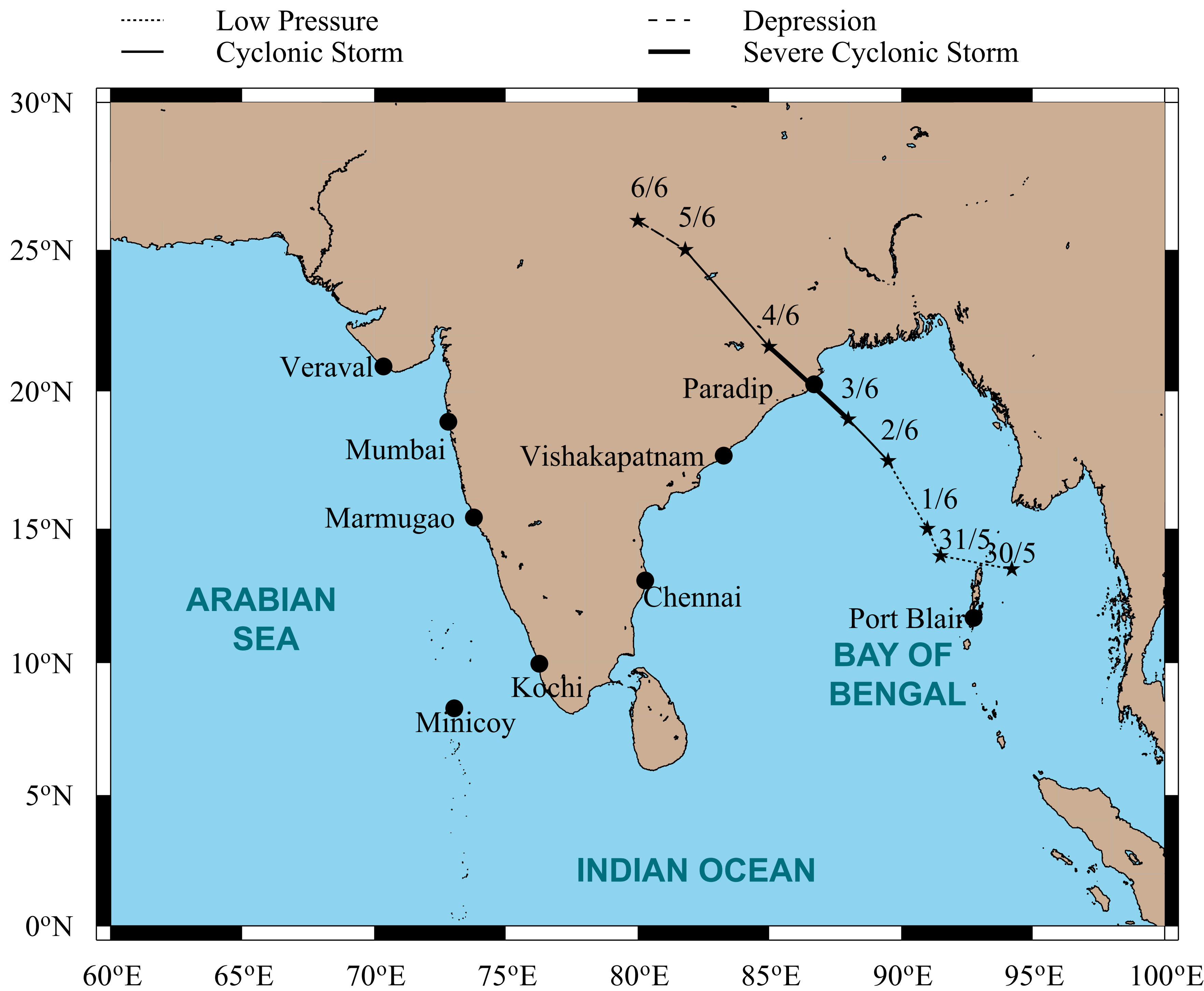




# Extreme Sea level changes along the east coast of India: Observations and Projections

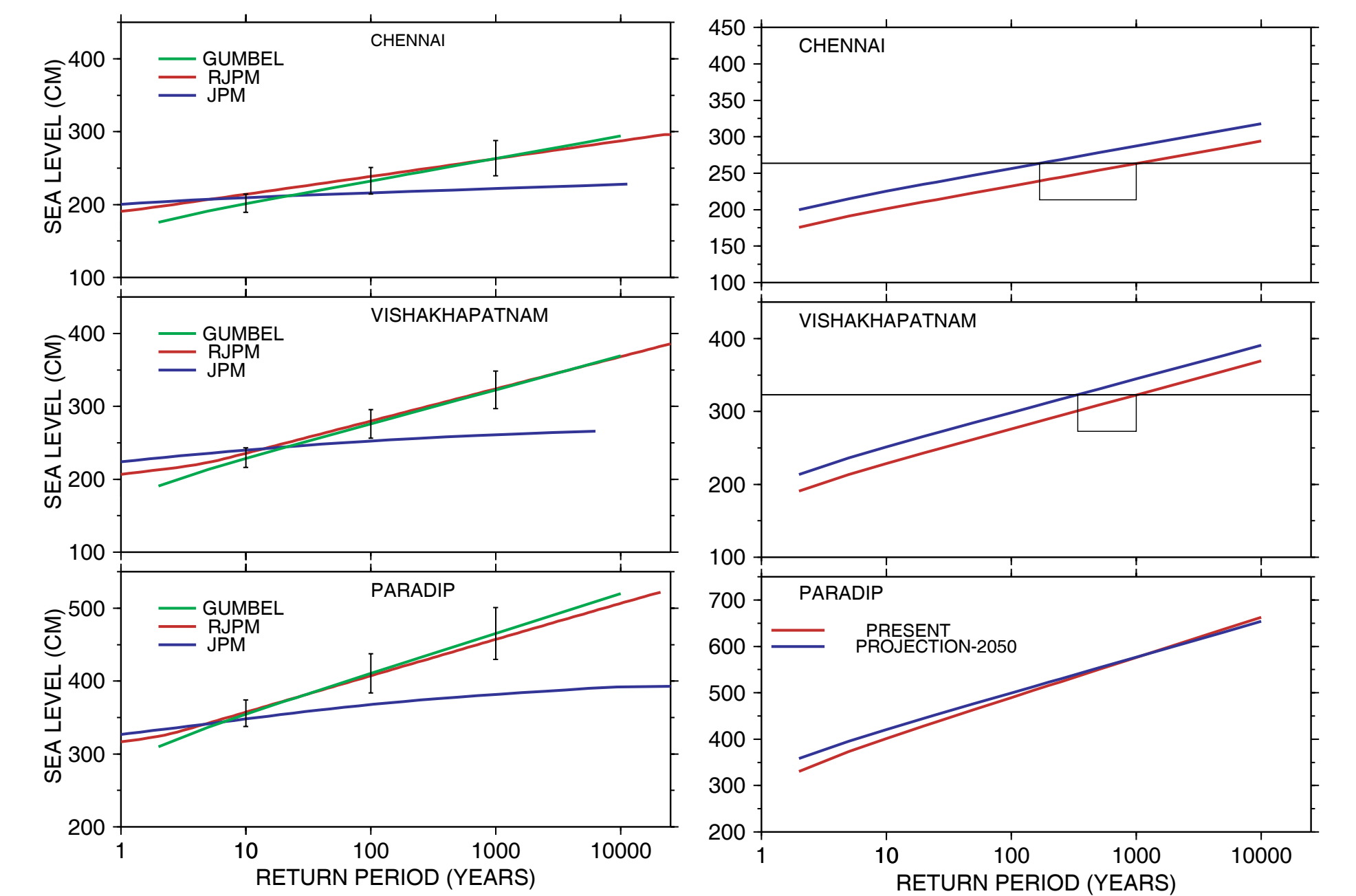
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The track of the Severe Cyclonic Storm which had the landfall near Paradip on 3-6-1982.

