The problem of Climate change in Vietnam

Active Vietnam

Xin Chao!

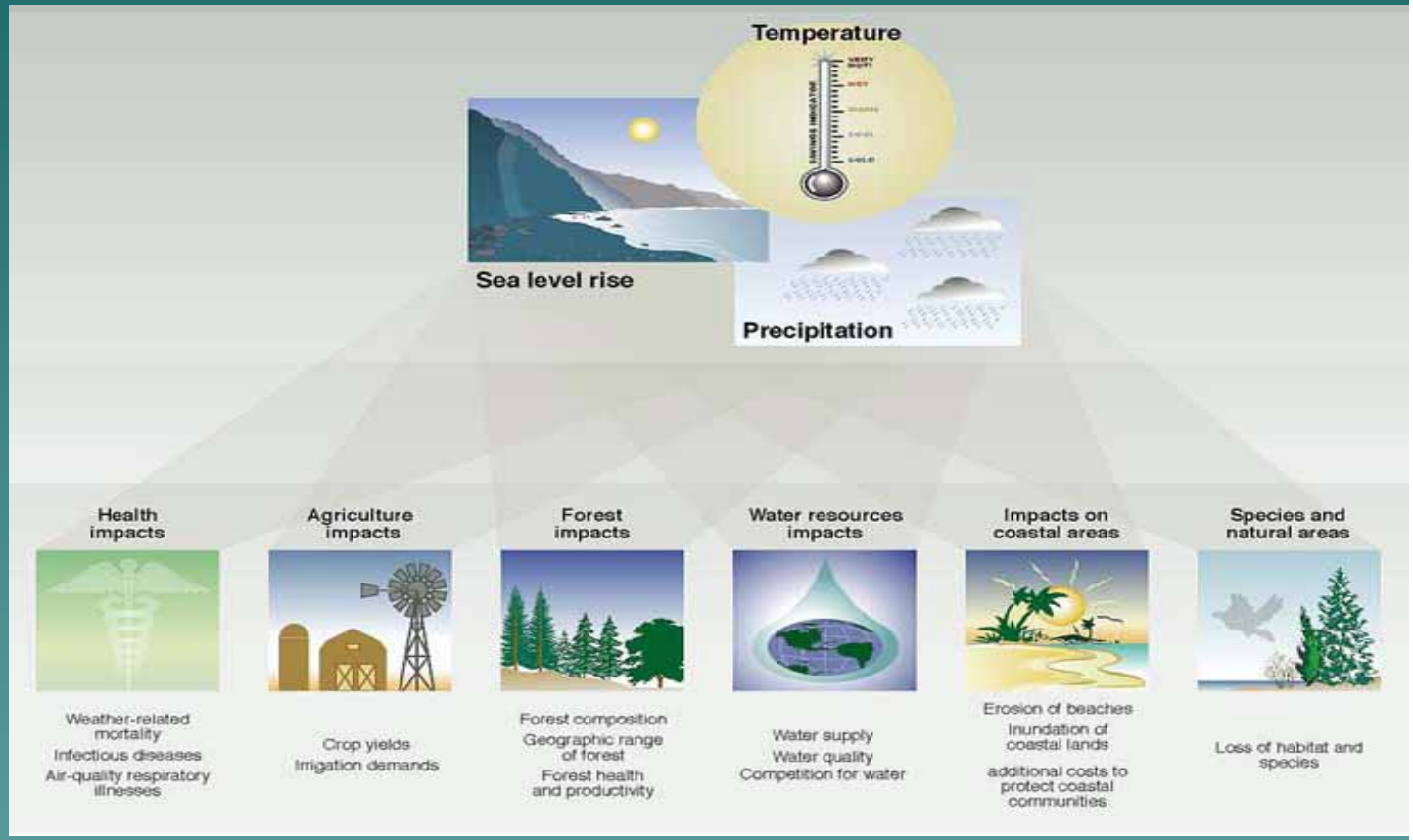
- Viet Nam has around 331,000 km² of natural land.
- Located in monsoon humid tropics, Viet Nam is affected by both oceanic and continental climates, especially flood and inundation.
- There are 2,360 rivers and streams that have lengths longer than 10 km, in the central Vietnam: 740.
- The coastal plains are not large but densely populated (60% of population) with many important and rather developed political, socio-economic centers. Most plains are with low elevation, easy to be flooded or inundated.

