

# Simulation of Coastal Changes in Thailand

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- ❑ Overview
  - ❑ Coastal erosion situation and mitigation
- ❑ Objectives
- ❑ Methodology
  - ❑ data sources and tools
  - ❑ Studied area
- ❑ Results & Validation
- ❑ Conclusions

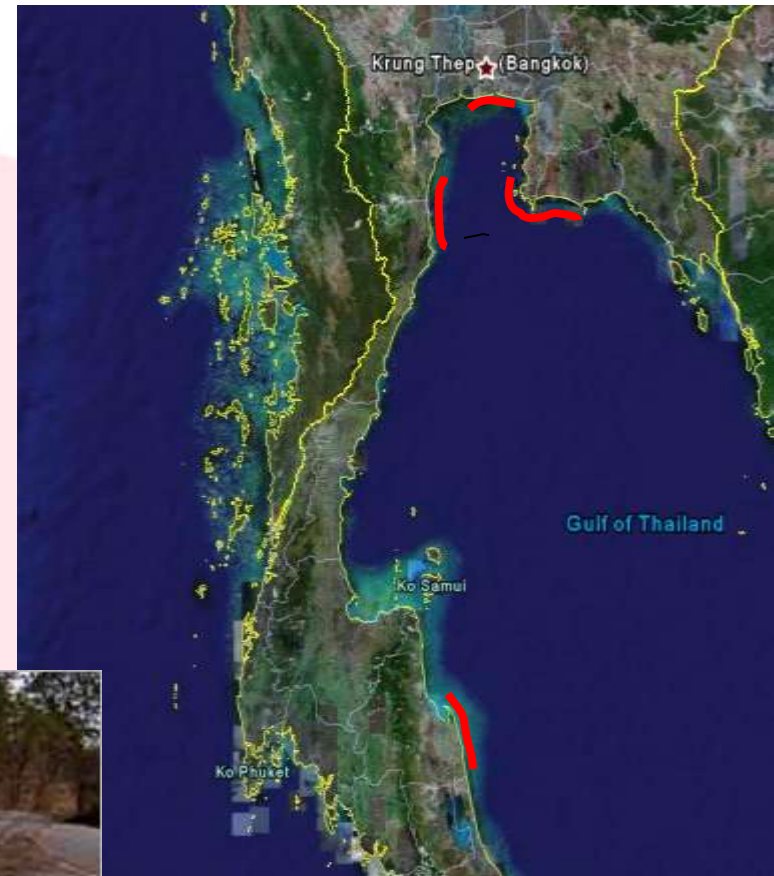
# Coastal Erosion: Situation

The length of the coastline of Thailand is approximately 2,637 km.

12 millions people reside near or long the coastline.

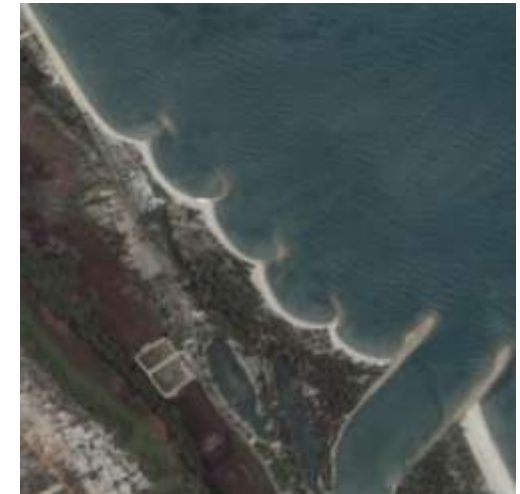
Coastal erosion in the Gulf of Thailand coastlines is about 376 km (14.26 % of total shoreline of Thailand).

