

# **VULNERABILITY OF VIETNAMESE COASTS DUE TO COASTAL DISASTERS AND CLIMATE CHANGE**



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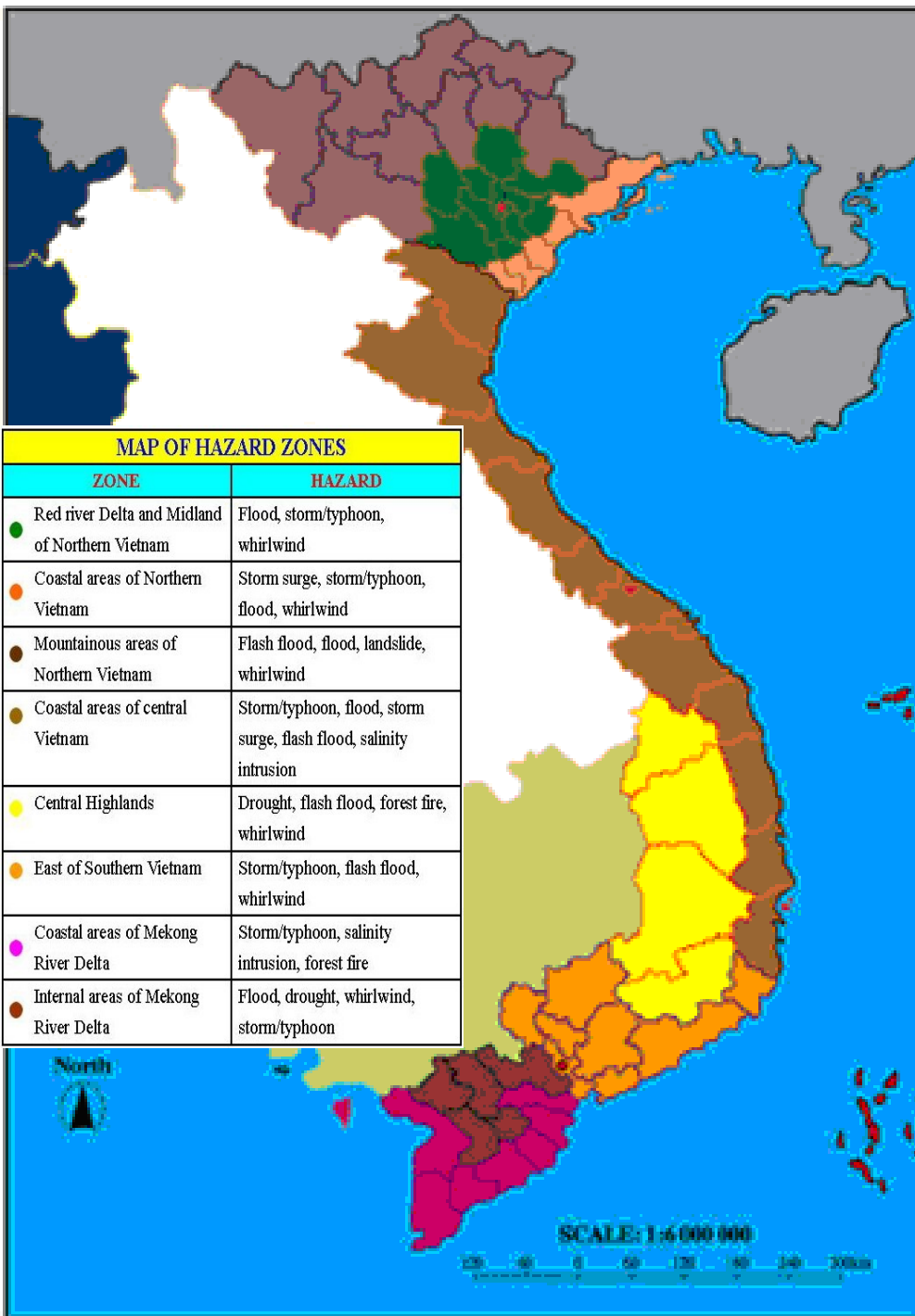
*Bangkok, January 28-30, 2015*



- Indian Ocean Tsunami in 2004
- Cyclone Nargis that hit Myanmar in 2008, which was the strongest cyclone in the last 60 years, caused devastating damage to low-lying areas of the country
- The 2011 Tohoku Tsunami: described as a one in 1,000 years event
- Typhoon Haiyan in the Philippines in 2013: 6,201 individuals dead, 28,626 injured and 1,785 still missing



# Introduction

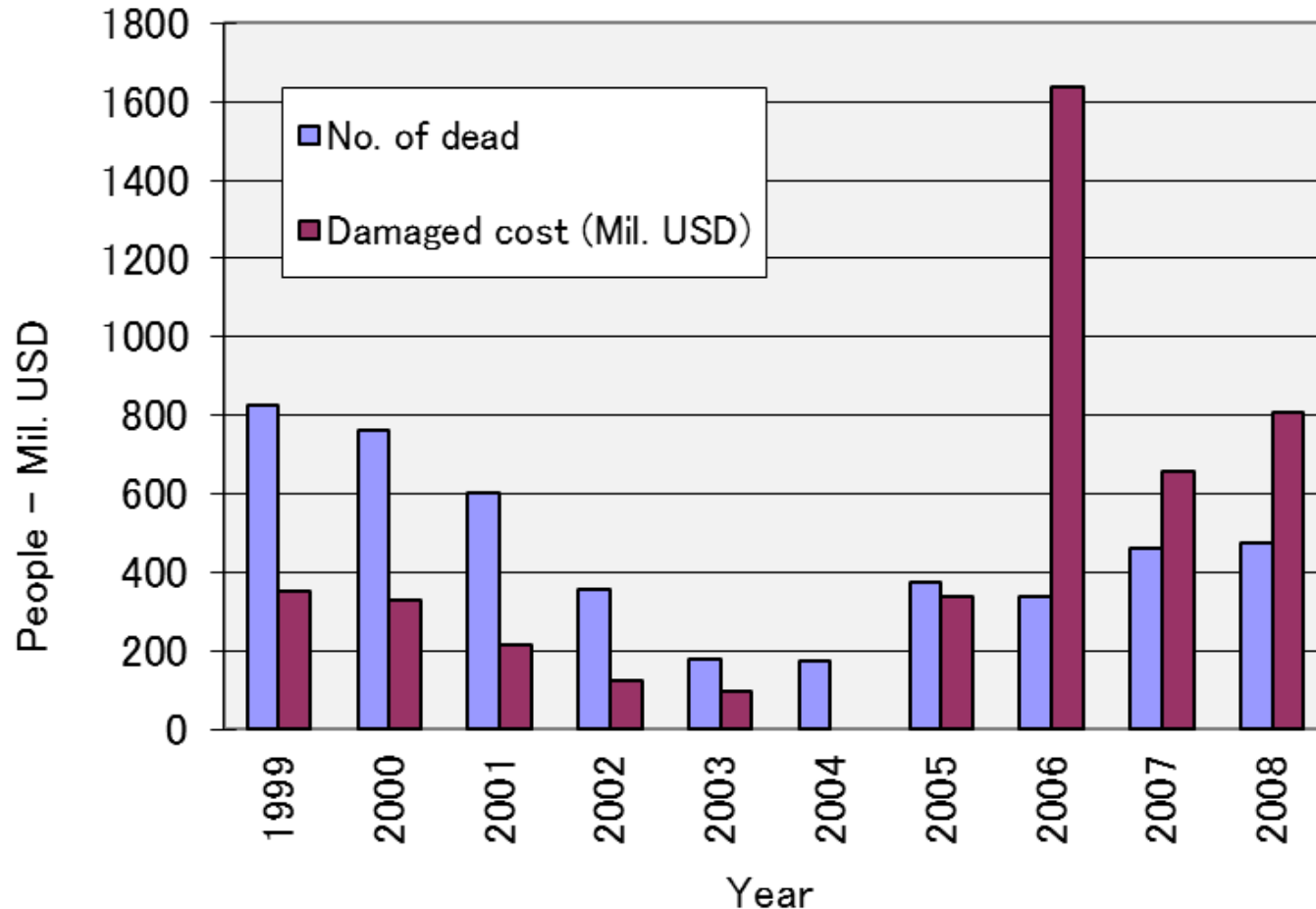


## DISASTER RELATIVE FREQUENCY

HIGH	MEDIUM	LOW
Storm/Typhoon	Landslide	Earthquake
Whirlwind, cyclone	Forest fire	Tsunami
Flood, inundation	Salinity intrusion	Frost
Flash flood	Storm surge	Hail rain
Drought, desertification		Accident (technology)
Erosion		



