

D-43: Geochemical and mineralogical study of Badulu Oya: a guide to new gem localities

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Sri Lanka is well known for its wide variety of gemstones. Discovery of sub-surface gem bearing gravels has however, been happenstance. No systematic study of their spatial distribution, or of geological methods

of readily identifying areas with high gem potential has been made. Many areas of the central highlands are as yet unexplored for gems, ancient river courses and alluvial plains should be the main target areas. Although morphological and geological factors seemed to be favourable for formation of gemstones, in the Badulu Oya catchment, gemming has so far not been reported there.

Stream-sediment sampling is widely used in regional geochemical surveys in areas with well defined drainage. It is believed that gem minerals found in stream beds were derived from adjacent bed rock from hill-side of the catchment. Five hundred and seventy four stream sediment samples were collected from 39,335 ha of the Badulu Oya catchment area and the $< 63 \mu\text{m}$ fractions were analysed for 23 elements by X-ray fluorescence spectroscopy. Al, Ba, Ca, Co, Cr, Cu, K, Ni, P, Fe, Ni, Rb, Si, Sr, Ti, Y, Zn, Zr, Sr/Rb values from samples were compared with known gem bearing areas by discriminant analysis. The statistical analysis integrated with element distribution pattern has resulted in the compilation of the gem potential map of Badulu Oya.

Three test gem pits were dug in the high to moderate potential areas shown by the gem potential map to check the validity. The stratigraphy of the test pits showed that it consisted of a sequence of rounded to sub-rounded pebbles in an ancient river course, sandy layers, black sand layers and blush black coloured, well compacted gem-bearing layer (*illam*) 0.5 - 1.0 m thick. The mineralogical analyses of washed gem gravels (*nambuwa*) revealed the presence of 30 - 60% heavy minerals, including corundum, spinel, zircon, tourmaline and garnet. Gem quality ruby, spinel, garnet and tourmaline were found in 30% of heavy minerals.

The comparison of geochemical data of selected elements shown earlier from known gem-bearing areas and that from potential areas such as Badulu Oya catchment, by statistical evaluation and integrated with element distribution patterns, can be effectively used as a powerful tool for identification of new gem localities of Sri Lanka.