

Hydro-biogeochemical controls on ammonium behaviors across the river-estuary interface: Addition or removal

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Ammonium dynamics across the river-estuary interface is a keystone for understanding the role of the estuary in modifying N delivery to the coastal ocean. However, transformations and controlling factors of ammonium in highly hydrological dynamic estuary systems are still poorly understood. A series of cruises with high spatial resolution under different hydrological conditions in the Jiulong River Estuary in south east China were conducted in 2015-2016. Affected by river discharges and tidal strength, hydrology controls the magnitude and structure of suspended particles through resuspension, associated with ammonium addition and removal processes. Nitrification is a major path to remove ammonium in a mostly well-mixed and oxygen-enriched macro estuary water system. And hydrology could affect nitrification intensity by changing available particle for nitrifiers. NH_4^+ in pore water is an important contributor to ammonium addition. Observed non-conservative behaviors of ammonium across the river-estuary system is determined by the competition of addition and removal processes. Nitrification mainly controls the feature of DIN fluxes export to the coastal areas under normal condition, while ammonium addition from sediment plays a more important role under flood-affected condition.