- Rainfall is unevenly distributed in time and space. More than 70% of annual rainfall occurs in wet season.
- Total flow of rivers in Viet Nam reaches 650km^3/year, equivalent to a flow depth of 960mm.
- Ratio of flood and low flow varies from 1.5 to 30.
- Severe floods were recorded in 1945, 1969, 1971, 1978, 1983, 1993, 1990, 1996, 1998, 1999 and 2000. 2001, 2002.
- In period of 1971 - 2007, death toll more than 14,000 people.
- Floods in Viet Nam represent a regular threat that occur throughout the year in different areas of the Country, affect the safety and well-being of the population and cause enormous economic loss, which in turn hamper the social development.
- Flood rising rate, amplitude and peaks are high. Flood rising intensity in mountainous rivers may reach 2-5m/hour; downstream plains 20-50cm/hour. Flood amplitude in mountainous areas may reach 10-20m, higher than 25m in some places.
- High Flood and inundation last for about 2-7 days in the Central Viet Nam, 7-15 days in the North Viet Nam, and 3-4 months in the Mekong River delta.
- Depth of inundation is about 2-4m, in some places it would reach 5-8m.

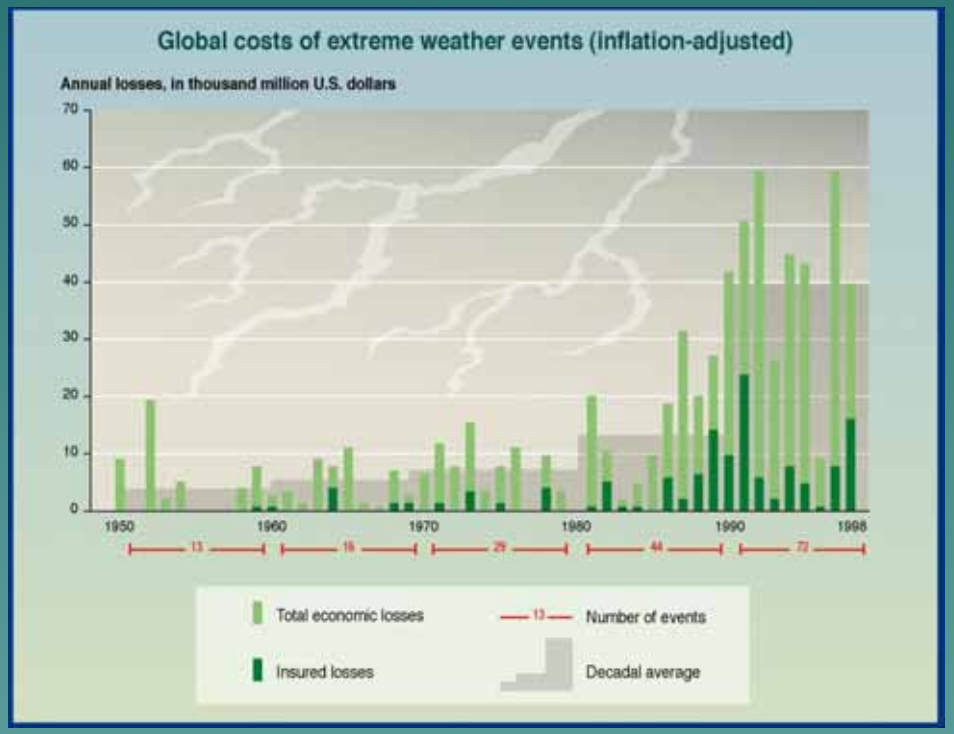
- Combination of typhoon, storm surge, heavy rain and high tidal level would cause the flood more severe.
- Often associated with heavy rains, typhoons, tropical depressions, occur in a large area covering some provinces or almost the whole region.
- Rivers are steep, times of concentration are short, and downstream areas have low drainage capacity.
- Somehow can be classified as flash floods.
- Tide and storm surge play a certain role in increasing inundation.
- Flood and inundation in the Central Viet Nam is ranged as the most severe. It occurs with high frequency causing prolonged inundation in small, narrow coastal areas where socio-economic centers and densely populated areas are located.