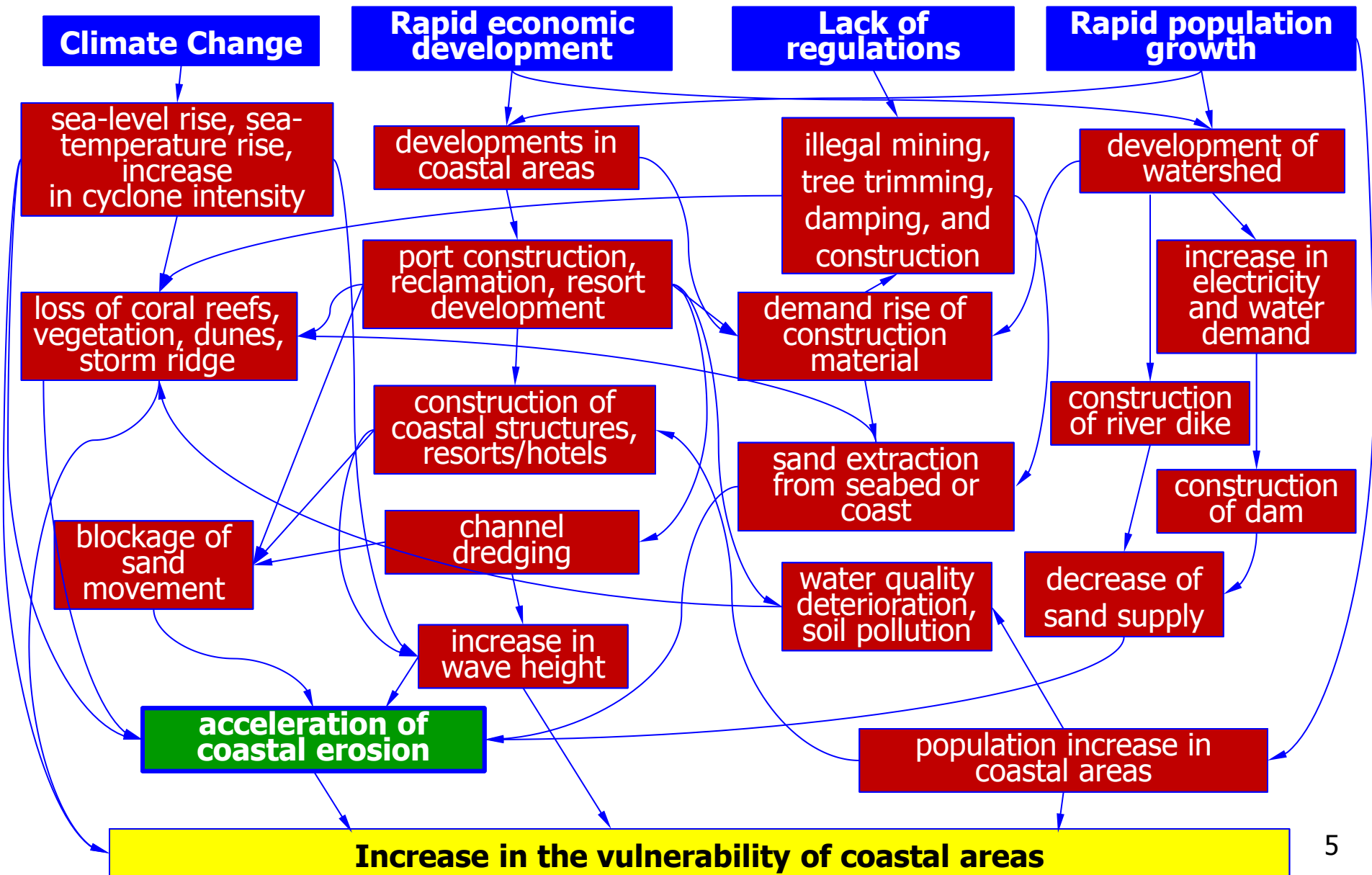
# Damages caused by natural disasters



- In 50 years, Vietnam has been hit by 380 typhoons and depressions (7-8 typhoons/year)
- Average annually deaths (From 1989-2011): 567 people/year



# Factors leading to coastal vulnerability





# Coastal Issues in Vietnam



## Coastal Environment

Coastal Erosion  
Pollution

## Coastal Disaster

Typhoon and Storm Surge  
Tsunami, High Wave, Sea  
Level Rise

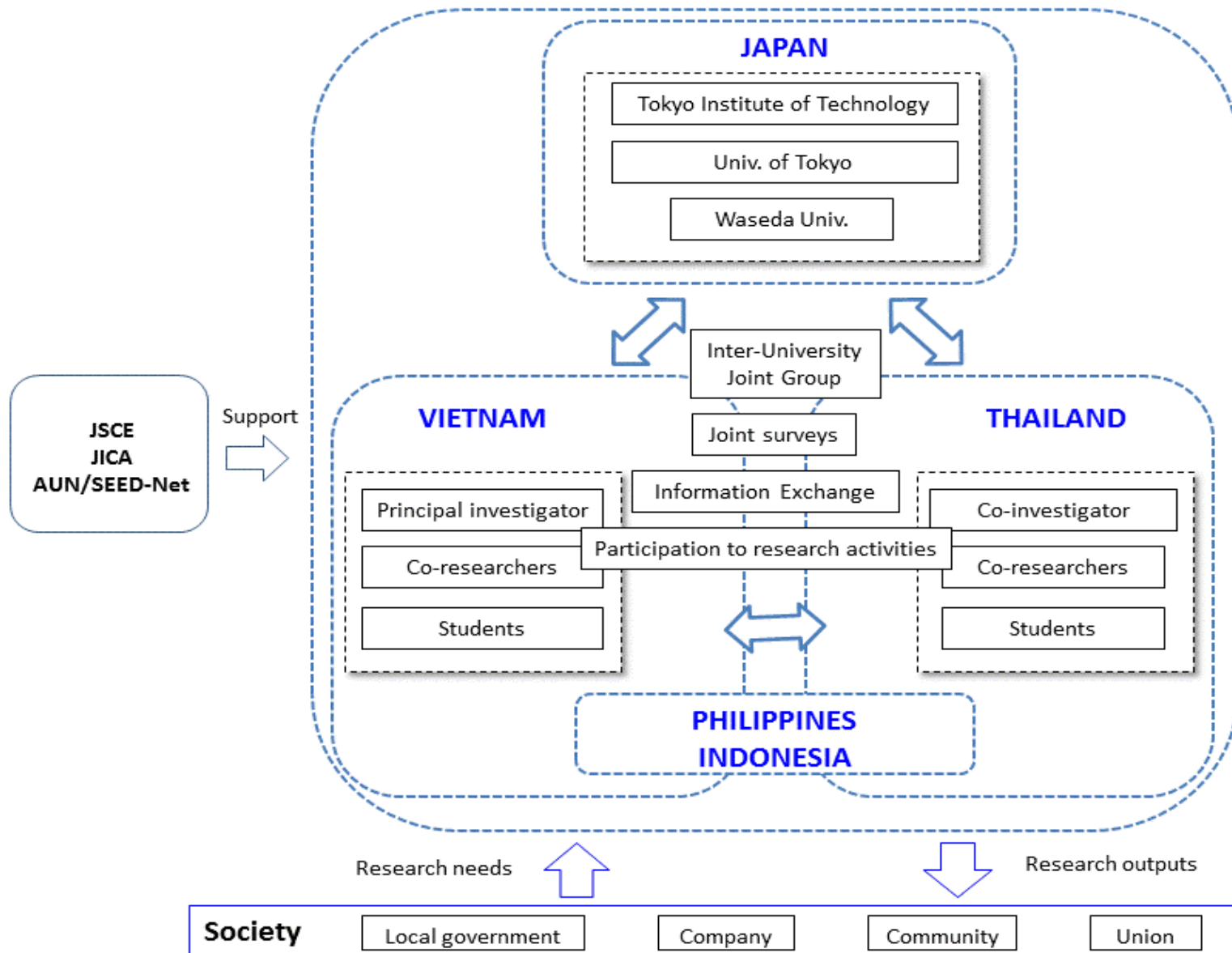
Having better management  
plans and reducing the risks