22% for severe coastal erosion with rate of more than 5 meters/year



# Coastal Erosion: Mitigation

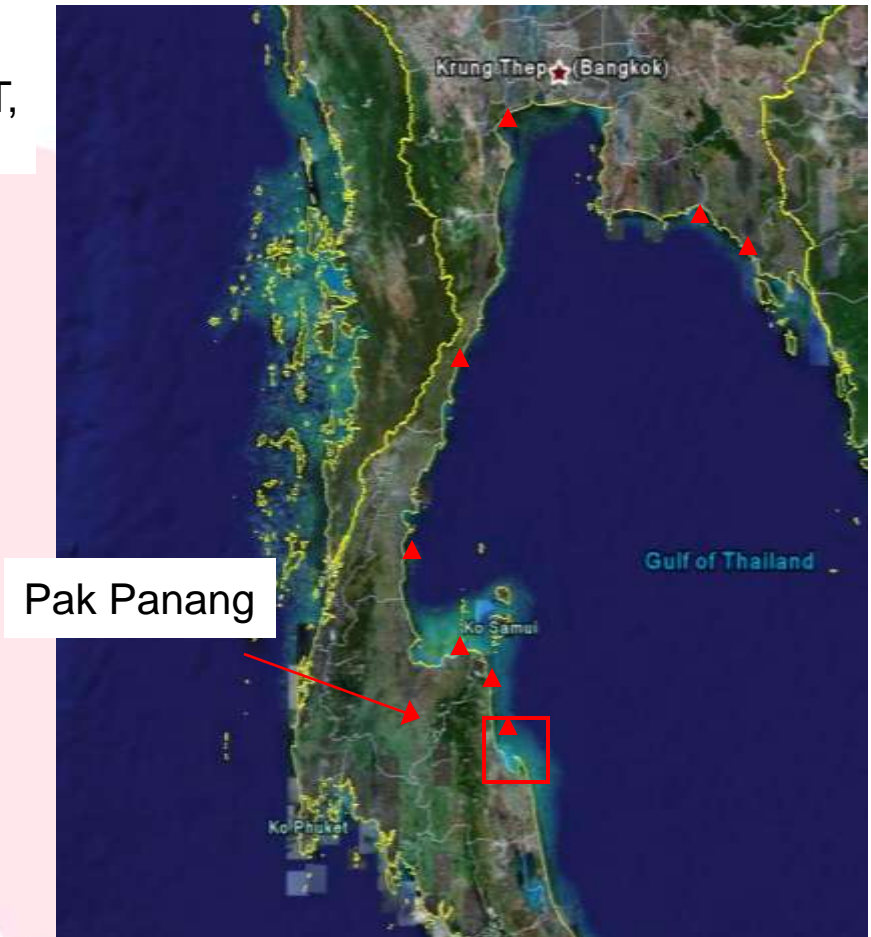
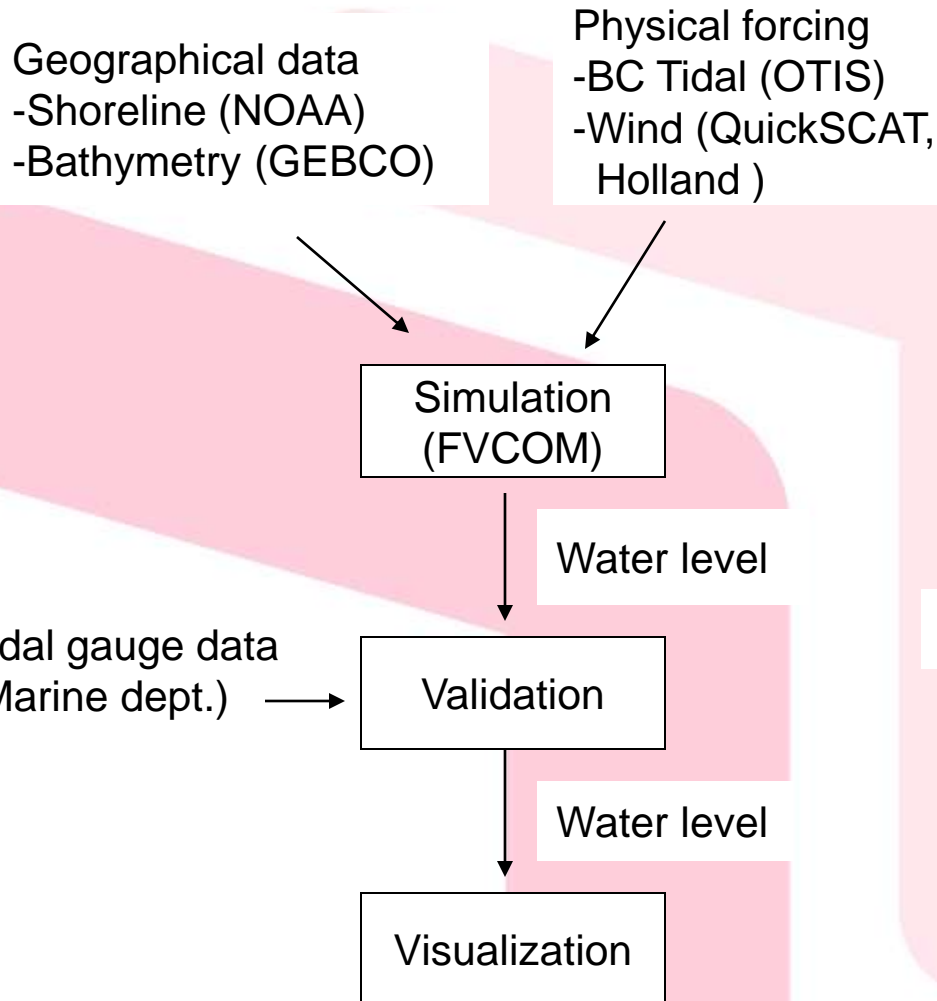
- ❑ There are a few mitigation strategies for coastal erosion:
  - Hard Engineering Structures
    - Groins, Breakwater, Seawalls.
  - Soft Engineering Structures
    - Beach nourishment, Revegetation, etc.
- ❑ Many solutions are expensive, require maintenance, and might **increase erosion** to nearby coastal areas.
- ❑ The long-term solutions needs better understanding of coastal processes



