Industrialization weakens important carbon sink

November 29 2011

Botany Bay (NSW, Australia) and the city of Sydney in the background. Credit: Macreadie

Australian scientists have reconstructed the past six thousand years in estuary sedimentation records to look for changes in plant and algae abundance. Their findings, published in *Global Change Biology*, show an increase in microalgae relative to seagrass in the past 60 years. This shift could diminish the ability of estuaries, which are natural global carbon sinks, to mitigate climate change.

According to Dr. Peter Macreadie, University of Technology, Sydney Chancellor's Postdoctoral Research Fellow, "We have effectively gone back in time and monitored carbon capture and storage by coastal ecosystems, finding a 100-fold weakening in the ability of coastal

ecosystems to sequester carbon since the time of European settlement. This severely hampered the ability of nature to reset the planet's thermostat."

Scientists collected cores, samples of earth, from sites within and around Botany Bay, Sydney. A chronology for the cores was determined using radiocarbon dating. Changes in plant and algae composition over time were then determined according to the change in the isotopic ratio of the organic matter in the sediment.

The team's analysis suggests that the relative reduction in seagrass and increase in microalgae coincided with a time of rapid industrial expansion and increased nitrogen deposition. These findings are critical because plants such as seagrass have a relatively large carbon sink capacity, which plays a critical role in mitigating climate change.

"Unfortunately, this outcome is common to urbanized estuaries throughout the world, therefore the study adds further support for the inclusion of Blue Carbon habitats (seagrasses, saltmarshes, and mangroves) in greenhouse gas abatement schemes," said Dr. Macreadie.

This research demonstrates that human activities have weakened the sink capacity of Botany Bay, and this is likely to occur in other coastal ecosystems.

More information: This paper is published in *Global Change Biology*.

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