Using stable isotope and lipid biomarkers to understand the history of Negombo Lagoon, Sri Lanka

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Measuring stable isotopes and lipid biomarkers in a sediment core can be used to obtain information about past enviornmental conditions and changes. In this study carbon and nitrogen stable isotopes, hydrocarbons, fatty alcohols and sterols were measured in a sediment core collected in Negombo lagoon, to investigate the sources and cycling of organic matter in the lagoon for the past 160 years.

Negombo Lagoon is a shallow brackish lagoon located in the western coast of Sri Lanka. The lagoon is highly productive with valued biodiversity and high socioeconomic value. Due to high rate of urbanization the lagoon has suffered from eutrophication.

The proxies reveal clear anthropogenic influences on the lagoon. The proxies reveal drastic changes in the lagoon during the second half of the 19th century due to the introduction of the Hamilton canal which lead to an influx of sea water into the lagoon, resulting in an increase signature of marine organic matter and a loss of terrestrial organic matter.

The first half of the 20th century had relatively little change in organic matter quality and quantity, which could be attributed to the stability of the lagoon after the contruction of the canal and/or there was little or no urbanization development in the Colombo region.

The second half of the 20th century has clear signals of increse urbanization of Negomboo langoon's watershed resulting in eutrophication of the lagoon.
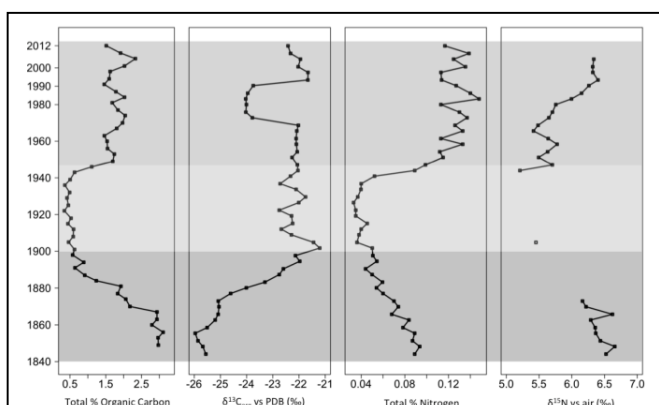
Figure 1: Sediment core profiles from left to right: total % organic carbon, δ^{13}C organic versus PDB (‰), total % nitrogen and δ^{15}N versus air (‰) plotted against years. The three different shades of grey highlight the periods when there are major shifts in the general trend of the variables. (1) the second half of the 19th century (1850-1900), (2) the beginning of the 20th century (1900-1940) and (3) the 1940's to 2012.