

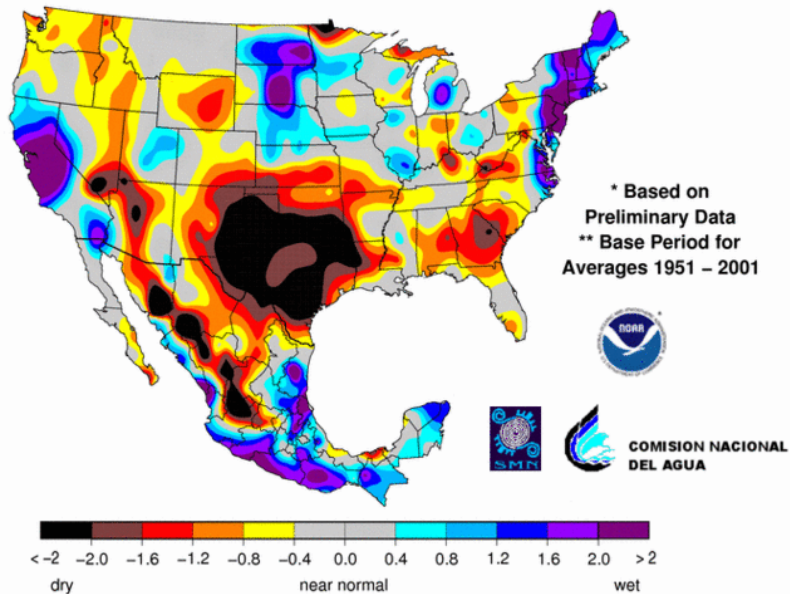
An Updated and Expanded Version of the WMO-GHCN Data Base for Mexico

Art Douglas and Phil Englehart
Creighton University
Omaha, Nebraska

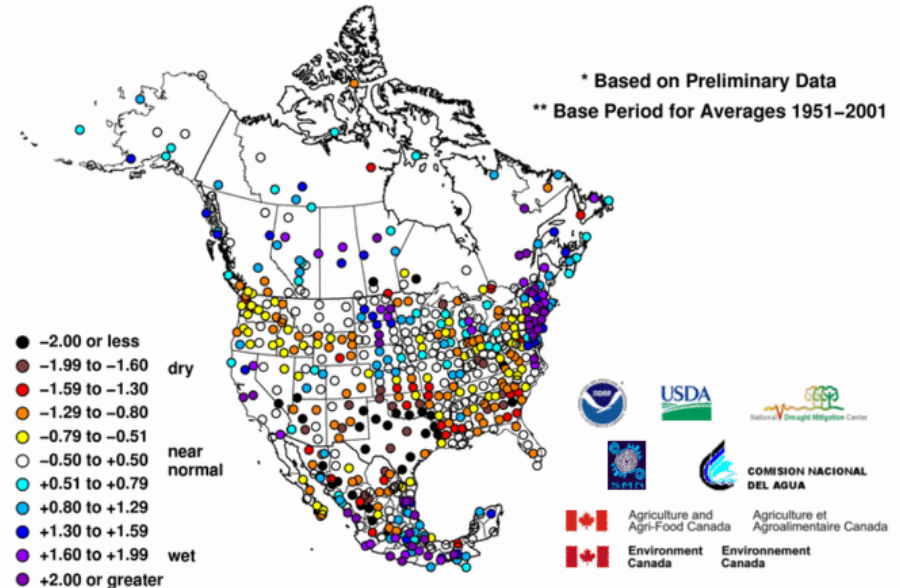
North America Drought Monitor

SPI 3 Months Ending August 2011

3-Month Standardized Precipitation Index
June – August 2011



3-Month Standardized Precipitation Index
June – August 2011

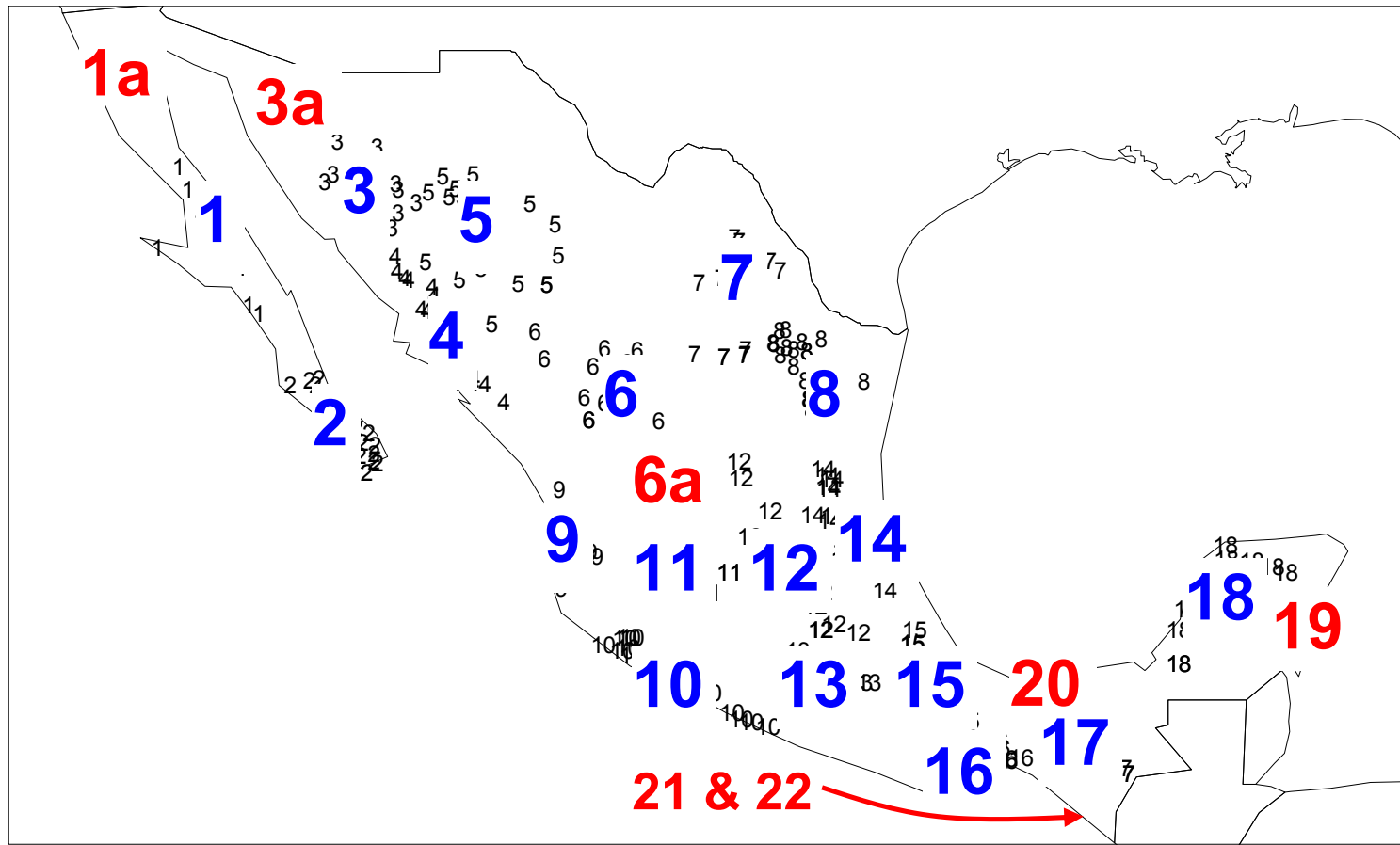


Outline

- I. A review of the updated and expanded Mexican GHCN Climate Division data base developed for long term Climate Monitoring.