Return period estimates (a) Present scenario (Unnikrishnan et. al., JRG, 2004) (b) For a projected sea level rise of 25 cm by 2050



## Regional climate model HadRM2 for north Indian Ocean

HadRM2 (Hadley Centre for Climate Research, UK) has a grid resolution of  $\sim 0.450$ . Two simulations (2041-2060) for IS92a scenario

(i) Control (CTRL) run

(ii) A run (GHG) with a 1% increase of  $CO_2$  every year since 1990

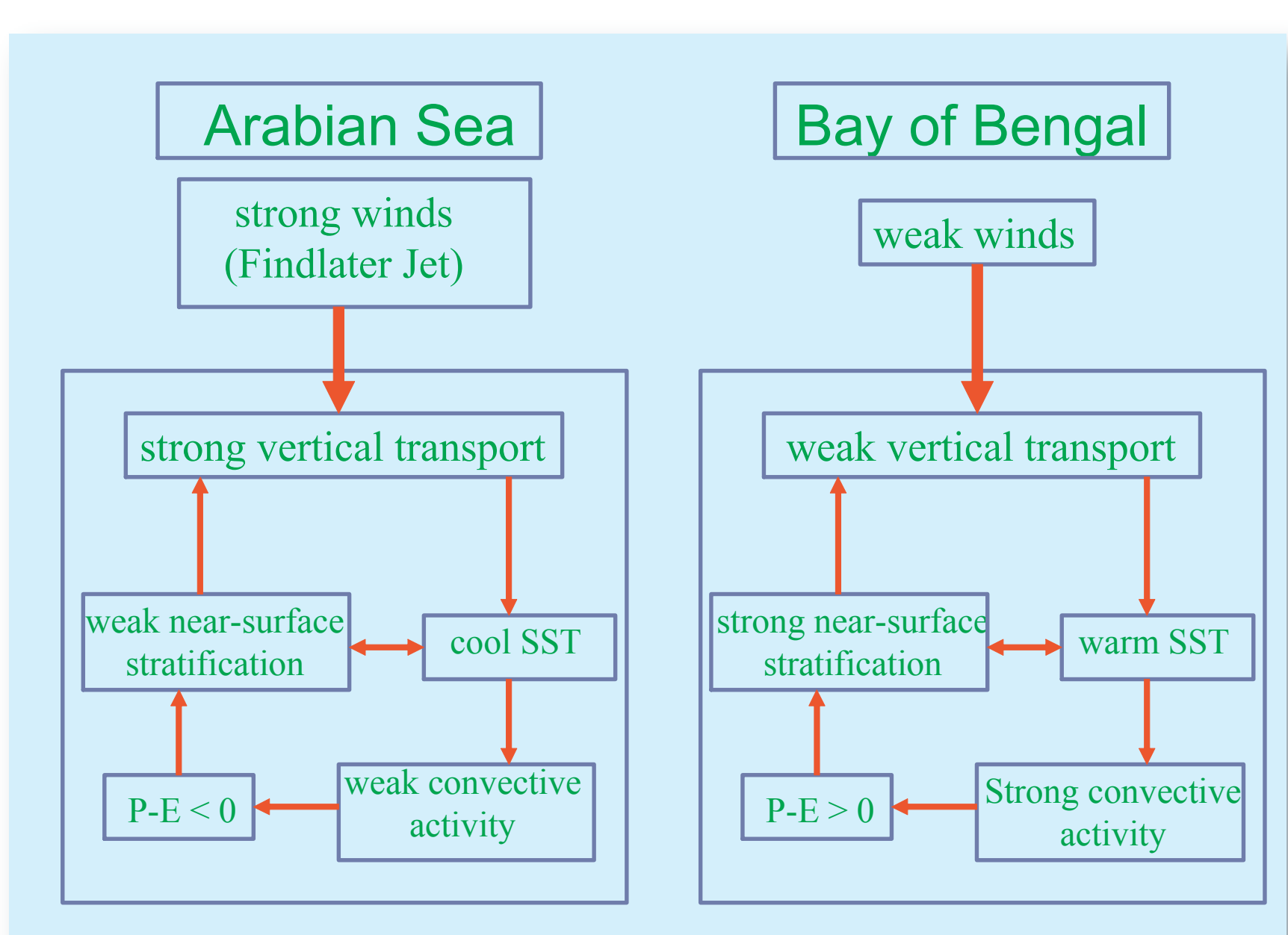
Storm surge model (NIO, Goa) was developed (Unnikrishnan et. al., 2006) for the Bay of Bengal (open boundary along the southern side along  $6.50^\circ N$ ). The model was forced by near surface winds from HadRM2 and tides along the open boundary from the global tidal model (Grenoble)

## Tropical cyclones in the Bay of Bengal

Most of the tropical cyclones in the Bay of Bengal form during the post-monsoon season (Oct-Dec) and some during SW monsoon season (June-Sept)

