

**HYDRODYNAMICS OF THE BANGRONG MANGROVE FOREST,  
PHUKET THAILAND**

**Pinsak Suraswadi<sup>1</sup> and Erik Kristensen<sup>2</sup>**

<sup>1</sup>*Phuket Marine Biological Center, P.O. Box 60, Phuket 83000, Thailand*

<sup>2</sup>*Institute of Biology, Odense University, SDU, DK-5230 Odense M, Denmark*

**ABSTRACT**

Mangrove forests play a crucial role in transport processes between land and ocean. They trap, transform and modify solutes and particulates by physical, chemical and biological processes. Thus, the understanding of hydrodynamics in mangrove environments is crucial for assessing any possible impact on adjacent ecosystems. Forest bathymetry, meteorological data, salinity and water current profiles in the Bangrong mangrove forest, Thailand, were monitored during several tidal periods in the dry and wet seasons. The Bangrong creeks are partially well mixed with transient stratification. The salinity is significantly lower in the wet than the dry season due to variations in precipitation. A salinity maximum zone occurred in the upper reaches during the dry season impeding the mixing of water between the creek and coastal waters. Tidal currents were strong (up to  $0.7 \text{ m}^2 \text{ s}^{-1}$ ) and asymmetric as a result of a large tidal range ( $\sim 2.5 \text{ m}$ ) and resistance of the dense mangrove vegetation. The ebb current was about  $\sim 15\%$  stronger than the flood current with 5–30 minute delay of tidal phases between the outer and inner creek. A longitudinal diffusion coefficient,  $E$ , of  $52 \text{ m}^2 \text{ s}^{-1}$  provided an estimated water residence time of about 2 days, which is in agreement with calculations based on evapotranspiration and mixing ratio.