Sea-level changes along the Indian coast – Impacts & Vulnerability

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Inputs to NATCOM-II

- Mean sea-level-rise trends along the Indian coast
- Storm surges in future climate scenarios along the east coast of India- Return period estimates
- Impact studies at selected locations (Kochi, Nagapattinam and Paradip) – Inundation maps
- Vulnerability of mangroves to sea-level rise

Net sea-level-rise trends (Unnikrishnan and Shankar, 2007 In: *Global and Planetary Change*) from past tide-gauge records

Tide-gauge Station	No of years of data	Trends (mm/yr)	GIA (Glacial Isostatic Corrections)	Net sea-level rise (mm/yr)
Aden	58	1.21	-0.16	1.37
Karachi	44	0.61	-0.45	1.06
Mumbai	113	0.77	-0.43	1.20
Kochi	54	1.31	-0.44	1.75
Vishakhapatnam	53	0.70	-0.39	1.09
Diamond Harbour	55	5.22	-0.52	5.74

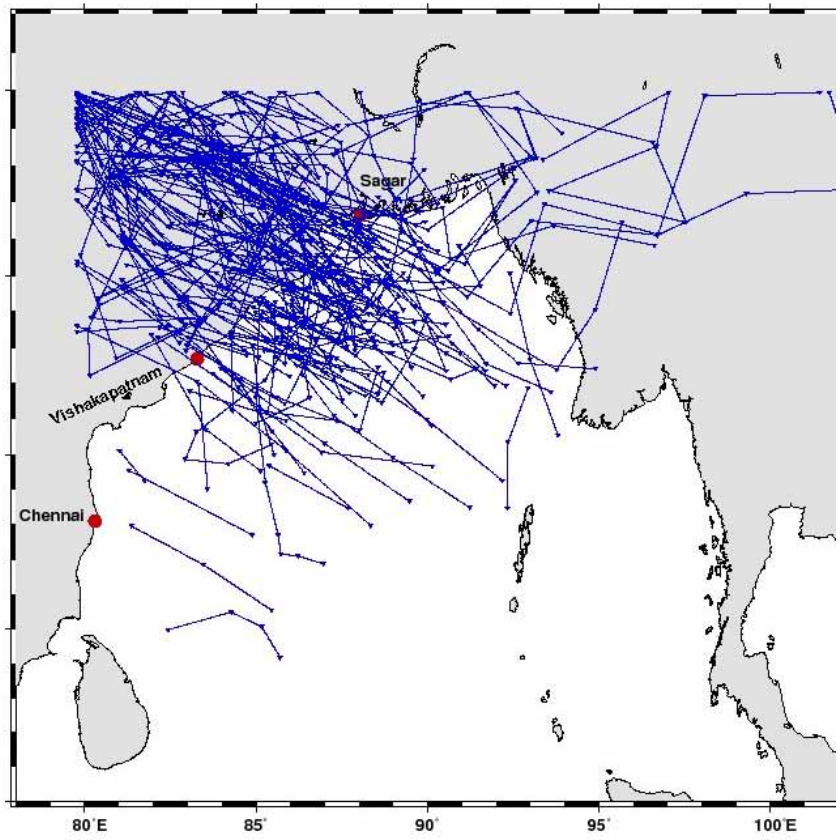
Analysis of PRECIS model runs

- Wind fields (10 m) and surface atmospheric pressure fields for Bl (1961-1990) and A2 (2071-2100) scenarios

