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Water balance and nutrient delivery in a densely populated delta for a future sustainable environment

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Abstract Besides the inputs of material from land-based sources and the in-stream processes leading to transformation, retention and elimination of nutrients during their downstream travel, the nutrient flux transported by river systems depends on a number of factors, including the influence of hydrological fluctuations due to tidal movement. We monitored the daily water discharges and the corresponding nutrient loads within the Day-Nhue River System, and chose the right bank of the Red River Delta, where Hanoi City and its conurbation are located, to further understand the biogeochemical functioning of the delta system. We underline the large impact of the tide on nutrient balance up to more than 150 km from the coastline. The integration of positive and negative fluxes due to the daily tidal cycle allowed calculation of the real nutrients fluxes, which appeared to be underestimated by between 50% to 80% if the calculation is based on daily mean discharge.

Key words Red River Delta; discharge; tidal influence; nutrient export; Vietnam