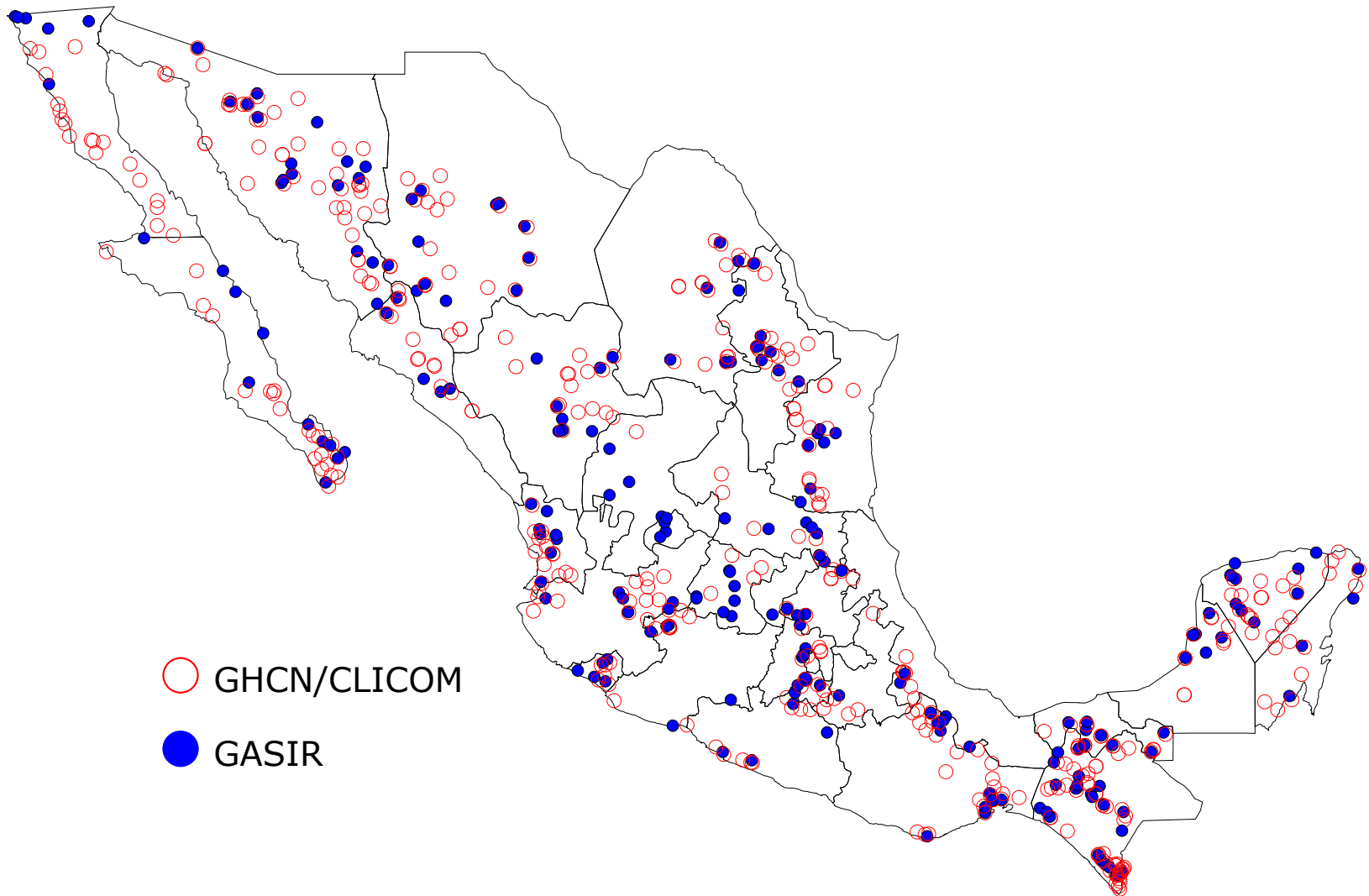
- II. Cool and warm season precipitation in Mexico as impacted by:
 - A. ENSO
 - B. PDO
 - C. AMO
 - D. South Pacific High (Easter Island SLP)

Distribution of the Original 18 Climate Divisions in Mexico (Blue) and the 6 New Climate Divisions (Red) in Formerly Data Sparse Regions

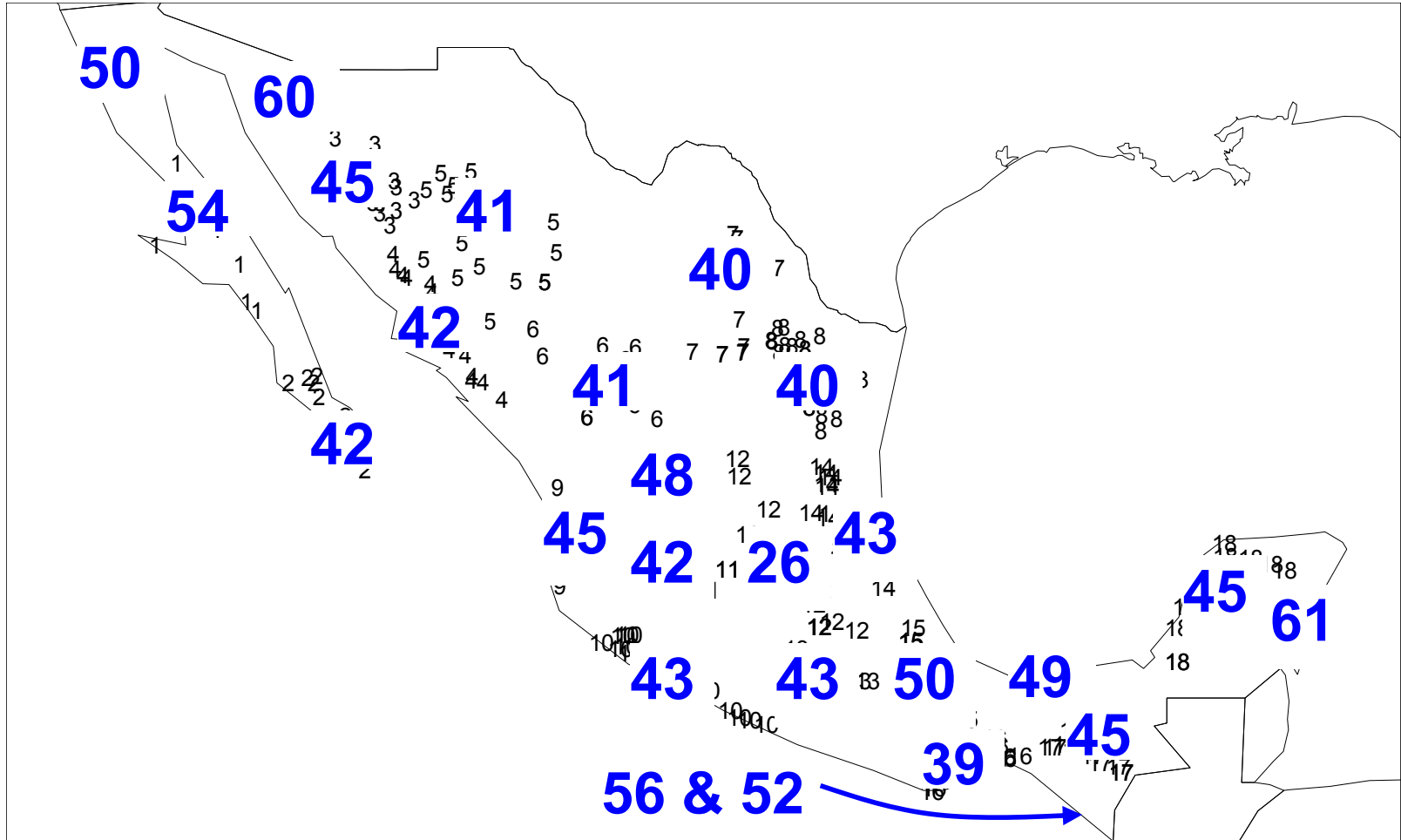


Original 18 Climate Divisions developed in 1988 and 6 new divisions developed in 2009-10

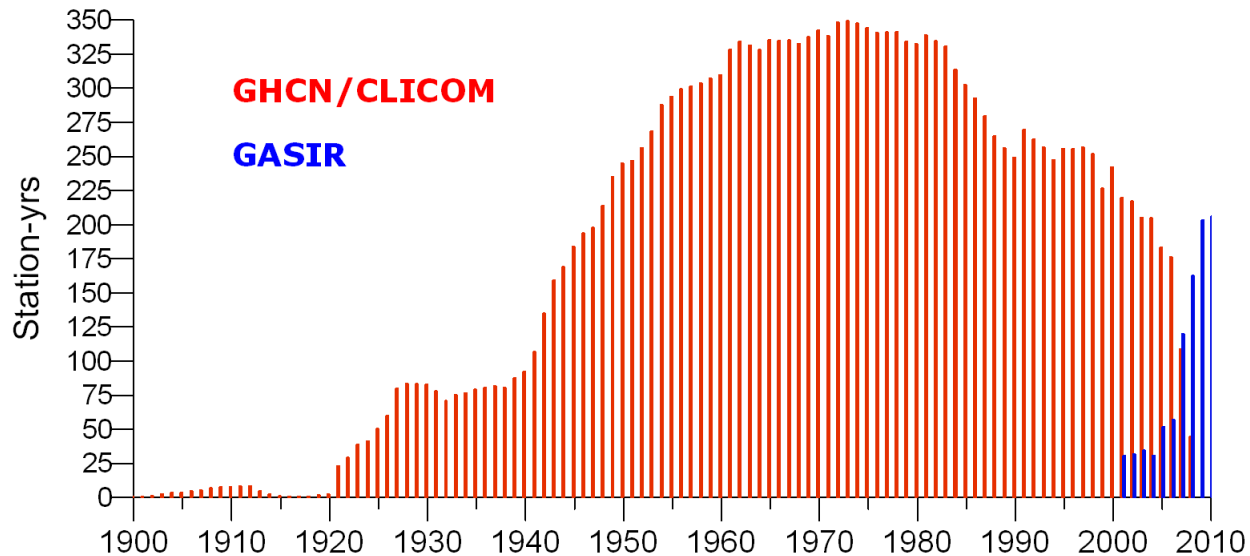
Station Distribution and Data Sources for the 25 Climate Divisions in Mexico 380 CLICOM and 214 GASIR Stations



