Climate Change Projection for the Philippines

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PAGASA/DOST
Outline:

• Introduction

• Climate Trends

• Climate Change Scenarios
Impacts of Climate Change in Asia (IPCC AR4)

RP among the hot spot areas
HIGHLY SUSCEPTIBLE TO FLOODINGS AND INUNDATIONS

- Archipelago, composed of 7,100 islands with low lying areas
- Highly susceptible to sea level rise
- Among the longest coastlines in the world with 32,400 kms (susceptible to storm surges)
Climate Change over RP: The Concerns.

- Projected increase in frequency and/or magnitude of extreme events esp. tropical cyclones, heavy rainfall, drought and extreme temperature

- Changes would result in adverse impacts on agriculture, water resources, health and coastal areas
The Philippines has not been spared of the weather-related disturbances and disasters. The past typhoons have been unusually heavy and devastating to our country and our people.
Observed 24-hour rainfall – 455mm

Flooding in Metro Manila: Tropical Storm
TYPHOOON “PEDRING” HAS JUST MADE LANDFALL OVER THE BOUNDARY OF AURORA AND ISABELA.

DOST PAGASA MTSAT IR1 23:32 UTC 25/09/2011

7 AM  27 SEPTEMBER 2011  TUESDAY
Climate Trends in the Philippines
What are the manifestations/signals of global warming in the local scale?

- In the Philippines, there already trends of increasing number of hot days and warm nights, but decreasing number of cold days and cool nights. Both maximum and minimum temperatures are generally getting warmer.

- Other extreme weather/climate events like intense rains have been seen to be more frequent.
An increase of 0.6104°C from 1951-2006

An increase of 0.3472°C from 1951-2006

An increase of 0.8904°C from 1951-2006
Most parts of the country are generally increasing in trend but not all are significant.

Only in Calapan, Laoag, Iloilo and Tacloban shows statistically significant increasing trend.

While significantly decreasing trend is found in Palawan.
Trends of the number of tropical cyclone in the Philippines

Annual Number Tropical Cyclones and five-year running mean
(1948 - 2009)

\[ y = -0.0108x + 19.759 \]

Frequency of tropical Cyclones

Year


5 per. Mov. Avg. (Number of Tropical Cyclones)

Linear (Number of Tropical Cyclones)

\[ y = -0.0108x + 19.759 \]

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Climate Change Scenario in the Philippines
Climate Change Scenarios

• Describe plausible future changes in climate variables and are usually measured with respect to baseline climatic conditions.

• Derived primarily from climate model simulations combined with (observed) climate baselines.

• Input in impact studies.
Downscaling Technique

PRECIS stands for "Providing REgional Climates for Impacts Studies."

Pronounced as ("Pray Sea")

PRECIS is based on the Hadley Centre's regional climate modelling system.

• PRECIS was developed in order to help generate high-resolution climate change information for as many regions of the world as possible.

• freely available to groups of developing countries in order that they may develop climate change scenarios.
Methodology

Model Used
- Uk model: HadCM3Q0
  - resolution 2.5° x 3.75° downscaled to 0.22° x 0.22° (25 km x 25 km)

Scenario Used
(a globalized, technologically advanced world in which energy production includes a broad portfolio of fossil-fuel and non-fossil-fuel sources). Balance in all energy sources. Emissions are growing much faster than required for stabilization at either 450 or 650ppm.

Domain Used
- Longitude: 115°E – 136°E, Latitude: 2.7°N – 23°N

Time Slices
- Projection for 2050 - 2036 to 2065 (2029 – 2040, 2039 – 2050, 2049 – 2065)
- Spin up time: 1 year

Computers Used
- 5 Units of Desk Top Core2 Duo (continuous running for 4 months)
- Linux Suse Operating System

Tools Used
- PP Stat, ArcView, GenStat, Excel
GCMs to Regional Adaptive Responses: Modelling Path

PRECIS 50 km

Global Coupled Climate Model Resolution
- e.g. HadCM3
  - 2.5° x 3.75°

Atmosphere only climate model
- e.g., HadAM3
  - 1.25° x 1.875°

Regional Climate Model Resolution
- e.g., PRECIS

Hydrology
Vegetation
Topography

Regional Land Use Changes
Socio-economic changes
Adaptive responses
REPRESENTATION OF THE PHILIPPINES WITH DIFFERENT MODEL RESOLUTIONS

GCM 300km resolution

50km RCM

25km RCM
Projected changes in future climates in Mean Temp. For 2020 and 2050 under A1B scenario over Philippines

- Under the A1B scenario mean annual temperatures in the Philippines are expected to rise by about 0.9°C to 1.4°C for 2020 and 1.7 °C to 2.4 °C by 2050.
Projected changes in future climates in Rainfall for 2020 and 2050 under A1B scenario over Philippines

The drier seasons of March-April-May will become drier still, while the wetter seasons of June-August and September-November become wetter.
SUMMARY OF FINDINGS

- Under the A1B scenario annual mean temperatures in the Philippines are expected to rise by about 0.9ºC to 1.1ºC for 2020 and 1.9 ºC to 2.2 ºC by 2050.

- Projection of seasonal temporal rainfall variation is largest (-35 % to 45%) during the seasons of JJA and MAM.

- The drier season of March-May will become drier, while the wetter seasons of June-August and September-November become wetter.
THANK YOU