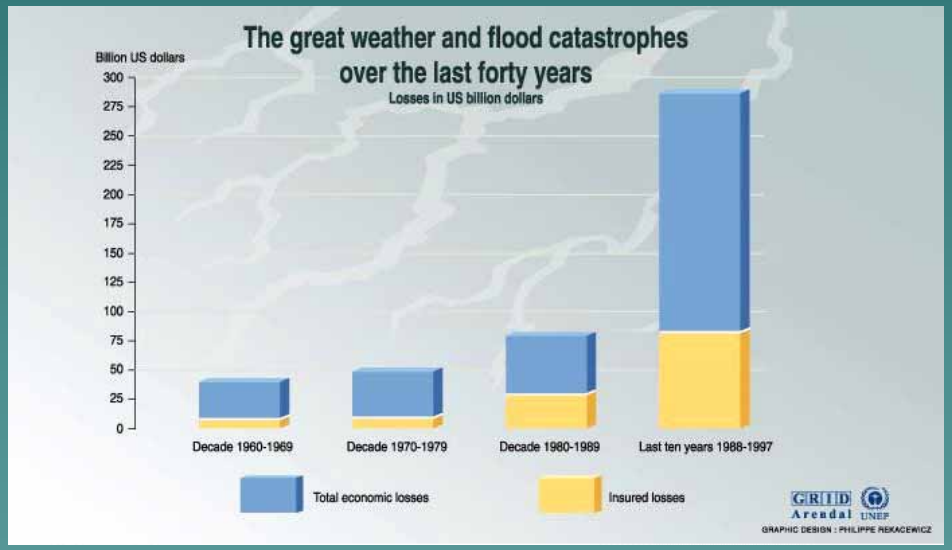
The impacts of climate change

The evidence the Earth is warming is "unequivocal." Increases in global average air and sea temperature, ice melting and rising global sea levels all help us understand and prepare for the coming challenges. In addition to these observed changes, climate-sensitive impacts on human health are occurring today.

