Title: Determination of the Probable Maximum Tropical Cyclone for the Chinese Coast: Case of Nansha, Guangzhou

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ABSTRACT

Typhoon inducing storm surge is the most important issue for coastal protection in the south-east Chinese coastal area. It is utmost important to predict the extreme storm surge during typhoon period for coastal defense and management. Nansha district, which is located in the south of Guangzhou City, is select as a case to determine the PMTC (Probable Maximum Tropical Cyclone), which causes the largest water level set up. A storm surge model has been set up to study the water level set up during typhoon period for the South China Sea. Two methods, statistical method and transplant method, have been applied to obtain the PMTC for Nansha. The result reveals that the WNW landing typhoon at Taishan landing site could be the worst situation for Nansha. The maximum water level set up can reach up to 3.56m.

KEY WORDS: Storm surge, Centre pressure, Probable Maximum Tropical Cyclone, Pearl River Estuary, Nansha

INTRODUCTION

To predict the extreme storm surge at coastal area influenced by tropical cyclones, the PMTC should be determined first. There are two methods commonly used to obtain the PMTC. One is the statistical method, which obtains the historical typhoon parameters causing maximum wind speed. Wang (1982), Yin et al. (1991, 1995) and Zhao (2009) used this method to determine the PTMC for the Hangzhou Bay. Liang and Zhou (2004) applied it to the Haikou Bay. The other method is transplant method proposed by Miyazaki and Okada (1975). This method is transplanting the typhoon parameters of a historical extreme typhoon to another typhoon track or a designed track. Ying and Yang (1986) used this method to study the largest typhoon induced storm surge for Shanghai Port.

The study area, Nansha district, is located in the south of Guangzhou City. From figure 1 we can find that Nansha is in the south part of Pearl River network and also in the upper part of Pearl River Estuary. This area is frequently attacked by tropical cyclone, or called typhoon locally. In last two decades, tremendous reclamation occurred in this area and results in new coastal line and more seaward lowland. As a consequence, this area is under risks of more typhoons attacking with the low standard for flood defense. It is significant to study the storm surge induced by PMTC from flood control and coastal management points of view. In this study the above two methods are used to determine the PMTC for Nansha and the extreme water level set up is investigated.

Fig.1 Location of Nansha, Guangdong