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El Nino Southern Oscillation (ENSO) in the Philippines: Impacts, forecasts and risk management

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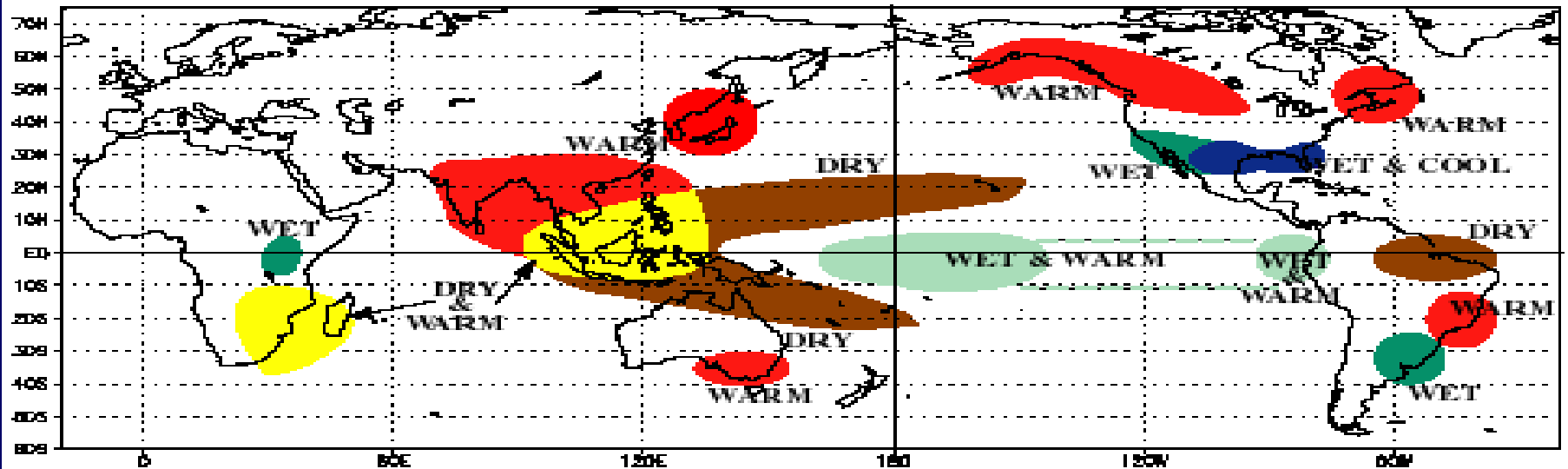
Outline

- **Introduction**
- **ENSO impacts in the Philippines**
- **Climate Forecast and Risk Management**

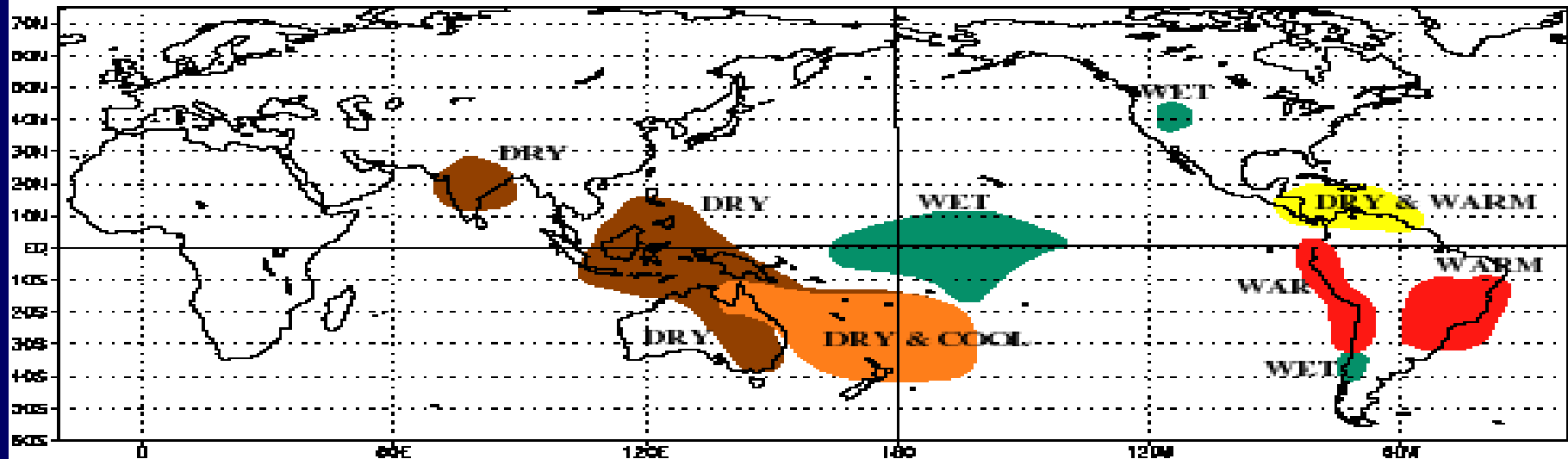
- **Today El Nino refers to the much broader scale phenomenon where water across much of the tropical eastern and central Pacific makes hotter than usual and affects the atmosphere and weather around the world.**
- **These “El Nino” events (warm episodes) do not occur in any precise cycle but broadly speaking tend to recur every 2 to 7 years and last around 12 to 18 months.**
- **Each El Nino event is different in terms of its strength and impact on altered rainfall patterns.**

Areas Consistently Affected by El Niño

WARM EPISODE RELATIONSHIPS DECEMBER - FEBRUARY



WARM EPISODE RELATIONSHIPS JUNE - AUGUST



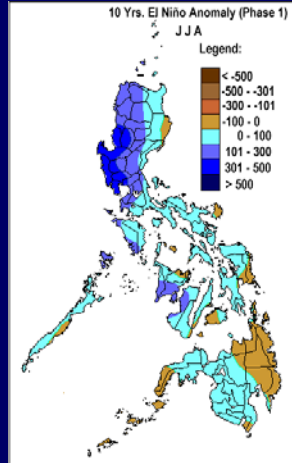
ENSO IMPACTS IN PHILIPPINES

MANIFESTATIONS OF ENSO EVENTS IN PHILIPPINE CLIMATE

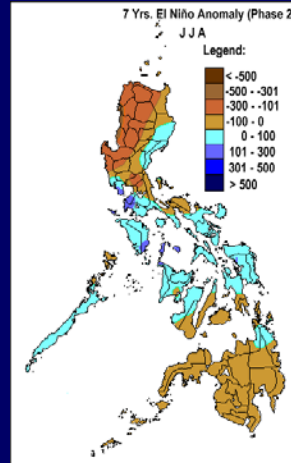
El Niño Episode	La Niña Episode
<ul style="list-style-type: none">• Early termination of the rainy season (1st year of the episode)• Weak monsoon activity<ul style="list-style-type: none">• Isolated heavy downpour on short duration• Weak tropical cyclone (TC) activity<ul style="list-style-type: none">• Tracks are displaced away from the Philippines• Not rain effective• Above normal sea level pressure• Above normal air temperature• Delayed onset of the rainy season (2nd year of the episode)	<ul style="list-style-type: none">• Longer rainy season• Active monsoon activity<ul style="list-style-type: none">• Increased cloudiness• Widespread rains• Active TC activity<ul style="list-style-type: none">• Near to above normal TC occurrences in PAR• Near normal TC tracks• Rain effective TC• Near normal or early onset of the rainy season (2nd phase of the episode)• Near normal to cooler than normal air temperature• Below normal sea level pressure
❖ Drier weather conditions	❖ Wetter weather conditions

