



Ensemble prediction of TC-related storm surges

M. Entel, K. Horsburgh, and G. Warren
(mie@bom.gov.au)

The uncertainties in deterministic forecasts of the dynamics of tropical cyclones (TCs), especially of their tracks and intensities, represent significant challenges for the accurate prediction of the storm surges that often occur when TCs make landfalls. In modern NWP systems (including TC prediction systems), the uncertainties are often addressed through the generation of ensemble forecasts. While the ensemble prediction systems (EPS) are now quite successfully employed to forecast the surges associated with mid-latitude storms (including estimation of uncertainties in their magnitudes), there have been relatively few attempts to use the TC EPSs for prediction of the TC-related storm surges. While some limitations of the currently available operational TC EPSs (such as relatively coarse resolution, limited number of ensemble members, poor predictive skill on intensity) make it difficult to directly use the corresponding atmospheric forcing to drive surge models, the valuable experience accumulated in the analysis of the TC EPSs' performance makes it useful to try and develop the best way of using them for operational surge forecasting. In this paper we use both generated synthetic and real operational ensembles of atmospheric forecasts for some TCs in the Australian region to investigate the relation between the parameters of the ensemble (such as its size, spread, spatial resolution of the ensemble members and some documented biases in the corresponding sea-surface forcing) and the statistical properties of the predicted surge. Some alternative strategies to apply the TC EPSs to surge forecasting are also discussed.