complex and geochemical signatures transitional between Island Arc Tholeiite (IAT) and Normal Mid Oceanic Ridge Basalt (NMORB), with harzburgitic mantle rocks and the presence of huge chromitite deposits; all confirm the supra-subduction zone setting for the Muslim Bagh ophiolite.