People's  
awareness

Sustainable development for coastal areas

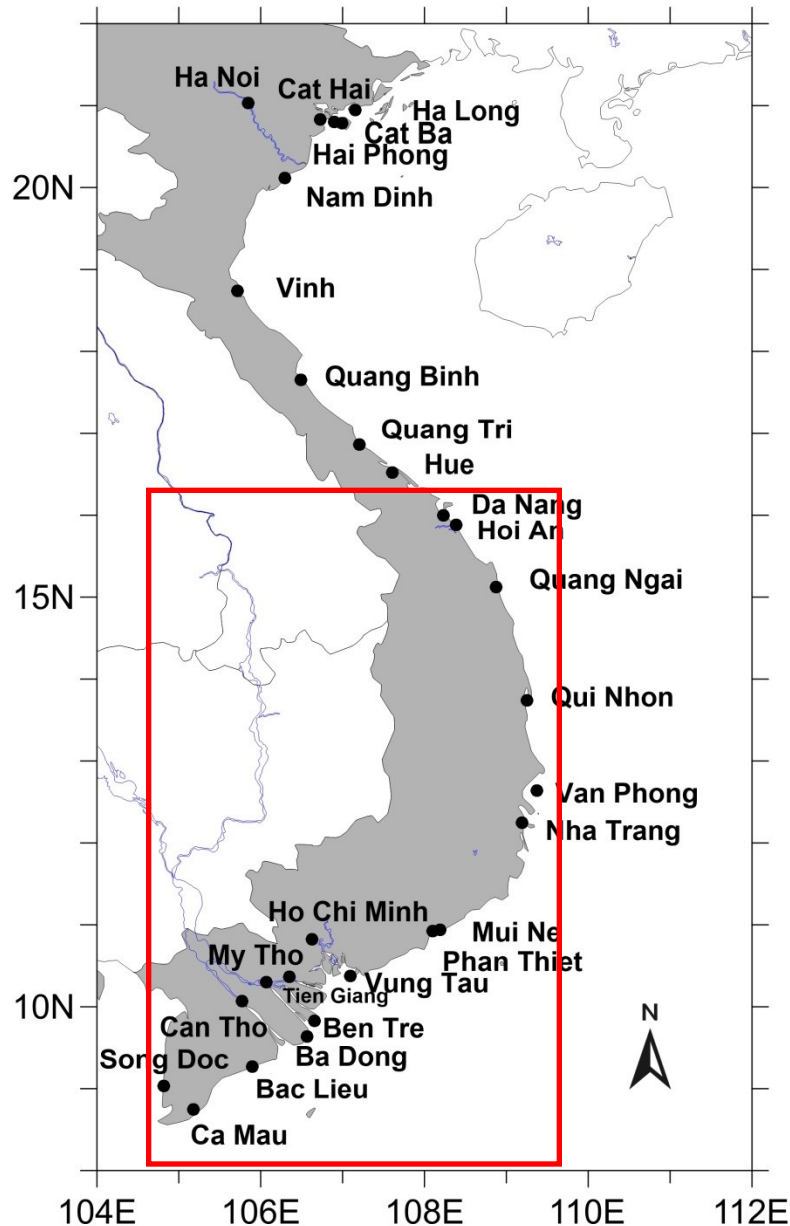


# Research Collaboration





# Field surveys



Da Nang (Jan 2014)



Can Tho (Jan 2012)



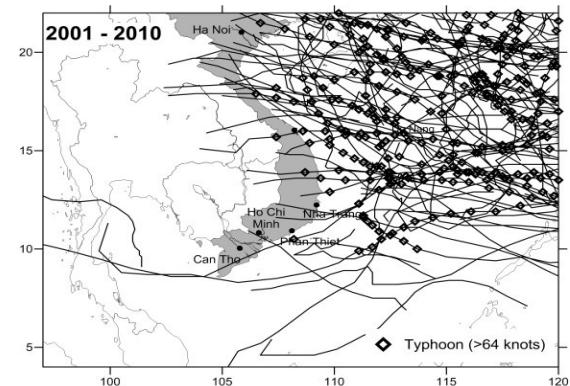
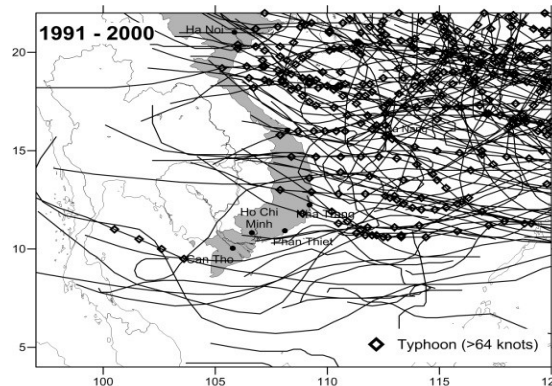
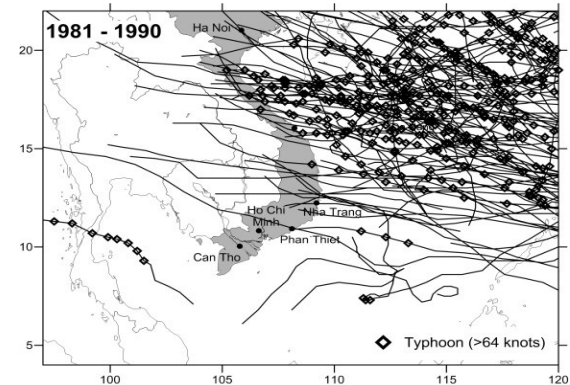
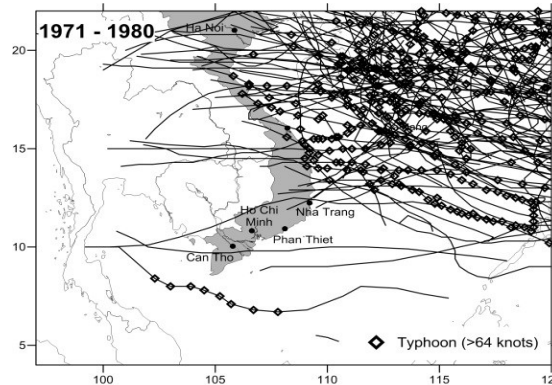
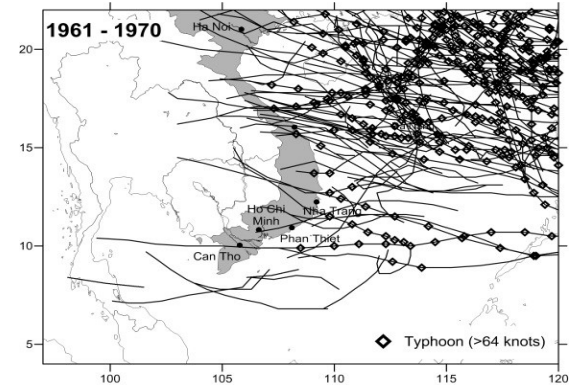
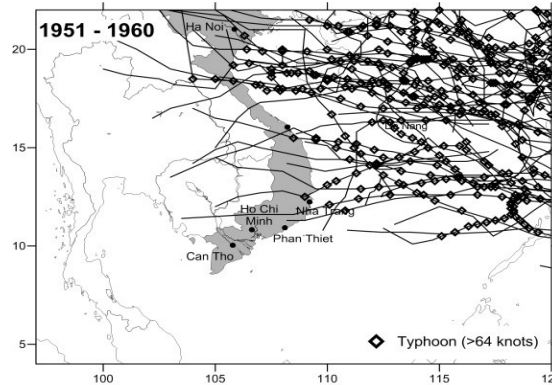
Bac Lieu (Mar 2014)





