The timing of El Niño impacts and drought in the Philippines

Preparing for extreme climate events

Wendy Clavano
Earth Systems Scientist

Philippine Association of Government Budget Administration
2015 3rd Quarterly Meeting
05 November 2015, Pasay City, Philippines

Outline

- What happens during an El Niño? (Cause)
- Why are climate forecasts useful? (Impact)
- How can be adjusted to better prepare? (Policy)

Objectives

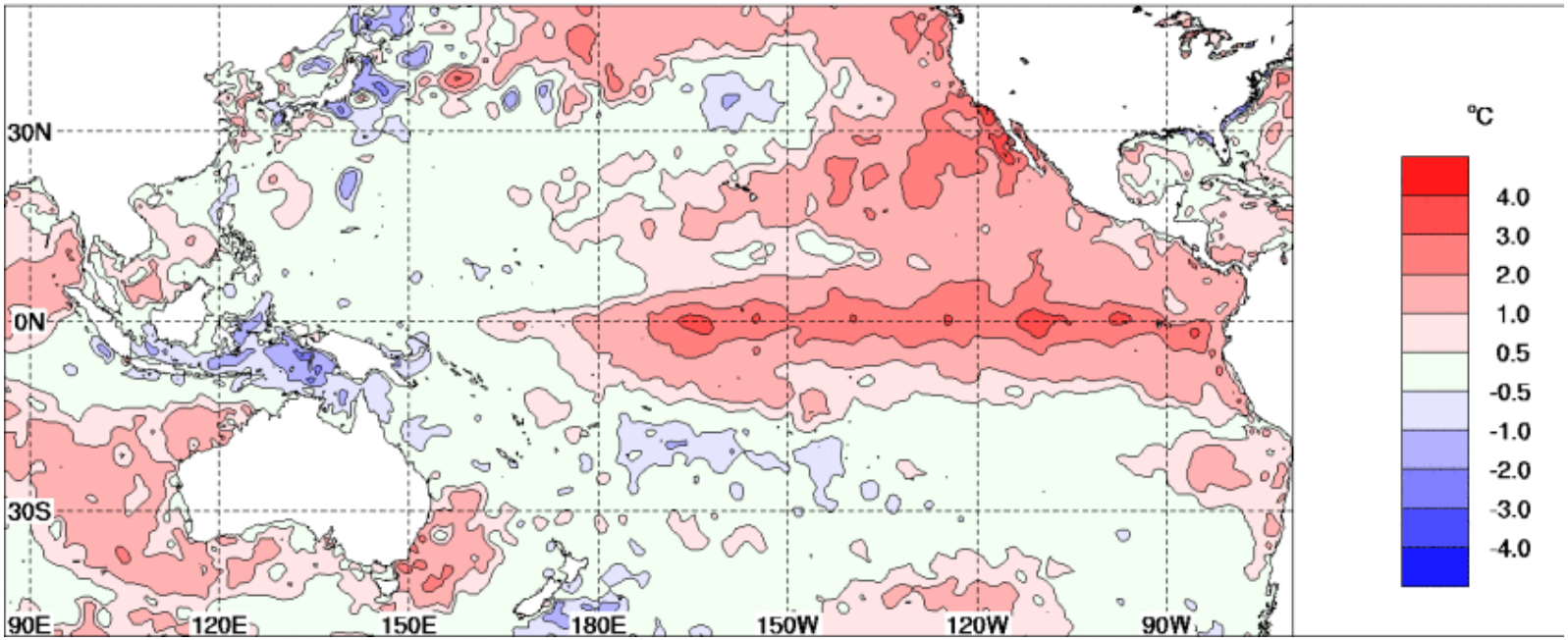
- **Drought as hazard** risk with or without El Niño
- **Timing** of impacts, opportunity for localization
- Compounding effects, **recover** from past events

Part 1: El Niño and drought

- What is an El Niño? Look at current conditions
- Why is it still raining now? Monsoon, ITCZ, tropical cyclone rainfall, convection
- What is drought? All rainfall sources combined

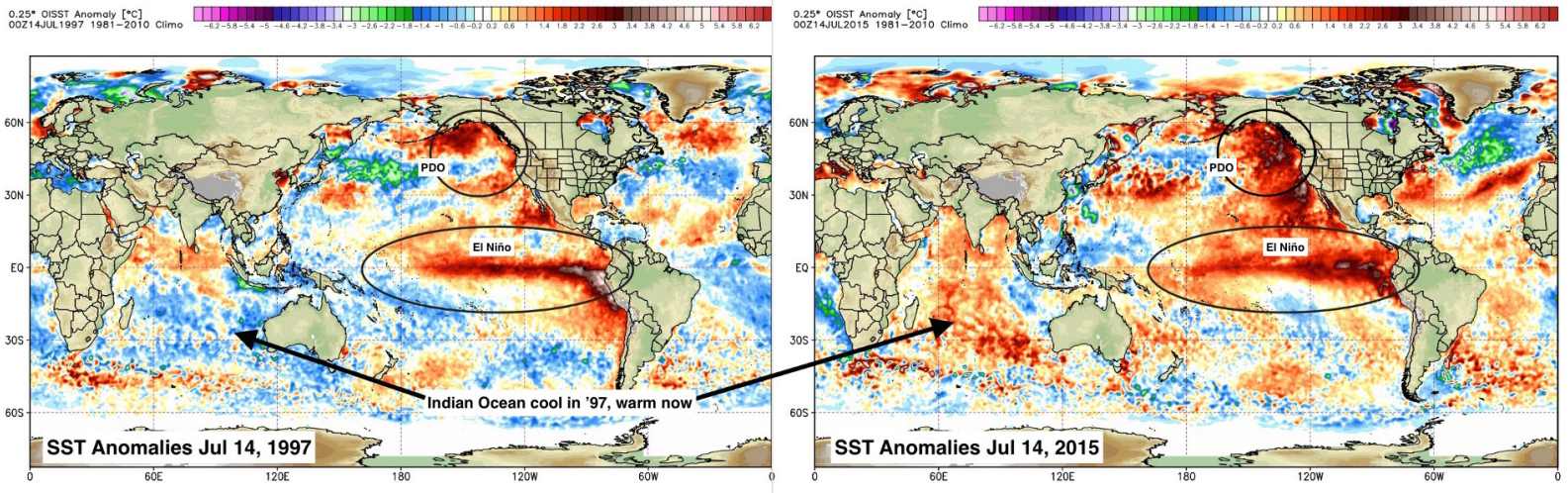
ENSO = El Niño Southern Oscillation

Current sea surface temperature anomalies

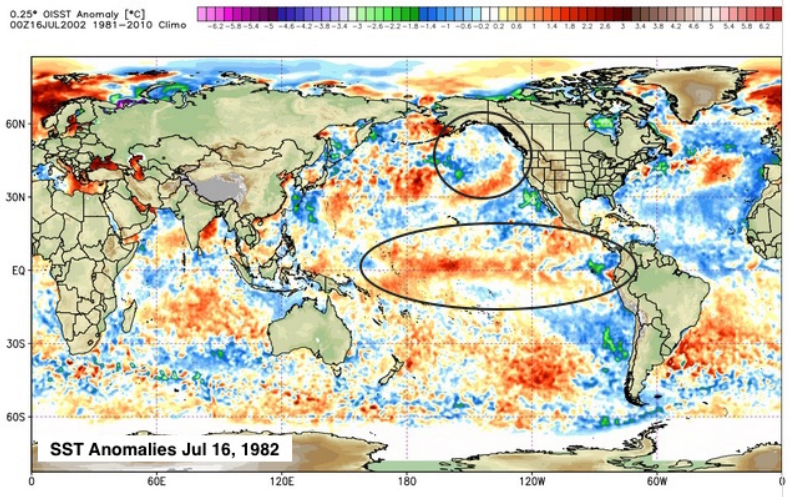


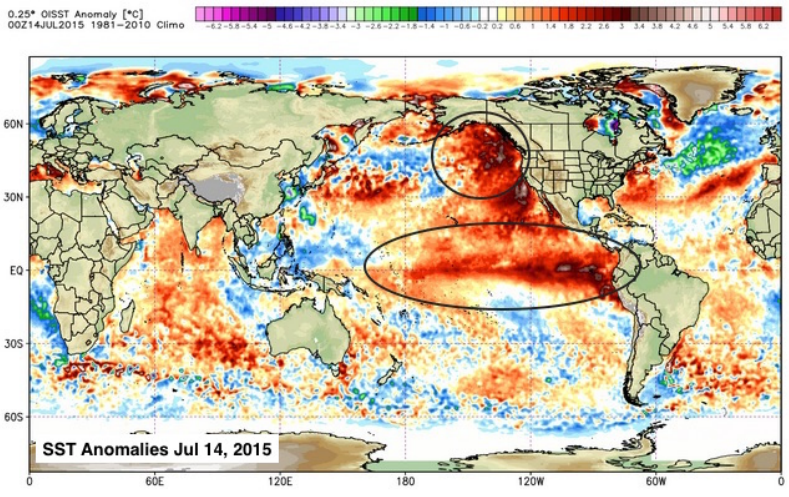
Source: BOM (Australia); as of 25 Oct 2015, base period 1961–1990.