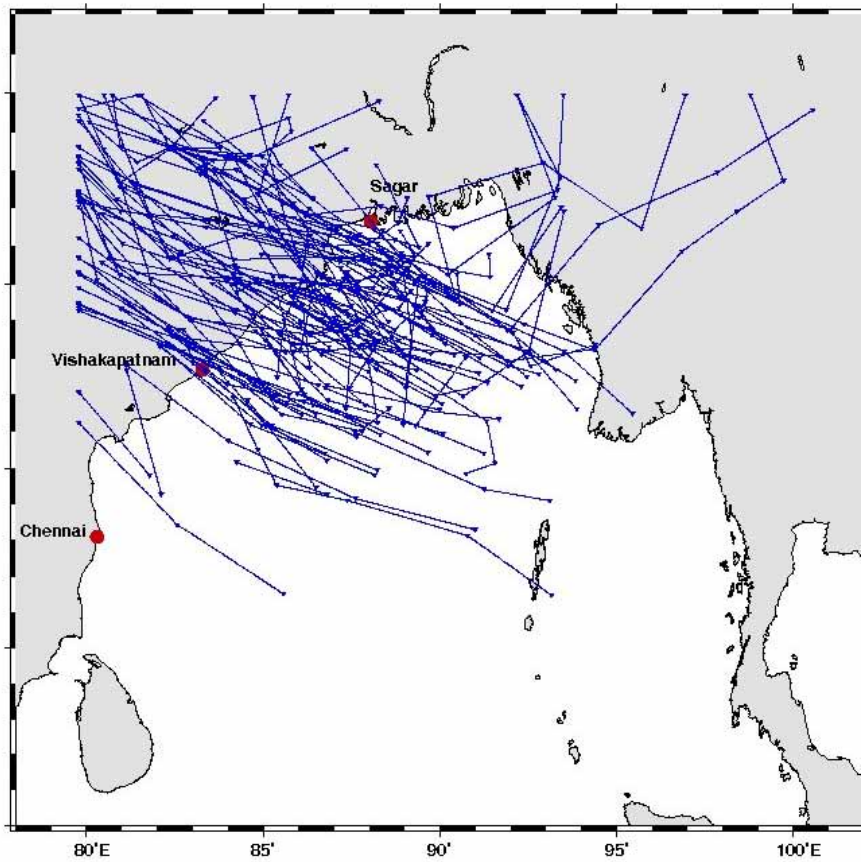
- Storm surge model, driven by winds from PRESCI, for the Bay of Bengal

Composite track of cyclones (PRECIS) in the Bay of Bengal

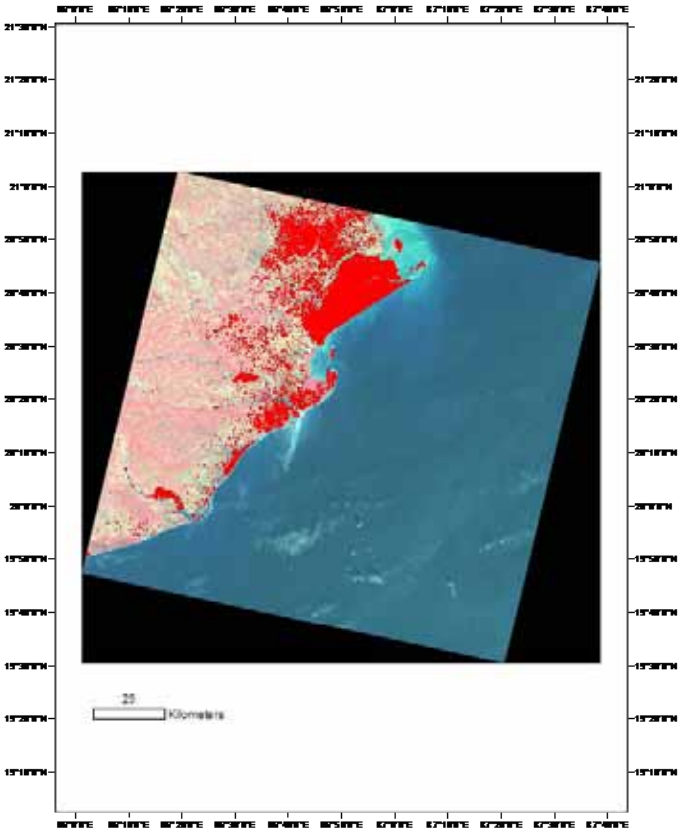
- Bl (1961-1990)