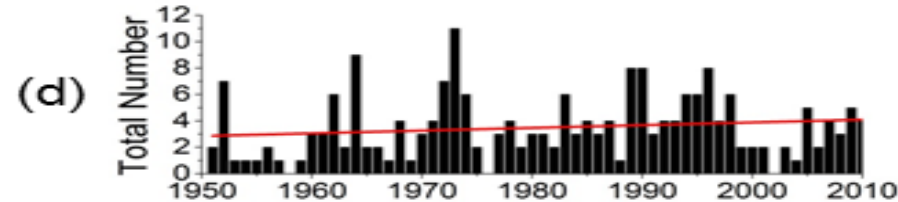
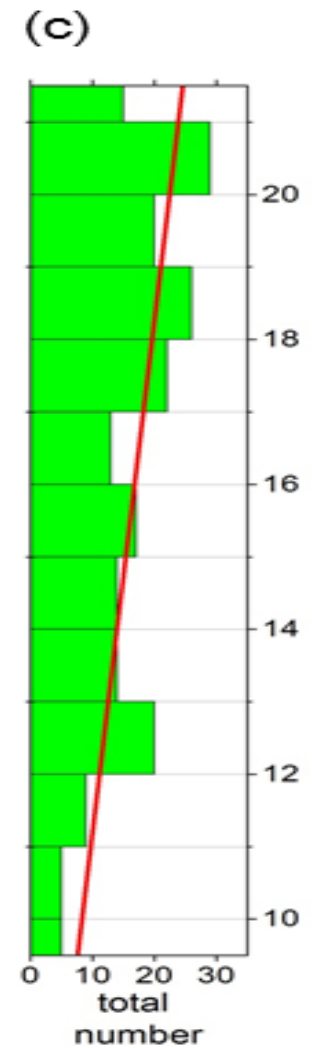
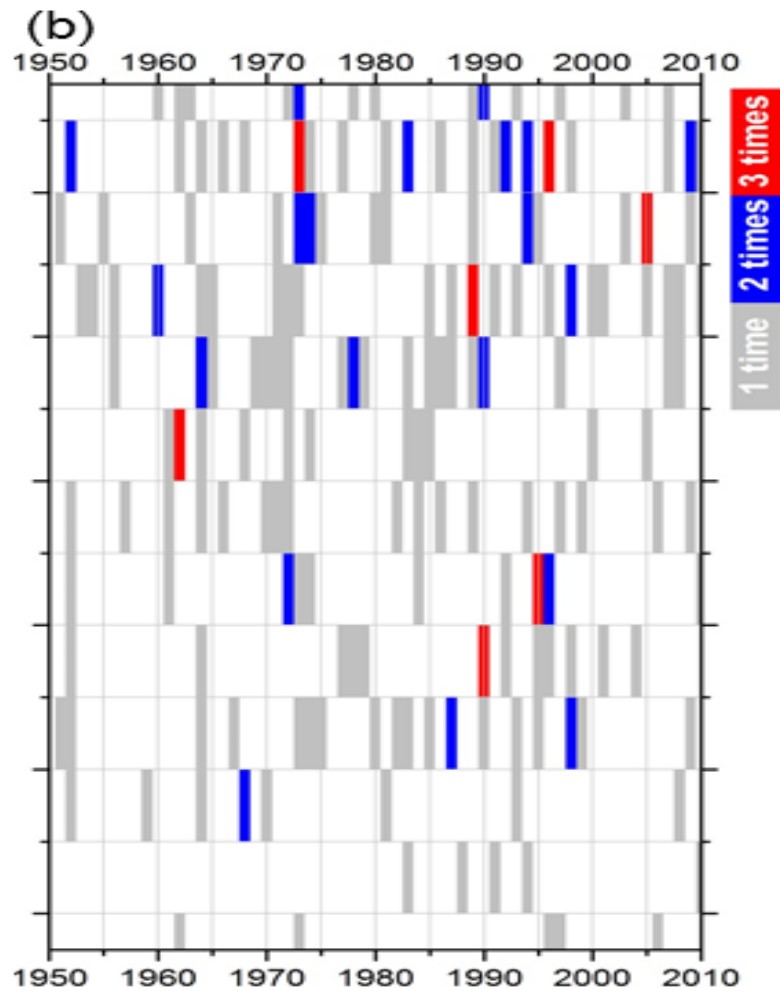
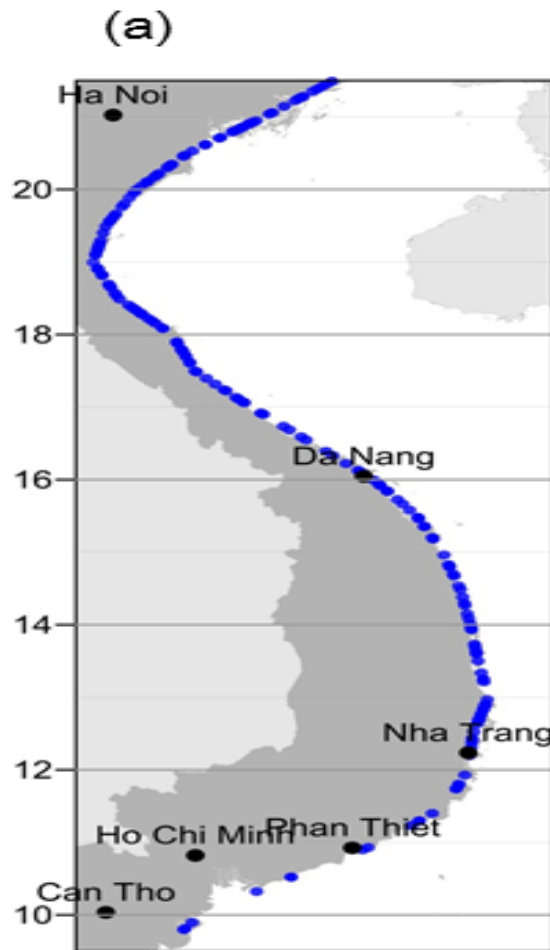
# Typhoons

- Like in the Philippines, the return period of a really strong typhoon is not clear
- These typhoons generally affect the north of the country
- However some of them also venture to the south (see map)



