

Environmental Stressing and Anthropogenic Impact on Geochemical Dynamic of Nutrient and Trace Metal in an Tributary Estuarine Milieu at Northern Taiwan

LIANG-S. WEN and Kuo-T. JIANN

National Center for Ocean Research, National Taiwan University, Taipei, Taiwan, R.O.C

Changing land uses, increased surface water runoff and point sources have resulted in major changes in the concentration, speciation and, loading rates of nutrients and trace metals in Danshuei Estuary, third largest river in Taiwan. The Estuarine mixing behavior is mainly controlled by river discharge, tidal mixing and reaction rates. Conservative mixing occurred at high river flow during wet seasons, while the nutrient concentrations were relatively low; non-conservative behavior occurred at low river flow during dry seasons with higher nutrient concentrations. Observed repeatedly, ammonium is the predominant nitrogenous species, ranged from 10 to 1000 μM . As the ammonia-bearing water reached the river mouth, ammonium was gradually oxidized to nitrite and nitrate by the oxygenated coastal water, reflecting a complicated biogeochemical pathway rather than simple dilution behavior. Variations in trace metal distribution and speciation were also evident in different environmental conditions. High river flow season corresponded to high labile fractions and mostly resided in smaller size fraction. During dry season, the inert fractions were elevated, higher percentages were found in larger size fractions. The nutrient and trace metal geochemistry in Danshuei tributary are complex and dynamic due to anthropogenic perturbation and reactions in the tidally mixed zone of strong redox gradients.

Keywords: Estuary; Nutrient; Trace Metal; Speciation

Table 1. Dissolved Cu speciation in waters collected at two distinct environmental conditions.

Date	Labile (%)	Organic (%)	Inert (%)	< 0.1 μm (%)	0.1~0.4 μm (%)	Kd
Oct. 2001	61	7	32	83	17	7.69
Jan. 2002	14	16	70	36	64	8.50

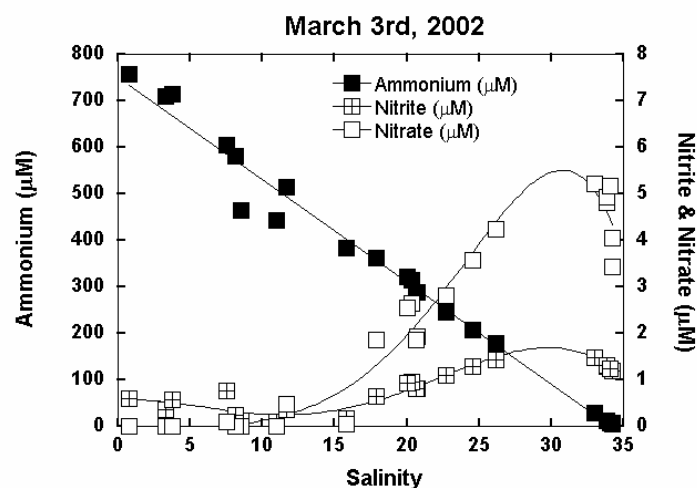


Figure 1 Dissolved nitrogenous speciation in the Danshuei estuary