Compare with 1997/1998 El Niño

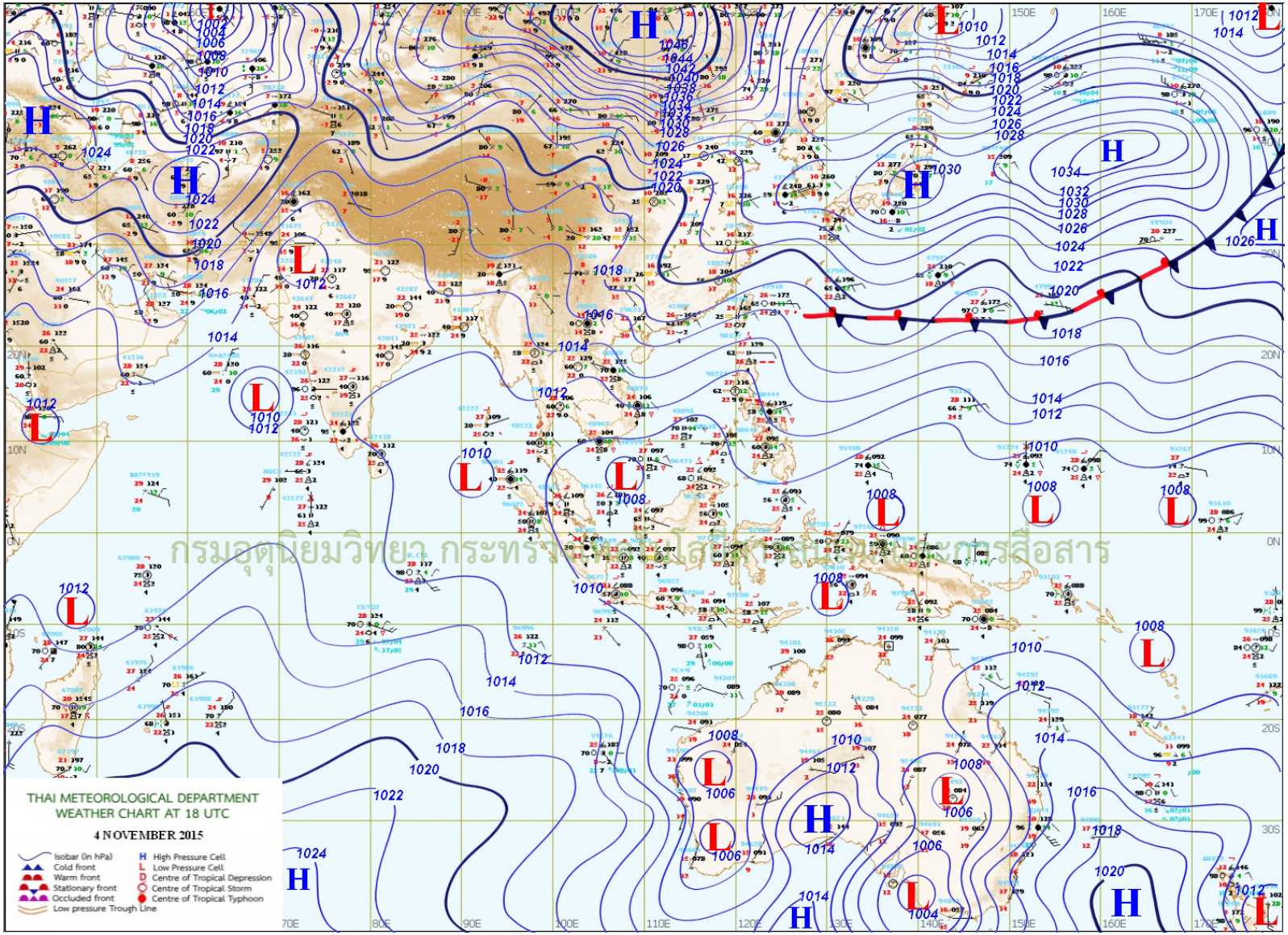


Compare with 1982/1983 El Niño

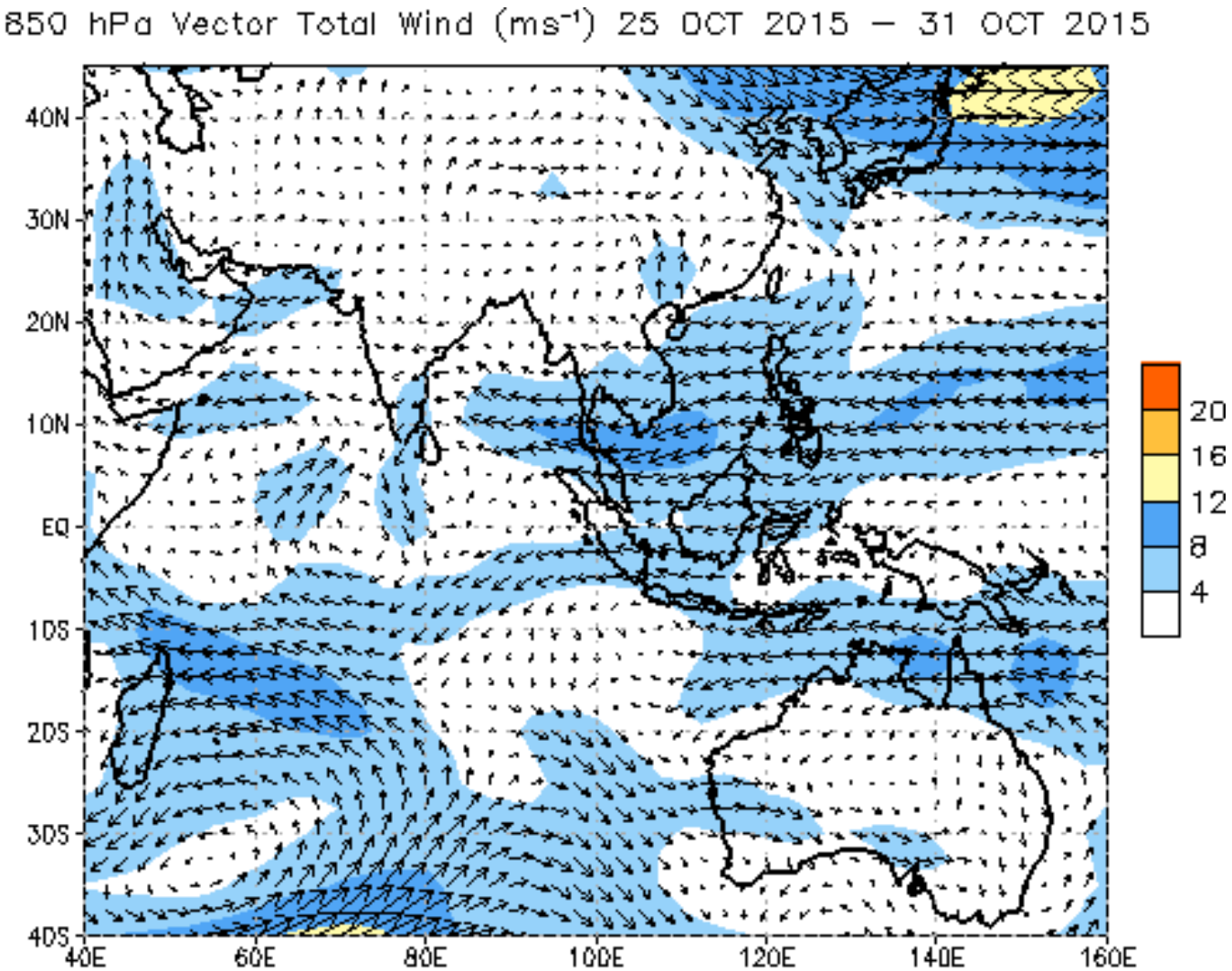




Current atmospheric conditions

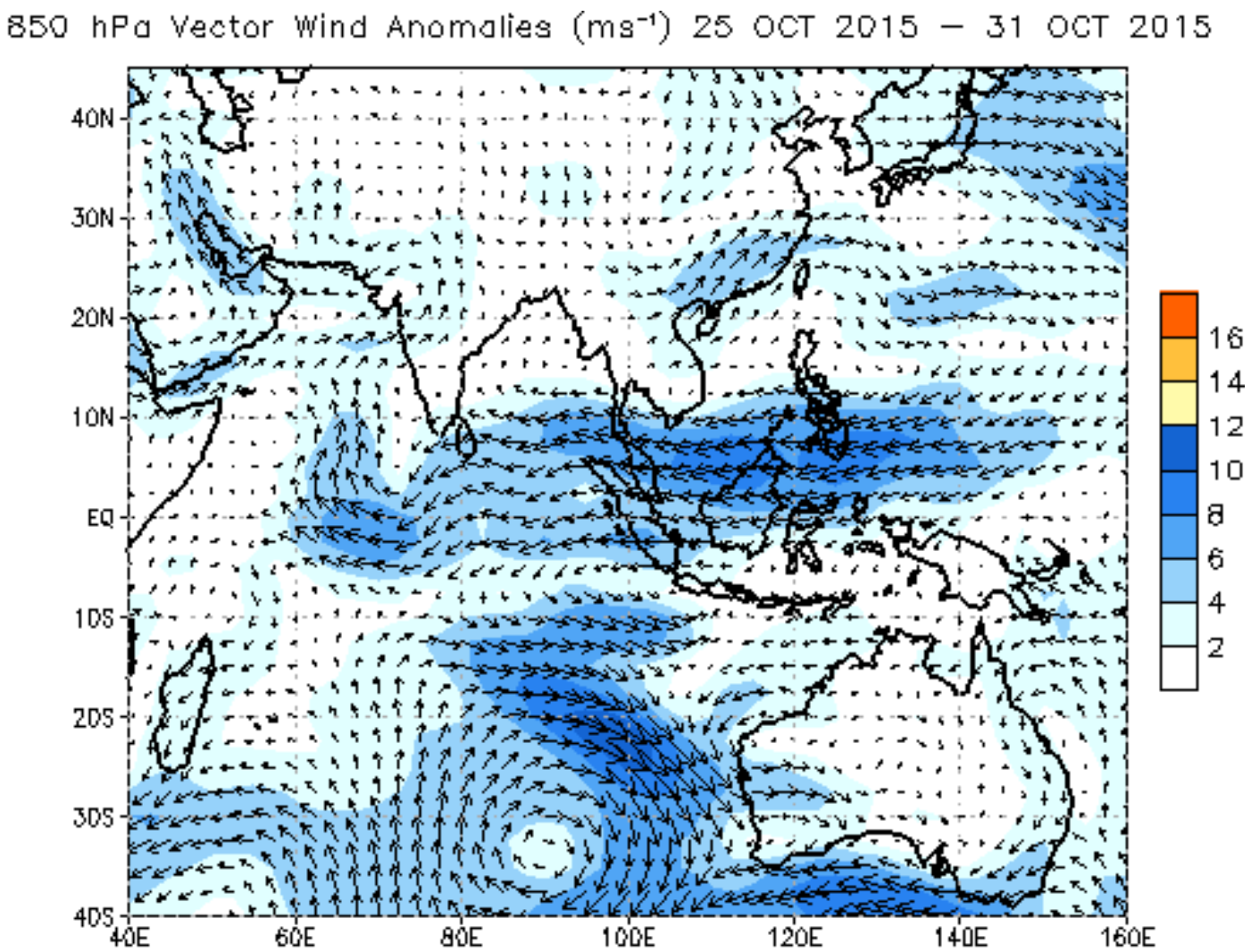


850-hPa winds 7-day average



