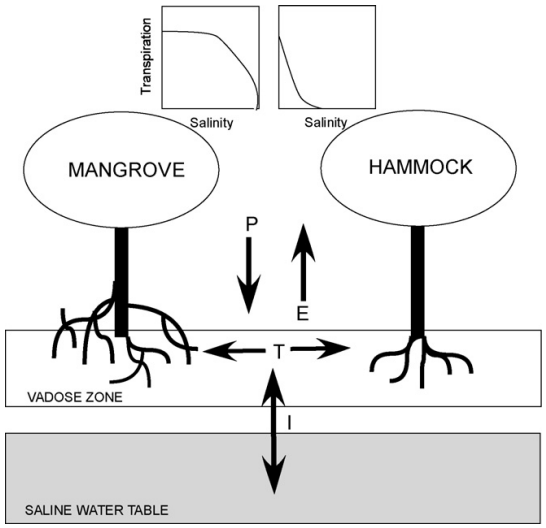
Biology Seminar

Dr. Donald L. DeAngelis

U. S. Geological Survey & University of Miami, Coral Gables, Florida

Modeling Vegetation Effects of Sea Level Rise & Storm Surges

We use a multi-faceted approach to attempt to estimate possible consequences of storm surges to low-elevation coastal areas. Our current modeling effort is focused on the Gulf Coast of southern Florida, but this will be extended to areas of Southeast Asia. The main components of the project are as follows. (1) We are compiling an historical record of major storms (hurricanes) that have affected southern Florida, including their windfields and impacts. (2) We are improving a landscape hydrology model of freshwater overland and estuarine flows in southern Florida to take into account effects of sea level rise on coastal hydrology and salinity. (3) We are improving on models of major vegetation types that may be affected by sea level rise and storm surges. (4) We will model the inland movement of water and salinity from storm surges. The current status of these tasks will be described here, in particular, the vegetation modeling. One possible consequence of sea level rise will be 'regime changes' in coastal vegetation due to inland intrusion of high-salinity water, both from the average rise in sea level itself and from storm surges. The vegetation types modeled will include mangrove, tropical hardwood (hammock) trees, and freshwater marsh. Our current vegetation model simulates the transition zone between mangrove and hardwood hammock vegetation. This model, which improves on earlier modeling (Teh et al. 2008), supports the earlier results that a major storm surge, carrying salinity inland, could cause a 'regime shift' of vegetation cover from hardwood hammock to mangrove over large areas. We describe here results of improvements in modeling the vadose (vegetation rooting zone) and vegetation dynamics and describe the details of model salinity and vegetation dynamics following a storm surge.



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