Beginning Year of Data for Each of the 25 GHCN Climate Divisions in Mexico 19XX



Change in Data Sources for the 25 Climate Divisions In Mexico Beginning of Record to 2010



Outline

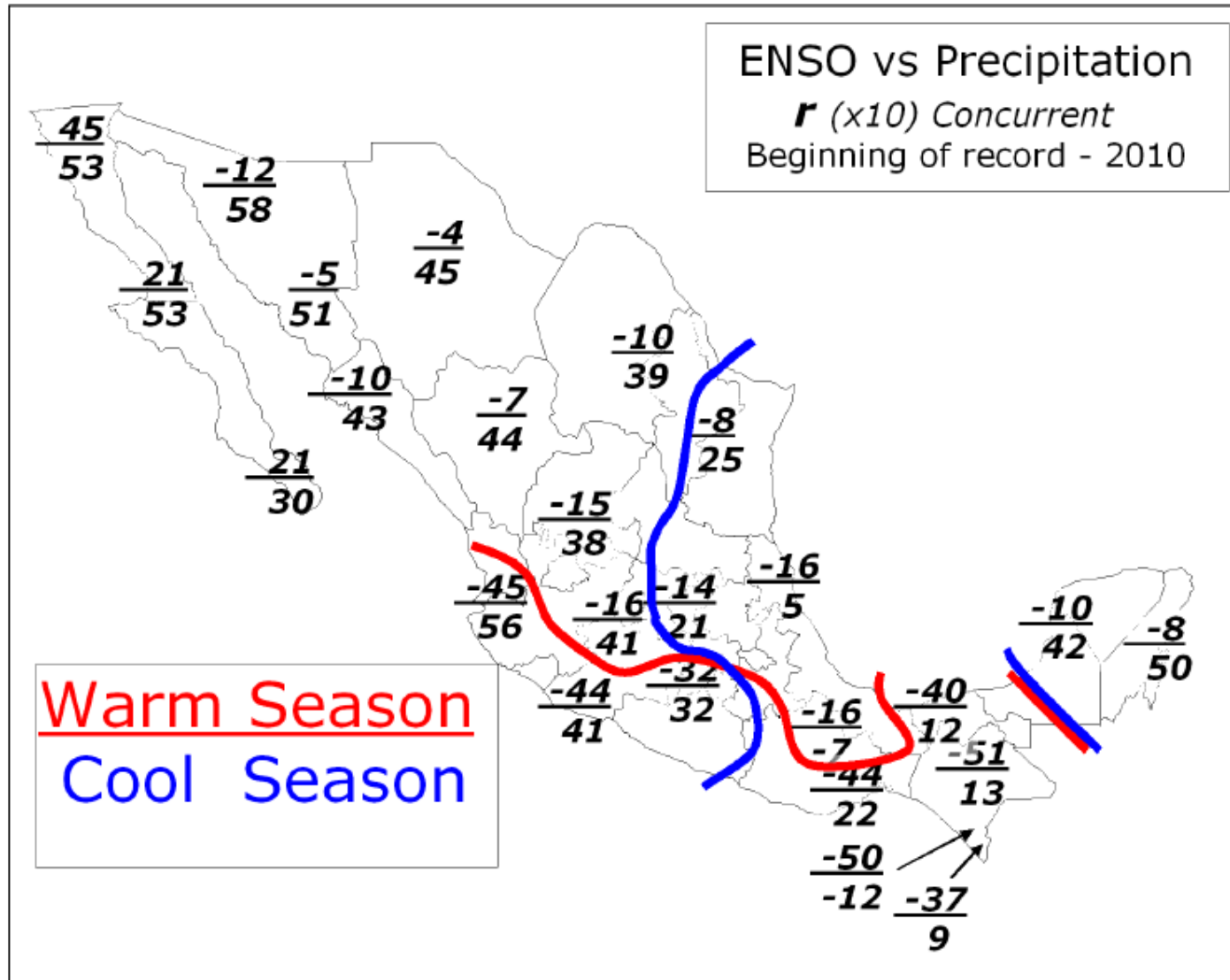
II. Cool and Warm Season Precipitation in Mexico as impacted by:

- A. ENSO
- B. PDO
- C. AMO
- D. South Pacific High (Easter Island SLP)

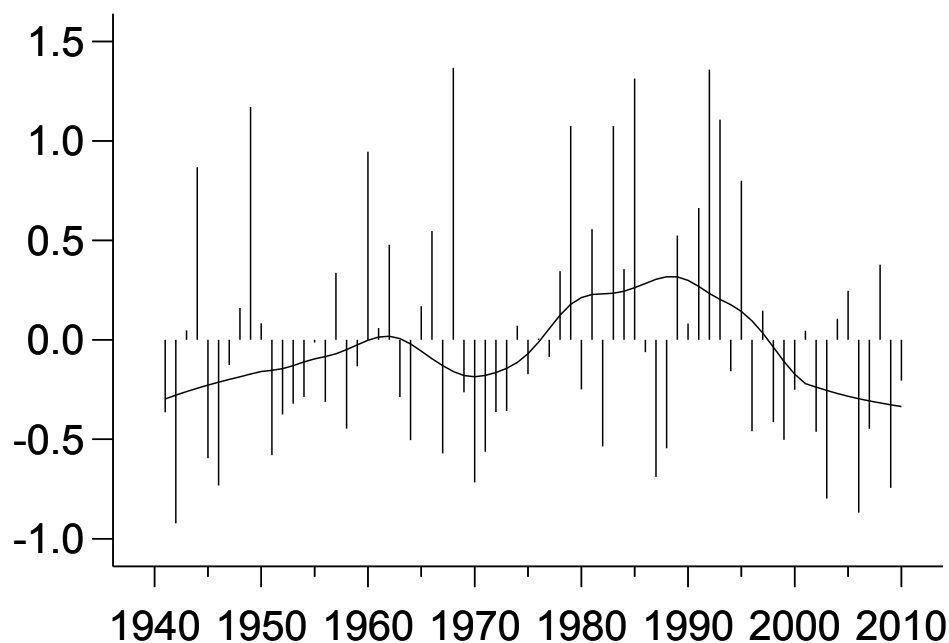
Correlations of Warm Season and Cool Season Precipitation vs. ENSO Index

warm season=May through October

cool season= November through April



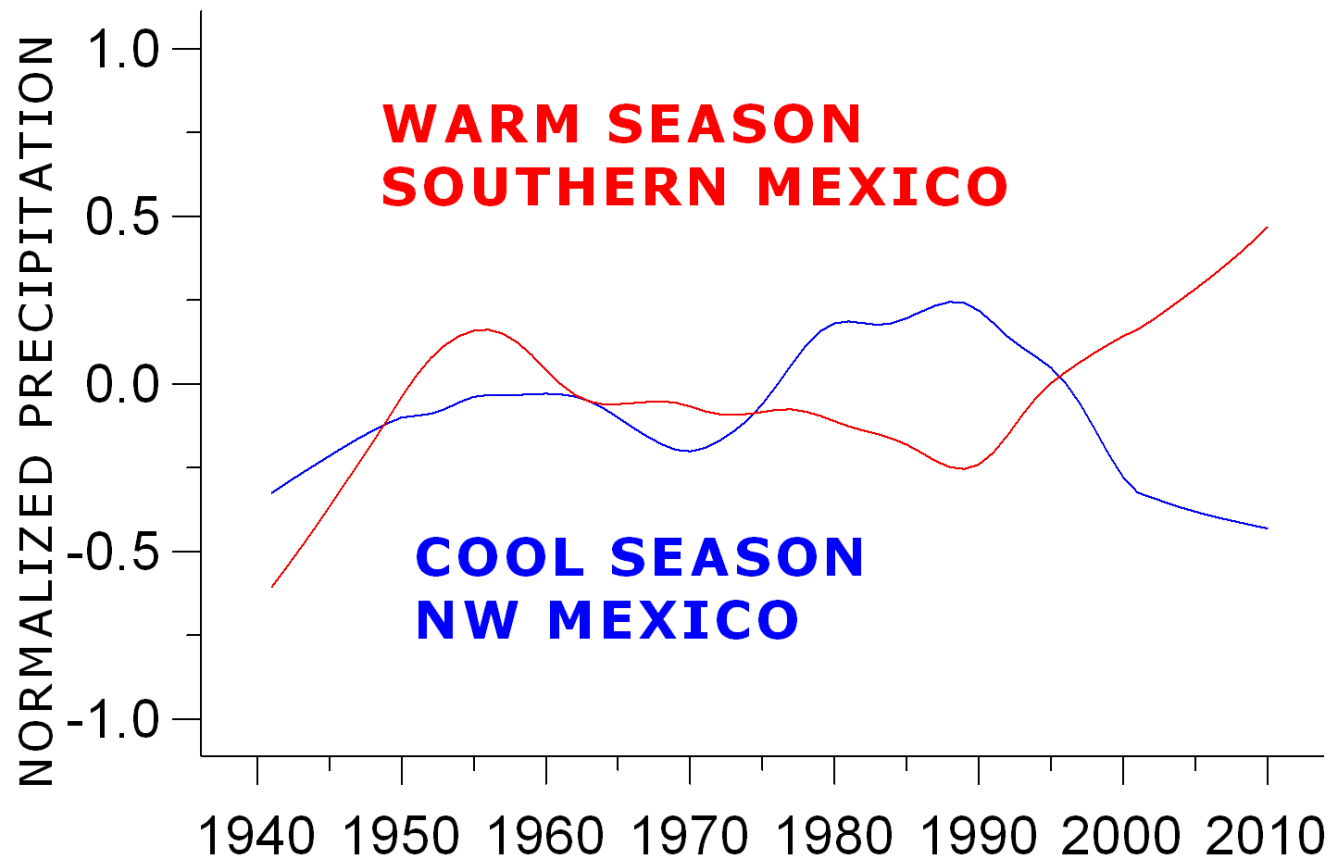
Time Series of NW Mexico Cool Season Rainfall With ENSO Influence Removed by Linear Regression