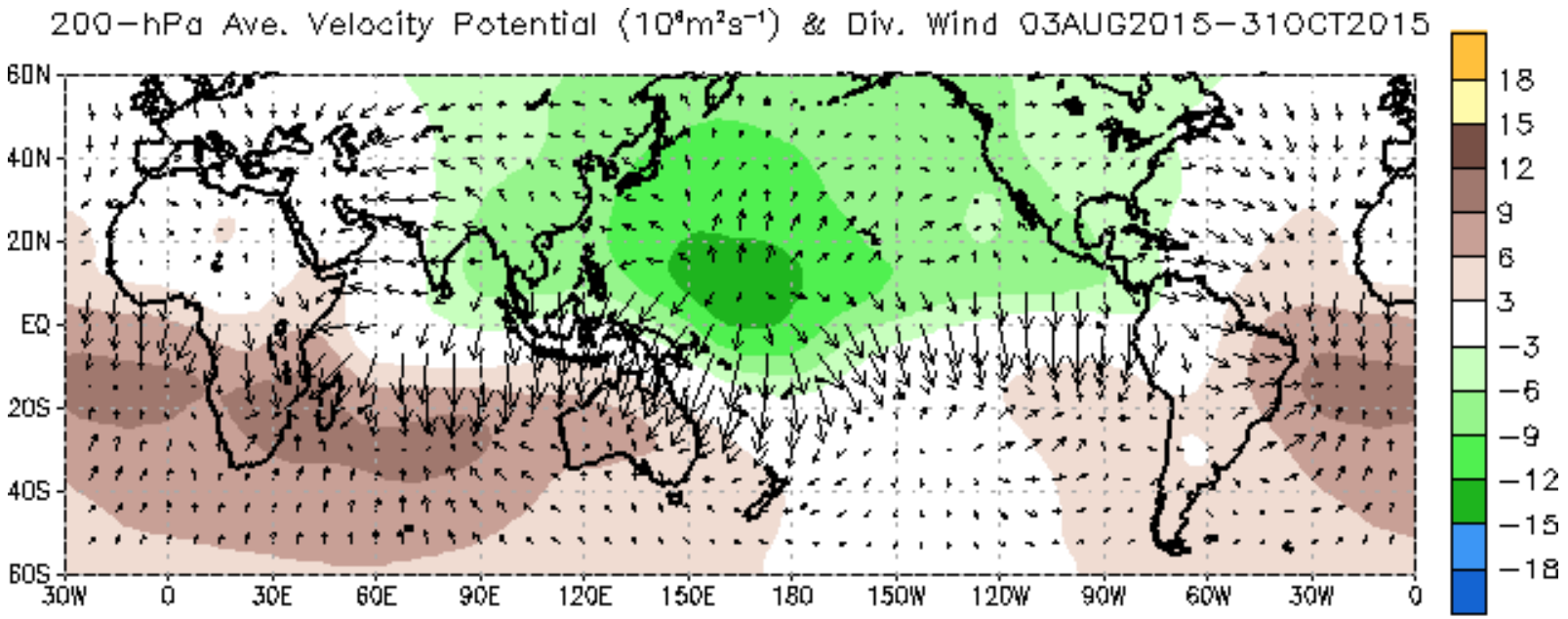
Data Source: NCEP/CDAS
(Wind speed > 4 ms⁻¹ shaded)

850-hPa winds 7-day anomalies



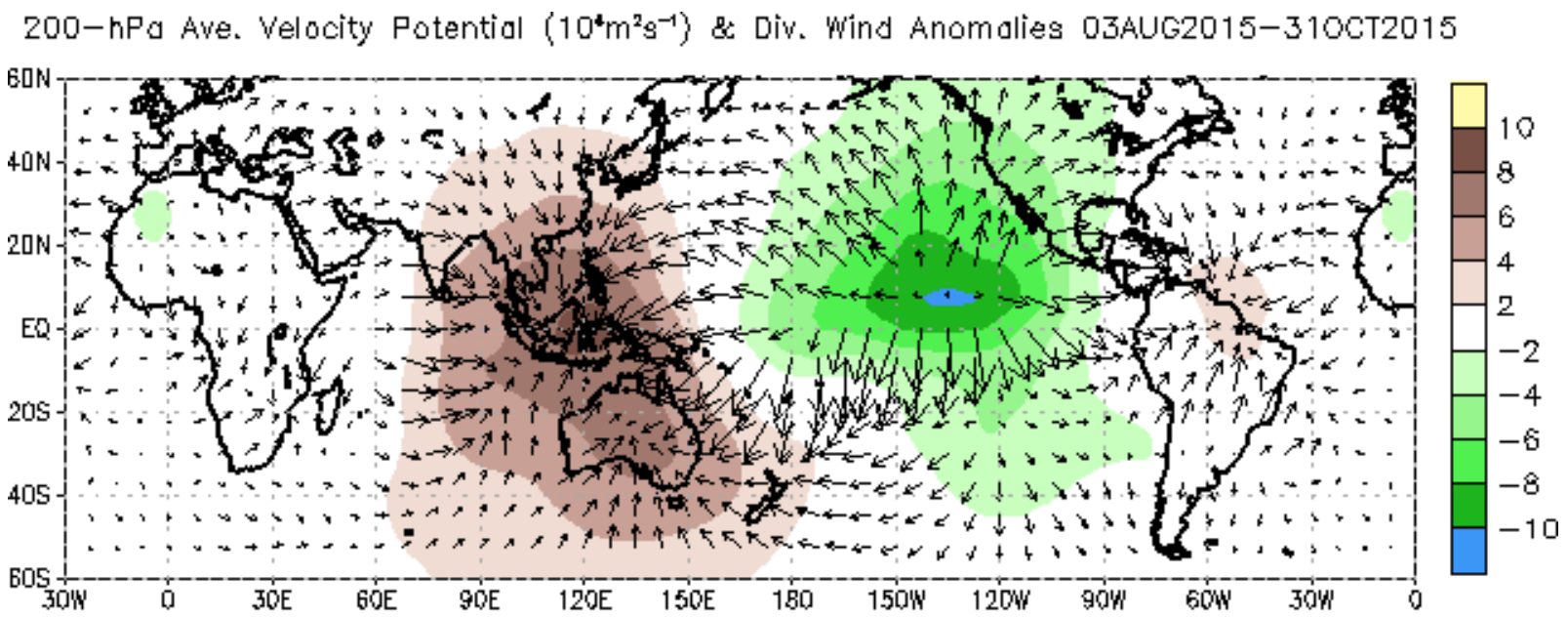
Data Source: NCEP/CDAS – Climatology (1981–2010)
(Wind speed > 2 ms⁻¹ shaded)