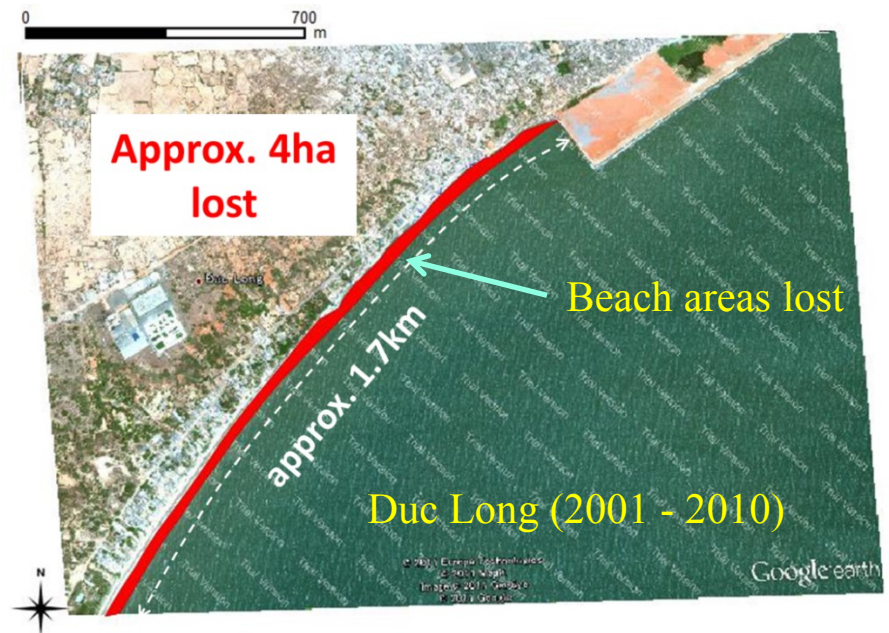
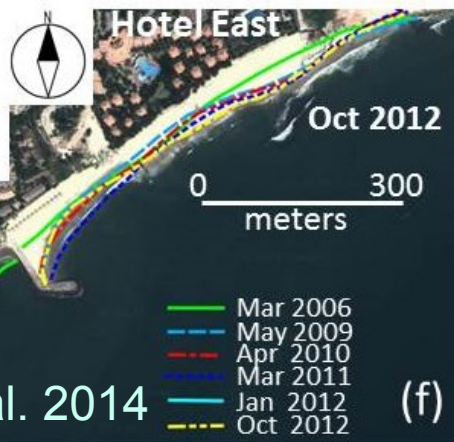


# Typhoons





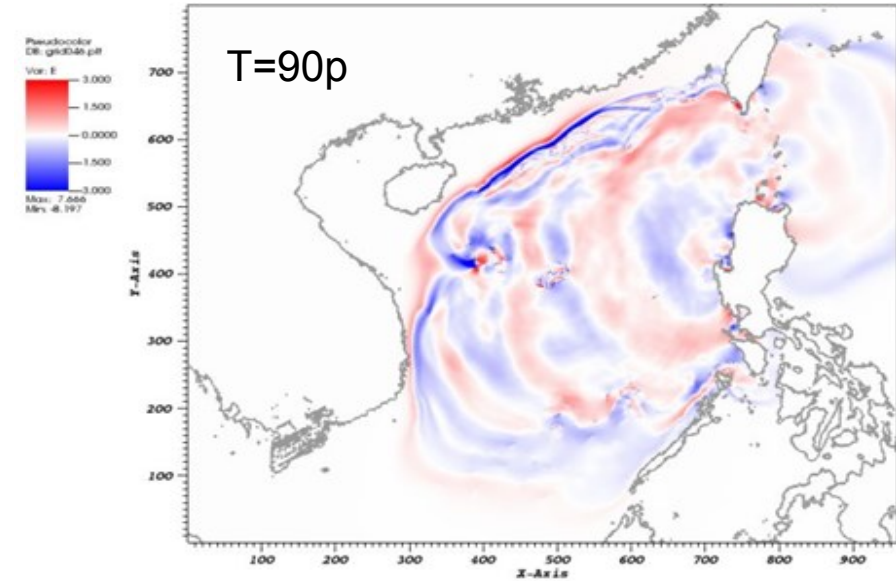
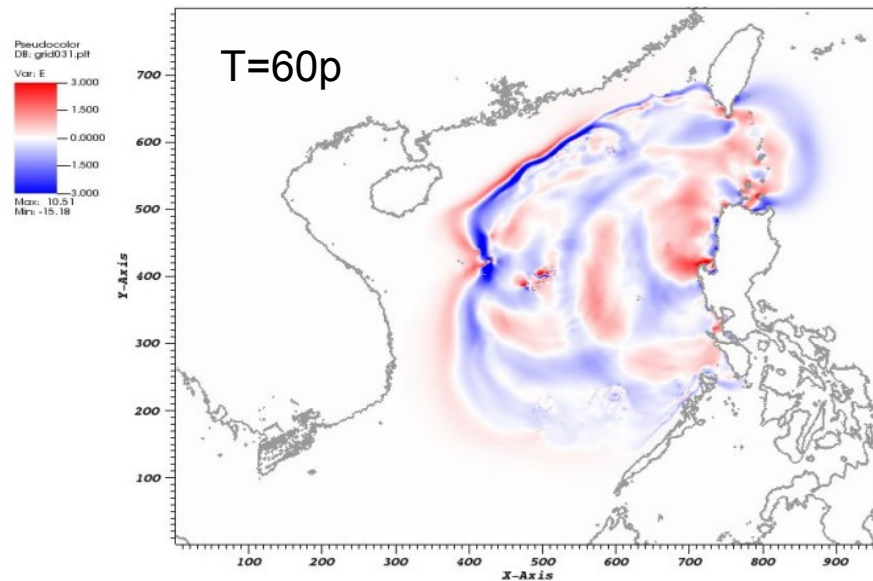
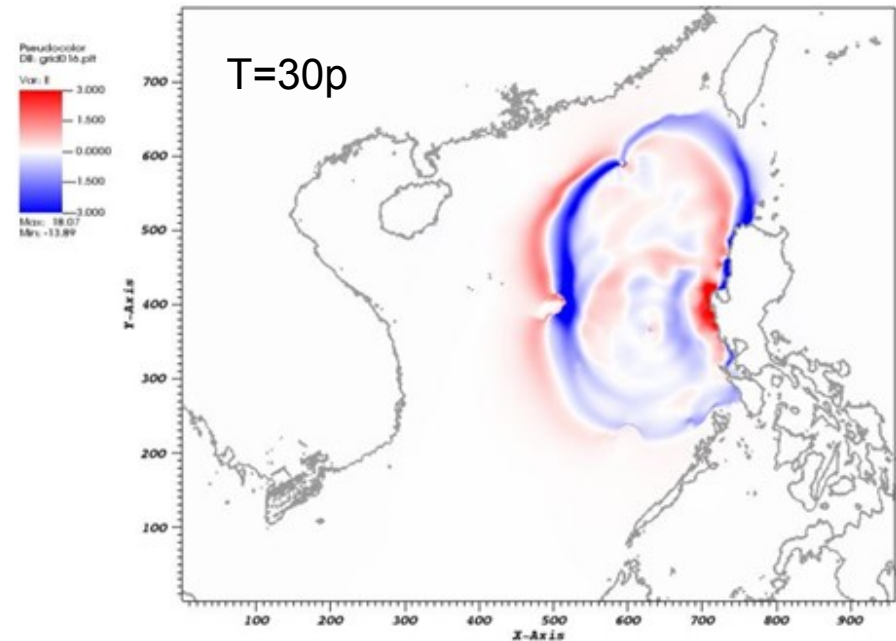
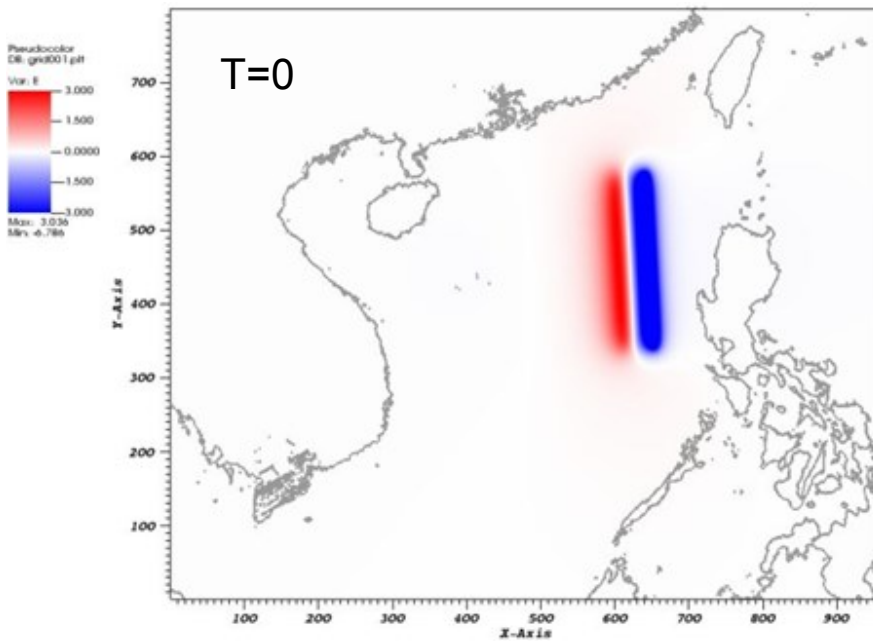
# Coastal changes