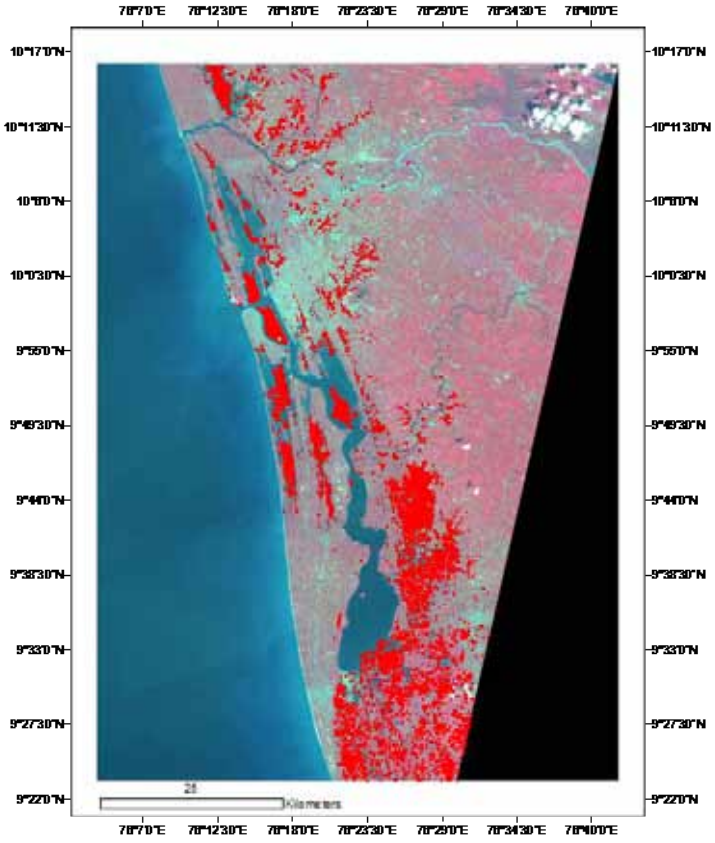
A2 (2071-2100)



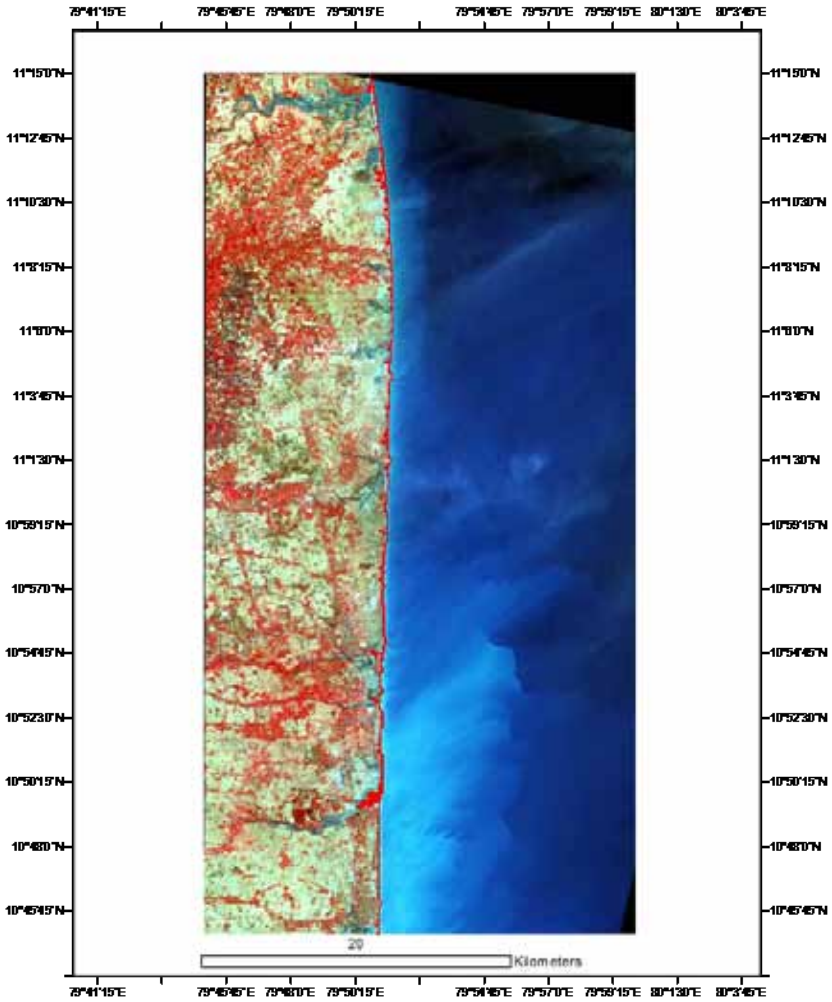
Inundation map of Paradip area for a sea-level rise of 1m