200-hPa and divergent wind 7-day average



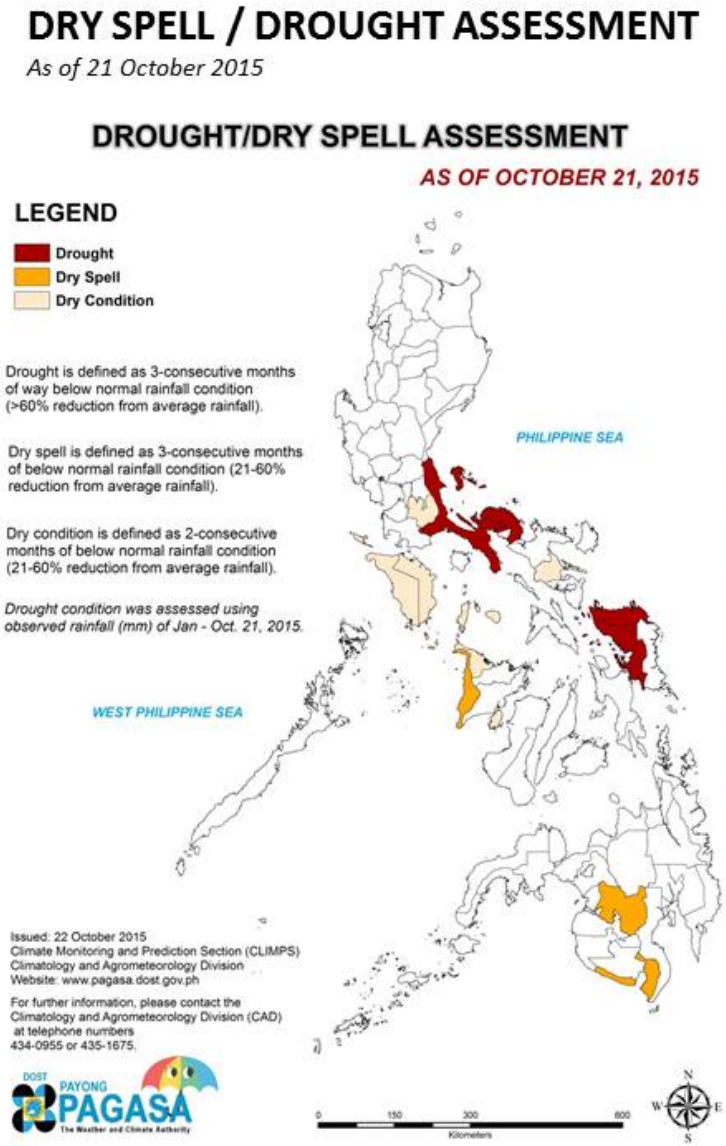
Data Source: NCEP CDAS

200-hPa and divergent wind 7-day anomalies



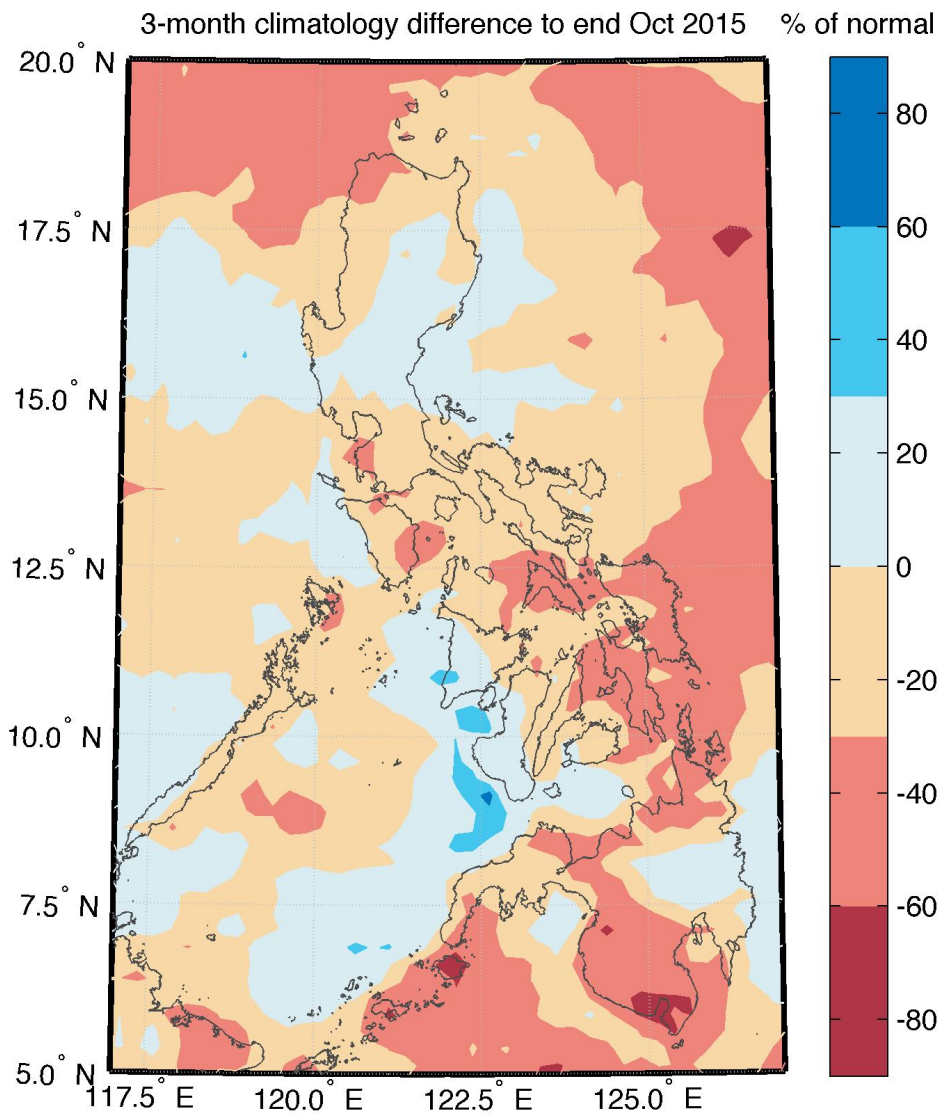
Data Source: NCEP CDAS
Climatology (1981−2010)

PAGASA drought monitor

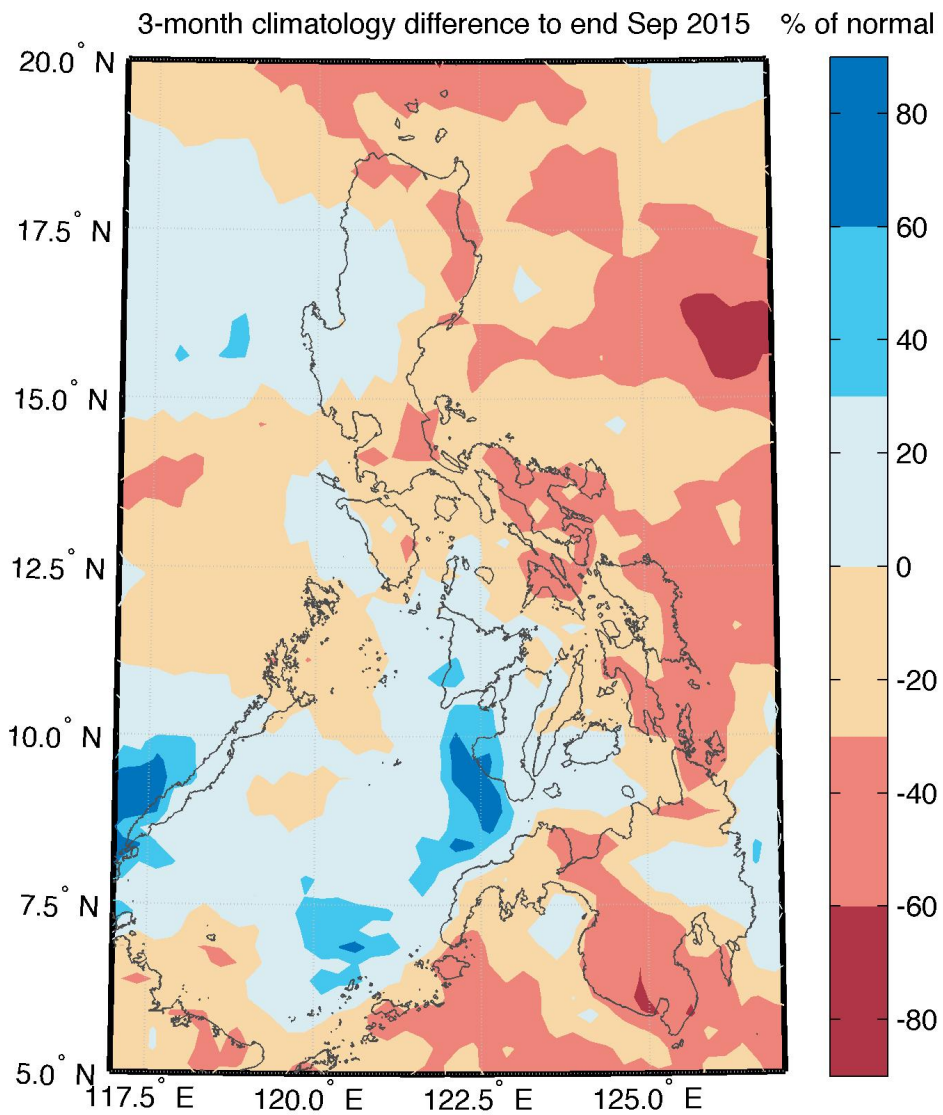


OVER DIFFERENT PROVINCES AS OF OCTOBER 21, 2015 AFTER THE PASSAGE OF 'TY LANDO'	
PROVINCES THAT EXPERIENCED DRY CONDITION	
LUZON	LAGUNA, OCCIDENTAL MINDORO, ORIENTAL MINDORO, ROMBLON, ALBAY
VISAYAS	AKLAN, GUIMARAS
MINDANAO	NONE
PROVINCES THAT EXPERIENCED DRY SPELL	
LUZON	
VISAYAS	ANTIQUE
MINDANAO	NORTH COTABATO, SARANGANI
PROVINCES THAT EXPERIENCED DROUGHT	
LUZON	QUEZON, CAMARINES NORTE
VISAYAS	NORTHERN SAMAR, SAMAR (WESTERN SAMAR)
MINDANAO	NONE

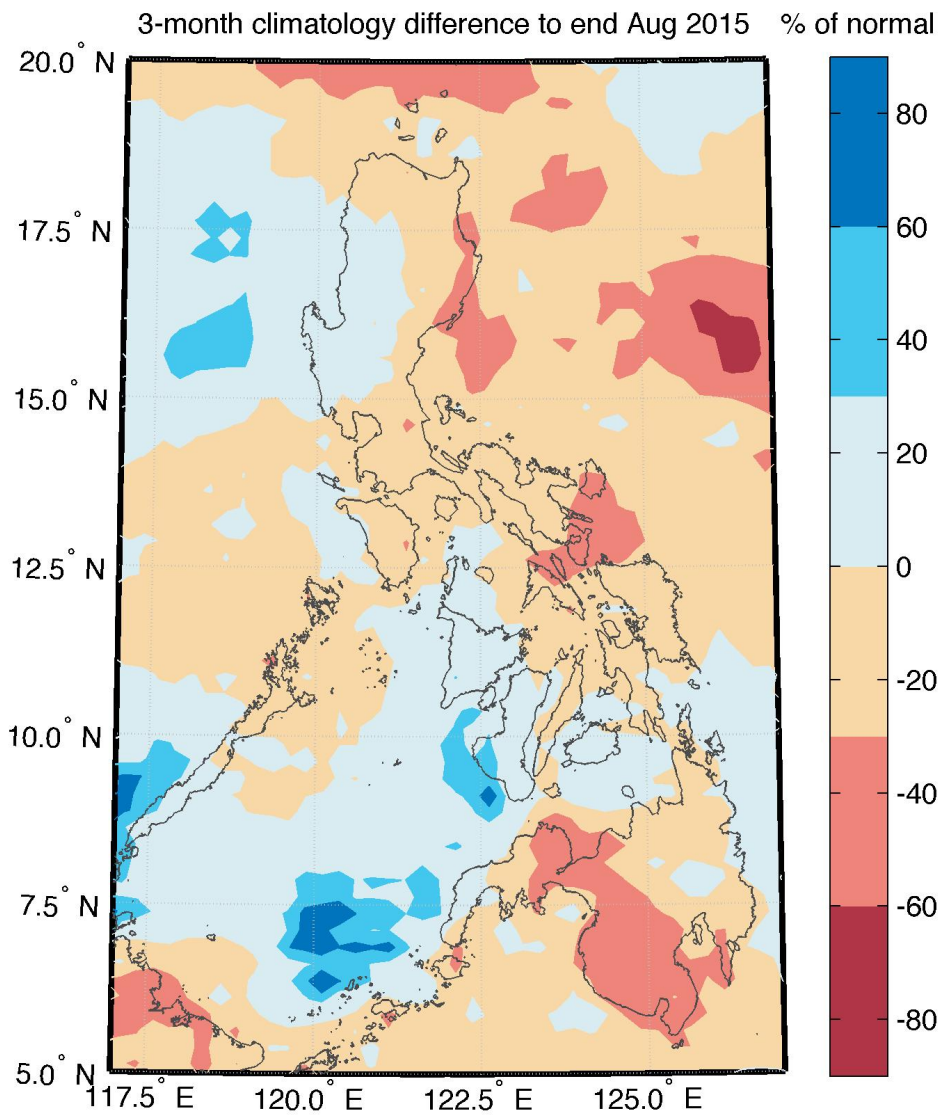
Seasonal rainfall difference, Oct 2015



Seasonal rainfall difference, Sep 2015



Seasonal rainfall difference, Aug 2015



Discussion: El Niño

About El Niño and rainfall–questions?