They propagate towards north and northwest

## Oceanographic conditions in the Bay favour formation/intensification of low pressure systems (Shenoi et al., JGR, 2002)



## Observed storm surges in tide gauge records along the east coast of India (Sundar et. al., 1999)

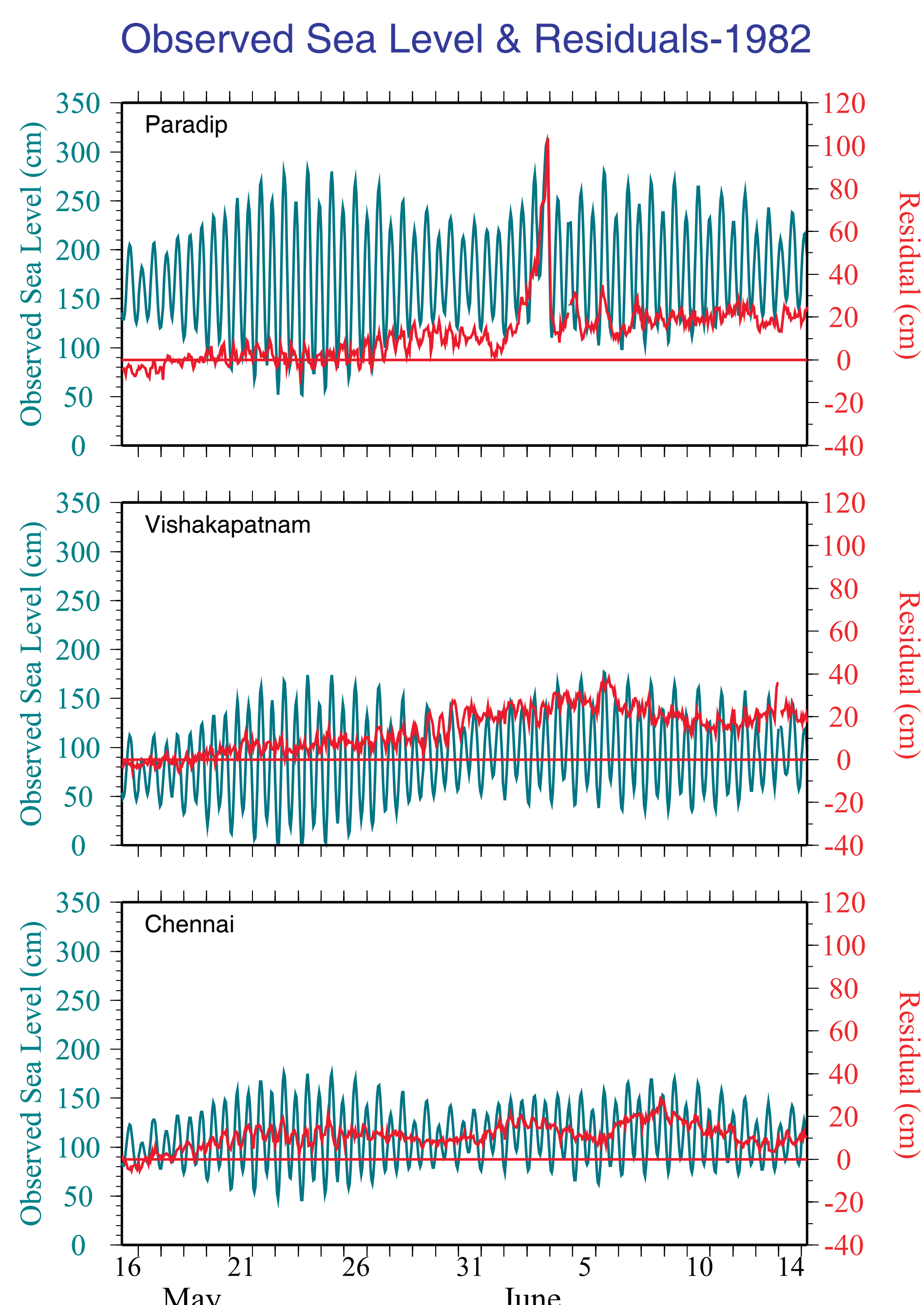
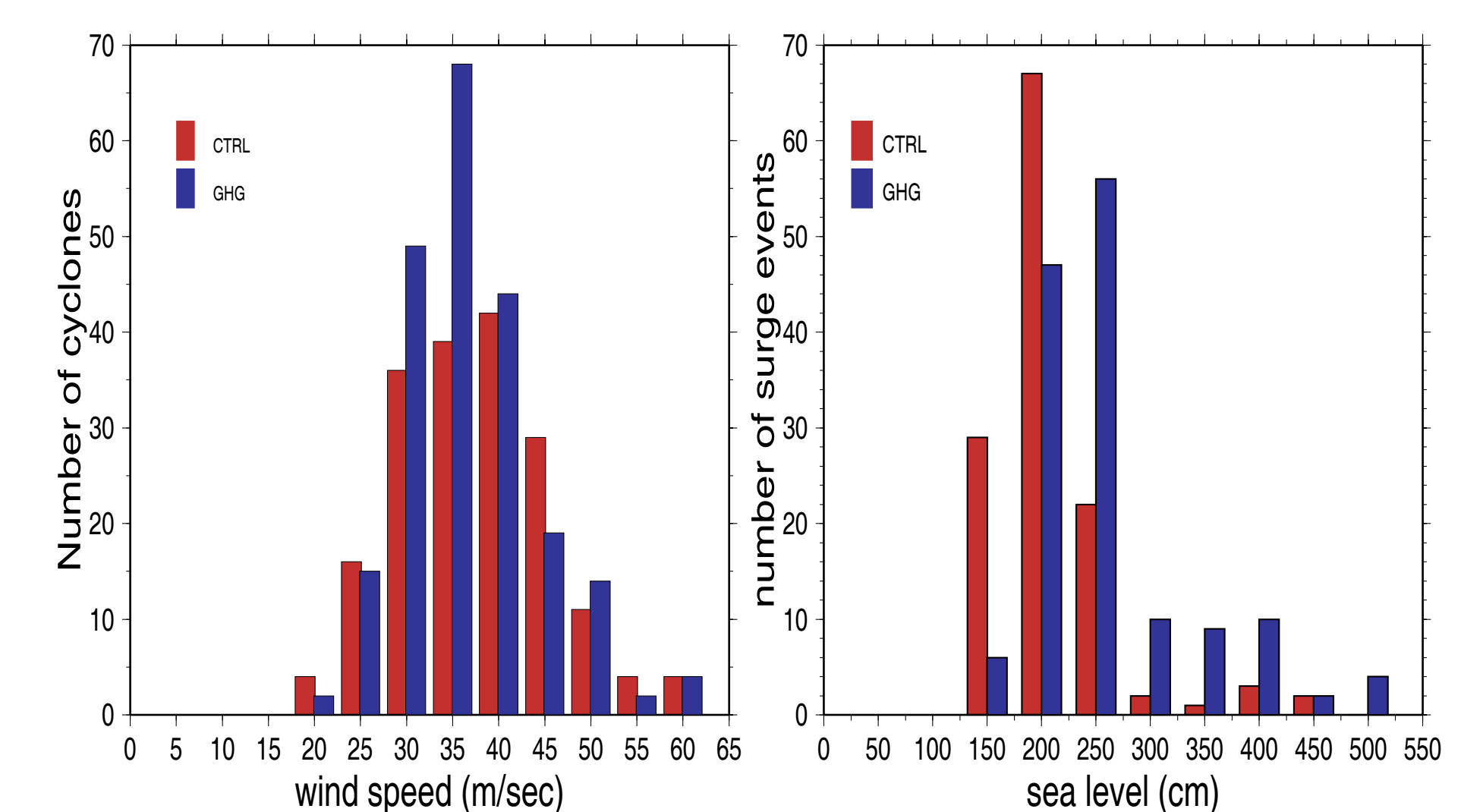


Fig. 4c. Observed Sea Level and Residual at the three stations on the east coast during the Severe Cyclonic Storm which had landfall near Paradip on 3-6-1982.

## Frequency distribution of Maximum wind speed associated with each cyclone and highest surge associated with a storm surge event (2041-2060)



## Conclusions

Future projection using a regional climate model (HadRM2) and a storm surge model for the Bay of Bengal indicates increase in frequency of intense events of tropical cyclones and storm surges in a model simulation with increased green house gases (IS92a scenario) than in a control run.

Future sea level rise can cause increased flood risks along the east coast of India, particularly in the southern side (Chennai), where tidal ranges are low than in the northern side (Paradip), where tidal ranges are high.