Takagi et al. 2014

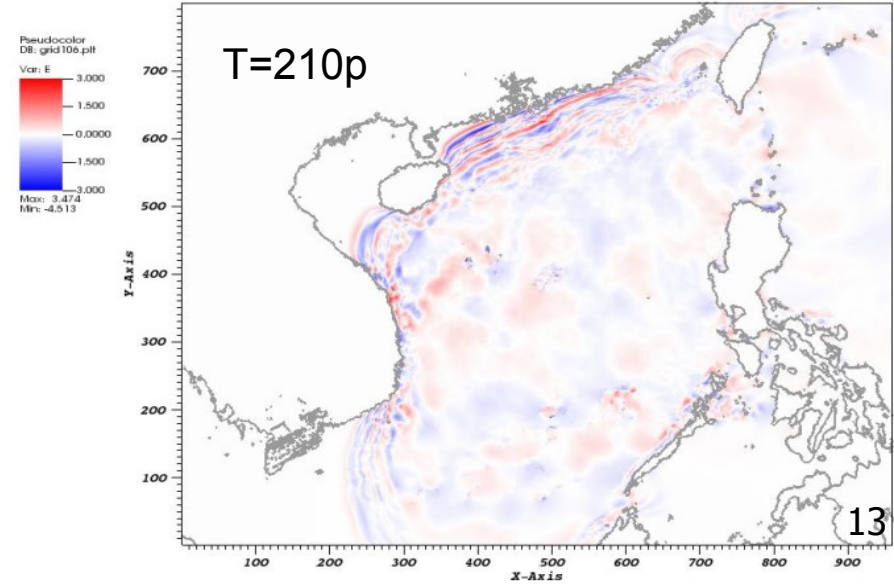
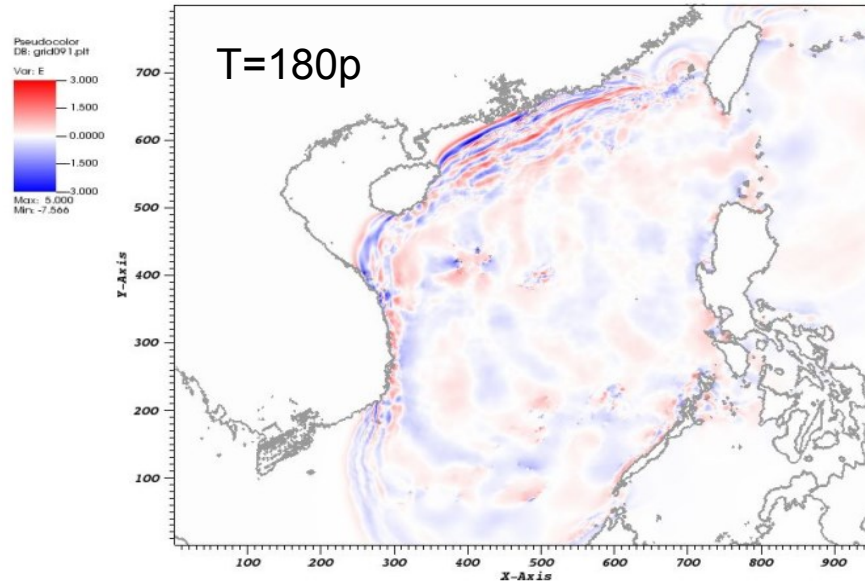
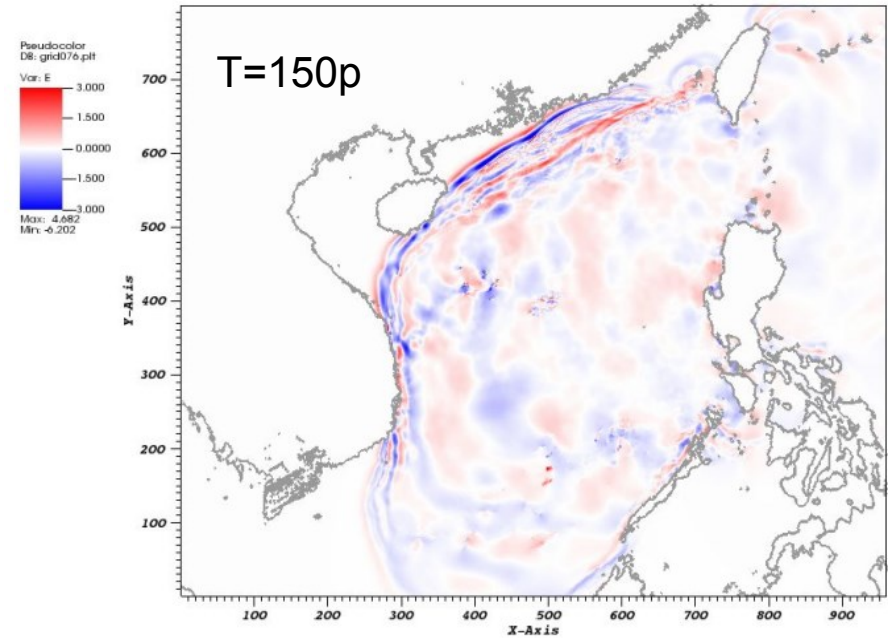
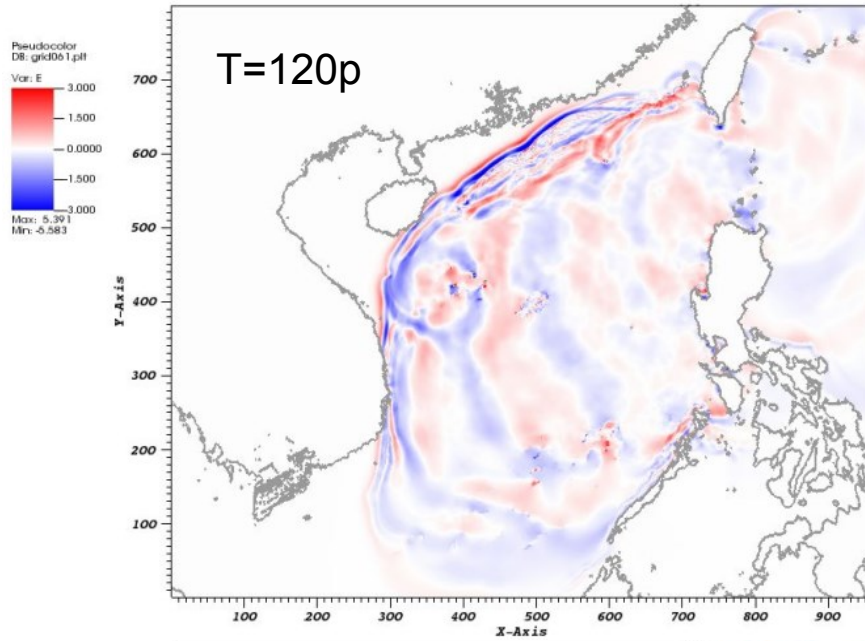