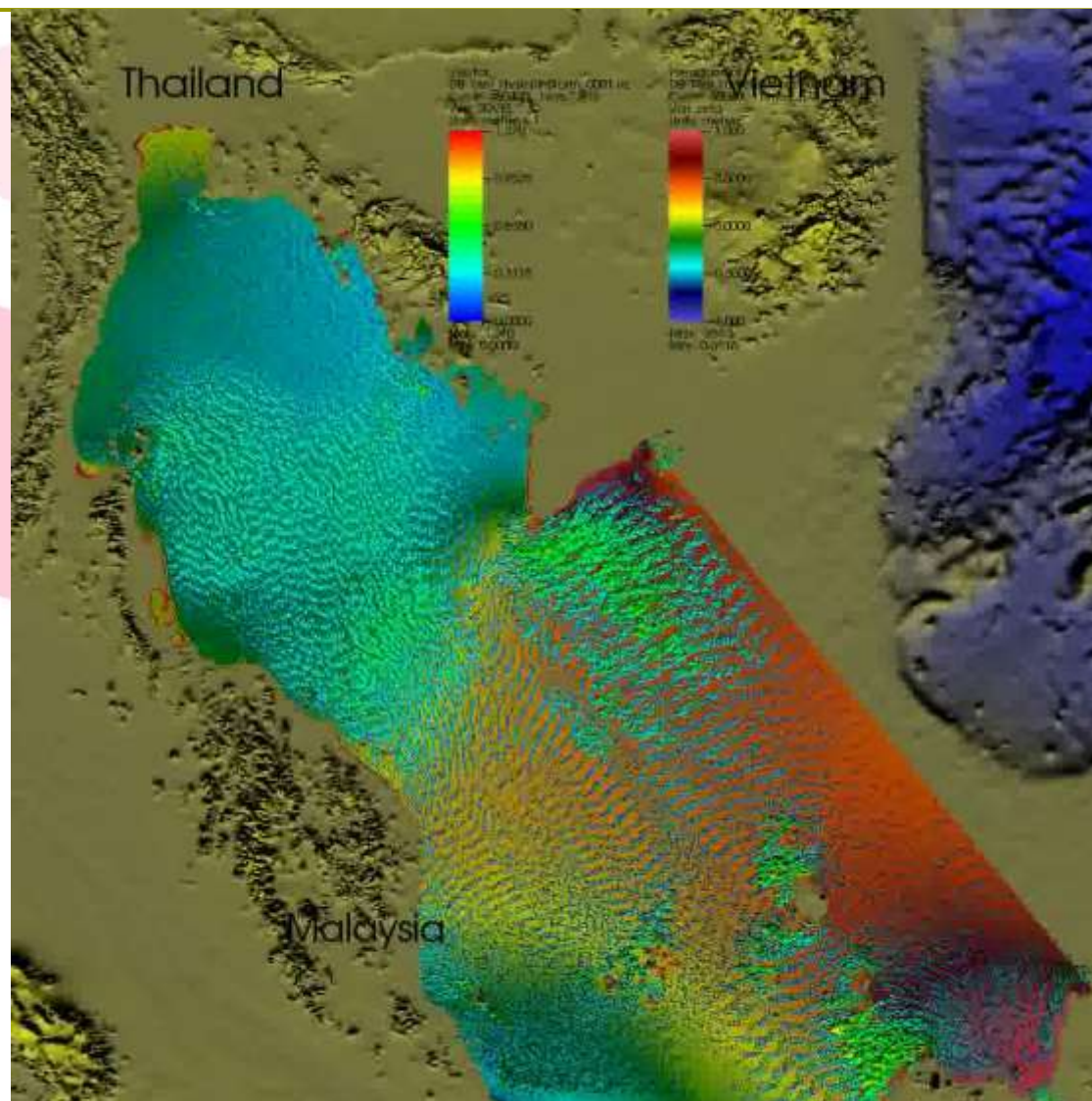
- ❑ Make the through understanding of coastal processes based on simulation approach
  - Sediment Transport
  - Tide, Wave, Current
  - Relative sea level
- ❑ Develop simulation models of coastal processes for the Gulf of Thailand.
- ❑ Provide results as inputs to coastal management