June_July_August El Niño Rainfall Anomalies

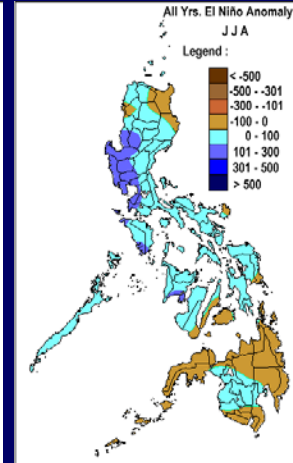
Phase 1



Phase 2

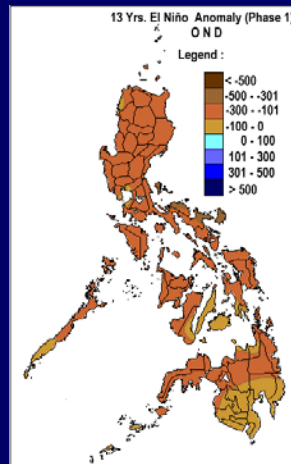


All Phases

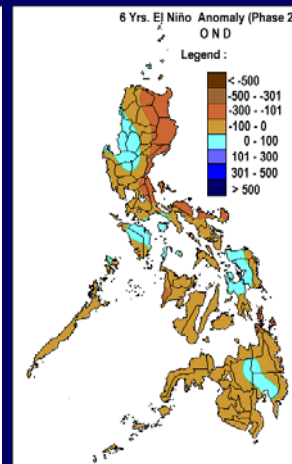


Oct_Nov_Dec El Niño Rainfall Anomalies

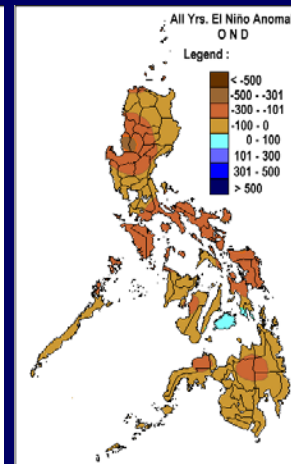
Phase 1



Phase 2



All Phases

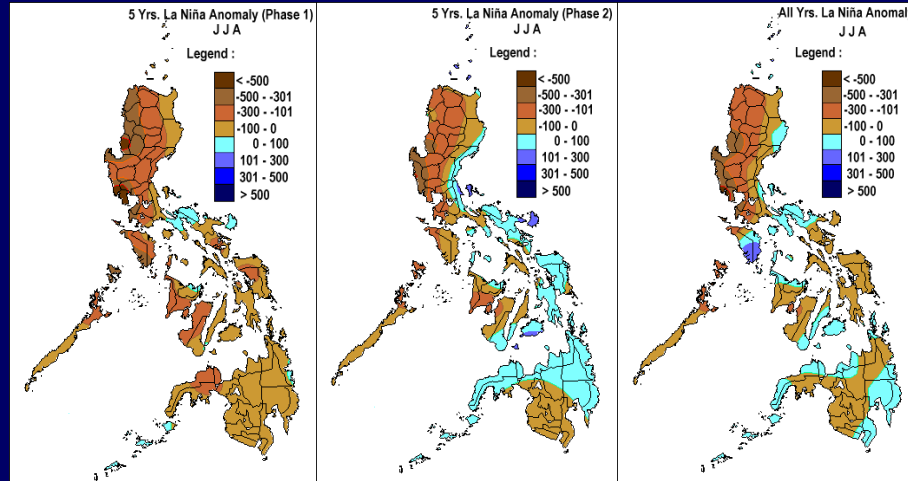


June_July_August La Niña Rainfall Anomalies

Phase 1

Phase 2

All Phases

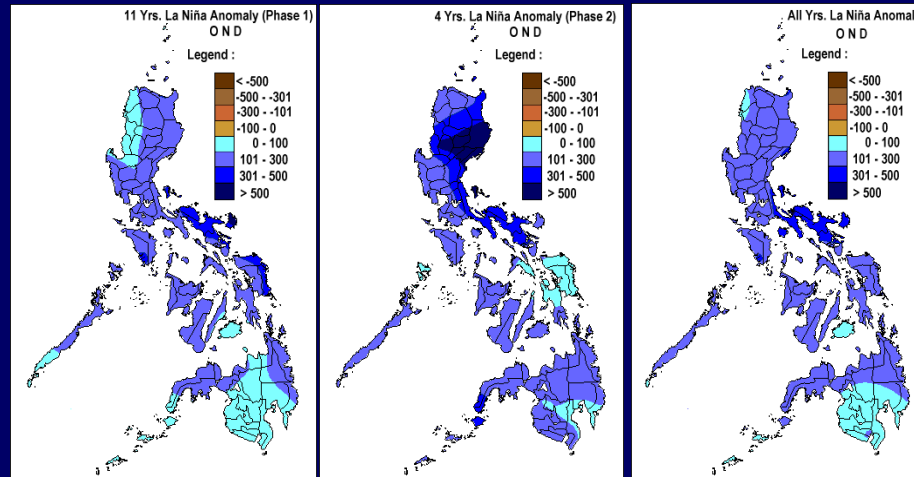


Oct_Nov_Dec La Niña Rainfall Anomalies

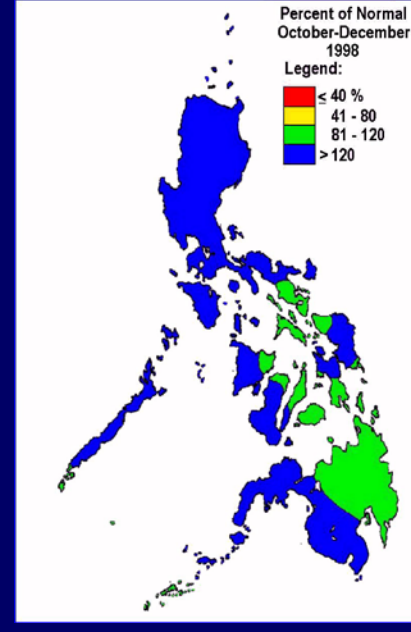
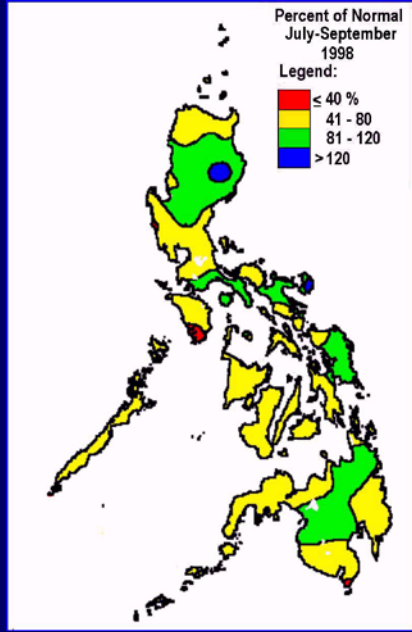
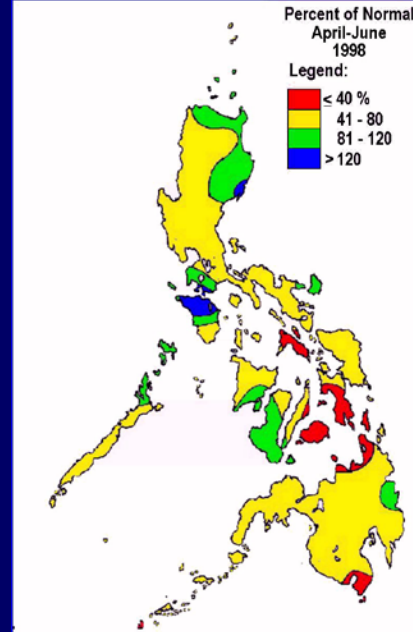
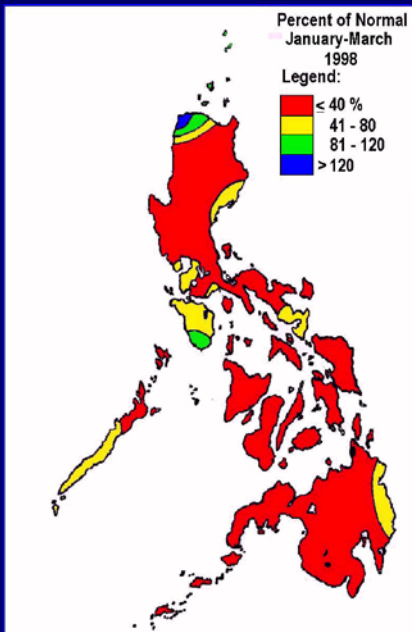
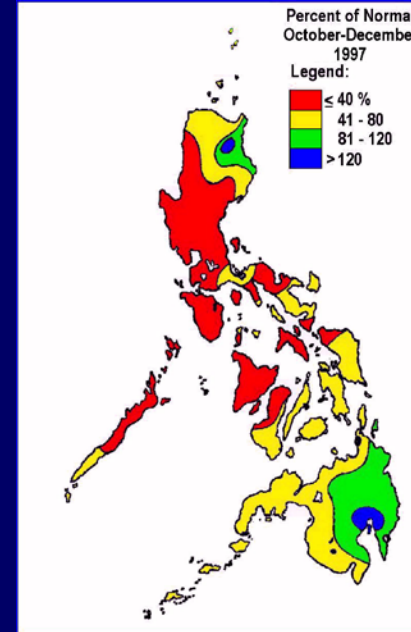
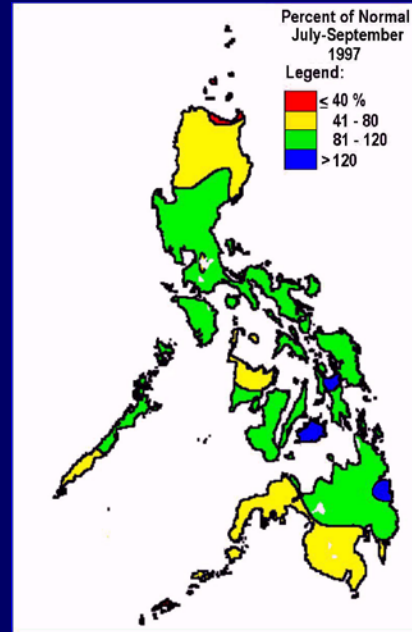
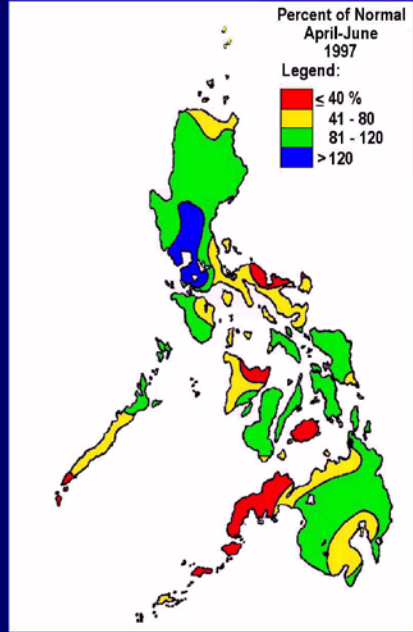
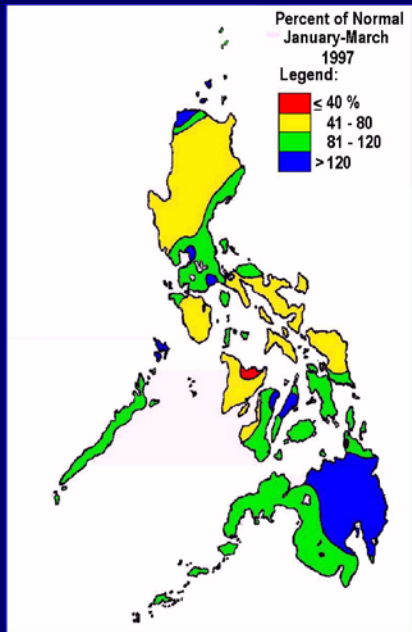
Phase 1