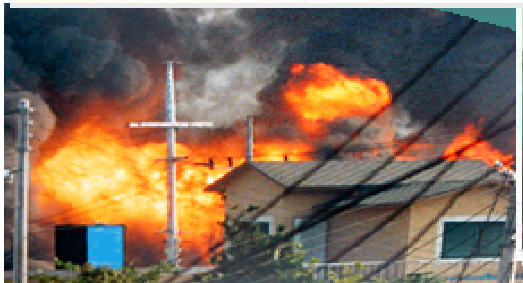


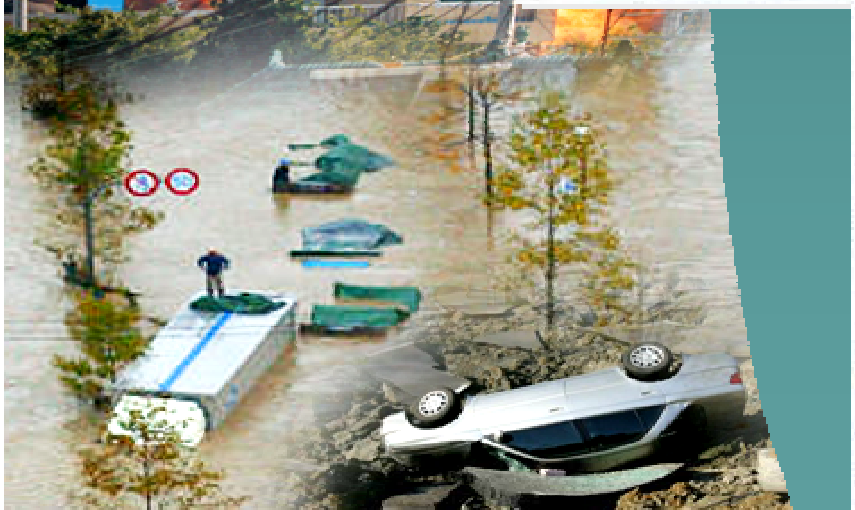
The loss caused by disaster and climate





Disaster and climate change



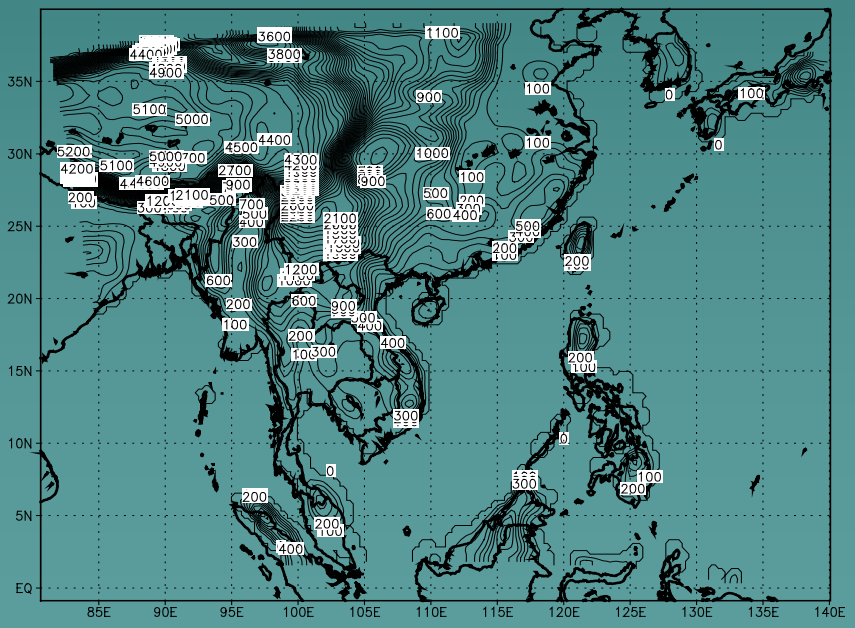


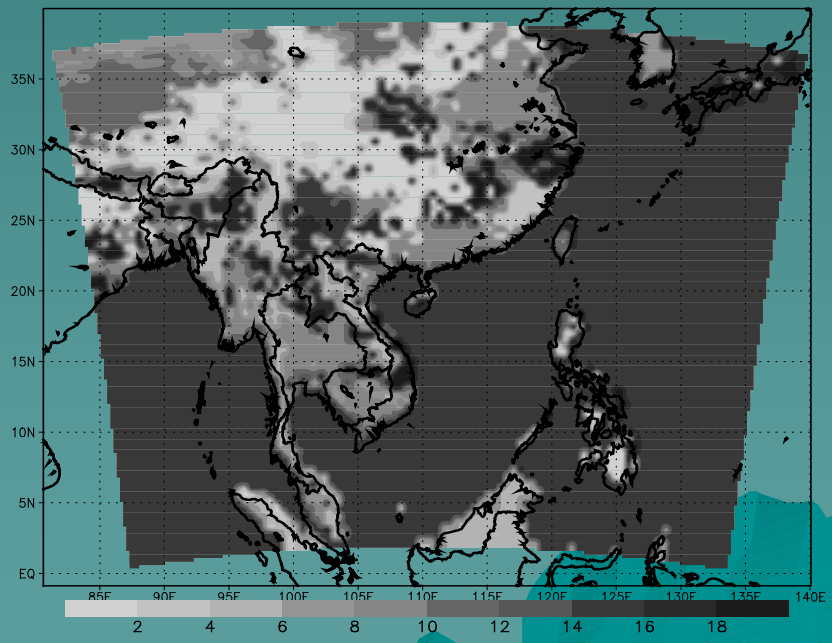
The impacts of climate change to economics of Vietnam

(the sources of Institute of Scientific Hdro-meteorological – Environment of Vietnam)

Climate change in Vietnam

- The Intensity and frequence (number) of typhoon, heavy rain, high Temperature drought is increasing

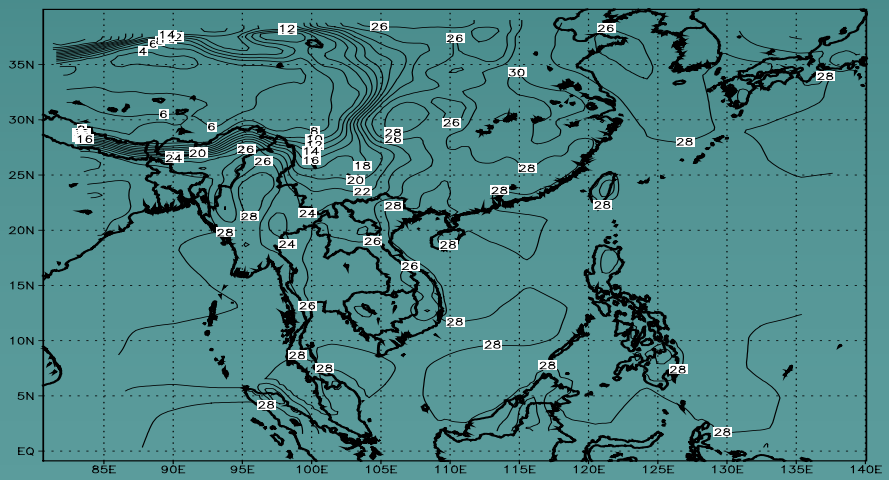


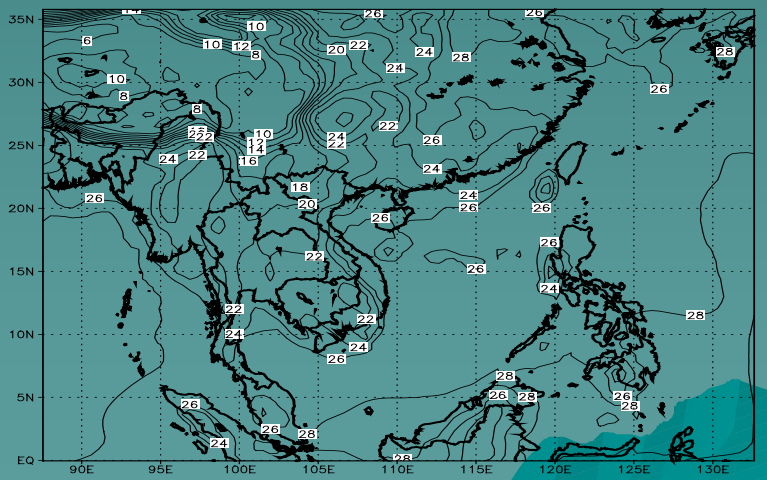


Nguån: Th«ng b¸o quèc gia, các đề tài NC của Viện

Climate change in Vietnam

- Yearly mean temperature increase about 0,1 ^{o}C each decade.
- In summer, monthly mean temperature increase about 0,1 – 0.3^{o}C each decade