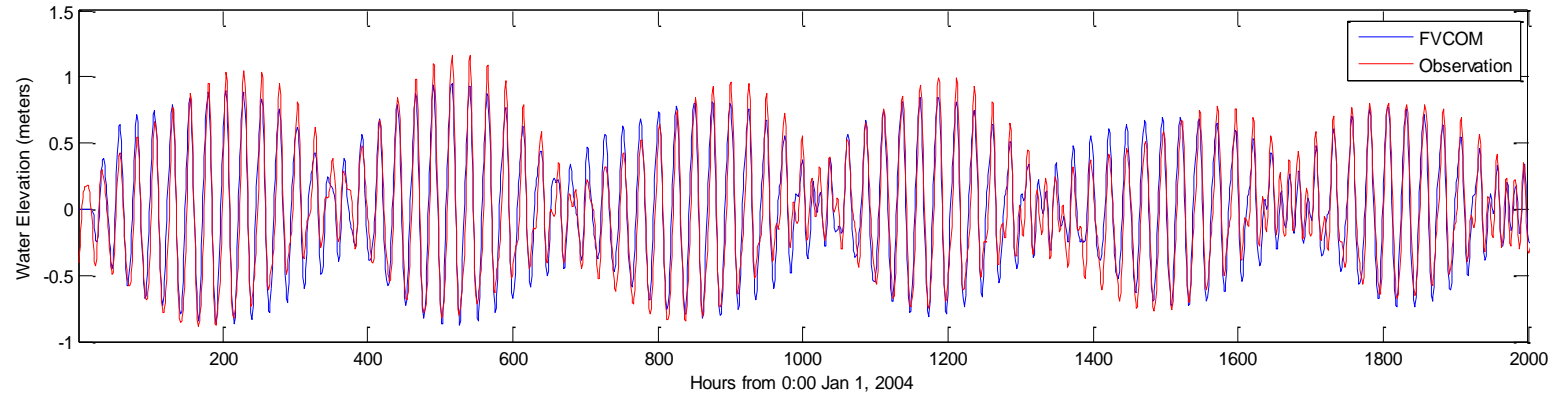


# Methodology

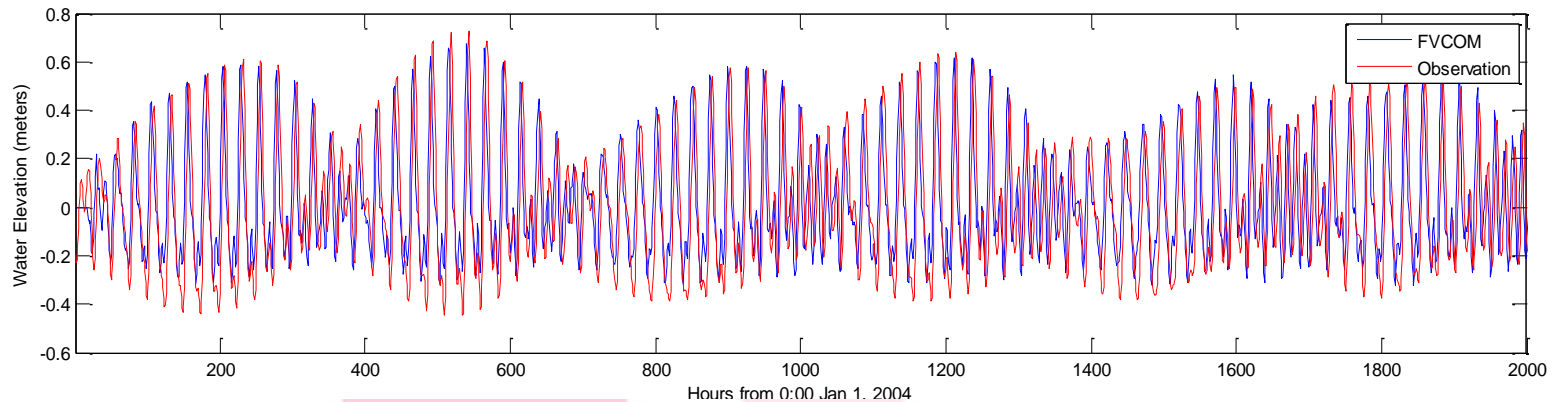


# Simulation Result





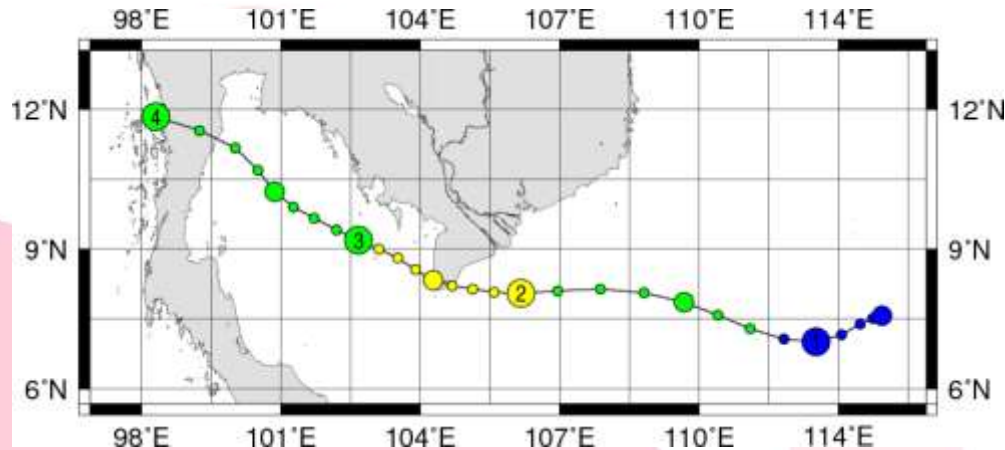
Lang Suan station



Pak Panang station



# Tropical cyclone model



Digital Typhoon (NII)

