

Expression levels of nitrate transporter genes indicate that nitrogen status differs between dominant diatom groups in the East China Sea

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Diatoms are ecologically important phytoplankton responsible for 75% of the primary production occurring in high-nutrient and coastal regions of the ocean, and their growths in the sea were frequently reported as limited by nitrogenous nutrients. In the present study, mRNA levels of the nitrate transporter gene (*Nrt2*) were used as a molecular indicator of nitrogen sufficiency in two dominant diatom groups, *Skeletonema* and *Chaetoceros*, inhabiting the southern East China Sea (ECS). Two research cruises (one in August 2010 and the second in June 2011) were conducted along a cross-shelf track from the coastal zone of China to the Kuroshio Current. In *Skeletonema*, moderate to low levels of *Nrt2* mRNA suggested nitrogen sufficiency in the coastal region, but high levels of *Nrt2* mRNA indicated nitrogen deficiency in the mid-shelf region. The stress of nitrogen starvation resulted in significant correlation between *Nrt2* expression and the nutricline depth, and apparently caused the seaward decrease in *Skeletonema* abundance. By contrast, low levels of *Nrt2* transcripts were observed in *Chaetoceros* across the continental shelf, indicating the status of nitrogen sufficiency. Compared to the *Nrt2* expressions in laboratory cultures, values in the ECS fell below the nitrate sufficient zone, suggesting that *Chaetoceros* may rely on ammonium as the nitrogen source in oligotrophic surface waters. Our results indicated different nitrogen status between these two dominant diatom groups across the continental shelf, which provide a potential mechanism for their differing distributions in the East China Sea.