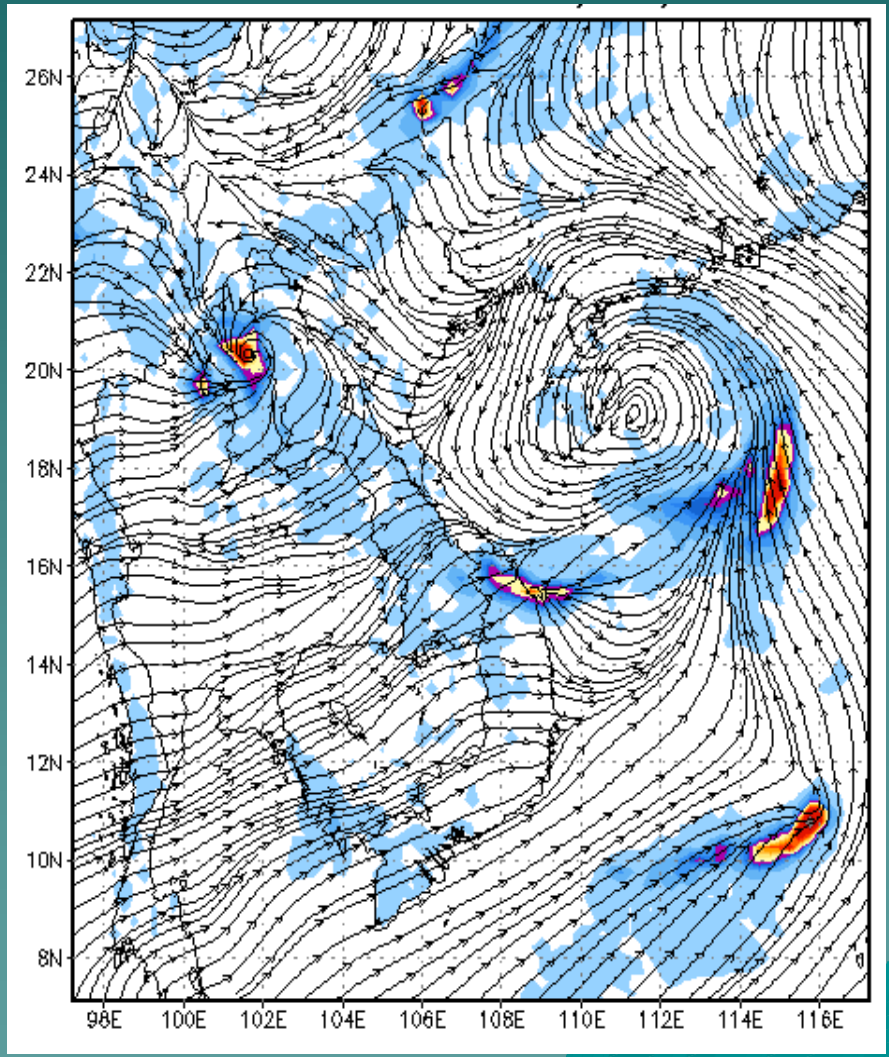




Nguån: Th«ng b¸o quèc gia, các đề tài NC của Viện

Climate change in Vietnam

- The amount of rainfall change irregulately between the different regions and different periods.
- Intensity of rainfall have the tendency of obviously increasing;
- In the mainly Vietnam area, The amount of seasonable rainfall reduced in July, August and increase in Sep., Oct., Nov.



Nguån: Th«ng b¸o quèc gia

Climate change in Vietnam

Linda Typhoon, 1997

- Typhoon often begin lately and move the lower latitude in Vietnam

Flood in Central Vietnam in 1999

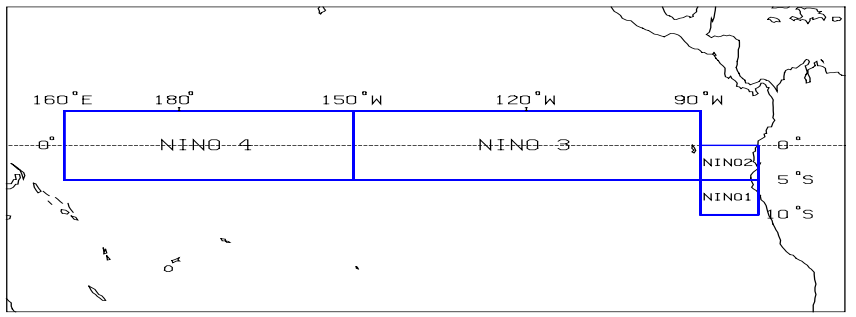
- Big flood and inundation occur in central and southern part of Vietnam have the tendency bigger and more than in 20 century;
  - In recent decades, together with the socio-economic development, floods cause great losses to every entity

