**Name: YANG Ye**

**Civil Engineering, HKU**

**Supervisor: T.F.M.Chui**

**Title: Potential causes of mudflat salinity trend inside a semi-enclosed bay**

**Abstract**

Mai Po, a Ramsar site in Deep Bay (DB), borders Shenzhen, China to the north and Hong Kong to the south. It hosts more than 55,000 migrating birds each year, and supports numbers of globally important wading birds. In recent decades, land reclamation inside DB has caused 16.1% loss of water surface, and training of Shenzhen River, the largest river in DB, has also caused around 20% increase of flow discharge. All these have contributed substantial changes to the hydrodynamic and salinity conditions in DB, and might further result in ecological implications on Mai Po. This study is proposed to examine the hydrodynamic changes at DB and then examine their ecological implications.

Numerical modeling is used to evaluate the impacts of hydrodynamic change on benthic infauna at Mai Po. Hydrodynamic model is generated using Environmental Fluid Dynamic Code (EFDC), which simulates the hydrodynamic condition and salt transport process. The model demonstrates good agreement with observation data and good performance in simulating the hydrodynamic and salinity conditions. Scenario experiments are then designed to investigate the impacts of land reclamation and river discharge increase.

Simulation results show that the 16.1% loss of water surface area between 1986 and 2007 has contributed to a 17.3% loss of tidal prism and reduced the salinity levels by 0.82 and 1.48 ppt respectively in the middle and inner bay, enlarging the salinity gradient across the bay. The results also confirm that the scale and location of reclamation are two key factors influencing the tidal prism and current field, and thus the salinity in the brackish bay. Furthermore, land reclamation is the main reason behind the general salinity decrease in inner bay, whose influence is double of that of river discharge increase.