



A comparison of the speciation and fate of mercury in two contaminated coastal marine ecosystems: The Venice Lagoon (Italy) and Lavaca Bay (Texas)

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ABSTRACT: We compared the speciation of Hg in two estuaries, Lavaca Bay (Texas) and the Venice Lagoon (Italy). Both are large, shallow embayments that are contaminated by direct discharges from mercury-cell chlor-alkali plants and dominated by rapid tidal flushing. Although contaminated by discharges into Lavaca Bay from 1966 to 1979 and into the Venice Lagoon from 1951 to 1989, Hg concentrations have dwindled to similar moderate levels in sediments (200-2,000 ng g⁻¹) and water (1-3 ng L⁻¹ dissolved) since the advent of pollution abatement. The Venice Lagoon contains lower levels of CH₃Hg than Lavaca Bay, which is surprising, given the much larger degree of wetlands coverage in the lagoon. A narrow temporal peak in methylation was seen in early spring at both sites, although it was much stronger in Lavaca Bay. Data indicated that sediment CH₃Hg is more strongly correlated with variables such as habitat and seasonality than with total Hg. In Lavaca Bay, because of high sedimentation rates and low remixing, the highest levels of Hg are buried 10-30 cm below the surface. Combined with previous observations of strong Hg methylation after dredging activities, this argues for leaving Hg-contaminated sediment in place, to be buried by the deposition of cleaner sediments. In Venice Lagoon, decisions may be complicated by continuous remixing of the upper sediment layers, moving the highest levels of Hg toward the surface and distributing it over a far larger area than has been seen in Lavaca Bay.

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