WATER SOURCES IN MANGROVES IN FOUR HYDROGEOMORPHIC SETTINGS IN FLORIDA AND MEXICO

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Mangroves are transitional environments, where fresh water from the terrestrial environments mix with seawater from the marine environment. The relative contributions of these sources vary and play a role in controlling the physical and chemical hydrological characteristics of mangroves and facilitate the exchange of mass, energy, and organisms between mangroves and the surrounding hydrological landscape. Therefore, understanding the water sources in mangroves is a critical first step in developing sound management strategies. We examined the hydrogeochemistry of four mangrove communities in distinct hydrogeomorphic settings along the Costalegre on the central Pacific coast of Mexico and along the Indian River Lagoon, east-central Florida. Salinities varied, with values ~9 psu in a basin mangrove, ~17 psu in a riverine mangrove, ~33 psu in a fringe mangrove, and a range of ~30-75 psu in a carbonate barrier island mangrove. Salinity, cation and anion concentrations, and isotopic signatures were used as tracers in mass-balance mixing models to quantify estimates of relative fresh-water and seawater contributions to each mangrove. The basin mangrove had mean fresh-water contribution estimates of 63-84 percent; the riverine mangrove had fresh-water estimates of 39-51 percent; and the fringe mangrove had fresh-water contributions of 0-5 percent. In contrast, waters in the carbonate barrier island mangrove exhibited no characteristics indicative of any fresh-water contribution. These results illustrate the varying role that groundwater plays in mangrove hydrodynamics, and the potential role that hydrogeomorphic classification can play in helping to make first-order estimates to mangroves in different hydrogeomorphic settings.

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