Phase 2

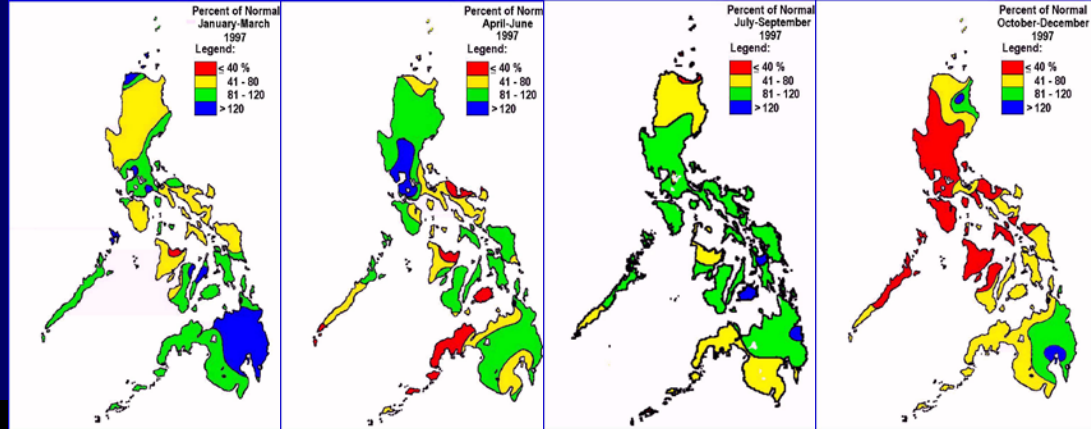
All Phases



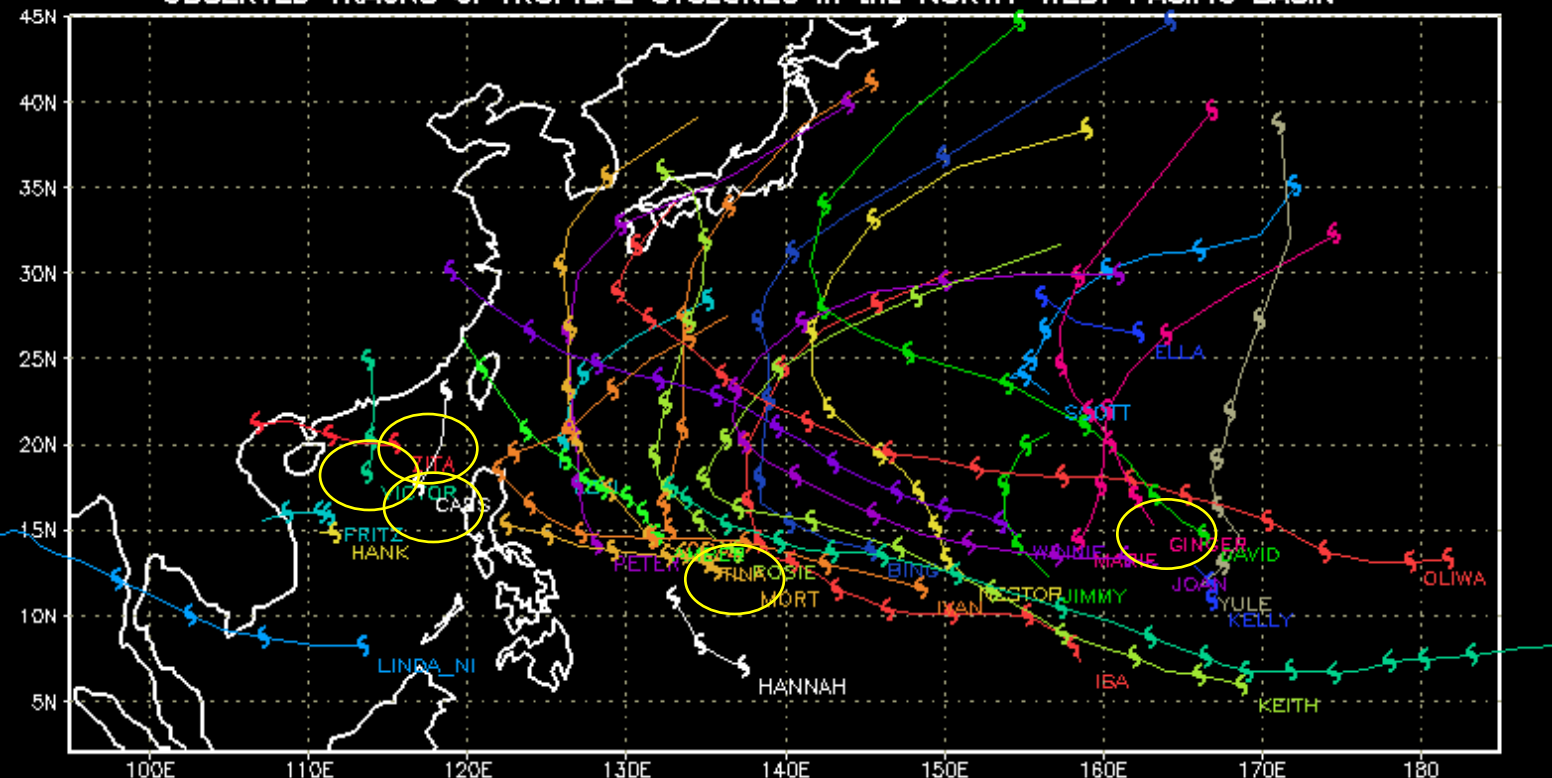
1997-1998 ENSO



Tropical Cyclones 1997



OBSERVED TRACKS of TROPICAL CYCLONES in the NORTH-WEST PACIFIC BASIN

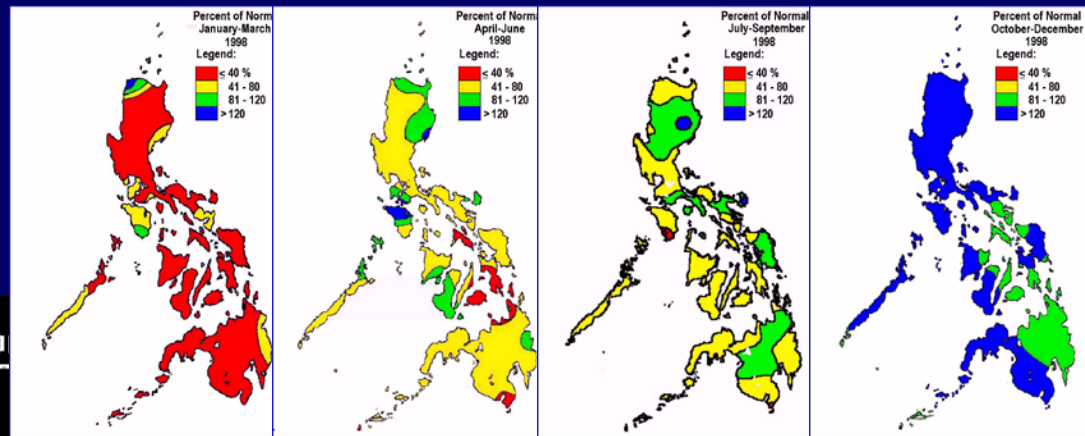


HANNAH 970120	ISA 970413	JIMMY 970423	KELLY 970508	LEM 970528	MARE 970529
NESTOR 970608	OPAL 970616	PETER 970624	ROSIE 970720	SCOTT 970728	TINA 970731
VICTOR 970801	WINNIE 970810	YULE 970818	ZITA 970821	AMBER 970822	BING 970828
CASS 970829	OLIVA 970903	DAVID 970913	ELLA 970922	FRITZ 970923	GINGER 970925
HANK 971003	IVAN 971014	JOAN 971015	KEITH 971028	LINDA_NI 971101	MORT 971112

