D-42: Spatial distribution of some elements in the Muthurajawela peatland

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The elemental geochemistry of Muthurajawela peat is important in assessing its economic viability for a variety of scientific and engineering applications. However, the geochemical data of this peatland is incomplete. This investigation was specifically targeted towards determining the spatial distribution of some selected total element concentrations.

Peat samples collected from 50 locations of the Muthurajawela peatland were dried and digested with $HF/HNO_3/HClO_4$ acid combination at temperature ranges of 150 - 235°C for 3 - 4 h. The aliquots of digestion were analysed by atomic absorption spectrophotometry and Na, K, Mg, Ca and Fe were studied. Halides (I^-, Cl^- and F^-), of surface water were measured by auto ion analyzer.

The data indicated that at locations of the peat deposit parallel to the Hamilton canal, appreciable amounts of halide occurred (I^- = .125 ppm F^- = .23 ppm Cl^- = 2,260 ppm) whereas towards the hinterland, halide content decreased significantly. Na content of peat closer to the sea was very high (=7,280 ppm). Towards the hinterland, Na contents were low (= 920 ppm) . This can be partially explained by the high leachability of Na ion when compared with the other macro elements commonly found in peat. In contrast, the concentration of K in peat samples did not show any significant variation in location both near the sea or hinterland ($K_{hinterland}$ = 9,234 ppm: K_{sea} = 8,965 ppm). This can be attributed largely to the contribution of K from plants and granitic/gneissic geological formations in the inland locations. Ca content ranged from 163 ppm to 11,740 ppm, and was irregularly distributed in the peatland. This feature can be attributed to the abundant occurrence of (Ca-rich) gastropod shells. Mg content varied between 600 and 8,600 ppm and low Ca/Mg ratio (<1)were recorded for peat. Total Fe contents were very high towards the land (=1.5%) and low values (300 - 6,000 ppm) were recorded near the sea and there was no significant pattern in the distribution. Higher amounts of total Fe were recorded in the peaty soil. The distribution of total Fe of this peatland appears to be controlled by lateritic soils of the surrounding area.

The observations suggested that the principal source of Na and Mg in the peatland was mainly sea water which entered the marsh through the Hamilton canal. Laterite and the granites/gneisses of the hinterland contributed K and Fe to the peat deposit. The irregularly distributed calcium was contributed both by sea water and gastropod shells. The low Ca/Mg ratios implied that marine conditions had governed the formation of peat.

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