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Tectonic evolution of the Banda Arc, E. Indonesia: Southern Tethyan crust obduction metamorphism and fragmentation of eastern Gondwanaland

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The Banda Arc, a west facing horse-shoe shaped arc in eastern Indonesia, defines the locus of triple junction system between three major plates: the Eurasian, the Pacific and the Indo-Australian. Splinters of the Mesozoic southern Tethyan crust are now formed the base of the Banda Sea. On the surrounding islands, dismembered ophiolites can be found in high mountains. Recent studies in the metamorphic aureoles at the base of these ophiolites revealed that obduction has been a major mechanism in the emplacement of southern Tethyan crust onto the passive Australian continental margin.

The history begins with a spreading at or prior to M-25 anomaly. Part of this spreading system died due to intraoceanic thrusting near the ridge axis. This compressional tectonics was associated with inverted HP-HT metamorphism recorded in Timor. It occurred between M-10 and M-21 anomalies, which time interval is now missing in the southern Banda Arc sector. In concert with fragmentation of Australia from the Gondwanaland and its further northward drift since 50 Ma ago, the Tethyan crust and the accreted metamorphic sole was

obducted onto the Australian continental margin. Obduction took place around 38 Ma ago and coincident with regional disappearance of Oligocene strata in Timor. Collision of Australia with the thrust packages at its leading edge, against the island arc at 3 Ma ago has caused the emergence of southern outer Banda Arc islands.

At about 7.6 Ma ago, the Australia-derived Buru-Seram microplate was at a latitude 2° more to the south and positioned at 74° clockwise relative to its present position. Transtensional pullapart tectonism was dominant in the eastern margin of Tethyan crust presently occupied by the Weber Deep. This tectonism has caused the hot young mantle materials of the NE Weber Deep, formed at 18 to 23 Ma, to be obducted onto the Buru-Seram microplate during 3.3 to 4.4 Ma interval. As Australia drifted further to the north and the west Pacific and Irian Jaya plates moved westward, the Buru-Seram microplate migrated and rotated anticlockwise to its present position. This has finally entrapped portions of the Tethyan crust now forming the base of Banda Sea.