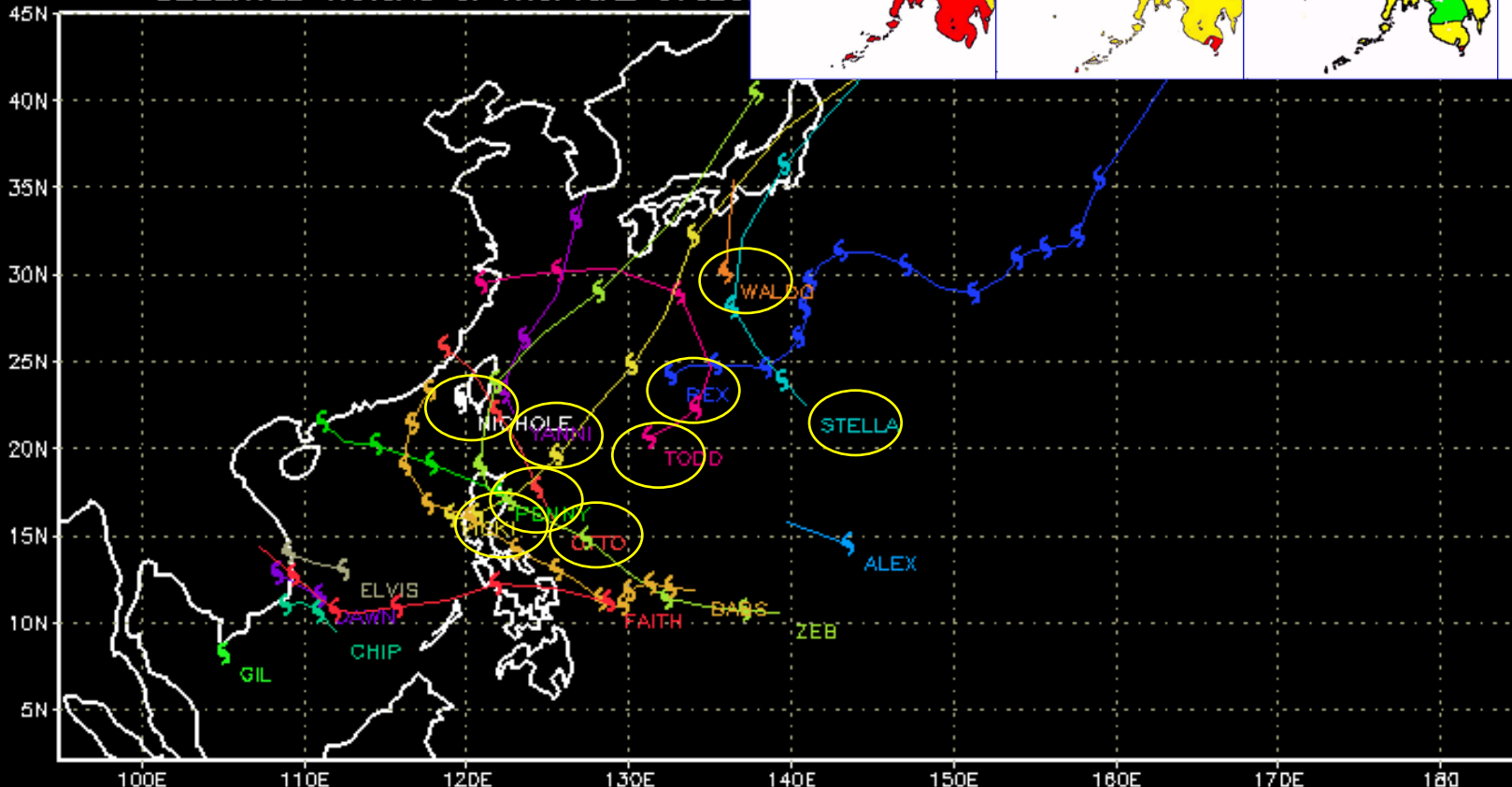
KEY to DATE of FIRST SYMBOL

24 HOURLY BEST TRACK OBSERVED POSITIONS
SYMBOLS REPRESENT 00Z POSITIONS

Tropical Cyclones 1998



OBSERVED TRACKS of TROPICAL CYCLO

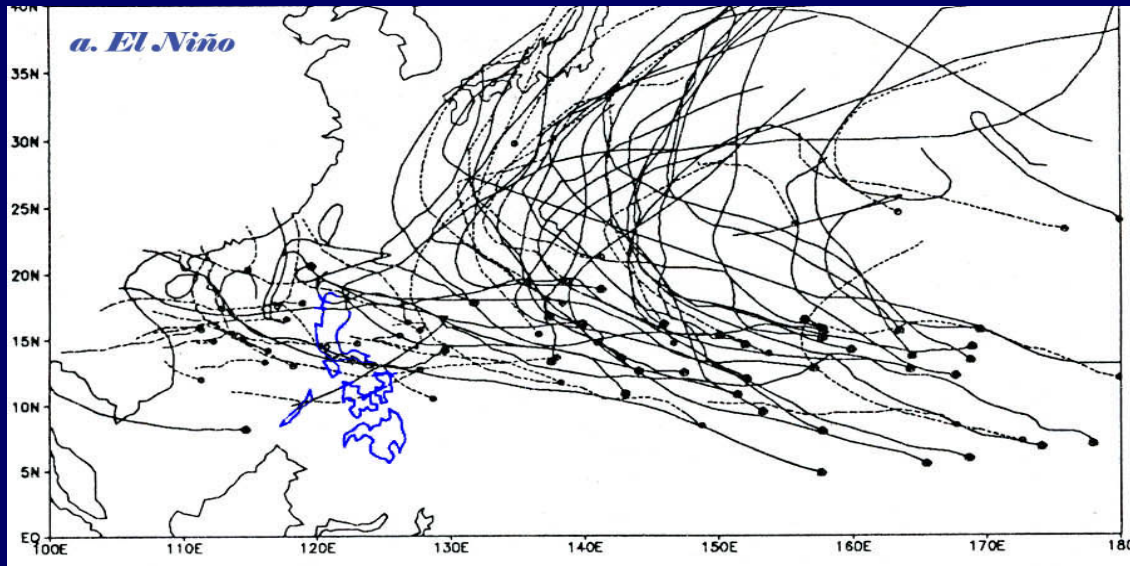


NICHOLE 19980709	OTTO 19980803	PENNY 19980808	REX 19980825	STELLA 19980914
TODD 19980918	VICKI 19980918	WALDO 19980921	YANNI 19980928	ZEB 19981011
ALEX 19981011	BABS 19981016	CHIP 19981113	DAWN 19981119	ELVIS 19981125
FAITH 19981210	GIL 19981211			

