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Blooms of *Pseudo-nitzschia* and domoic acid in the San Pedro Channel and Los Angeles harbor areas of the Southern California Bight, 2003–2004

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Abstract

Abundances of *Pseudo-nitzschia* spp. and concentrations of particulate domoic acid (DA) were determined in the Southern California Bight (SCB) along the coasts of Los Angeles and Orange Counties during spring and summer of 2003 and 2004. At least 1500 Å km² were affected by a toxic event in May/June of 2003 when some of the highest particulate DA concentrations reported for US coastal waters were measured inside the Los Angeles harbor ($12.7 \text{ } \mu\text{g} \text{ DA L}^{-1}$). Particulate DA levels were an order of magnitude lower in spring of 2004 (February and March), but DA concentrations per cell at several sampling stations during 2004 exceeded previously reported maxima

for natural populations of *Pseudo-nitzschia* (mean = 24 pg DA cell⁻¹, range = 0–117 pg DA cell⁻¹). *Pseudo-nitzschia australis* dominated the *Pseudo-nitzschia* assemblage in spring 2004. Overall, DA-poisoning was implicated in >1400 mammal stranding incidents within the SCB during 2003 and 2004. Ancillary physical and chemical data obtained during our regional surveys in 2004 revealed that *Pseudo-nitzschia* abundances, particulate DA and cellular DA concentrations were inversely correlated with concentrations of silicic acid, nitrogen and phosphate, and to specific nutrient ratios. Particulate DA was detected in sediment traps deployed at 550 and 800 m depth during spring of 2004 (0.29–7.6 µg DA (g sediment dry weight)⁻¹). The highest DA concentration in the traps was measured within 1 week of dramatic decreases in the abundances of *Pseudo-nitzschia* in surface waters. To our knowledge these are the deepest sediment trap collections from which DA has been detected. Sinking of the spring *Pseudo-nitzschia* bloom may constitute a potentially important link between DA production in surface waters and benthic communities in the coastal ocean near Los Angeles. Our study indicates that toxic blooms of *Pseudo-nitzschia* are a recurring phenomenon along one of the most densely populated coastal stretches of the SCB and that the severity and magnitude of these events can be comparable to or greater than these events in other geographical regions affected by domoic acid.



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Keywords

Domoic acid; Harmful algal blooms; Los Angeles; *Pseudo-nitzschia*; Southern California

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