Inundation map of Kochi area for a sea-level rise of 1m



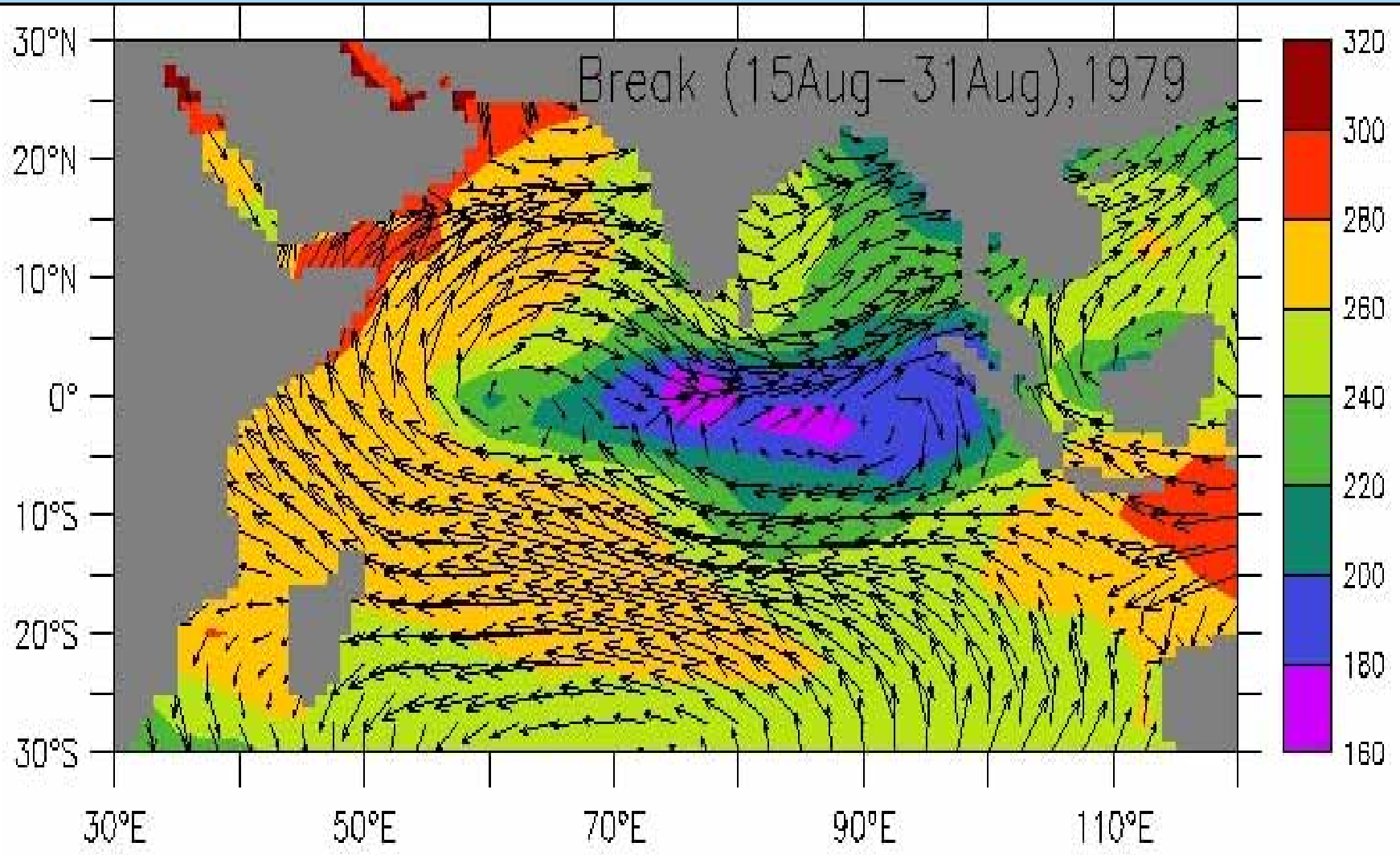
Inundation map of Nagapattinam area for a sea-level rise of 1m



