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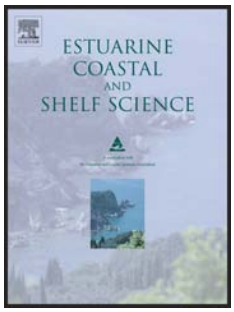

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Short-term dissolved oxygen patterns in sub-tropical mangroves

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ABSTRACT

Mangrove forests in subtropical areas are highly heterogeneous environments, influenced by diverse physical structures and tidal flushing regimes. An important component of tidal water is the concentration of dissolved oxygen (DO), as it affects aquatic organisms such as fish (directly: respiration and behaviour) and immature mosquitoes (directly: trigger for egg-hatch; indirectly: fish predation of larvae). Changes in DO may be important over relatively small time scales such as minutes and days, but, at such scales it has received little investigation. The aim of this study was to address this knowledge gap, monitoring DO at small time intervals (1 minute) over tidal flooding events (hours - days) in two contrasting subtropical mangrove systems. These represented a range of mangrove tidal hydrology: a well-connected fringing mangrove forest in south-east Queensland and a more complex mangrove basin forest in northern New South Wales with impeded tidal connections.

The results indicated that patterns of DO varied diurnally and by mangrove system. In the fringing forest, where the substrate was exposed before and after flooding, the highest mean DO concentration was during the day, followed by evening, with pre-dawn the lowest (6.8, 6.5 and 6.1 mg/l, respectively). DO patterns differed by tide stage and time of day with falling DO especially during late evening and pre-dawn as tides ebbed. In the mangrove basin forest the pattern was reversed, but also depended on the distance the tide had travelled across the basin. Before tidal incursion, standing water in the basin was anoxic (DO 0 mg/l). As tidal water