Developing a Stratigraphical Model for Gem bearing Alluvial Basin at Rathnapura, South Central Sri Lanka

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Abstract

The Rathnapura gem field consist of Pleistocene or sub-recent alluvium with patches of streak of gravel of heavy minerals laid down in flood plains of streams, either in the beds of abandoned tributaries or talus fans at the foot of steep hill slopes. The heavy minerals including gems were deposited during periods of intense flooding that caused their mechanical removal from their source areas. Alluvial over lied fills materials generated from abrupt and episodic events such as landslides and flooding in periods of intensified monsoonal activity. Therefore the features of the alluvial sediments present as a clue for the environmental condition at the time they were deposited. The processes such as erosion, transportation and deposition responsible for the sediments reflect the region's environmental history.

Gem pits located at Pelmadulla which is one of the major gem mining cities of Sabaragamuwa province, was selected for this study after an extensive desk evaluation. Gemming areas at Pelmadulla are located in a broad alluvial plain that is surrounded by ring of mountains. The alluvial plain is utilized for paddy cultivation. Alluvial plains is presently in the both side of Pelmadulla to Lellopitiya (Sannasgama)are being mined for gems.

Study was conducted on 47 separate gem pits from Lellopitiya to Pelmadulla order to construct the alluvial serigraphy. These selected gem pits have not been disturbed by previous mining and have natural alluvial stratigraphy. Coordinates of the gem pits, the existing stratigraphy, depth of the whole alluvial section and sub units were recorded in the field. Then, these information were used to construct a three dimentional modal for this sedimentary basin.

Interpolation, one of commonly used geostatistical tools in basin analyses, was employed to generate the modal from collected data. Arc GIS 9.3 and Surfer 11 softwares were used to interpolation and mapping steps of the study.
Constructed model of the gem bearing layer interpretes the deviation of the drainage pattern time to time due to weathering and erosion of the bed rock.