When someone's immune system is down, they are more susceptible to diseases. If they get sick, the cause is the disease not their weakness. It is the same with ENSO, an El Niño increases the likelihood of more intense storms, it did not cause Typhoon Lando.

Part 2: Timing of impacts

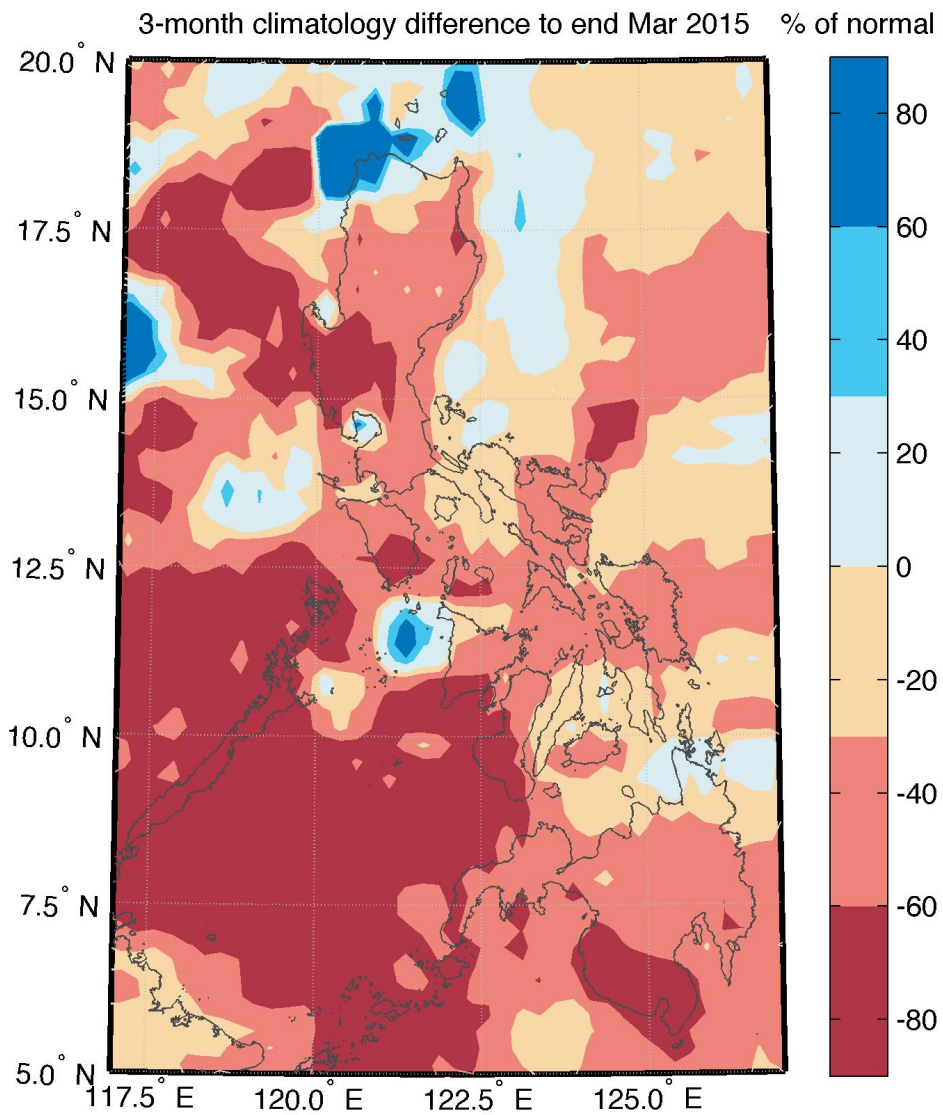
- Climate vs weather
- Past observations (no El Niño), climatology, and model results
- Timing and risk

Climate vs weather

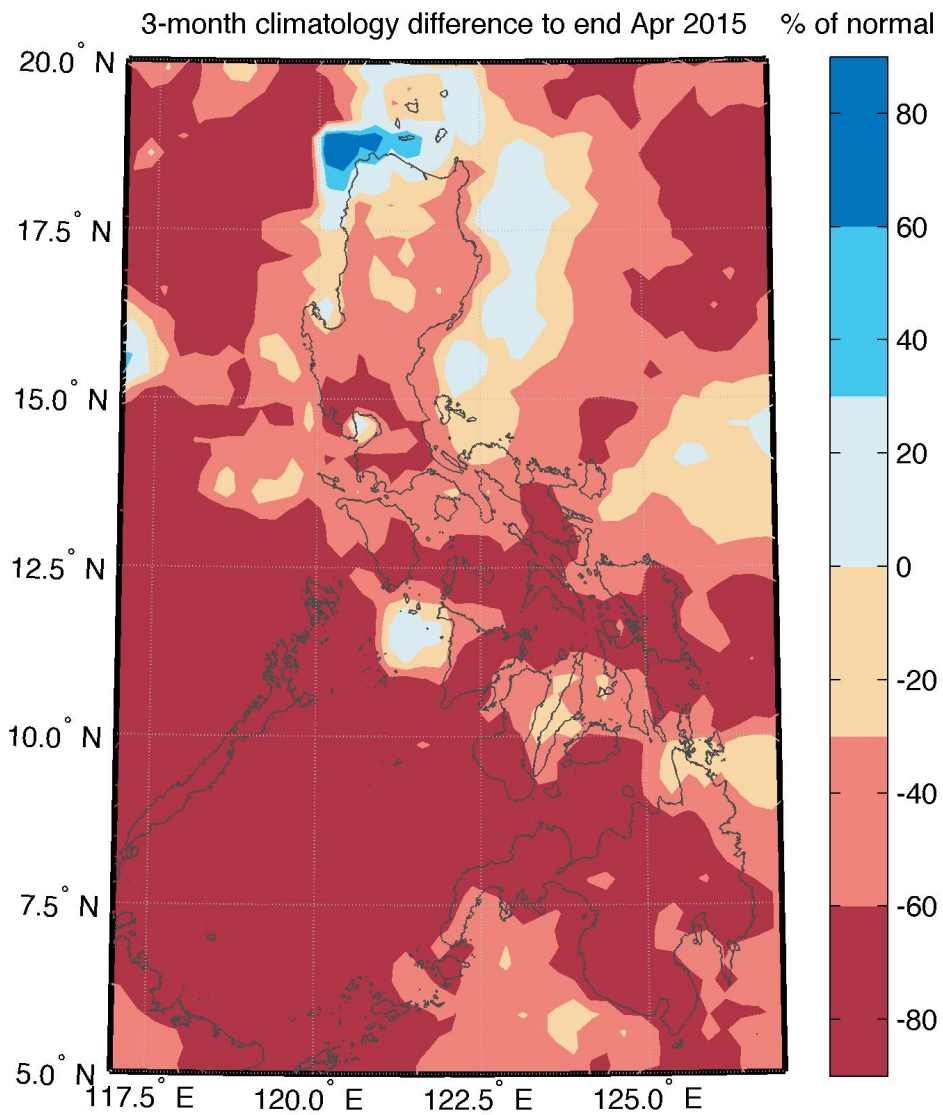
- Extreme climate (primary hazard) vs extreme weather (secondary hazard)
- Dry vs no rain
- Seasonal or year vs day-to-day

