



## Turbulent nitrate fluxes near a sill in a large estuary

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Historical nitrate concentration profiles and new turbulent microstructure observations were combined to calculate turbulent nitrate fluxes in the Lower St. Lawrence Estuary (LSLE), Canada. Two stations were compared: the head of the Laurentian Channel (st. 25), where intense mixing occurs on the shallow sill that marks the upstream limit of the LSLE, and another station located about 100 km downstream (st. 23). Nitrate fluxes at the base of the surface layer for both stations were respectively (with the 95% confidence interval):  $\bar{F}_{25} = 64(23, 130) \text{ mmol m}^{-2} \text{ d}^{-1}$  and  $\bar{F}_{23} = 0.11(0.04, 0.23) \text{ mmol m}^{-2} \text{ d}^{-1}$ . Observations suggest that the interplay between large isopleths heaving near the sill and strong turbulence is the key mechanism to sustain such high turbulent nitrate fluxes at station 25 (about 600 times those at station 23). Calculations also suggest that these localised large fluxes can sustain almost entirely the post-bloom new production over the whole LSLE.