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Application of 1D/3D Coupled Water Quality Model for Water Resource Management in the Pearl River Estuary

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Abstract:

The Pearl River is one of the seven major river systems in China with an annual averaged flow volume of 336 billion cubic meters. This rich water resource is one of the key factors supporting the rapid economic growth in the Pearl River Delta (PRD) region in the last two decades. At the same time, various development and human activities have inevitably posed increasing pressure on the water environment. For example, the potential disruption of fresh water supply in recent years due to the more frequent and intense saline intrusion from the coastal waters into the river network is becoming a major concern of the local governments. To safeguard and protect the precious water resource in and to ensure the sustainable development of the PRD region, the Guangdong and HKSAR Governments jointly developed a numerical water quality model, namely the PRD Model, as a scientific tool and a platform for future regional water quality management studies. The PRD Model comprises of a 1D river model (SOBEK) and a 3D estuary model (Delft3D), which are online coupled to simulate the complex dynamic interactions between the fresh water discharges from the river network and the tidal influence from the coastal waters. The presentation will highlight the key considerations in the development process and introduce some of the features and performance of the model. The potential application of the PRD model for studying the effect of saline intrusion in the river network will be discussed.