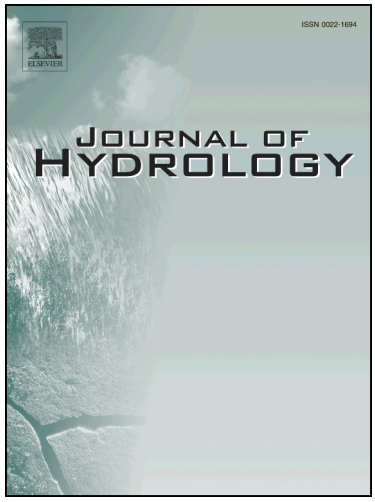

Research papers

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TITLE: Assessing the contribution of porewater discharge in carbon export and CO_2 evasion in a mangrove tidal creek (Can Gio, Vietnam).

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ABSTRACT

Although mangroves are efficient natural carbon sinks, most of the atmospheric carbon dioxide (CO_2) fixed by its vegetation is believed to be exported via tidal exchange, rather than stored in biomass and sediment. However, the magnitude of tidal export is largely unknown and direct measurements are scarce. We deployed a novel experimental design that combined automated high-resolution measurements of hydrodynamic, hydrogeochemical and biogeochemical parameters during the dry season in a mangrove tidal creek (Can Gio Mangrove Forest, Vietnam). The objective was to quantify the water, porewater, DIC and DOC tidal exchange, and estimate the CO_2 evasion throughout tidal cycles, contrasted by amplitude. We hypothesized that the tidal creek is a net exporter of carbon towards the coastal ocean, with its majority transferred as DIC. Data from three 25-h time series showed a clear peak of DIC, DOC, pCO_2, and ^{222}Rn at low tide, particularly during tidal cycles of large amplitude, which directly account for porewater discharge. Our mass balance models revealed that the tidal creek was a net exporter of dissolved carbon to coastal waters, with an important contribution (38%) from porewater discharge