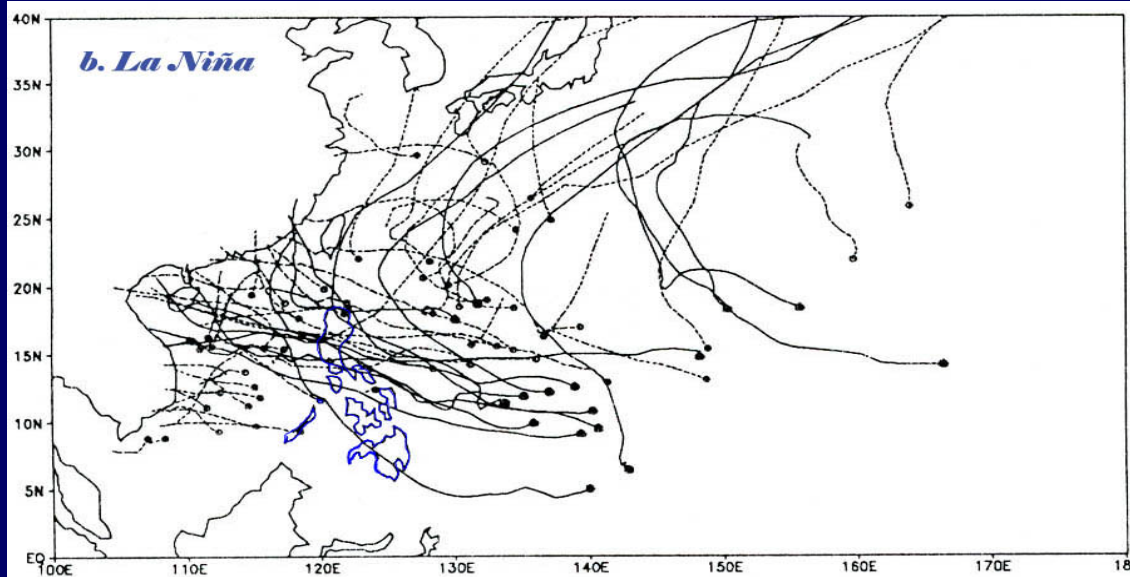
KEY to DATE of FIRST SYMBOL

24 HOURLY BEST TRACK OBSERVED POSITIONS
SYMBOLS REPRESENT 00Z POSITIONS

HOW STRONG ENSO EVENTS AFFECT TROPICAL CYCLONE ACTIVITY OVER THE WESTERN NORTH PACIFIC

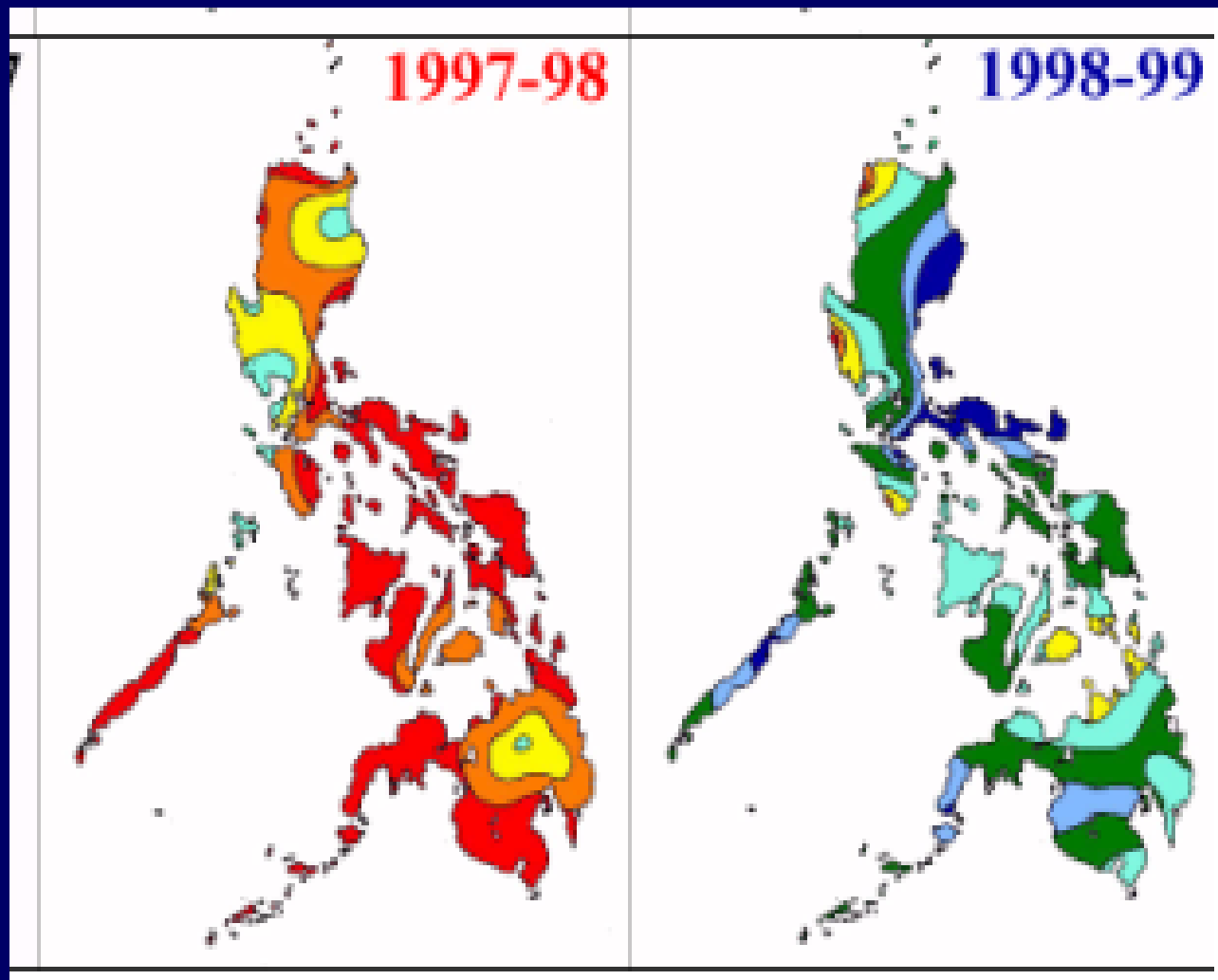


(a.) Sept-November TC tracks during the six strongest warm years



(b.) Sept-November TC tracks during the six strongest cold years

IMPACTS OF ENSO ON PHILIPPINE RAINFALL