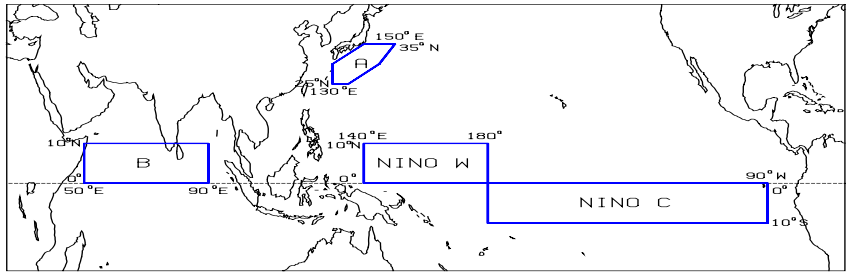
Climate change in Vietnam

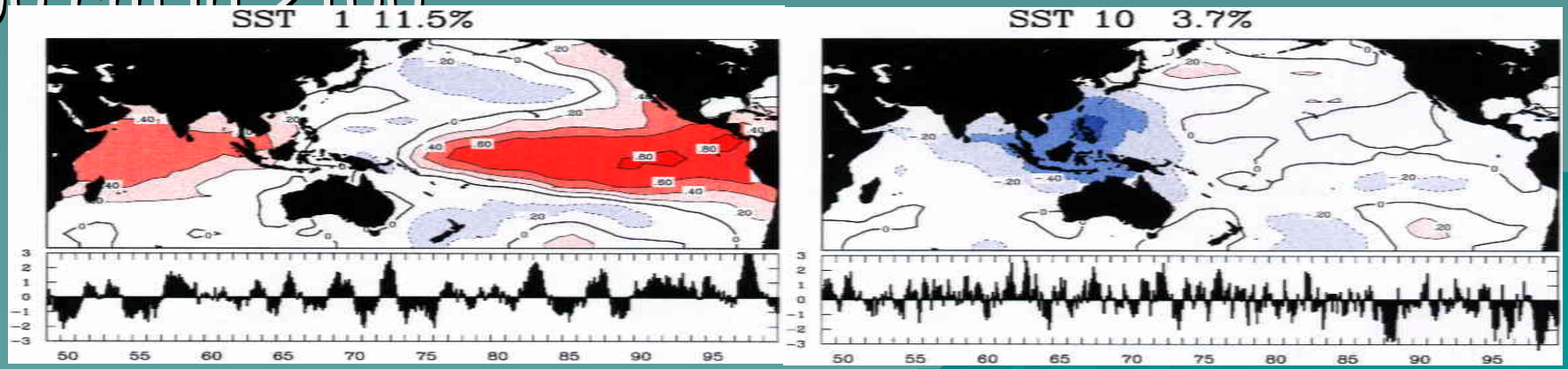
- Every year, the drought happen every where and the tendency more seriously than some decades ago.

Climate change in Vietnam

- ENSO affected strongly to regime of weather and climate on the many regions of Vietnam
- The sea level rise 5 cm per decade and will rise from 33 to 45 cm in 2070 and the possibility rise to 100 cm in 2100







Impacts of climate change to surface water resources

- Yearly flow change from +4% to -19%
- The peak discharge flow increase;
- In 2070, in the almost river, yearly flow should reduce from 6 to -40.5%;
- Potent ion of evaporation increase from 3% - 8%.

Nguån: Th«ng b¸o quèc gia

Impacts of climate change to Agriculture

- To 2070, the cultivative tree should plant in the height of 550 m and move to the north direction 100-200 km compare to nowadays situation. The subtropical plants reduce;
- The big part of area of Hong delta, Cuulong delta should inundated by sea level rise;

Chª nh lÖch tæng nhiÖt ®é, nhiÖt ®é tèi thÊp tuyÖt ®èi vµo n¨m 2010, 2050 vµ 2070

§¬n vÞ ^{0}C

N¨m	2010		2050		2070	
Chª nh lÖch so víi hiÖn tª i	Tæng nhiÖt ®é n¨m	NhiÖt ®é tèi thÊp	Tæng nhiÖt ®é n¨m	NhiÖt ®é tèi thÊp	Tæng nhiÖt ®é n¨m	NhiÖt ®é tèi thÊp
MiÒn nói vµ trung du B¾c Bé	180	+2.7	660	+3.0	910	+4.5
§ång b»ng B¾c Bé	110	+1.0	400	+1.8	550	+2.2
B¾c Trung Bé	110	+0.5	400	+1.3	550	+1.7
Nam Trung Bé	110	+0.5	400	+1.3	550	+1.7
T©y Nguyª n	180	+1.2	660	+1.7	910	+3.2
Nam Bé	110	+1.1	400	+2.0	550	+2.3

- Climate change effect strongly to land use, land cover, forest ecology system; the sea level rise make the change of the area of soil forest;
- The distribution of boundary of variously typed forest should be changed;
- In crease the disappear of pared valuable animals and plants; reduce the pare valued gens;