Following: examples of drought with no El Niño

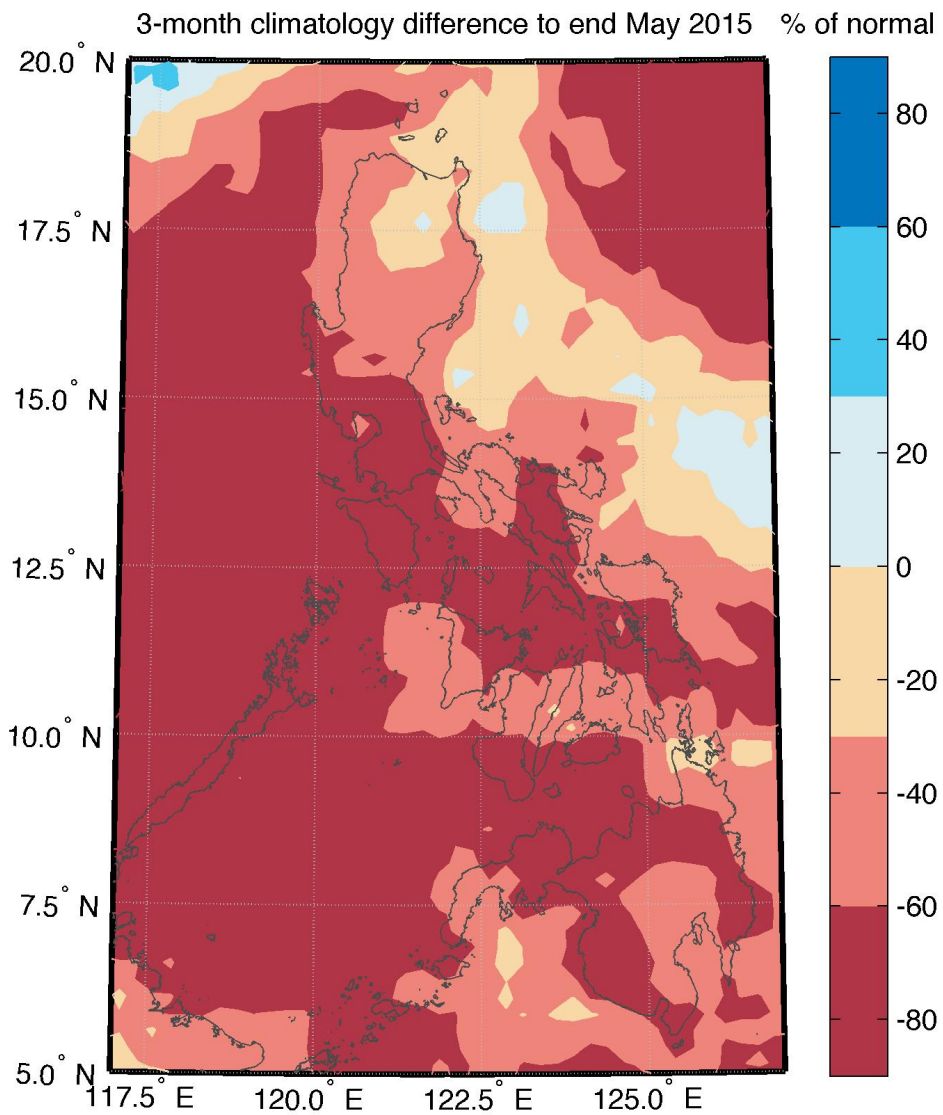
Seasonal rainfall difference, Mar 2015



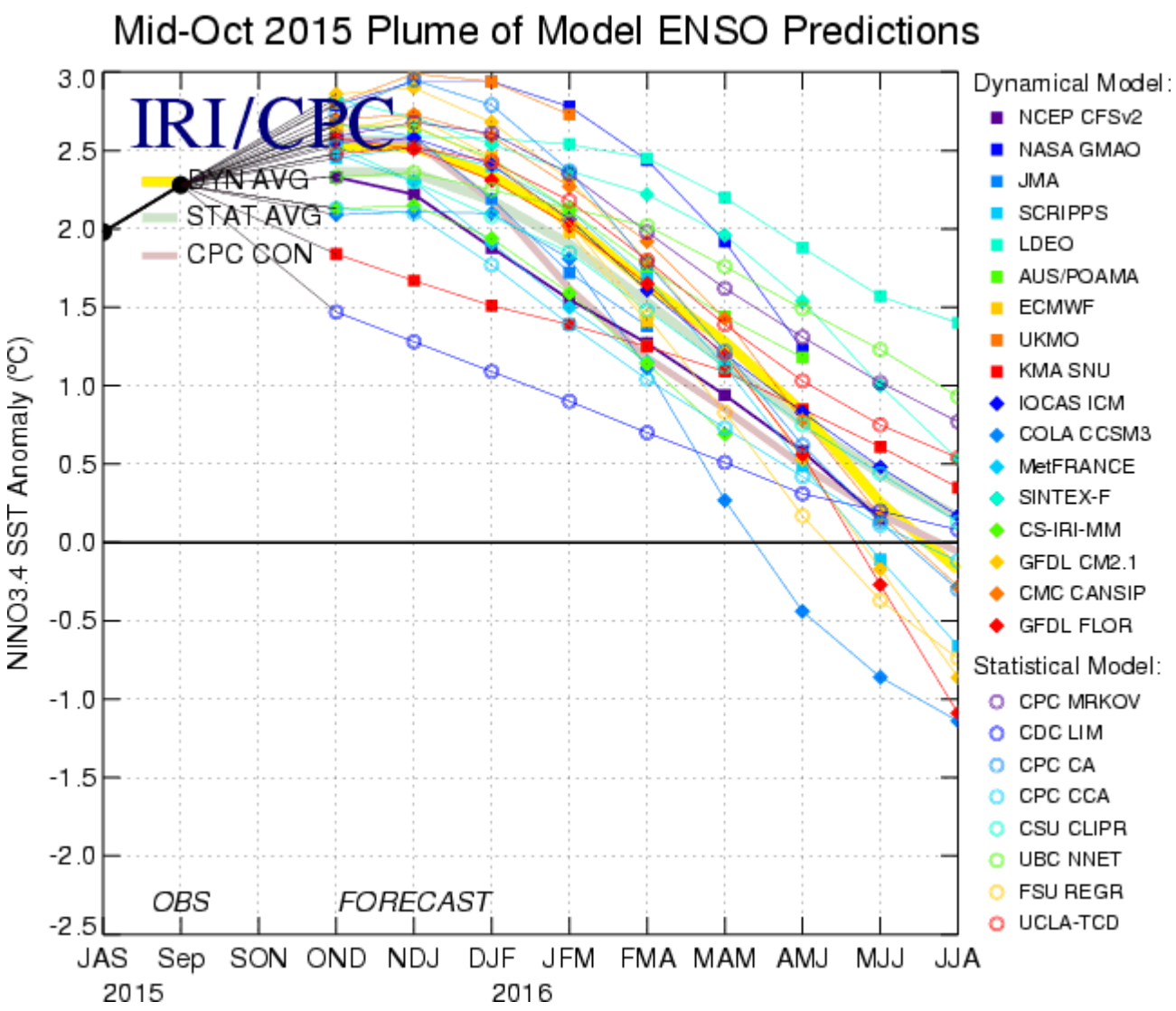
Seasonal rainfall difference, Apr 2015



Seasonal rainfall difference, May 2015



ENSO model predictions



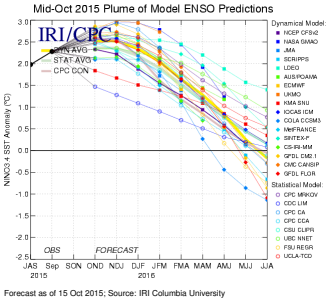
Forecast as of 15 Oct 2015; Source: IRI Columbia University

Preparing for El Niño impacts and drought

Forecasts

ENSO model predictions

ENSO model predictions



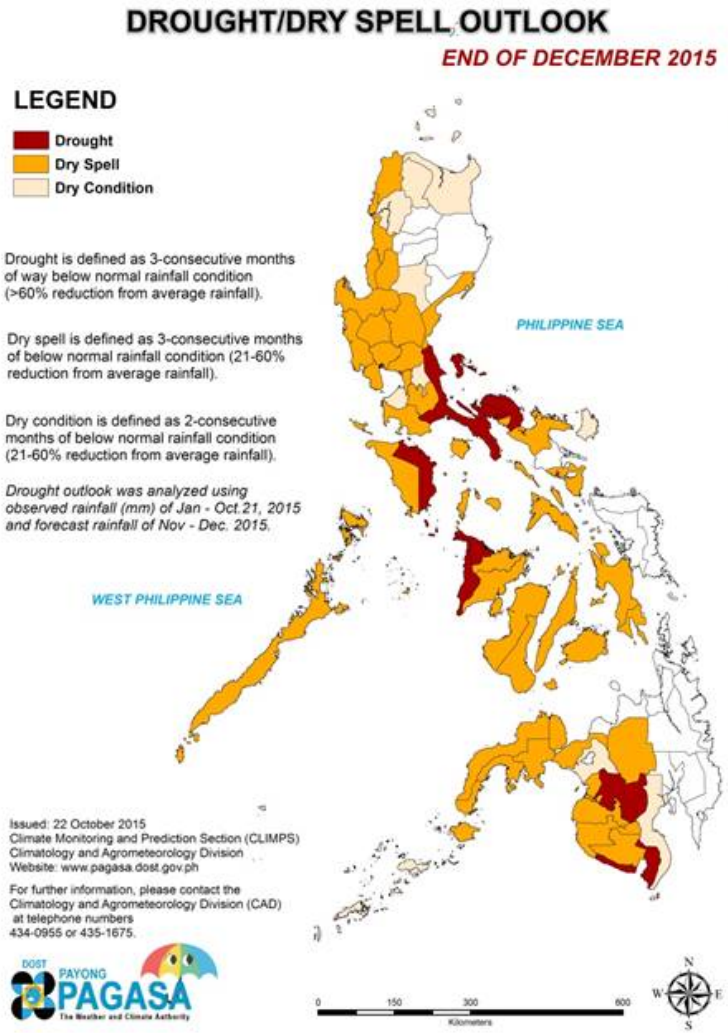
Forecast as of 15 Oct 2015; Source: IRI Columbia University

‘Unpredictable seasons produce unreliable harvests.”