Cool season precipitation index (avg. standardized values) based on these divisions:
1a,1,3a,3,4,5,18,19

Smoothed Time Series of Regional Rainfall

ENSO Influences Removed By Simple Regression Equations

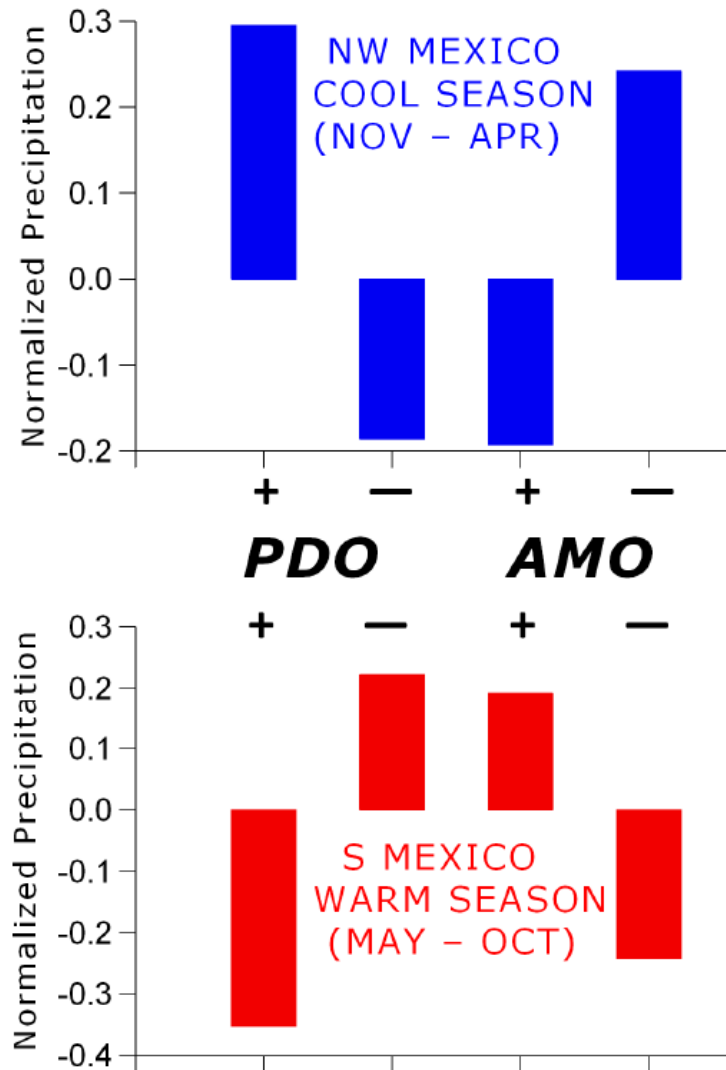


$r = -0.49$

Average Standardized Seasonal Rainfall

Positive and Negative Phases of the PDO and AMO

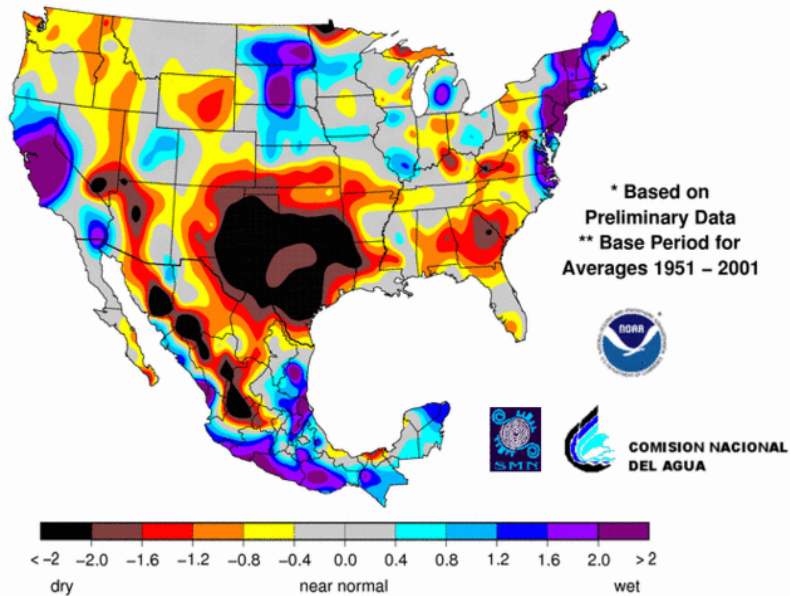
1940-2010



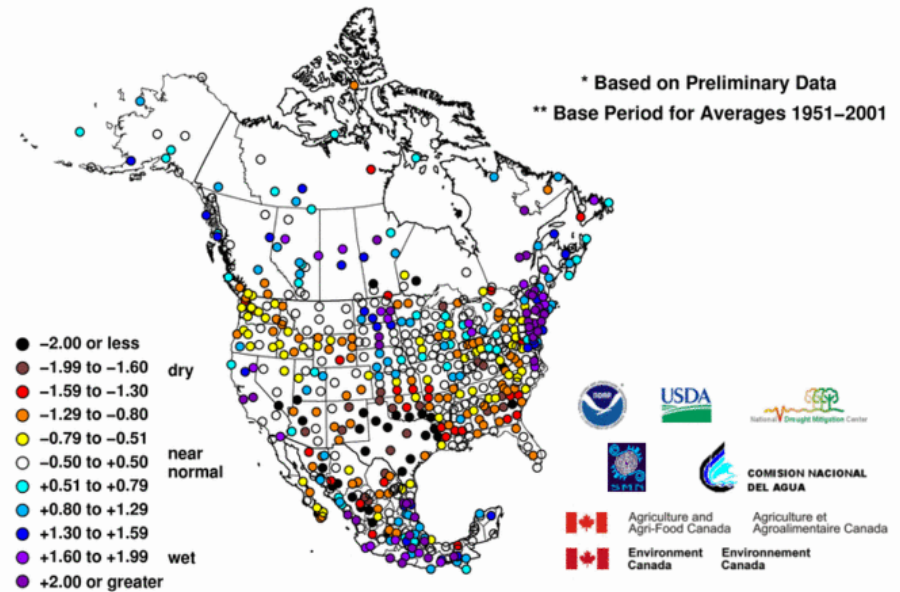
North America Drought Monitor