Impacts of climate change to seafood

The event of the Earth is warming cause the capacity of seafood source is dispersed. The kind of tropical fish increase, and kind of subtropical fish is reduce; The forecasting of economy value of fish capacity should reduce 30% compare to now

- Sea fish should emigrate to ocean of high latitude;

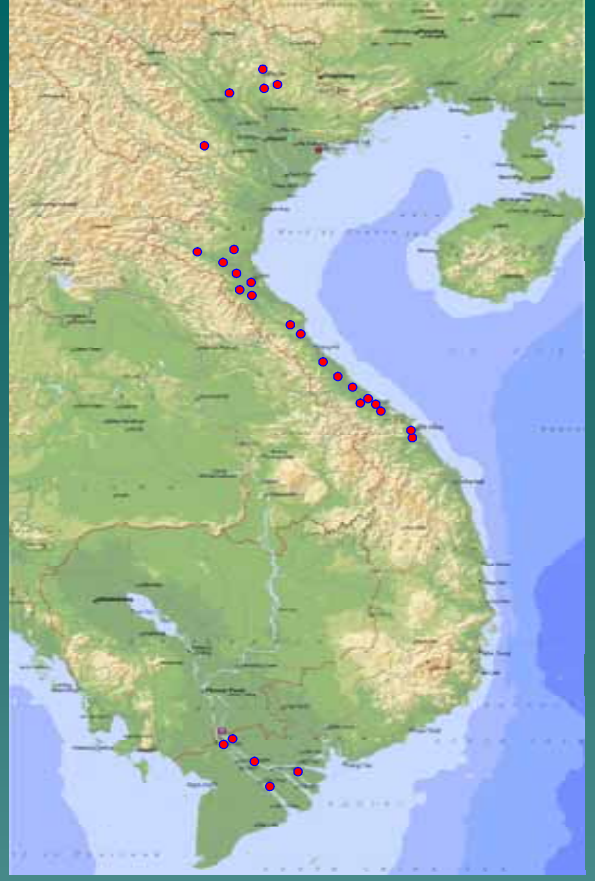
- Cause the inundation in mouth of river , estuary delta;
- Sea level should effect the wetland in sea coast of Vietnam. Specially in the Camau, Hochiminh city, Vungtau, Namdinh city;
- Seashore area of central Vietnam should by dry seriously;

Climate change and energy

- The activity of plattform at the oil field on the sea, the system of oil and gas transtation and electrolic plant use gas that was built on the seashore should be effected;
- The impact should be very big to all activities of sociality, economics, men for all countries.

Climate change and health

- Impacts of climate change on human health are occurring today and attacking the pillars of public health. They provide a glimpse of the challenges public health will have to confront on a large scale
- Climate change will erode foundations of health



The points with flood peaks higher than III alert in, 2007

In Vietnam during 2007 have been very complicated with several extreme weather events occurred all over our country, especially in the Central part of Vietnam together with 2 tropical storms and 1 tropical depression that exerted their direct impacts on our territory.

- Flood was very serious with successive and very high peaks, rather high flood rising intensity, flood water was concentrated very quickly and all these circumstances led to serious prolonged inundation in 12 provinces of Vietnam.

- The Central region of Vietnam usually faces with various kinds of natural disasters, among those, flood was ranked the first in terms of affected areas, severity, frequency and significant losses in economics, culture and society.

- In this region, flood and inundation usually follows heavy rains, typhoon, and tropical depression.
- Flood and inundation often occurs successively and in a large area, covering some provinces or almost whole the region.
- Flood in rivers in the Central Viet Nam often has the features of flash flood: flood is severe, water level quickly rises up and goes down, and duration of flood is short.
- The tidal regime and storm surge play a certain role in flood and inundation situation in this region.

Người dân thôn

Theo Reuters, đã có 42 người thiệt mạng

Sách vở được đem phơi trước một căn nhà đổ nát ở

MAHASRI in Viet Nam .

- Now , the prototype system is established in central Viet Nam near Da Nang City . The System include :
- 33 automatic rain gauges installed in area from Thua Thien Hue to Quang Ngai provinces (There are 15 solar panels)
- 9 automatic water level equipments installed in Huong and Thu bon-Vu Gia rivers
- 1 automatic meteorological station will be installed in Ba Na , Da Nang province .

MAHASRI ACTIVITY IN VIETNAM

Before May, 2008:

- Install 20 data logger;
- 3 Radar (Tam Ky, Nha Trang, Nha Be) had been calibrated;
- Engineering test 41 meteorological station and 12 Hydrological station;
- Improve the investigation and observation Meteo-hydrological data;

15 May – 30 Jun, 2008: Improve the observation at pilot station (Ha Noi, Vinh, Dien Bien);

October – December, 2008: Improve the observation at Da Nang pillot station; Observe rainfall by Phu lien, Vinh, Tam Ky, Nha Be Radar station (from 5 to 10 minute/times);

2008- March, 2009: Collect meteorological data of 41 Meteo. Station;

The end 2008: completely establish the telecommunication line as GPRS;

March, 2009, Organize the scientific workshop.