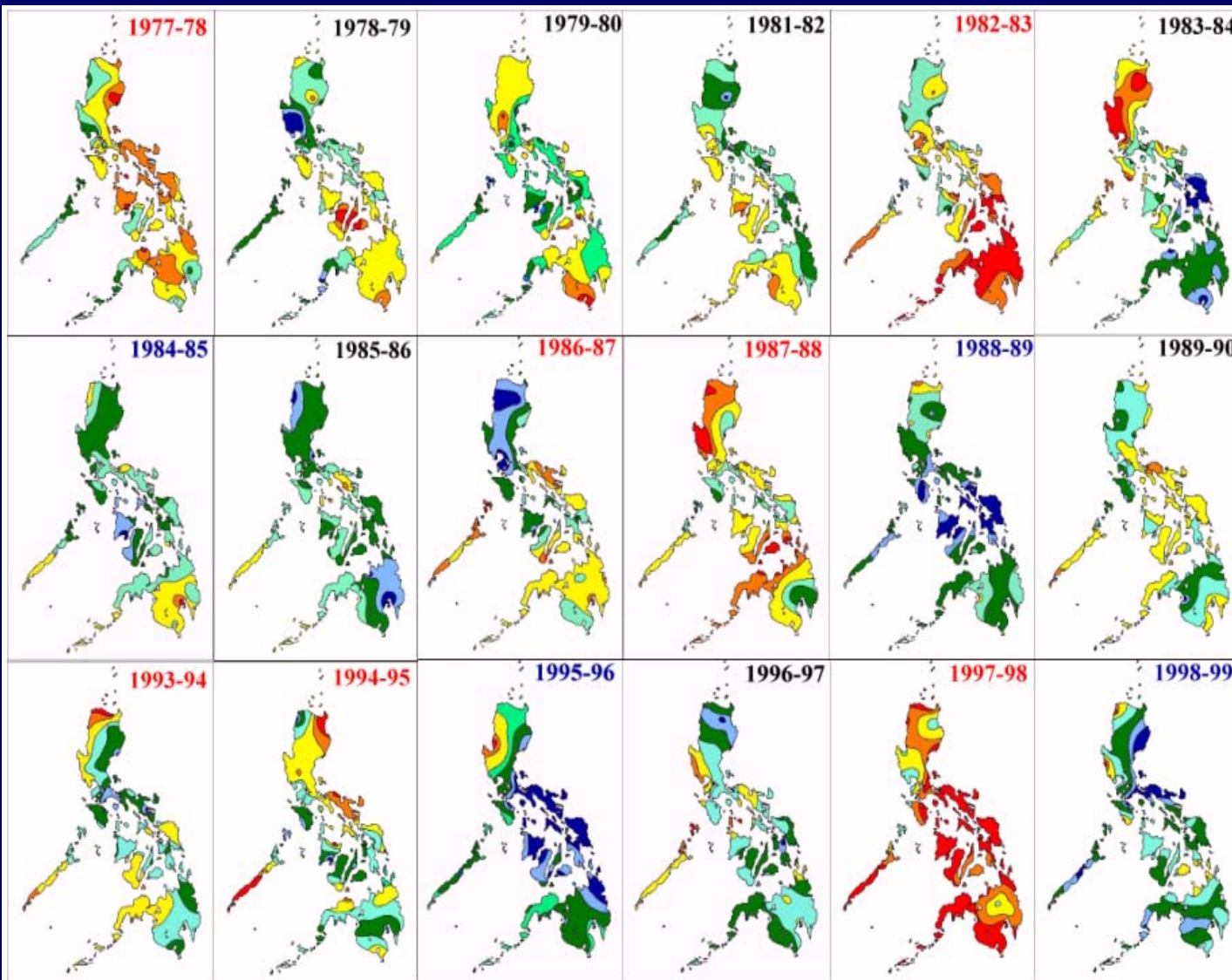


Legend:








- Severe drought impacts
- Drought impacts with major losses
- Moderate drought impacts
- Near normal to above normal condition
- Way above normal condition
- Potential for flood damage
- Severe flood damage

RED colored years are EL NINO years, BLUE colored years are LA NINA years and BLACK colored years are NON ENSO years

IMPACTS OF ENSO ON PHILIPPINE RAINFALL

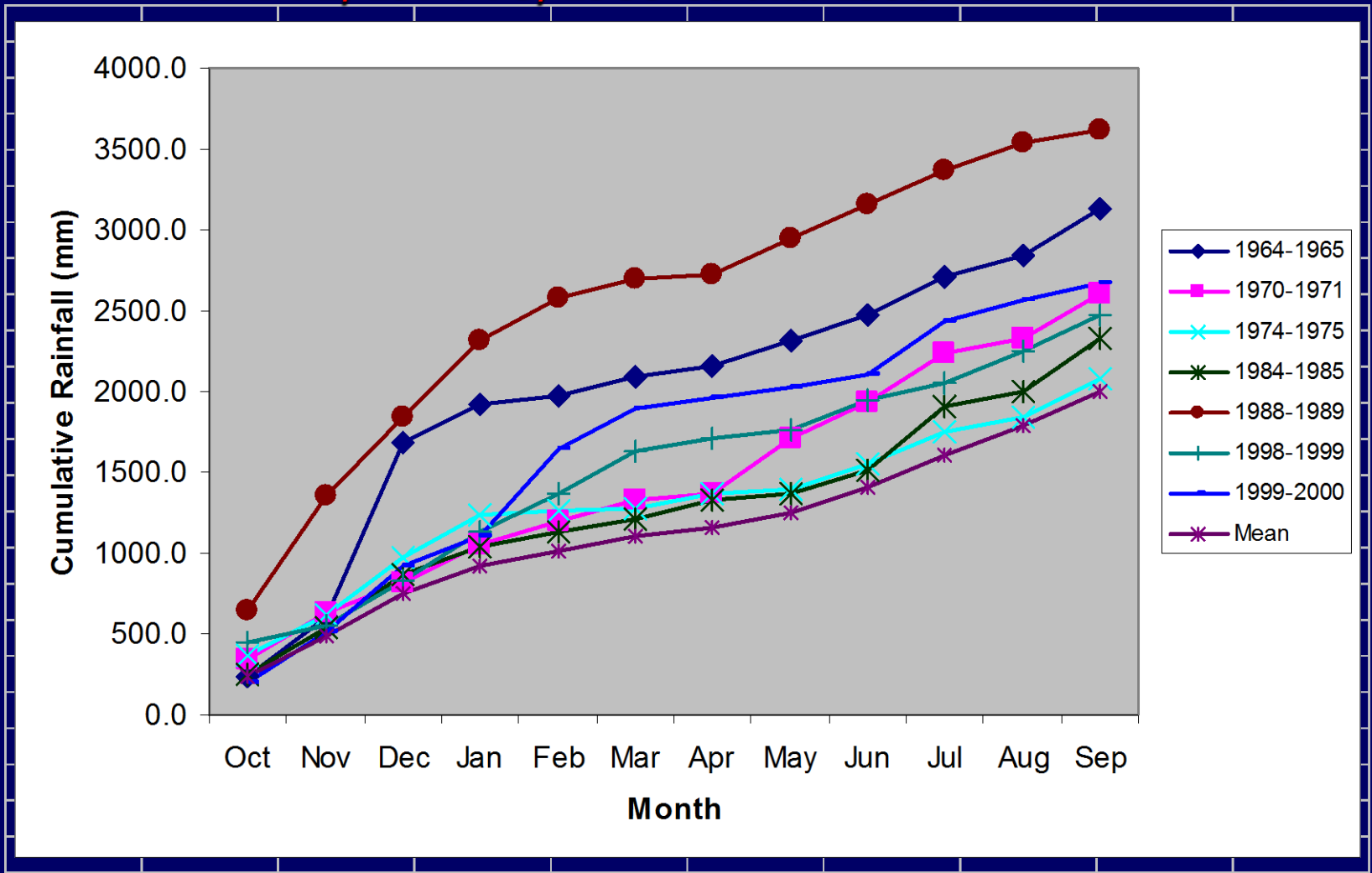


Legend:

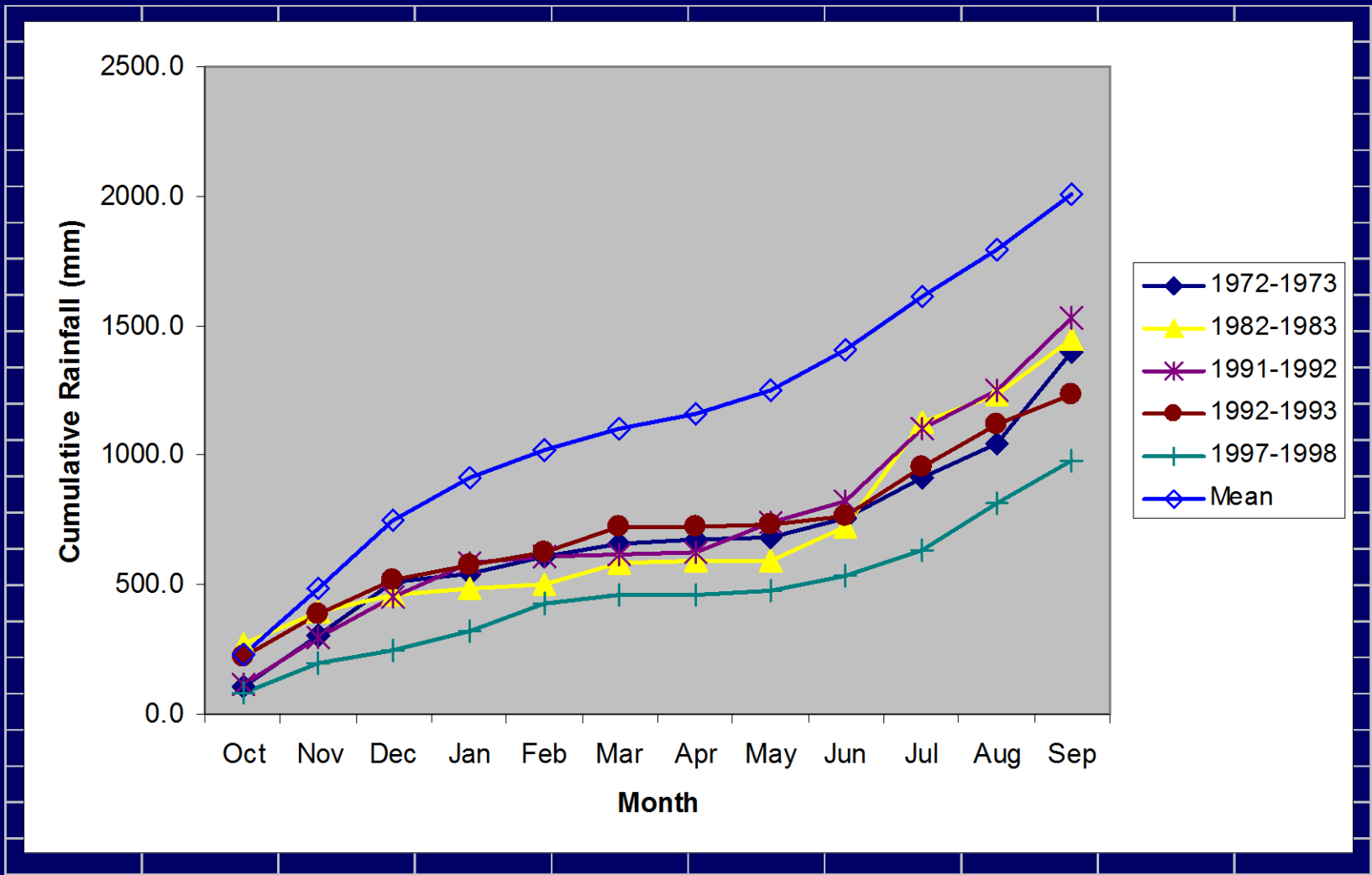
-  Severe drought impacts
-  Drought impacts with major losses
-  Moderate drought impacts
-  Near normal to above normal condition
-  Way above normal condition
-  Potential for flood damage
-  Severe flood damage

RED colored years are **EL NINO** years, **BLUE** colored years are **LA NINA** years and **BLACK** colored years are **NON ENSO** years

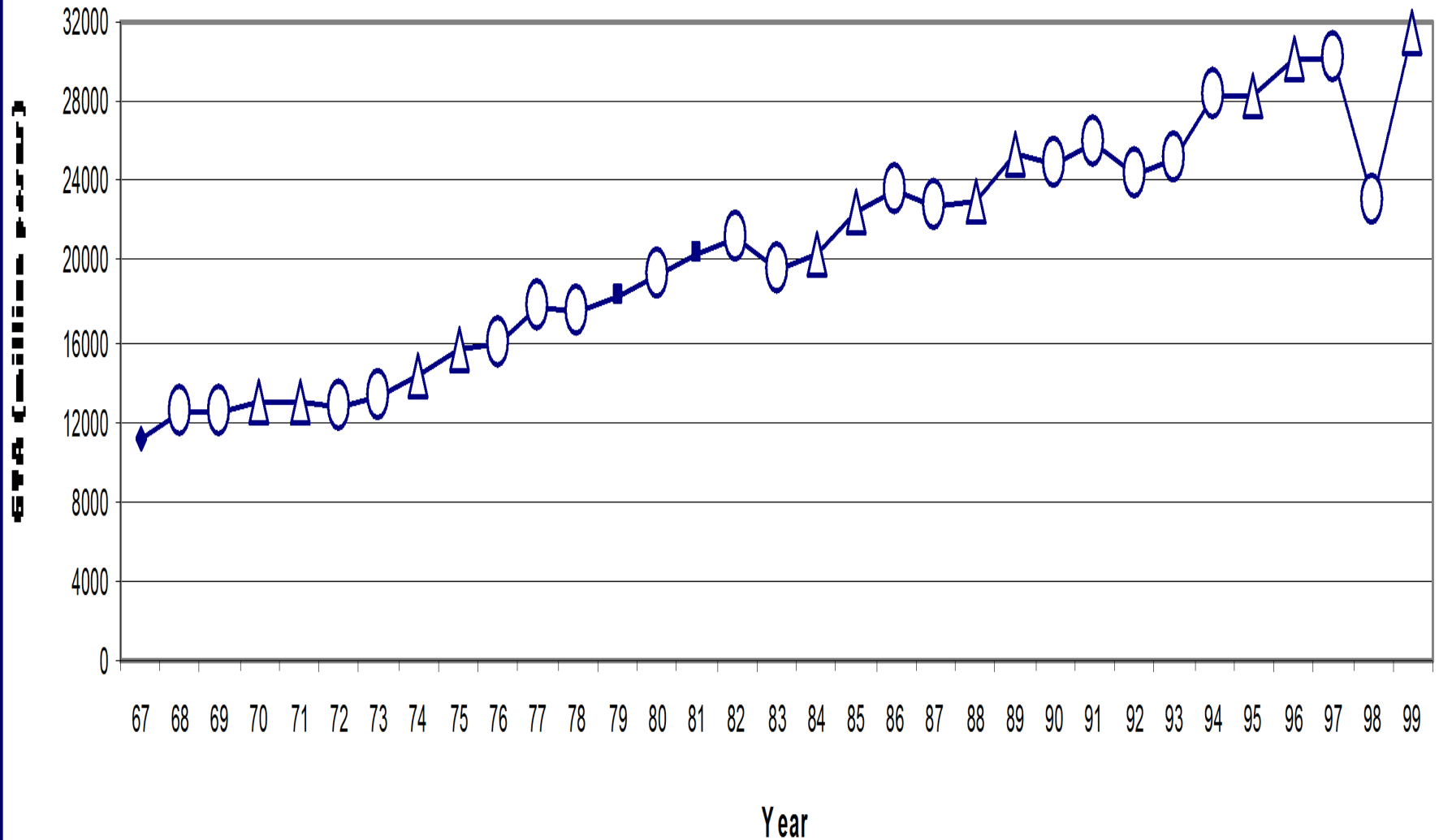
October to September Cumulative Rainfall in Masbate During 1964-65, 1971-72, 1974-75, 1988-89 and 1998-99 La Niña Years