SPI 3 Months Ending August 2011

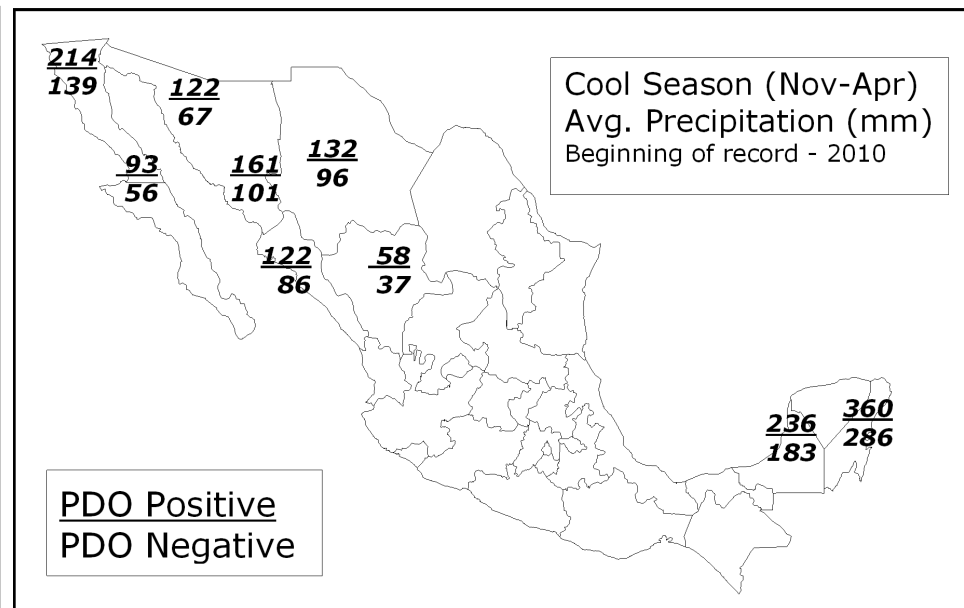
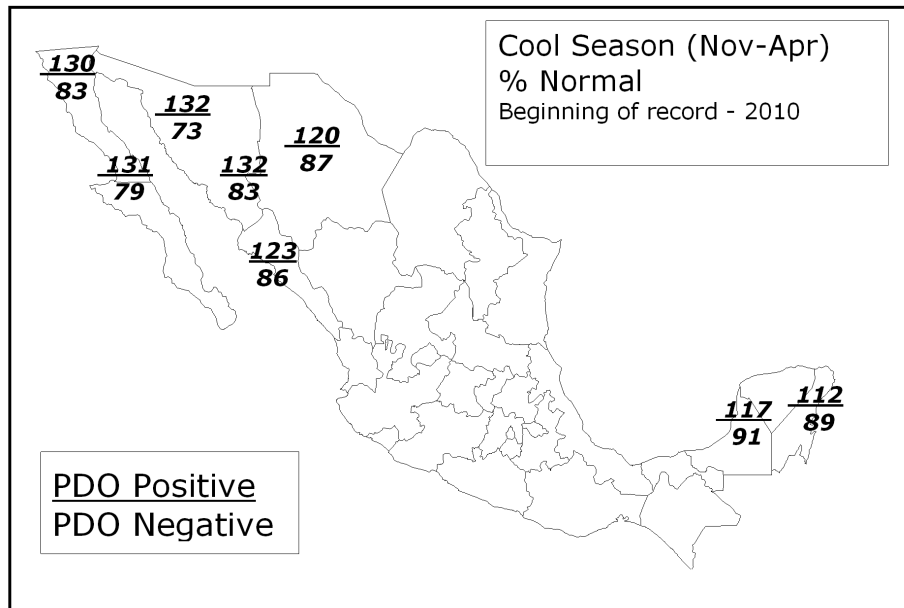
3-Month Standardized Precipitation Index
June – August 2011



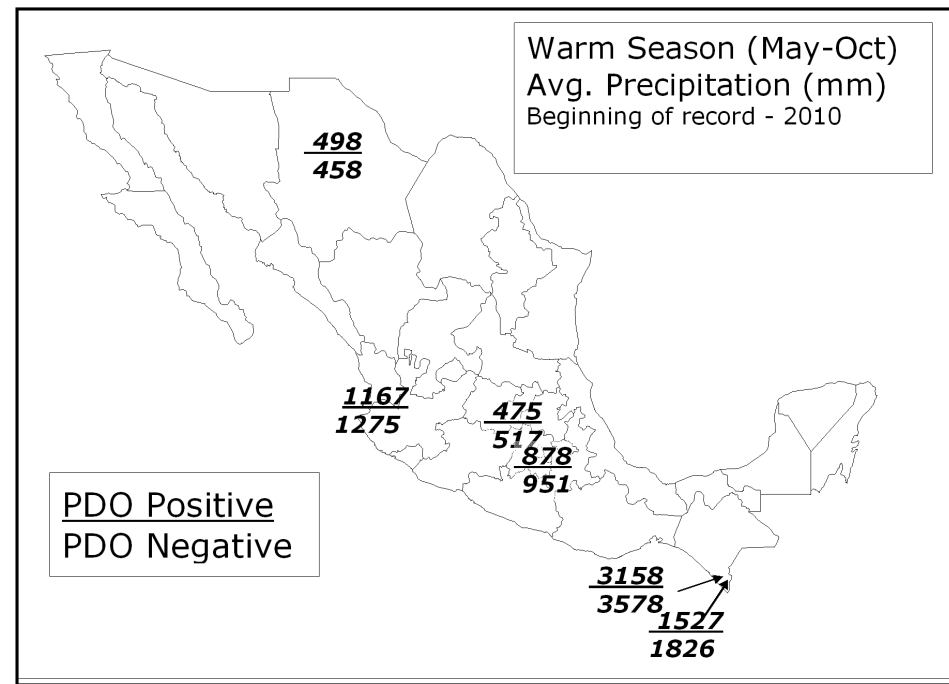
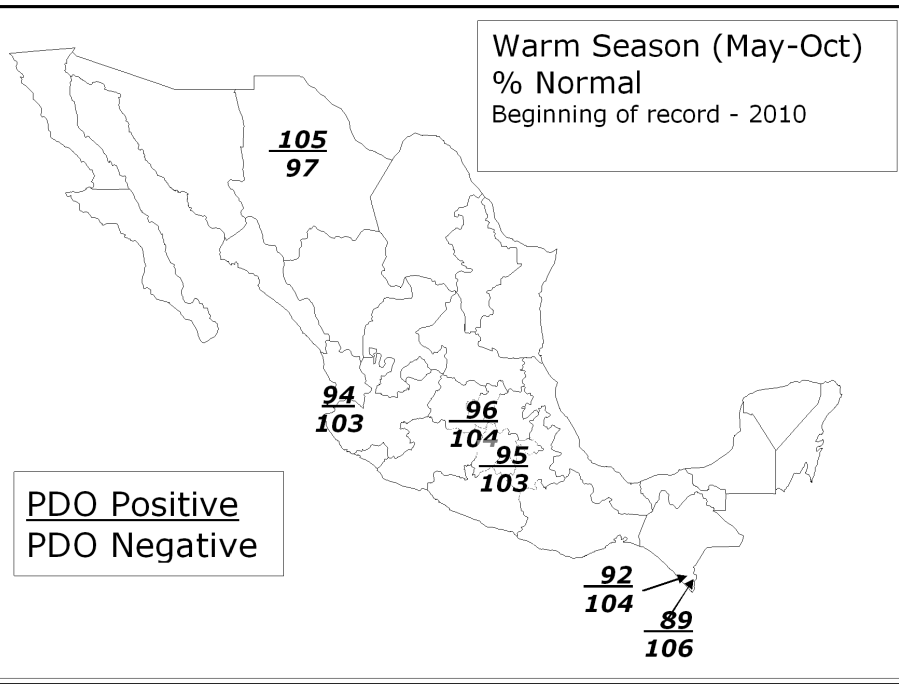
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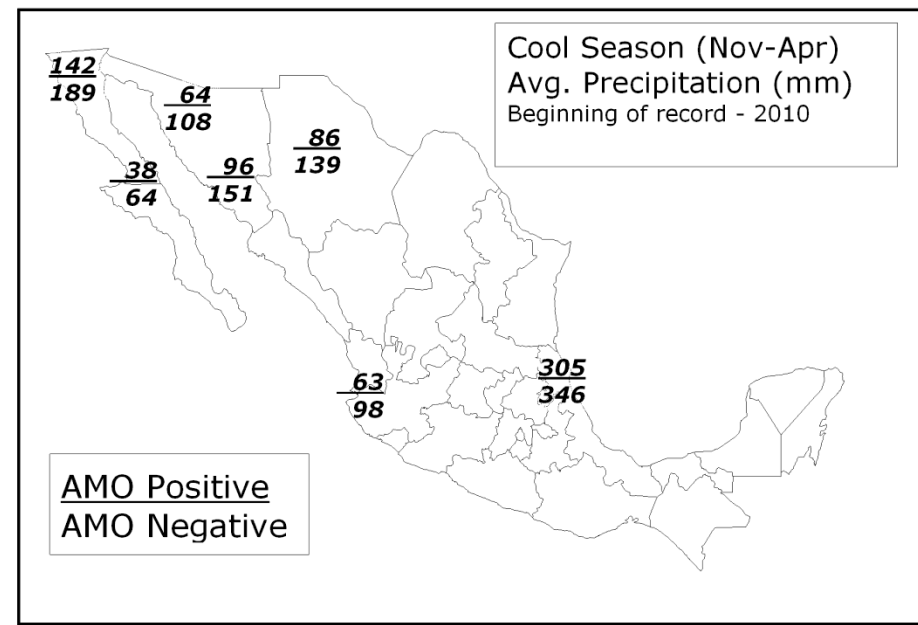
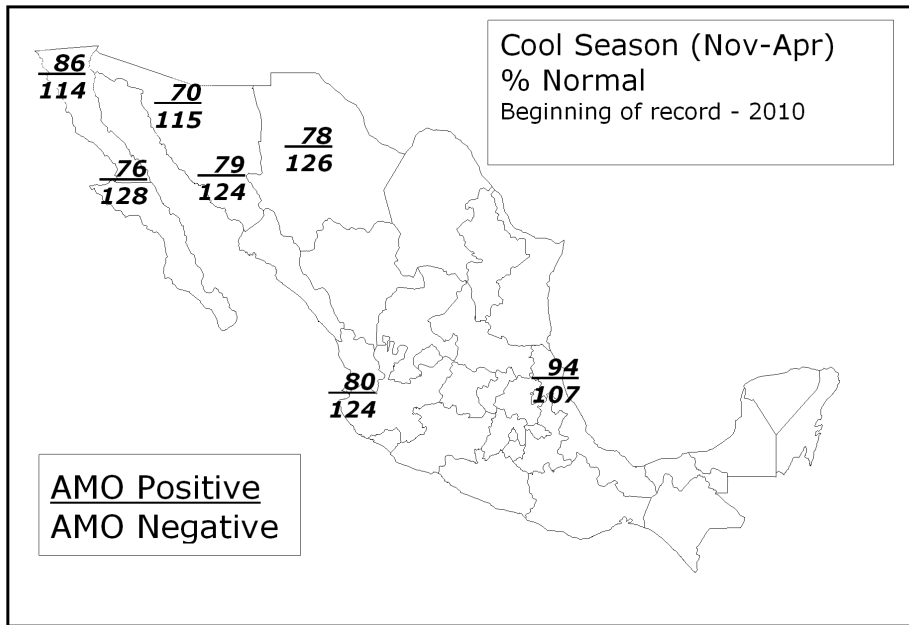
Impact of the PDO on Cool Season Precipitation 1940-2010



