

# Geochemical Exploration of Negombo Lagoon Sediments in Western Coast of Sri Lanka

U.M.P. Wijesinghe and A.S. Ratnayake

*Department of Science and Technology, Uva Wellassa University, Badulla, Sri Lanka*

Negombo Lagoon is one of the largest lagoons in Sri Lanka, and it is surrounded by Muthurajawela peat deposit. Geochemical characteristics of sediments were examined using proximate, X-ray diffraction (XRD), Fourier-transform infrared spectroscopy (FTIR), atomic absorption spectroscopy (AAS) analyses. Chronology was determined using accelerated mass spectrometry (AMS) <sup>14</sup>C data for undamaged two shells at International Chemical Analysis Inc laboratory, USA. Stratigraphic observation suggests deposition of dark color sandy/silty clays. Moisture, volatile, ash and organic matter contents show homogeneous distribution with depth. XRD analysis identified mainly peaks of Quartz, Calcite, Feldspar, Beryllium Carbide (Be<sub>2</sub>C), Lanthanum Palladium, suggesting that different provenances for the source materials. FTIR analysis identifies mainly functional groups of C-H, O-H, C=C, C=O, Si-O and C-O probably from carboxylic acid, alcohol, aliphatic hydrocarbons and polysaccharides, suggesting that the early stage diagenesis in this natural system. Fe (range from 30.98 ppm to 31.79 ppm), Cr (range from 0.055 ppm to 1.381 ppm) and Rb (range from 0 ppm to 0.323 ppm) elements distributions in core samples suggest the increment of the anoxic and acidic conditions. Therefore, organic matter preservation can be enhanced by slow decomposition rates in deeper anoxic layer. According to radiometric dating, the undamaged shells at 45 cm and 57 cm in depth were deposited after 1950. Therefore, it suggests that higher short-term carbon accumulation rates (sedimentation rate > 8.4 mm per year) in this estuary. Finally, Negombo Lagoon can be identified as represent important carbon stores, and are important archives of past climatic and ecological information.

*Keywords:* Tropical lake sediment, Carbon accumulation, Estuarine peat, Anaerobic carbon cycling