Origin of salinity variations in Florida Bay

Swart, P. K., R. Price

Limnol. Oceanogr., 47(4), 2002, 1234-1241 | DOI: 10.4319/lo.2002.47.4.1234

ABSTRACT: This note presents a method of distinguishing the source of freshwater that causes reductions in salinity in the coastal environment of South Florida. This technique, which uses the $\delta^{18}O$ and δD of the water, allows for differentiation of the freshwater derived from precipitation as opposed to runoff, because surface waters in the Everglades have been highly evaporated and therefore have elevated $\delta^{18}O$ and dD values relative to precipitation. A time series of monthly $\delta^{18}O$ and δD values of surface waters, collected from stations in Florida Bay between 1993 and 1999, has shown that, during this time, the major source of freshwaters causing depressions in the salinity in the western portion of Florida Bay was derived from precipitation rather than from the runoff of water from the Everglades. In the eastern portion of Florida Bay, close to the boundary between peninsular Florida and the Bay, the proportion of freshwater derived from precipitation drops steadily, reaching <10%. This method not only allows differentiation between the sources of freshwater but can, in a temporal sense, ascertain the effectiveness of water management practices on the salinity of the estuarine ecosystems of South Florida.