Reconstruction of environmental changes and anthropogenic activities based on sedimentary records in the Pearl River Delta, China

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Rapid urbanization has occurred in the Pearl River Delta (PRD) since 1980s, resulting in tremendous accumulation of population and material in an area of around $4.0x10^4$ km^2. Massive nutrients, heavy metals and organic compounds were released to the coastal zone either via the Pearl River or the aquifer, and effects of these materials and possibly the re-suspension of the sediment on ecosystem and drinking water supply are a big public concern. Field campaigns to collect water samples and sediment from reservoir, river, delta plain, and estuary were implemented in rainy (April- September) and/or dry seasons (October –March) during the period of 2011-2017, and sediment from each layer of 1-2 m to a depth of 30-50 cm was collected. Samples were analyzed for major ions, nutrients, multiple isotopes(^{13}C and ^{15}N), heavy metals and microbiological DNA, and ^{210}Pb was used to date the age of the sediment with particle size and flooding events as correction factors. Temporal pattern of nutrients/heavy metals was built for the period of 30 to 40 years, when the PRD experienced the economic boom and suffered the serious environmental pollution. Main sources of pollutants and relevant accumulation mechanism were interpreted for varied research sites.

Keywords: reconstruction, environmental change, Pearl River Delta, human activities, sediment