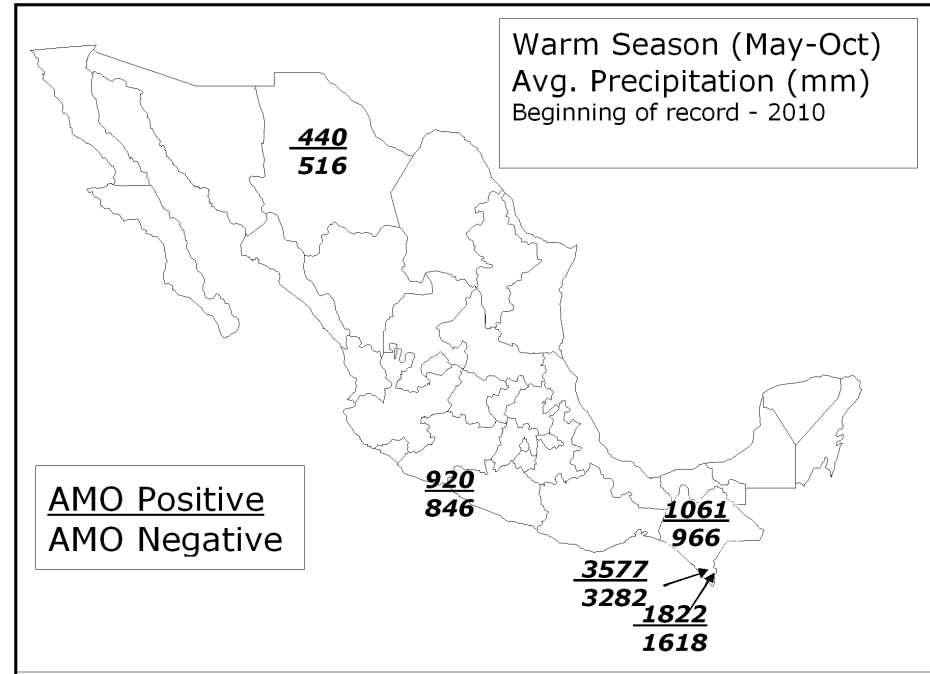
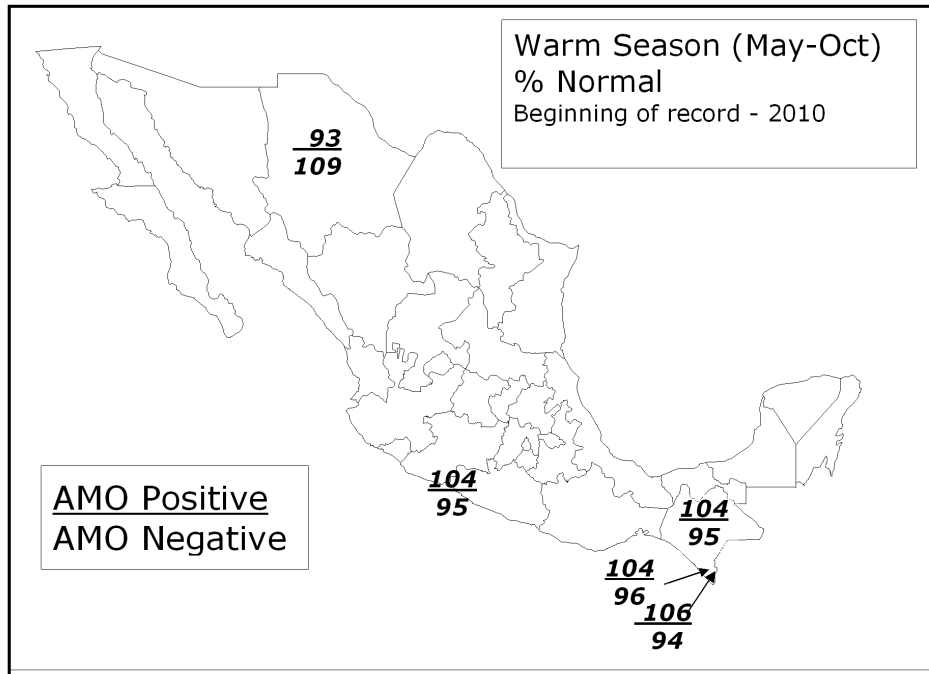
Impact of the PDO on Warm Season Precipitation 1940-2010



