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Variations of metals in the unsaturated soil cover of the Southern coastal belt

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In the southern coastal line the affected area by the tsunami wave is about 1.5 km inland. Water from the Tsunami wave caused contamination of large areas of soils. The sediments making up the coastal aquifer are mostly structure less sand ranging from fine to moderately coarse. The aquifers are unconfined, shallow and very permeable and hence prone to be contaminated from leaching metals.

Further the quality of ground water depends on the quality of soil. Hence there is a necessity to asses the risk that the Tsunami wave poses to soil.

Hence the determination of metals in the soil down to the groundwater level was carried out.
27 points, from both affected and unaffected areas from the Tsunami wave, along the south coast were selected from Midigama to Matara for the auguring of soils. Points of auguring are located within 2 km from the coastal belt and 4 km distance from one point to another. Soil samples were collected in each site, from 50 cm depths from the surface, down to the water level. Geological positions of each site were recorded using the GPS.

Collected soil samples were air dried for overnight and sieved using 2mm sieve. 0.5g of soil was digested in a mixture of HNO_3 and HCl and diluted to 50 mL prier to analysis by Atomic Absorption Spectrophotometry (AAS). K, Mg, Na, Mn, Zn and Fe were measured by flame AAS and Cd, Cu and Pb were determined using graphite furnace AAS.

The results showed that that the groundwater level is deep in the unaffected area. In the affected area K (max 54.1 mg/g soil), Mg (max 234.3 mg/g soil), Mn (max 149.5 mg/g soil), Zn (max 99.5 mg/g soil) and Fe (max 389.8 mg/g soil) are present in higher amounts than others and Cd and Pb are present in very low amounts. The maximum (747.4 mg/g soil) and mean values (448.4 mg/g soil) of Na are always higher. It is higher in the surface and also close to the water level. This could be due to the fact that Na leach from water to the soil and the Na levels are still high in the affected area. Some of the other metals are also higher in the affected area and some heavy metals show that they have deposited on the middle layers of the soil. The surface soils are now disturbed and could have been influenced by many factors, rain, wind etc. but the heavy metals deposited in the middle layers are remaining.

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