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TITLE: Chinese coastal seas are facing heavy atmospheric nitrogen deposition

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ABSTRACT:

As the amount of reactive nitrogen (N) generated and emitted increases the amount of N deposition and its contribution to eutrophication or harmful algal blooms in the coastal zones are becoming issues of environmental concern. To quantify N deposition in coastal seas of China we selected six typical coastal sites from North to South in 2011. Concentrations of NH₃, HNO₃, NO₂, particulate NH₄⁺ (pNH₄⁺) and pNO₃⁻ ranged from 1.97? 4.88, 0.46 ?1.22, 3.03 ?7.09, 2.24 ? 4.90 and 1.13?2.63 ?g N m⁻³ at Dalian (DL), Changdao (CD), Linshandao (LS), Fenghua (FH), Fuzhou (FZ), and Zhanjiang (ZJ) sites, respectively. Volume-weighted NO₃⁻?N and NH₄⁺?N concentrations in precipitation varied from 0.46 to 1.67 and 0.47 to 1.31 mg N L⁻¹ at the six sites. Dry, wet and total deposition rates of N were 7.8?23.1, 14.2?25.2 and 22.0 ? 44.6 kg N ha⁻¹ yr⁻¹ across the six coastal sites. Average N dry deposition accounted for 45.4% of the total deposition and NH₃ and pNH₄⁺ contributed to 76.6% of the dry deposition. If we extrapolate our total N deposition of 33.9 kg N ha⁻¹ yr⁻¹ to the whole Chinese coastal sea area (0.40 million km²), total N deposition amounts to 1.36 Tg N yr⁻¹, a large external N input to surrounding marine ecosystems.

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