# Tsunami





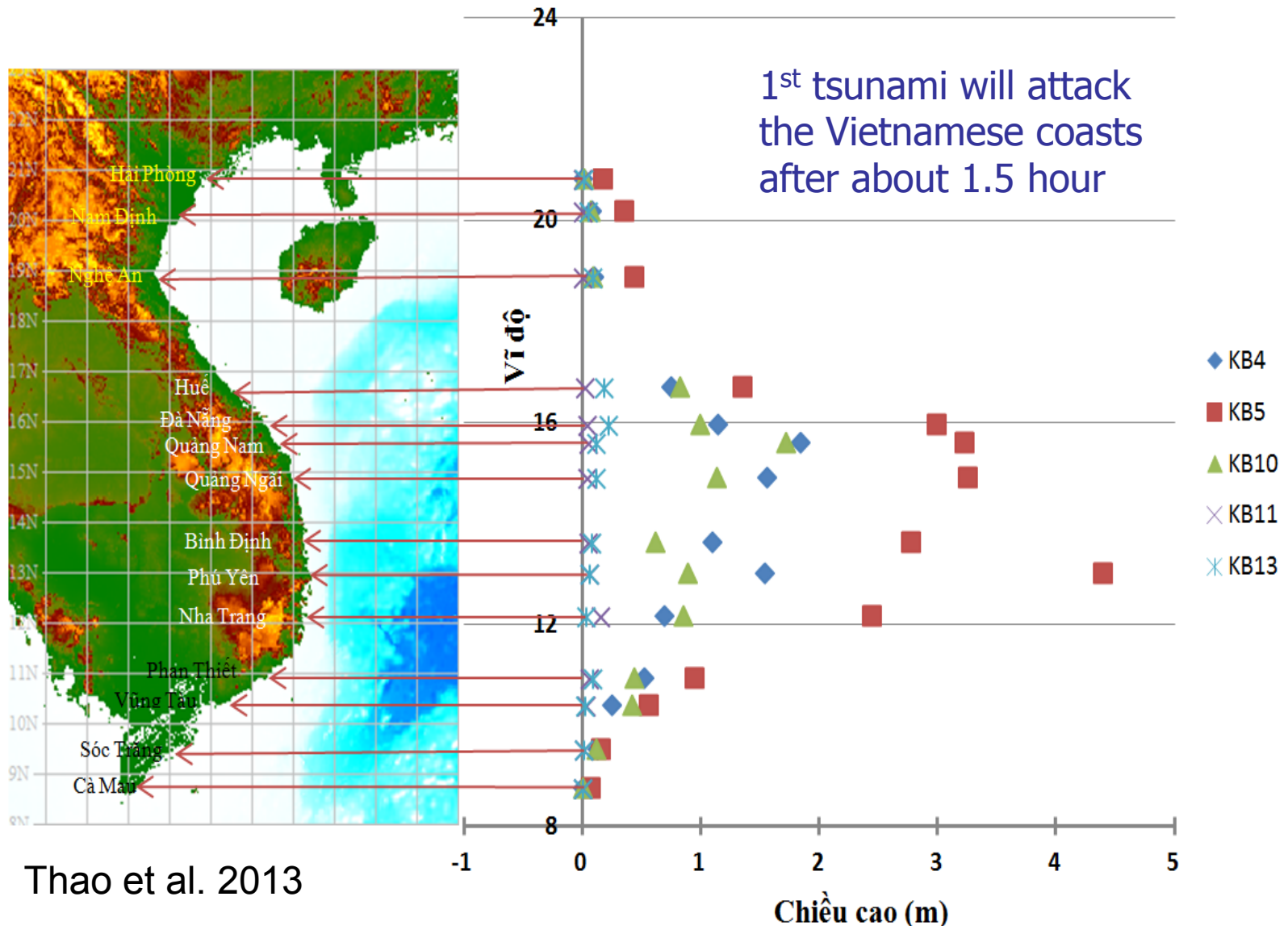
# Tsunami





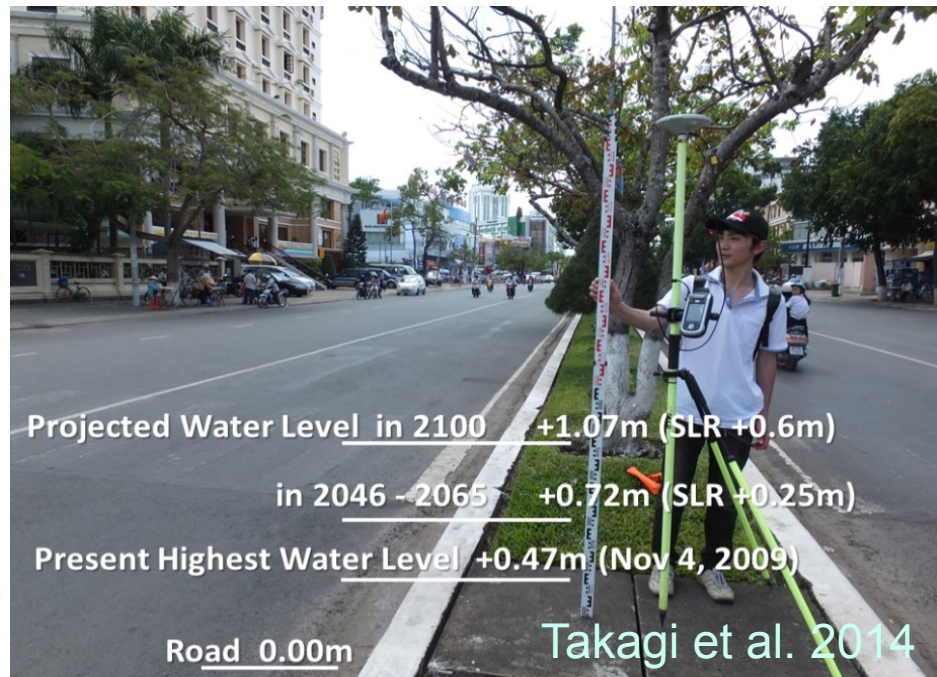
# Maximum tsunami height

## CHIỀU CAO SÓNG LỚN NHẤT





# Urban flooding





# People's awareness to coastal disaster

Interviews were conducted with local residents in urban and rural communities in order to grasp the tendency of people's awareness to disasters and climate change.

## questionnaire

**1. There are some terms concerning disaster and phenomenon below. Please whichever you know what it is. (Multiple choices)**

(Dưới đây sẽ có một vài thuật ngữ liên quan tới thảm họa và các hiện tượng liên quan đến thảm họa. Xin vui lòng lựa chọn bất cứ khái niệm nào mà bạn biết. Đáp án có thể có nhiều lựa chọn).