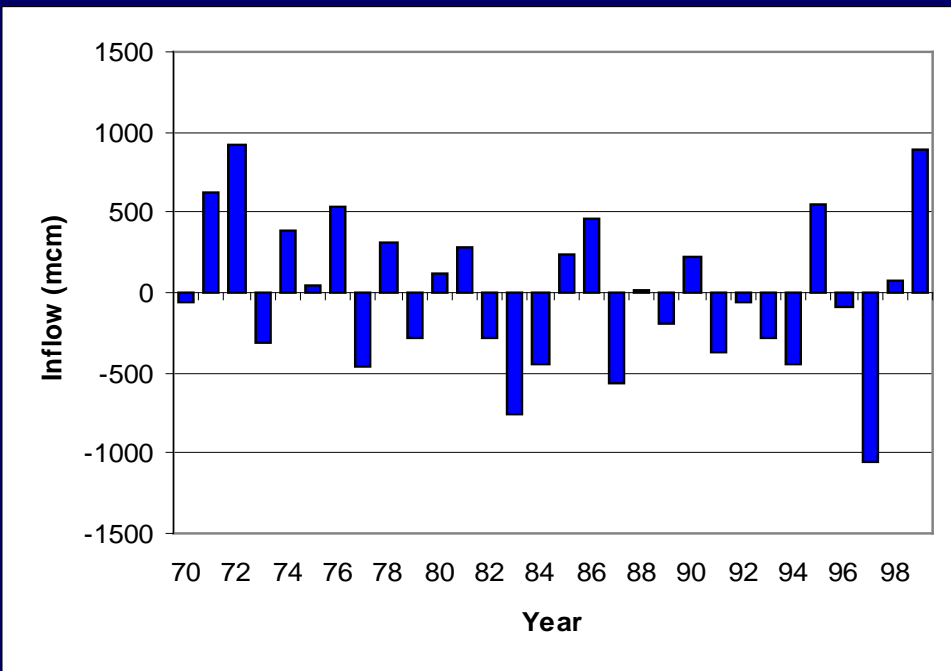
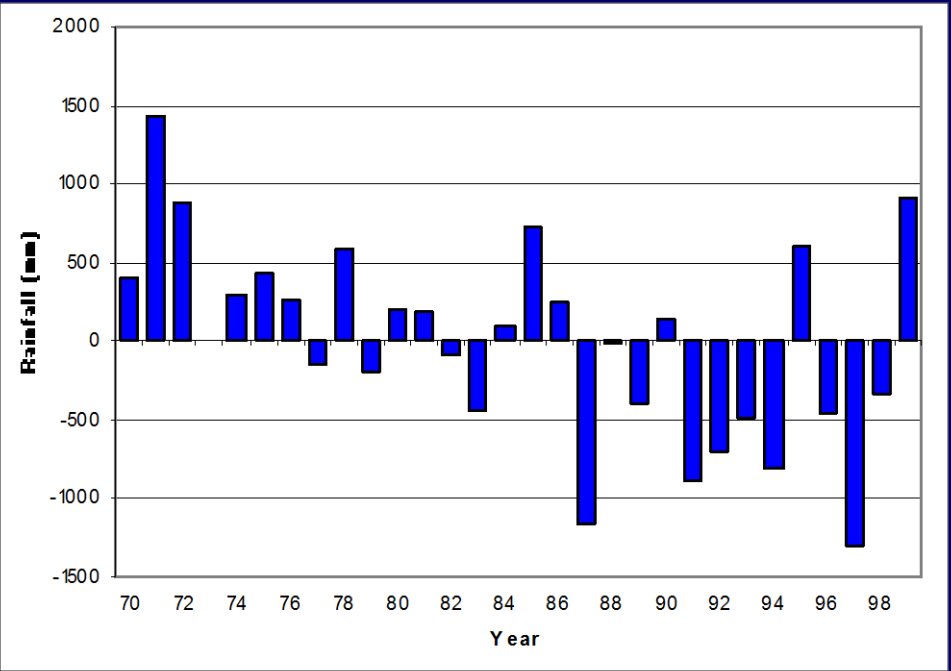
October to September Cumulative Rainfall in Masbate During 1972-73, 1982-83, 1991-92, 1992-93 and 1997-98 El Niño Years



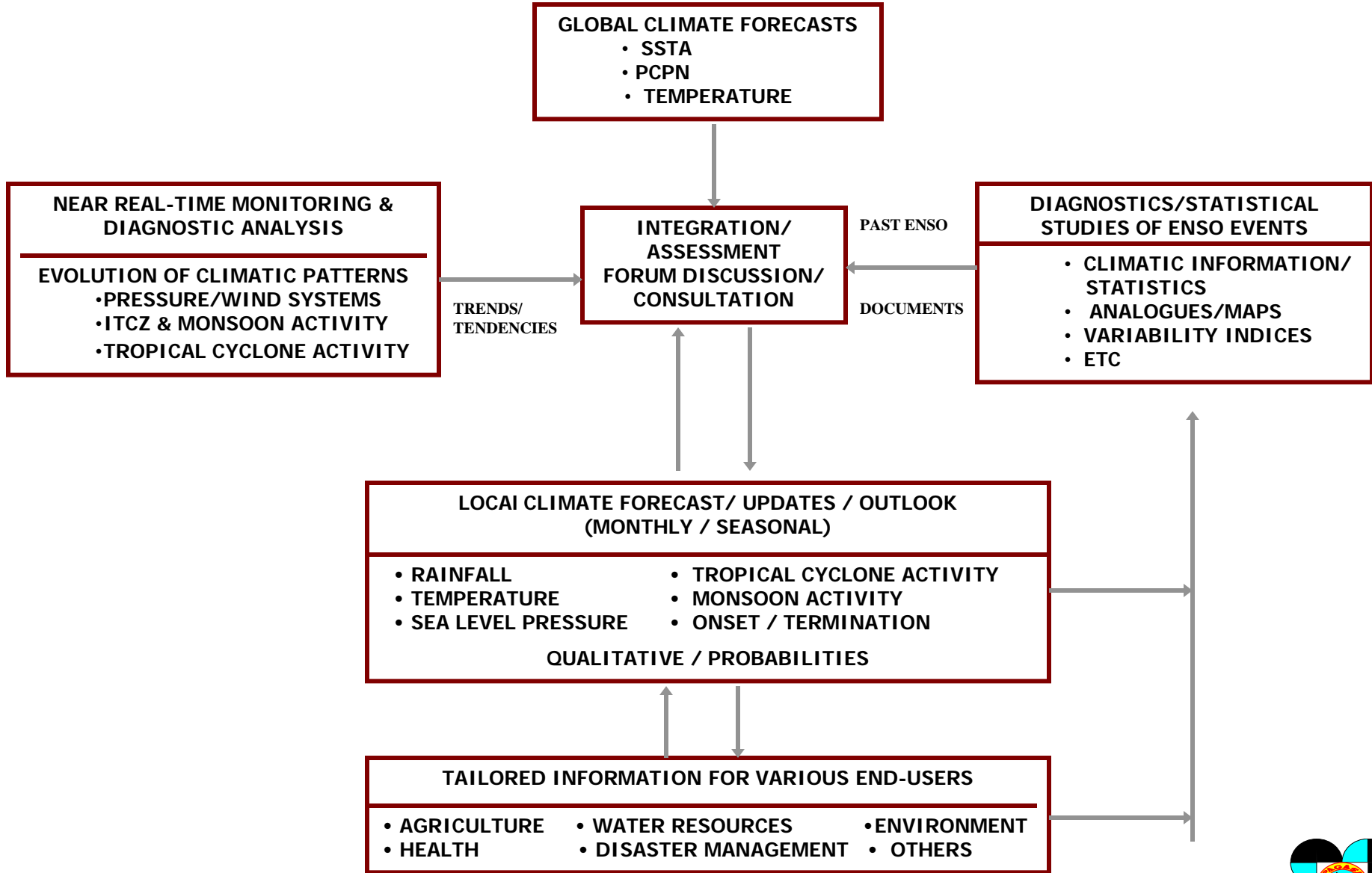
Gross Value Added in Palay at Constant 1985 Prices



Annual rainfall and inflows anomalies in Angat reservoir (main water source for Metro Manila). Minimal amounts of rainfall and inflows are associated with ENSO-related drought events of 1973, 1977, 1983, 1987, 1991, 1994, 1997.



Schematic Diagram of Translation of Global Climate Forecasts/Information Into Local Climate Forecasts Tailored for Various End-Users



For more information, VISIT us at
<http://www.philonline.com/~cab>
<http://www.pagasa.dost.gov.ph>



Thank you