PAGASA drought forecasts

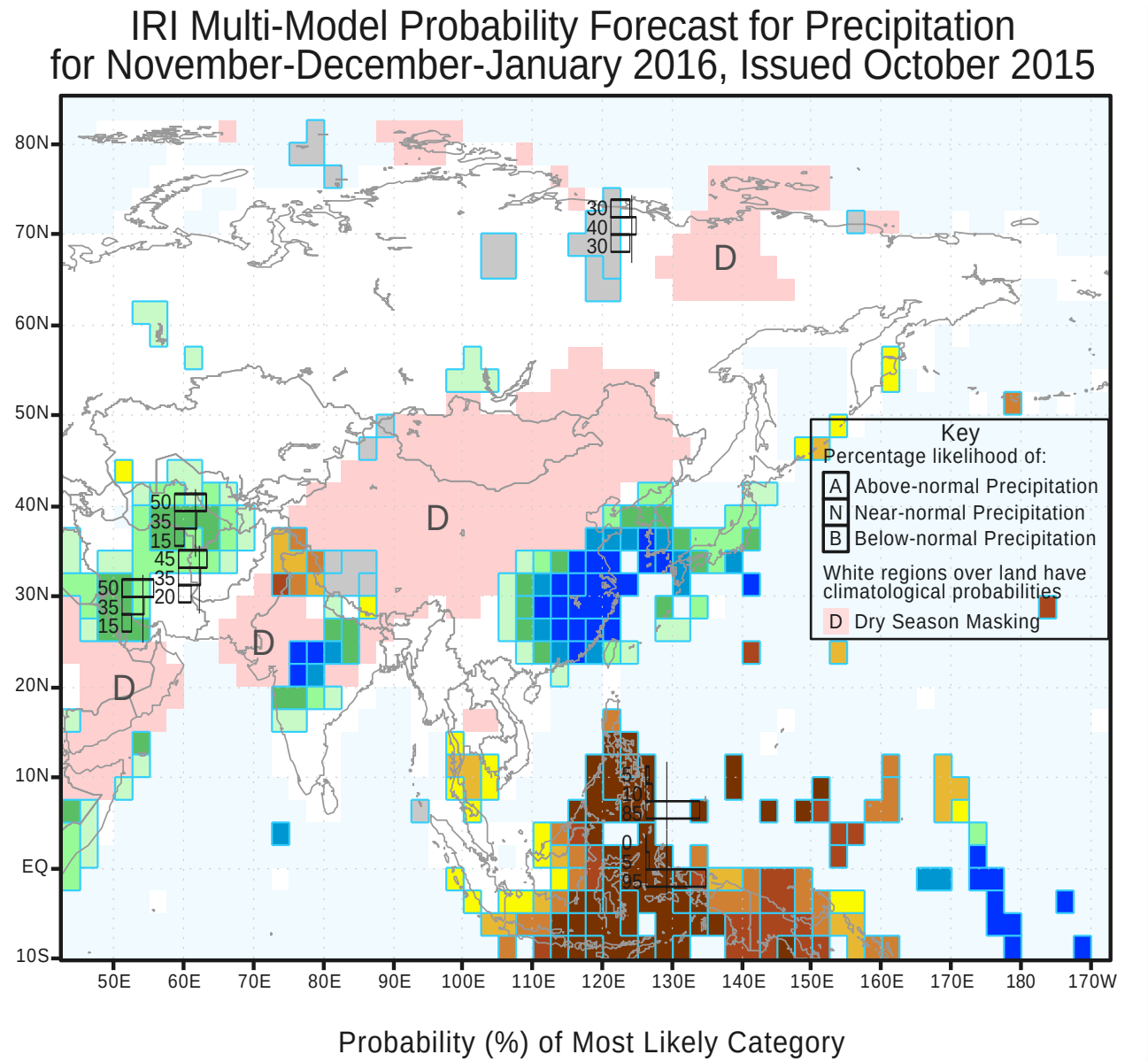
DRY SPELL / DROUGHT OUTLOOK BY END OF DECEMBER 2015

As of 21 October 2015

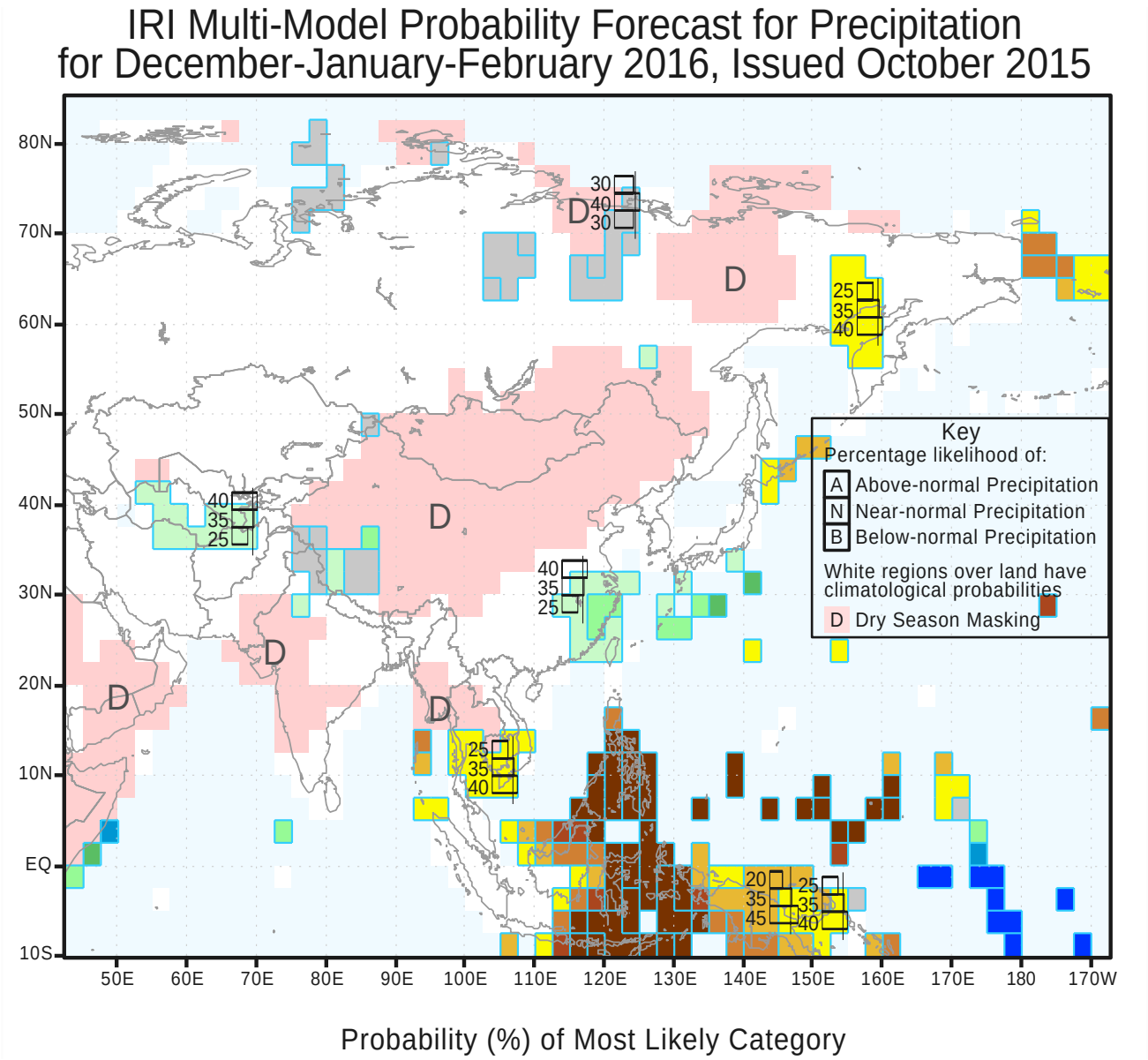


OVER DIFFERENT PROVINCES END OF DECEMBER 2015	
PROVINCES THAT WILL LIKELY EXPERIENCE DRY CONDITION	
LUZON (7)	ABRA, APAYAO, CAGAYAN,NUEVA VIZCAYA,CAVITE RIZAL, CATANDUANES
VISAYAS	NONE
MINDANAO (3)	DAVAO DEL SUR, LANAO DEL SUR, SULU, TAWI-TAWI
PROVINCES THAT WILL LIKELY EXPERIENCE DRY SPELL	
LUZON	BENGUET, ILOCOS NORTE, ILOCOS SUR, LA UNION PANGASINAN, BATAAN, BULACAN, NUEVA ECIJA, PAMPANGA, TARLAC, ZAMBALES, AURORA, METRO MANILA, BATANGAS, LAGUNA, MARINDUQUE, OCCIDENTAL MINDORO,ROMBLON,PALAWAN CAMARINES SUR,,MASBATE, SORSOGON
VISAYAS	CAPIZ, GUIMARAS, ILOILO, NEGROS OCCIDENTAL, BOHOL, CEBU, NEGROS ORIENTAL, SIQUIJOR BILIRAN, LEYTE, SOUTHERN LEYTE
MINDANAO	ZAMBOANGA DEL NORTE, ZAMBOANGA DEL SUR, ZAMBOANGA SIBUGAY, BUKIDNON. LANAO DEL NORTE, MISAMIS OCCIDENTAL, SOUTH COTABATO, SULTAN KUDARAT, BASILAN, MAGUINDANAO
PROVINCES THAT WILL LIKELY EXPERIENCE DROUGHT	
LUZON (3)	QUEZON, ORIENTAL MINDORO, CAMARINES NORTE
VISAYAS (2)	AKLAN, ANTIQUE
MINDANAO (2)	NORTH COTABATO, SARANGANI

