STRATEGY FOR STORM SURGE MITIGATION IN THE BAY OF BENGAL AND ARABIAN SEA

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1. Abstract

India and its neighborhood are threatened by the possibility of storm surge floods whenever a tropical cyclone approaches. About 300,000 lives were lost in one of the most severe cyclone that hit Bangladesh (then East Pakistan) in November 1970. The Andhra Cyclone devastated the eastern coast of India, killing about 10,000 persons in November 1977. More recently the Orissa coast of India was struck by a severe cyclonic storm in October 1999, killing more than 15000 people besides enormous loss to the property in the region. These and most of the world's greatest human disasters associated with the tropical cyclones have been directly attributed to storm surges.

Storm surge disasters cause heavy loss of life and property, damage to the coastal structures and the losses of agriculture, which lead to annual economic losses in these countries. Thus the real time monitoring and warning of storm surge is of great concern for this region.

The main objectives of the talk is to highlight the current activity in surge prediction in Bay of Bengal and Arabian Sea. The talk also describes the mitigation measures for storm surge hazards.

2. REAL TIME STORM SURGE PREDICTION SYSTEM FOR THE BAY OF BENGAL

In India, DUBE ET AL (1994) describe a real time storm surge prediction system for the east coast of India. The only meteorological inputs required for the model are the positions of the cyclone, pressure drop and radii of maximum winds at any fixed interval of times. The model can be run in a few minutes on a PC in an operational office. The system is operated via a terminal menu and the output consists of the two –dimensional and three-dimensional views of peak sea surface elevations with the facility of zooming the region of interest. One of the significant features of this storm surge predication system is its ability to investigate multiple forecast scenarios to be made in real time.

3. VALIDATION EXPERIMENTS

In order to validate the model, using the data of severe cyclonic storms hitting the east coast of India has performed several simulation experiments. An attempt has been made to compare the simulated sea surface elevations with observations from local tide gauges wherever possible or with post storm survey estimates of India Meteorological Department. The model results reported in the present study are in good agreement with available observations/estimates.

In the present paper we will give the results of the model computed storm surges associated with October 1999 Orissa cyclone.

4. Real Time Prediction of Storm Surge associated with 1999 Super Cyclone

Cyclone crossed the Orissa coast of India close to Paradip between 0430 and 0630 UTC of 29 October. For the track land falling near Paradip the pressure drop is 97 hPa and radius of maximum winds is 40 km. The track of the cyclone is shown in Figure 1.

Figure 2 (c) shows the model computed peak surge envelope along the Orissa coast. It can be seen that a maximum surge of about 7.8 m occurred close to the landfall point (Dube et al. 2000). The coastal region between Konark and Chandbali is affected by a surge of more than 5m. Post- storm survey reports also show that the surge is more than 7m, near Paradip.

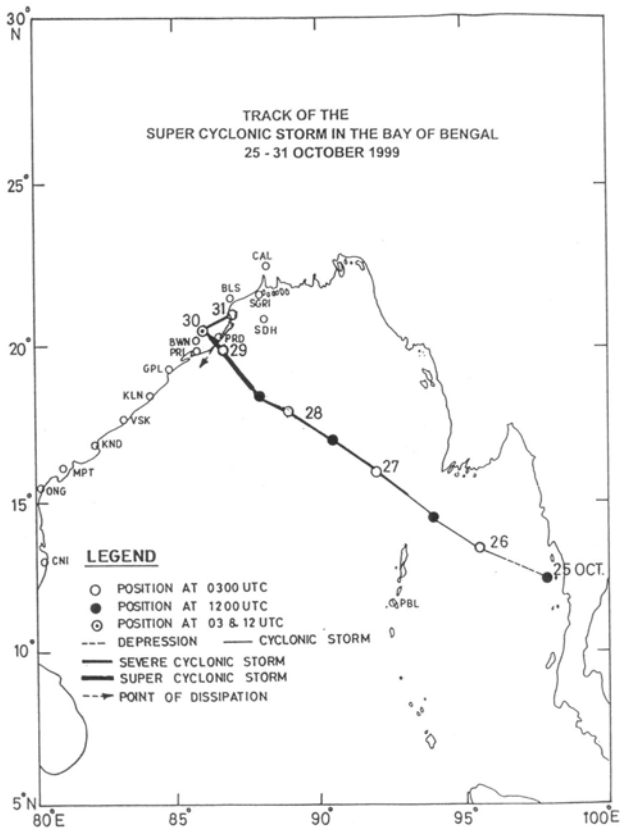

Figure 1: Track of October 1999 Orissa Cyclone

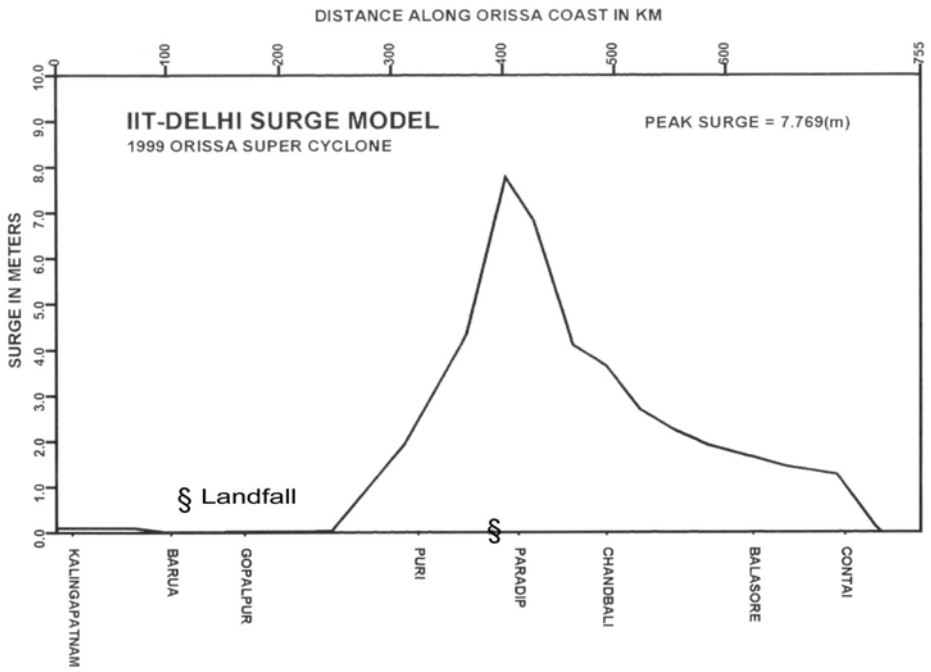

Figure 2 : Peak surge envelop associated with 1999 Orissa Cyclone (DUBE ET AL, 2000)

5. References

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