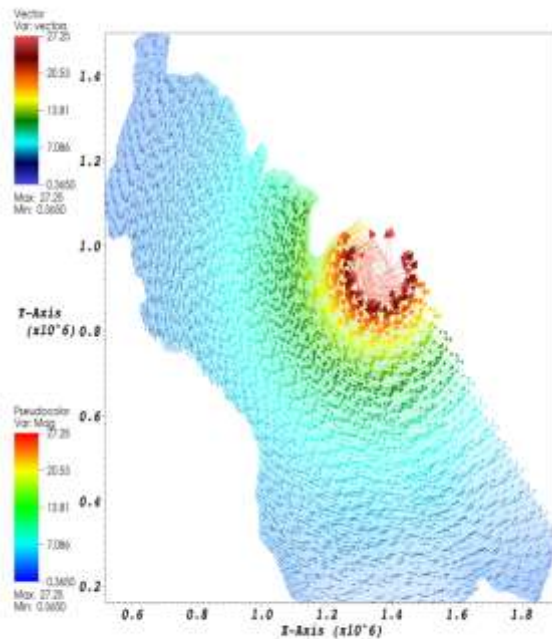
The Linda Typhoon,  
1997

Location, Wind Speed, Pressure

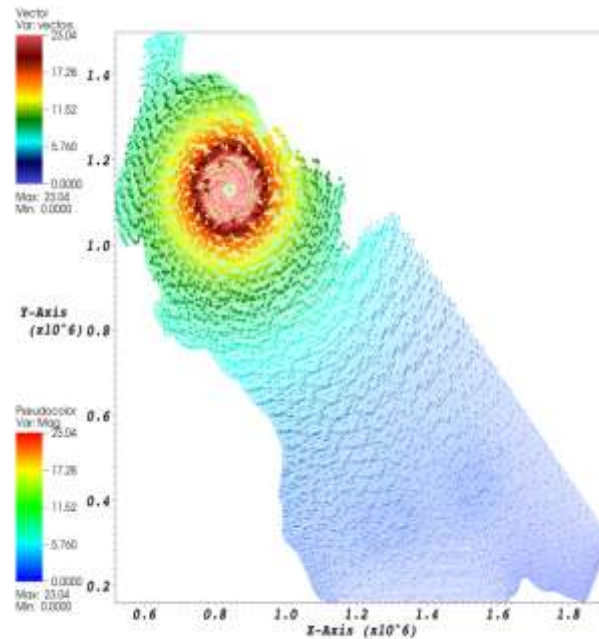
Holland Wind Model

Wind Speed, Pressure

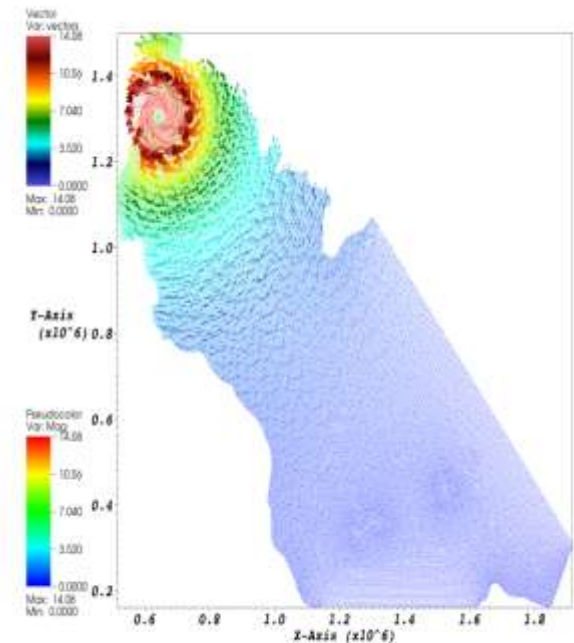
# Visualization: Linda Typhoon



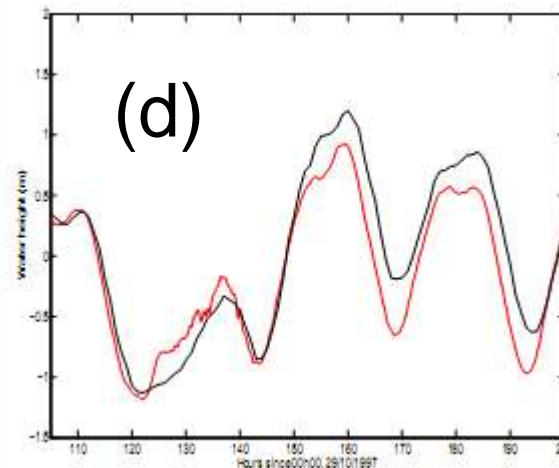
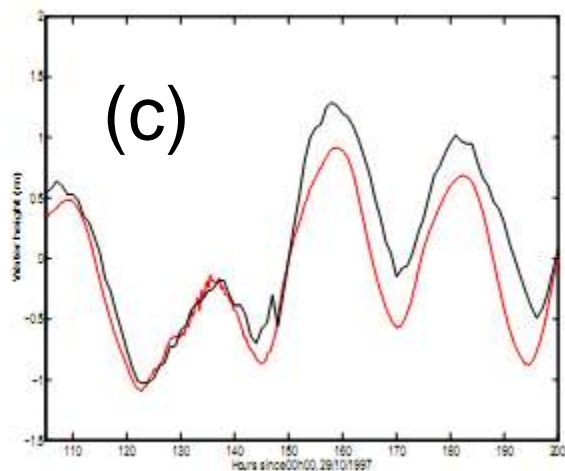
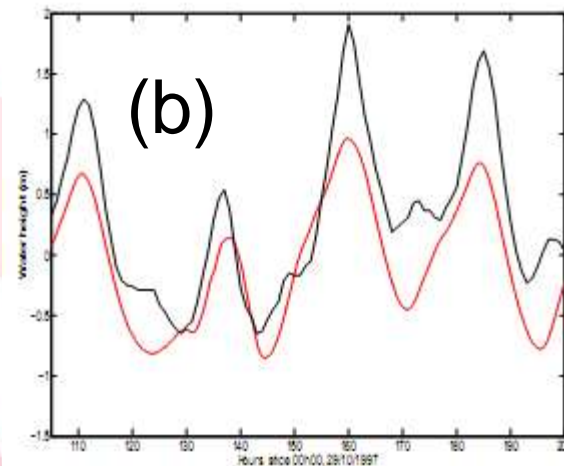
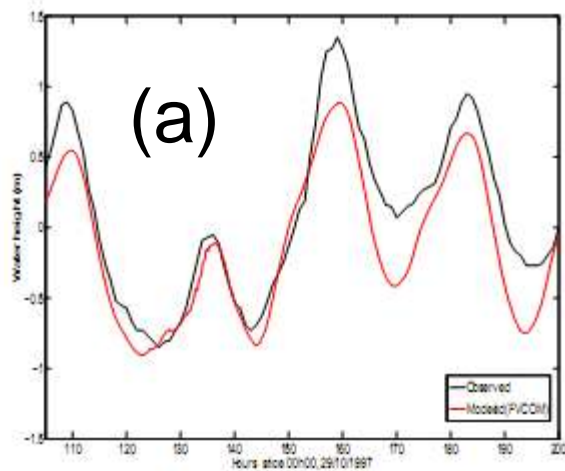
2-Nov-97: 00UTC



3-Nov-97: 06UTC



3-Nov-97: 18UTC



a: Koh Mataphon  
b: Koh Prap  
c: Koh Lak  
d: Laem Singh

- ❑ Developed a simulation model for tidal forcing in the gulf of Thailand
- ❑ Results has been verified with the observation data
- ❑ Future work
  - Asymmetric tropical cyclones model and forward speed
  - Atmospheric pressure
  - Scenario-based studies – wind speed, typhoon location
  - Coastal flooding in Pak Panang area



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[www.ngdc.noaa.gov/mgg/shorelines/shorelines.html](http://www.ngdc.noaa.gov/mgg/shorelines/shorelines.html)  
<http://www.gebco.net/>  
<http://www.oce.orst.edu/research/po/research/tide/otis.html>  
<http://manati.orbit.nesdis.noaa.gov/quikscat/>  
<http://fvcom.smast.umassd.edu/FVCOM/index.html>  
<http://agora.ex.nii.ac.jp/digital-typhoon/index.html.en>

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Q/A