MAHASRI ACTIVITY IN VIETNAM

Second period: 2009 – 2015

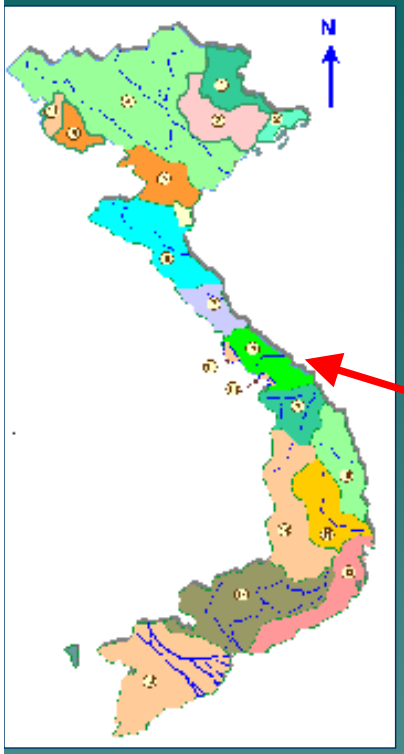
- Research of combination between the Tamky radar with rainfall data from auto-record station;

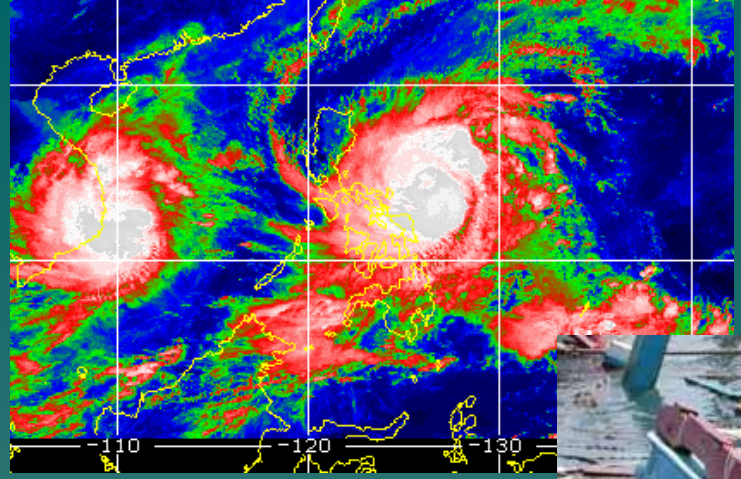
- Using forecasting rainfall data, rainfall value from numerical modell, satellite products, rada data, rainfall record for forecasting and warning model;

- Establish the flood, inundation warning system realtime for Thu Bon, Tra Khuc, Huong River;

2010- 2015: Research, training, transformation of hydro-meteorological technology

With cooperation for AWCI, Vietnam nominated Huong river basin





For Huong river b

Fig.6 A flood inundation caused by a heavy rainfall in the city Jul. 2004

Fig.5 A flood inundation caused by a heavy rainfall in the central city Aug. 2001

Schedule activity for AWCI in Vietnam

Year 2008:

- Vietnam will provide seriously, fully all data of Hydro-meteorological data of Huong river basin from 2007 to 2010;

- Vietnam will strong then the capacity of station network (quality, quantity equipments, data transmission system, computer software in processing and conservation of data for Huong river also for Hue Hydro-meteorological Forecasting Center);

- Need AWCI to Organize GBHM training course in Vietnam or In Japan for *Establishment of flood and flash flood warning and forecasting system on the Huong river system;* improvement the skill, Knowledge in building the input data for modeling:

- Need to training for analyses of High resolution satellite data for apply in disaster management, estimate rainfall and flood inundation in implementation of flood forecasting and warning system in ungauged or poorly-gauged river basins.

- To share the skill and knowledges in combination of the data from the rain gauges with radar information in order to increase the accuracy of rainfall estimates for flood forecasting.

- Assistance, provide of software, sophisticated hydrological models to compute and forecast flood for Huong river basins (data input:satellite-based rainfall product, radar products, numerical weather prediction model products and hydro-meteorological data);

2009 year:

- Need AWCI to Improve the Capacity building of forecasting and management of Drought and Water Quality. Specially, in using satellite data, the skill in making the drought mapping and Water Quality. Mapping;
- Vietnam will pilot running the DHM in forecasting hydrology for Huong river after AWCI transfer the skill and technique and also the provided satellite data for Huong river;

2010 year:

- Need AWCI to help Vietnam to perform the project" build the risk map of inundation and flood for Huong river basin" (provide the specialist, skill, technique, method to perform).



Thank you very much for your attention






The problem of Climate change in Vietnam

Active Vietnam

Xin Chao!