Impact of the AMO on Cool Season Precipitation 1940-2010

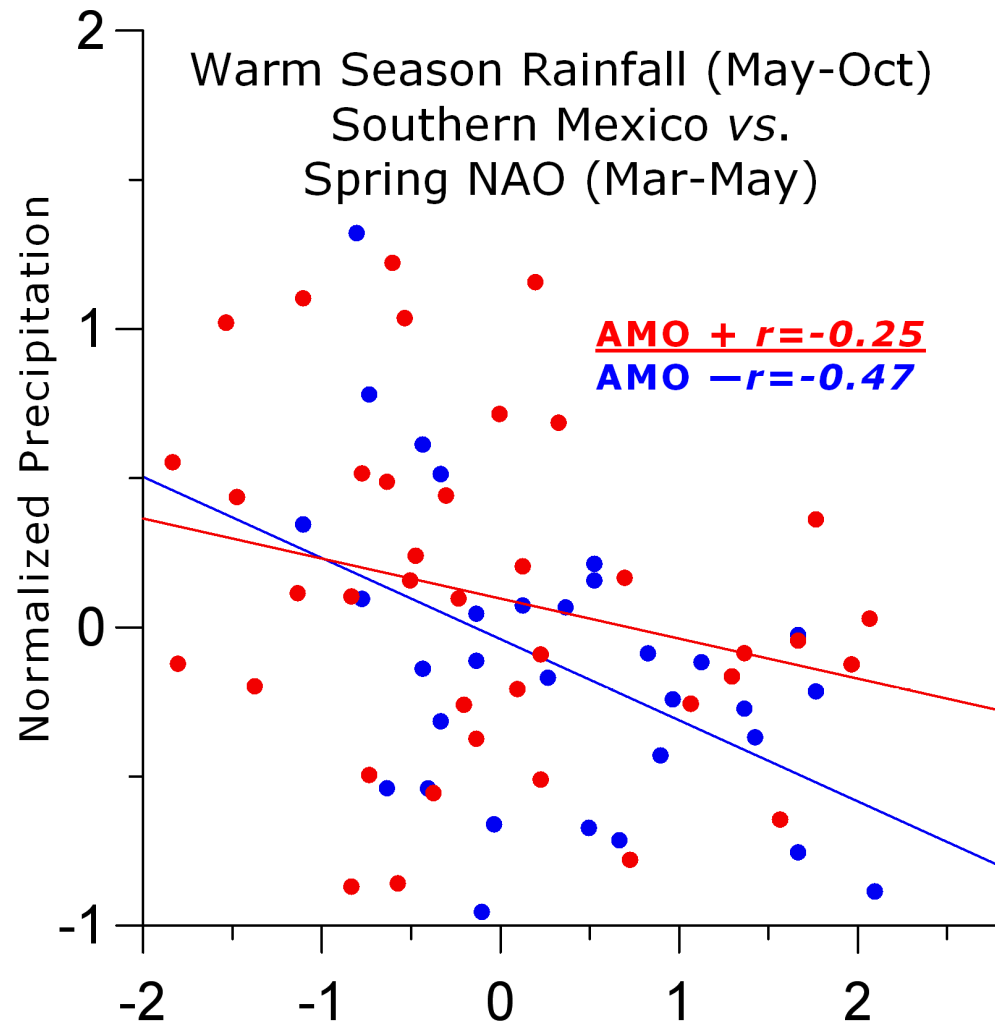


Impact of the AMO on Warm Season Precipitation 1940-2010

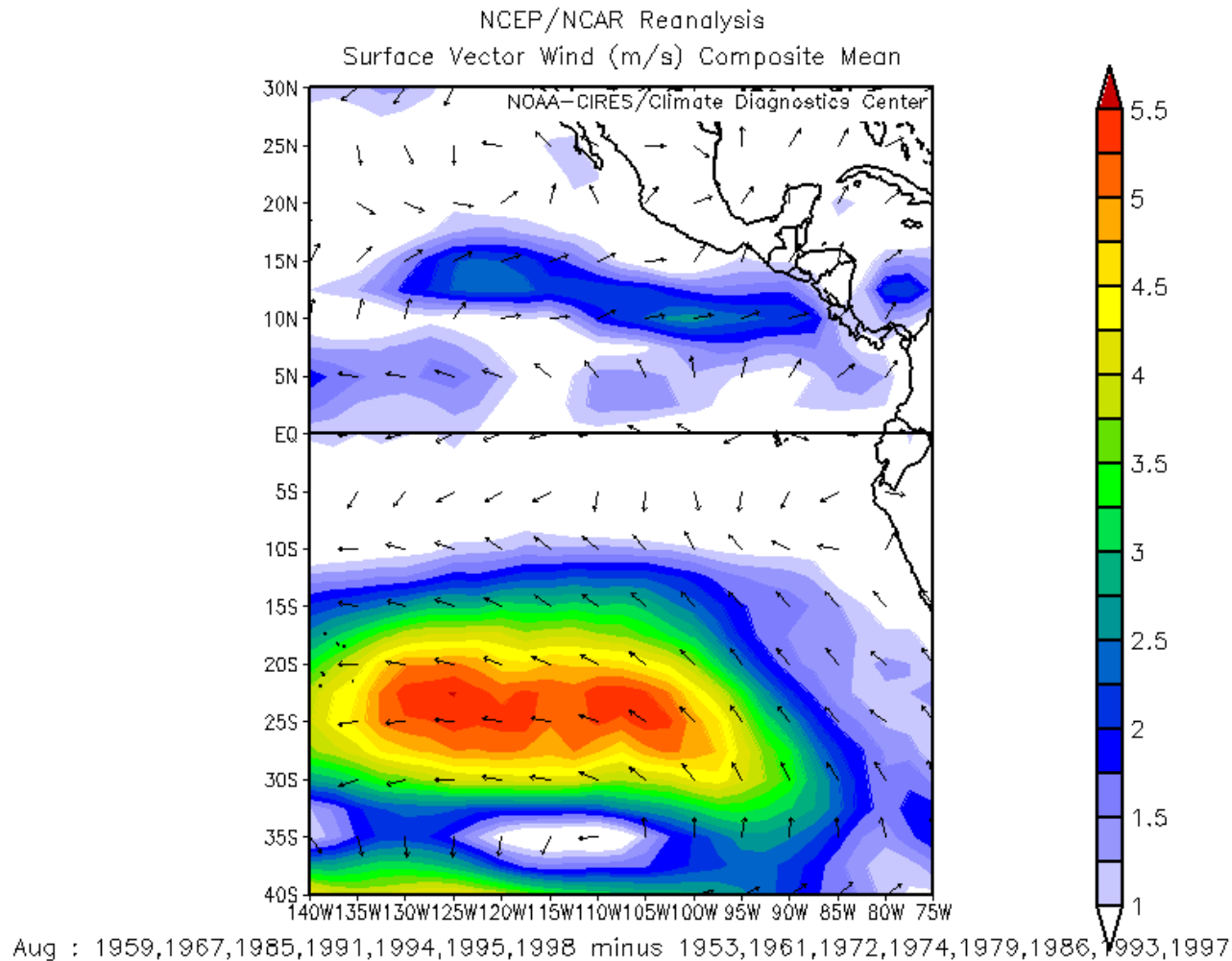


Impact of Spring NAO on Warm Season Rainfall During Positive and Negative Phases of the AMO

Cold AMO & Positive NAO = Dry Trades & Dry South Mexico



Difference in Sfc Vector Wind Anomalies 7 Augusts with Highest SLP Pressure Easter Island minus 7 Augusts with Lowest SLP Pressure Easter Island