Vulnerability of the mangroves to sea-level rise

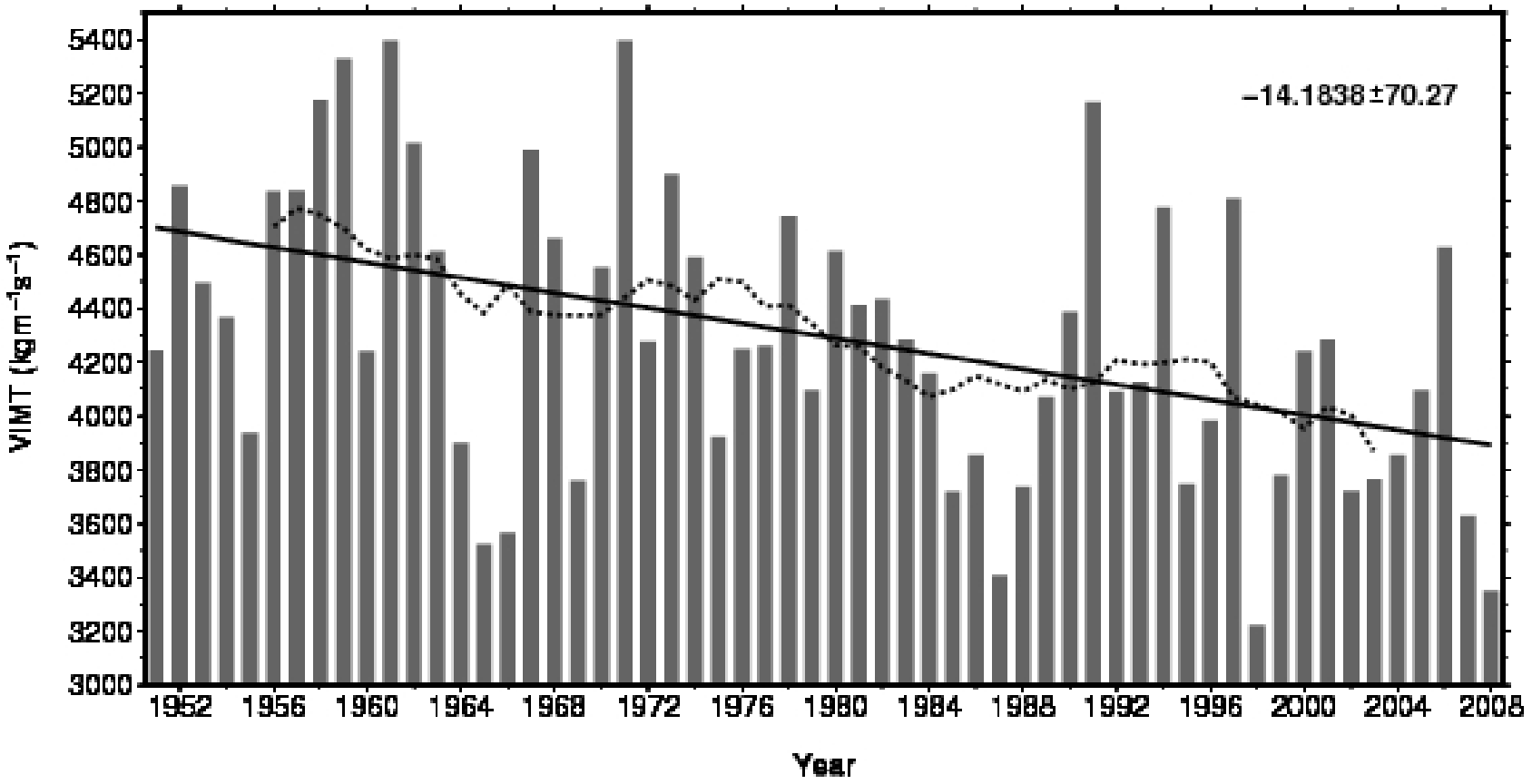
Tanaji,et.al, Ambio, 2007

Winds at 850 hPa and convection over the Indian Ocean during break monsoon conditions



Swapna and Ramesh Kumar (2002)

Vertically Integrated Moisture Transport to Peninsular India during 1951-2008



Ramesh Kumar et al (2009)

Conclusions

- Mean sea-level-rise trends along the Indian coasts are about 1.30 mm/yr
- Future (global) Projections (global) indicate on an average about 3.8 mm/year for A1B scenario

In Progress…….

- Regional sea-level-rise projections for the Indian coasts - uses IPCC model simulations and sea-level observations (Joint project with IITD)