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Sediment quality assessment in tidal salt marshes in Northern California, USA: An evaluation of multiple lines of evidence approach

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This study evaluated the efficacy of integrating a traditional sediment quality triad approach with selected sublethal chronic indicators measured in resident species in assessing the quality of sediments in four tidal salt marshes. These included the highly contaminated (Stege Marsh) and relatively clean (China Camp) marshes in San Francisco Bay and two reference marshes in Tomales Bay in California, USA. Two components (toxicity potential of sedimentary contaminants and benthic macroinvertebrate survey) of the sediment quality triads showed significant differences between Stege Marsh and reference marshes. Porewater toxicity test was significantly influenced by natural contaminants such as unionized ammonia. Some sublethal chronic toxicity tests such as apoptotic DNA fragmentation in liver cells of longjaw mudsucker (*Gillichthys mirabilis*) and embryo abnormality inlined shore crab (*Pachygrapsus crassipes*) also clearly distinguished contaminated and reference marshes. The present study demonstrates that additional chronic sublethal responses measured in resident species under field exposure conditions can be readily combined with traditional sediment quality triads for expanded multiple lines of evidence approach. This confirmatory step may be warranted in environments like salt marshes in which positive interferences affect the interpretation of toxicity test data. Integration of the portfolio of responses in resident species can support a more comprehensive and informative sediment quality assessment in salt marshes and possibly other habitat types as well.

Biography

Hyun-Min Hwang is an expert in sediment and water quality assessment and environmental monitoring for trace metals and organic pollutants such as PAHs, PCBs, pesticides, flame retardants, phthalates, and pharmaceuticals and personal care products. His specialty is integrating chemical, ecological and toxicological data together to better understand environmental impacts of pollutants. He also conducted many studies for atmospheric and aquatic pollutant source apportionment using a chemical mass balance model. His recent studies include stormwater runoff monitoring and application of best management practices to remove pollutants in stormwater runoff. He has more than 20 years of experience in research, teaching, and student training. He has been directing summer undergraduate research program over the last 5 years.

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