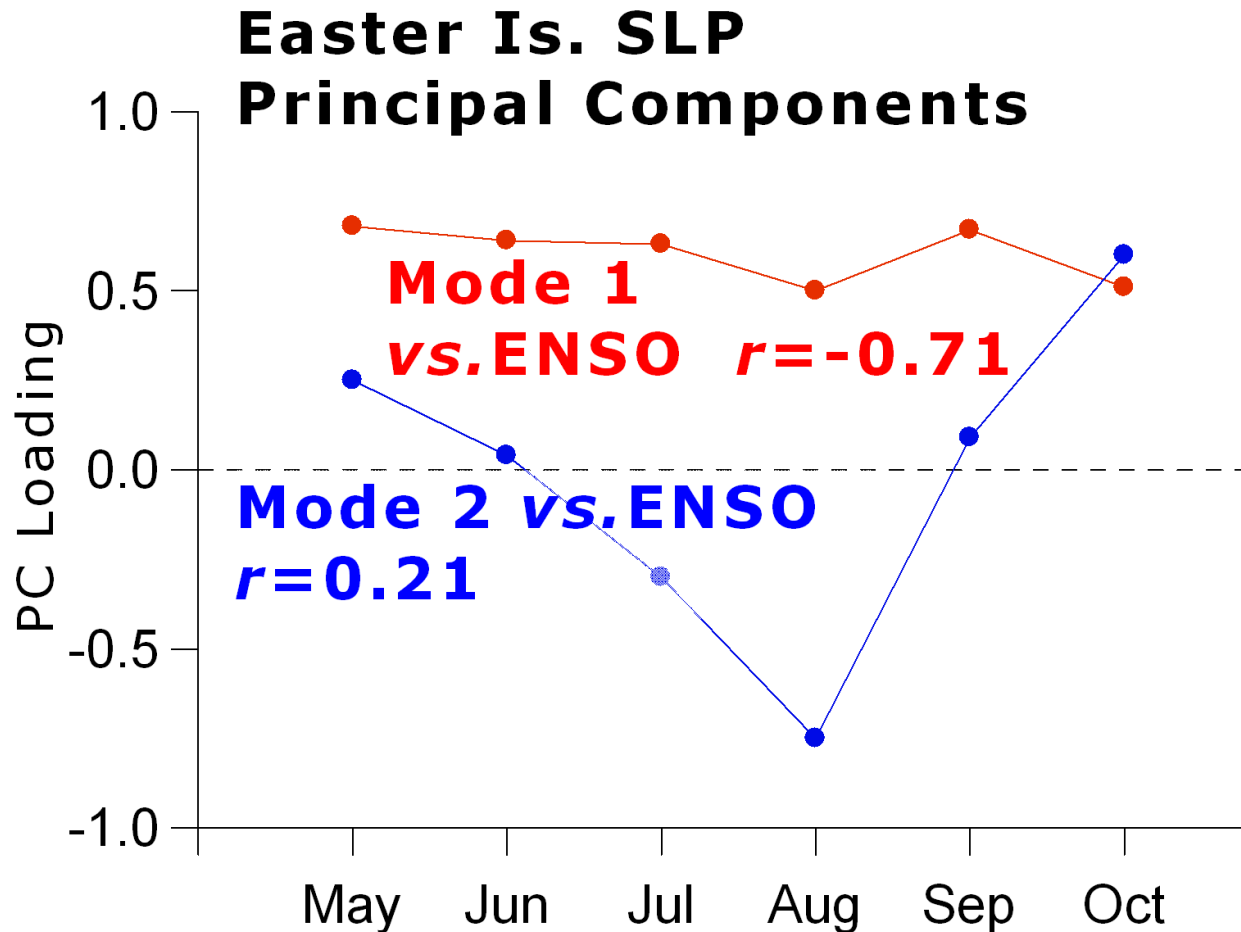


Easter Island Un-Rotated PC Analysis

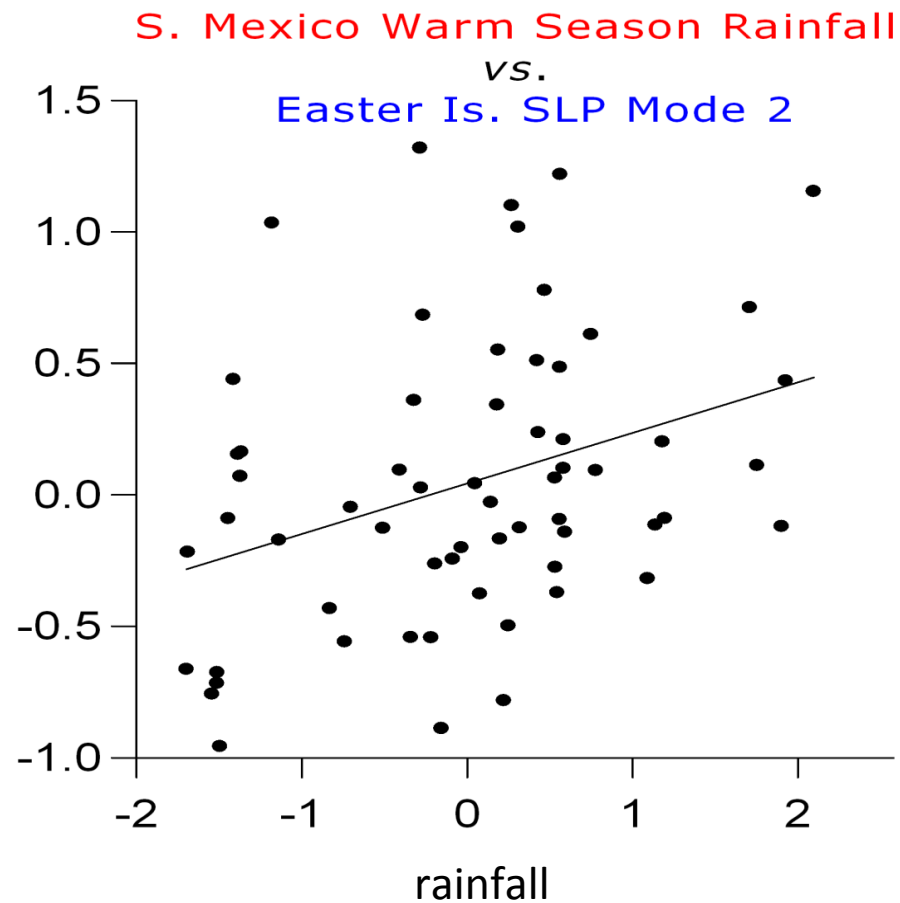
Sea Level Pressure

1949-2010

37% 19%



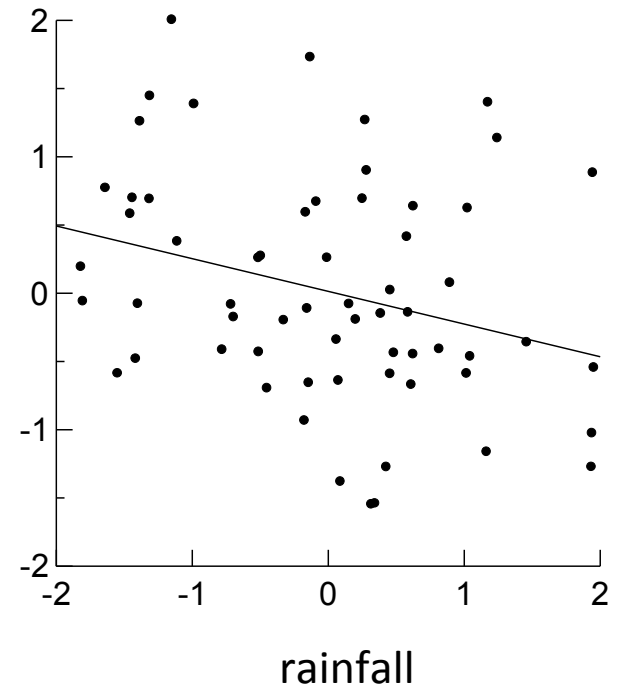
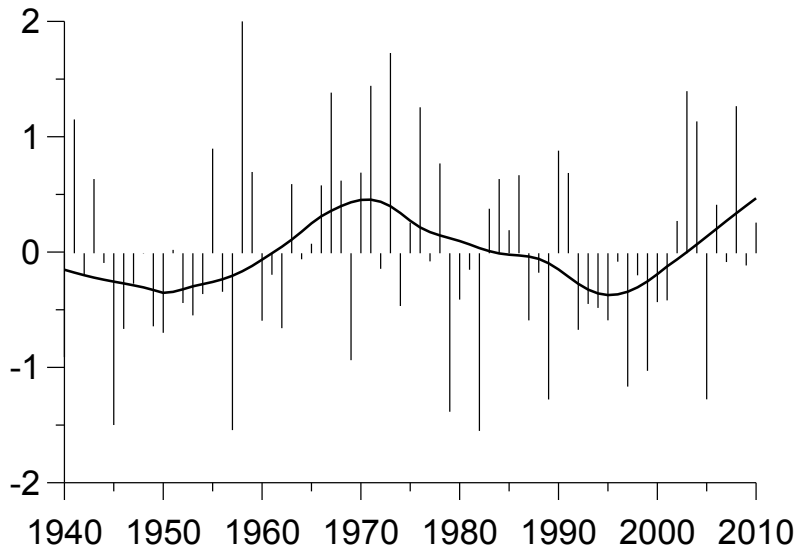
Southern Mexico Warm Season Precipitation vs. PC Mode 2 Eastern Island SLP $r = -0.36$ (ENSO signal removed from Easter Island Mode 2 Time Series)





Central Mexican Warm Season
Rainfall vs. PC Mode 2 of
Easter Island SLP
 $r = -0.29$ (70yrs data)

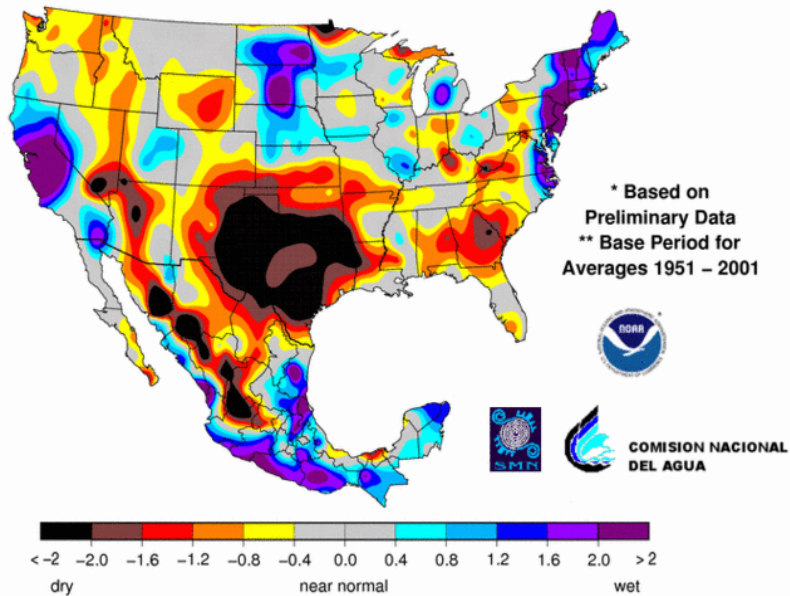
This weak correlation is the opposite
of the relationship with southern
Mexican rainfall and Easter Island
SLP.



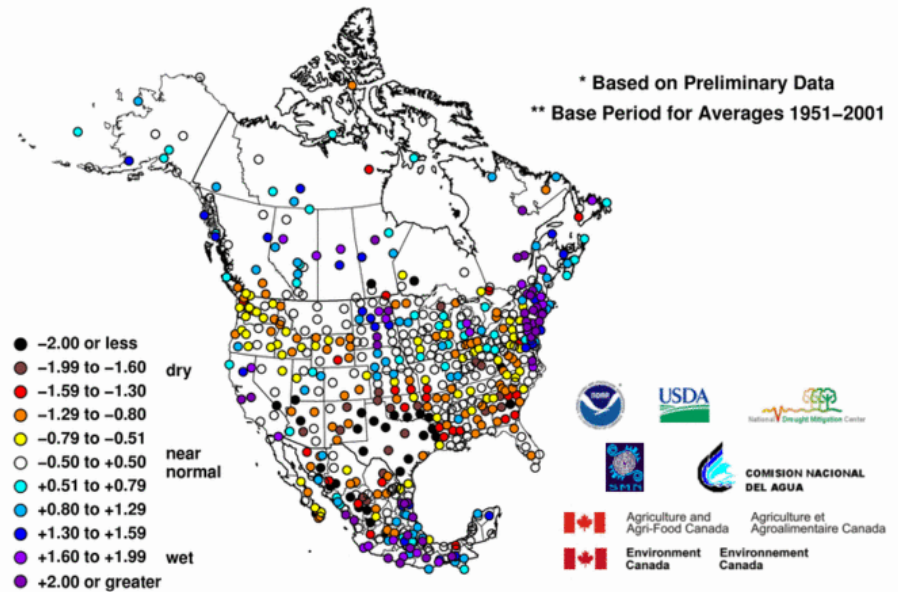
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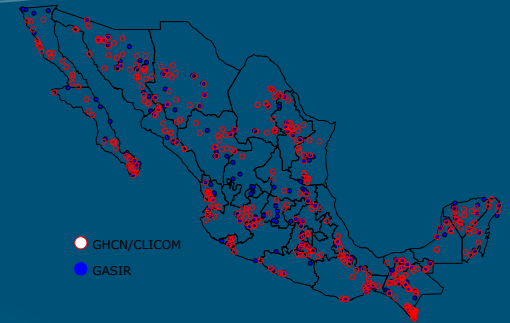
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The Updated and Expanded Version of the WMO-GHCN Data Base for Mexico



AVAILABLE FROM NDCD

1. Daily and Monthly Data Available.
2. Station and Divisional Data Available.
3. Beginning of Record to December 2010.
4. Station METADATA for all Stations.
5. Contains 380 CLICOM Stations and 214 GASIR Operational Stations.