- |   |   |
|---|---|
| <input type="checkbox"/> Flooding (Lũ lụt).                 | <input type="checkbox"/> Tsunami (Sóng thần).             |
| <input type="checkbox"/> Typhoon (Bão).                     | <input type="checkbox"/> Storm Surge (Triều dâng do bão). |
| <input type="checkbox"/> Salinity Intrusion (Xâm nhập mặn). | <input type="checkbox"/> Sea Level Rise (Nước biển dâng). |

**2. Is your place in danger of flooding? (Please tick one answer)**

(Nơi bạn sống có gặp nguy hiểm về ngập lụt không? (vui lòng đánh dấu một câu trả lời))

- |   |  |
|---|--|
| <input type="checkbox"/> Not at all (Không có).             | <input type="checkbox"/> Little (Ít có khả năng xảy ra). |
| <input type="checkbox"/> Moderate (Có, mức độ trung bình).  | <input type="checkbox"/> Strongly (Thường xảy ra).       |
| <input type="checkbox"/> Very strongly (Rất thường xảy ra). |  |

**3. How often do you suffer flooding? (Nơi bạn ở thường bị ngập lụt như thế nào)**

- ☐ Once a few days (Một lần trong một vài ngày).
- ☐ Once a week (Một lần trong một tuần).
- ☐ Once a month (Một lần trong một tháng).
- ☐ Once a few years (Một lần trong một vài năm).
- ☐ Never (Chưa bao giờ).

**What month do you experience the most severe flood in the year?**

(Tháng nào là tháng mà bạn bị qua ngập lụt nhiều nhất trong một năm)

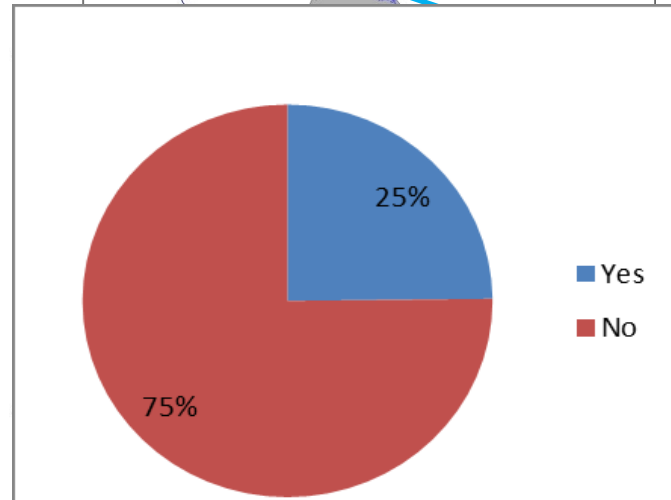
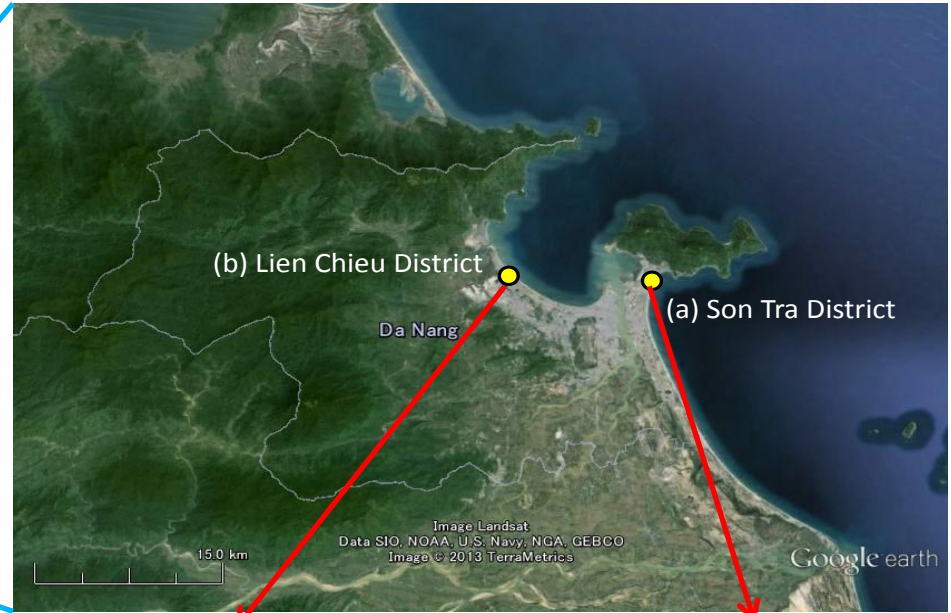
(Chọn từ tháng 1 đến tháng 12)

(Chọn từ tháng 3 đến tháng 4)





# Coastal Disaster Preparedness



Know there is a tsunami warning system in this area

Tsunami warning system in Da Nang

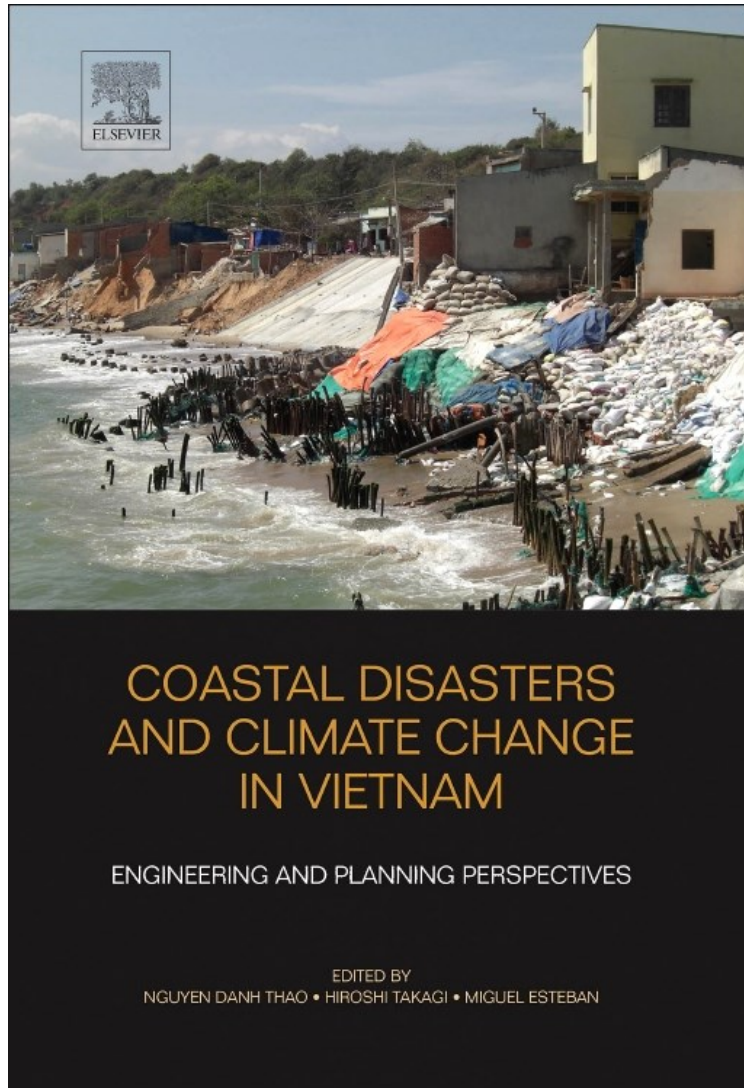




- Vietnamese coasts are vulnerable to coastal hazards and climate change
- Coastal disasters and climate change in Vietnam are more and more complicated and unpredictable
- It is necessary to develop not only structural countermeasures but also improve the awareness of both authorities and local people and setting up a proper evacuation plan
- Need to have more collaboration in wide range and many levels, domestic and international



# Introduction of our recent publication



## Coastal Disasters and Climate Change in Vietnam Engineering and Planning Perspectives

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Thao N.D., Takagi H., Esteban M. (2014): *Coastal Disasters and Climate Change in Vietnam: Engineering and Planning Perspectives*, 1st ed., Elsevier, 393p.



# THA 2015

International Conference on  
“Climate Change and Water &  
Environment Management  
in Monsoon Asia”



**28-30 January 2015**  
Swissôtel Le Concorde,  
Bangkok, Thailand

## Thank you very much!

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