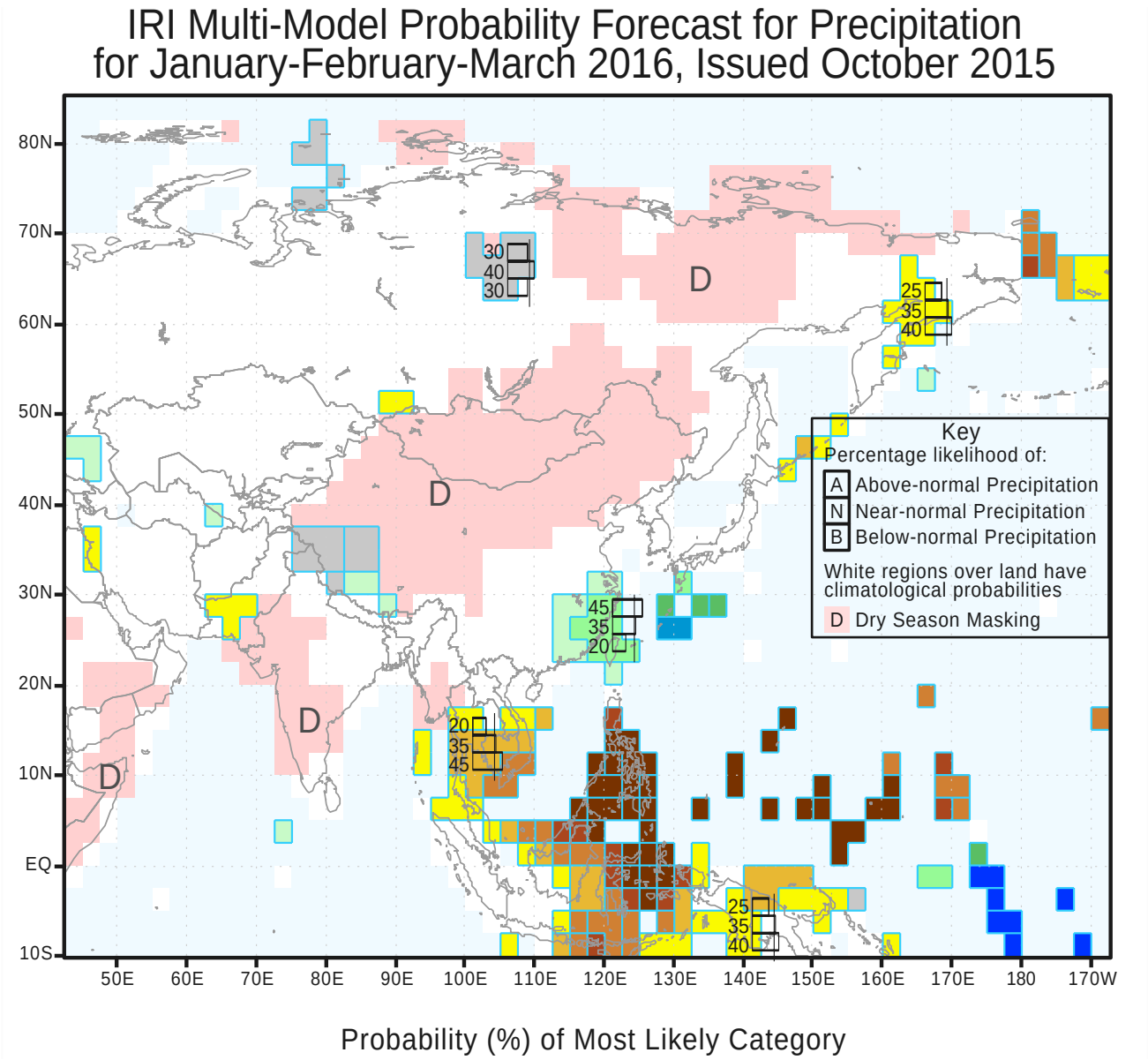
Rainfall deficit in Nov-Dec-Jan 2016



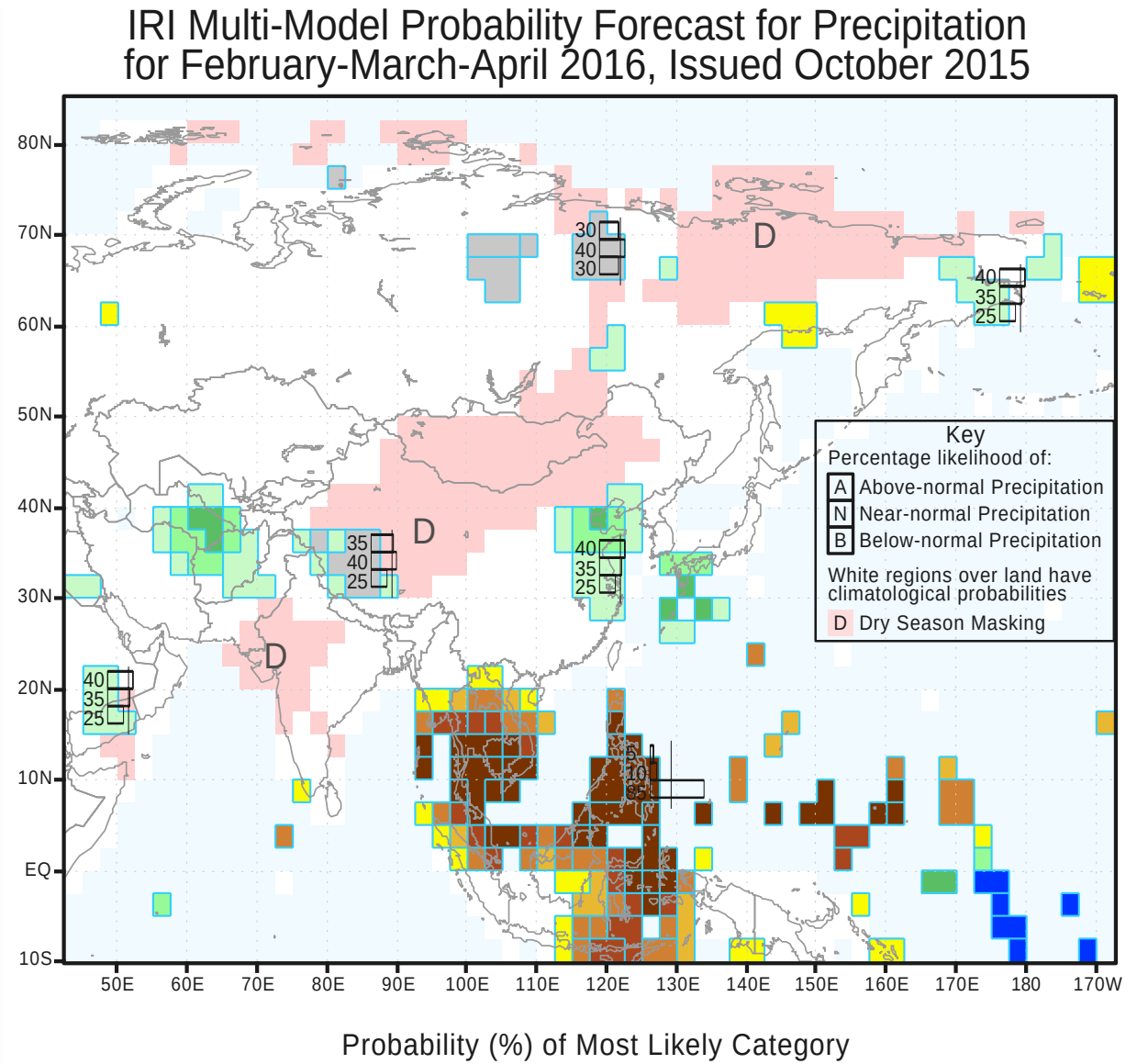
Rainfall deficit in Dec-Jan-Feb 2016



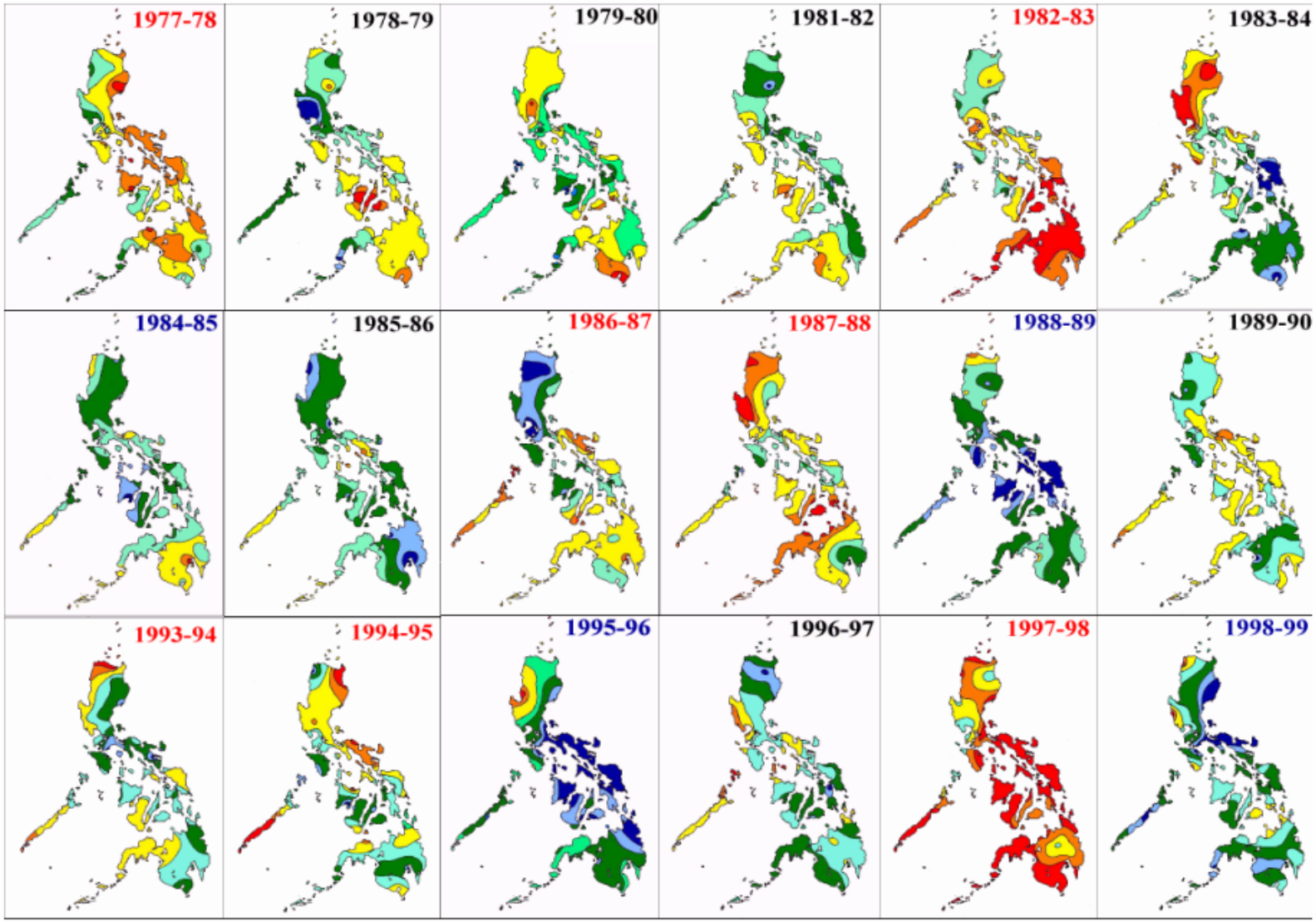
Rainfall deficit in Jan-Feb-Mar 2016



Rainfall deficit in Jan-Feb-Mar 2016



Spatial and temporal distribution of “risk”



Source: Hilario (2009)

Discussion: Timing

About seasonal climate forecasts and impacts–questions?

Part 3: Preparing for extremes

- Coming from “recovery”, prior condition
- Seeing it through, during an event
- Development out of poverty, get out of *risk*

Start from recovery mindframe

An estimated 7 pesos is saved for every peso spent for preparation.

- Economic or investment risk
- Build back better
- Other more pressing needs

Drought hazard after Yolanda in Samar and Leyte.

Immediate action: respond

Drought is a creeping hazard.

- Water, conservation in practice
- Food, change a culture
- Health, clean water

Dengue as an example.

Disaster risk reduction as development tool

Economic sense: Get people out of the risk of poverty.

- Livelihood
- Education
- Infrastructure
- Socioeconomic inclusion

Shift timing: buffer seeds for drought.

Summary: cause, impact, policy

- Impacts of ENSO, we know it is going to happen
- Climate forecasts and the timing of drought, we know when
- The timing of preparations, we know what we might save

Discussion: Preparations

Thoughts on preparations–suggestions?

Thanks

- NASA's Global Precipitation Measurement
- US NOAA (NCEP)
- DOST
- NOAH
- Thailand Meteorological Department
- Institute of Environmental Science for Social Change
- The Manila Observatory
- International Research Institute for Climate and Society (Columbia University)
- Australian Bureau of Meteorology
- WeatherBell Analytics
- W Coventry, University of New England

The timing of El Niño impacts and drought in the Philippines

Preparing for extreme climate events

Wendy Clavano
Earth Systems Scientist

Philippine Association of Government Budget Administration
2015 3rd Quarterly Meeting
05 November 2015, Pasay City, Philippines