

The geology of Sri Lanka - problems and perspectives

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Abstract: This review records some of the advances made in our understanding of the geology of Sri Lanka during the past 11 years. In the Quaternary formations, the 'Red Beds' of the N.W. coastal belt (formerly called the 'Red Earth'), may be about 25 000 years BP in age, if they are of the same age as the red beds from Bundala and Patirajawela in the south-east of the island. Holocene coral from the southwestern coast is about 6 000 years old; and substantial deposits of heavy minerals occur on the western continental shelf. Some advances have been made in understanding the geomorphological evolution of the western coastal region.

Two sedimentary facies are recognized in the Tertiary Miocene limestone belt in the north and north-west of the island. The north-western belt is underlain by a 'limestone facies' composed of marine, near-shore, calcareous and lagoonal deposits in which three sedimentary cycles have been recognized. A sandy facies, controlled by faulting, has been recorded in the north-east.

Most advances have been made in the study of Precambrian rocks. Because of certain characteristics and some affinity with the Highland Series (HS), the 'western' Vijayan has been renamed the 'Wanni Complex' (WC), the name 'Vijayan Complex' (VC) being confined to the former 'eastern' Vijayan. Isotopic zircon U-Pb ages have given the following results:

2.4 - 3.2 Ga for Highland Series metasediments

1.0 - 1.8 Ga for Vijayan Complex orthogneiss

ca. 1100 Ma for high-grade metamorphism of the Highland Series

ca. 750 Ma for local charnockitisation near Kurunegala

550 Ma for widespread H₂O retrogression.

The boundary between the HS and the VC is conjectured to be either a geosuture or a thrust zone.

At least four structural events can be recognized in the HS, and a variety of minor structures suggest a complex tectonic history for the Precambrian units. The widespread presence of recumbent folds on all scales and a NW- and NE-trending pattern of megalineaments have also been noted. The presence of kyanite and staurolite in the HS suggests that these rocks underwent prograde metamorphism, from earlier high-P/low-T conditions to later lower-P/high-T conditions. Cordierite, previously thought to be confined to the Southwestern Group (SWG) is now known to occur locally in other localities in the HS in two generations. Sapphirine has also been noted in the HS. A significant new discovery has been that of arrested charnockitisation in some localities.

A few studies have been made on granitoid rocks, the most significant being that on the circular plutons of hypersthene-bearing charnockitoids in the south-east. The Gallodai dolerite has been dated at 150 Ma, and determination of the remanent magnetism in dolerite places Sri Lanka adjacent to the Lutzow-Holm Bay area of Antarctica in a reconstruction of Gondwana. Serpentinites and an apatite-bearing carbonate rock (carbonatite or mobilised marble?) have been recorded.