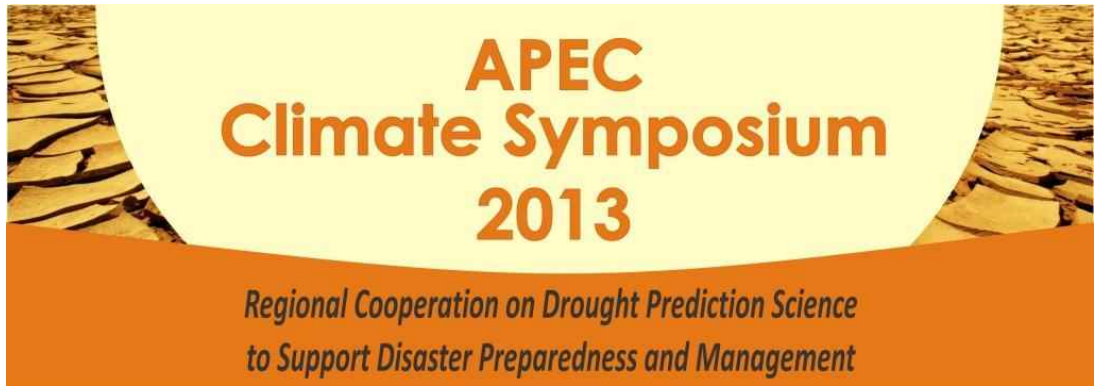

ENSO INDEX AND ITS RELATIONSHIP TO STANDARDIZED PRECIPITATION INDEX (SPI) IN THE MARITIME CONTINENT

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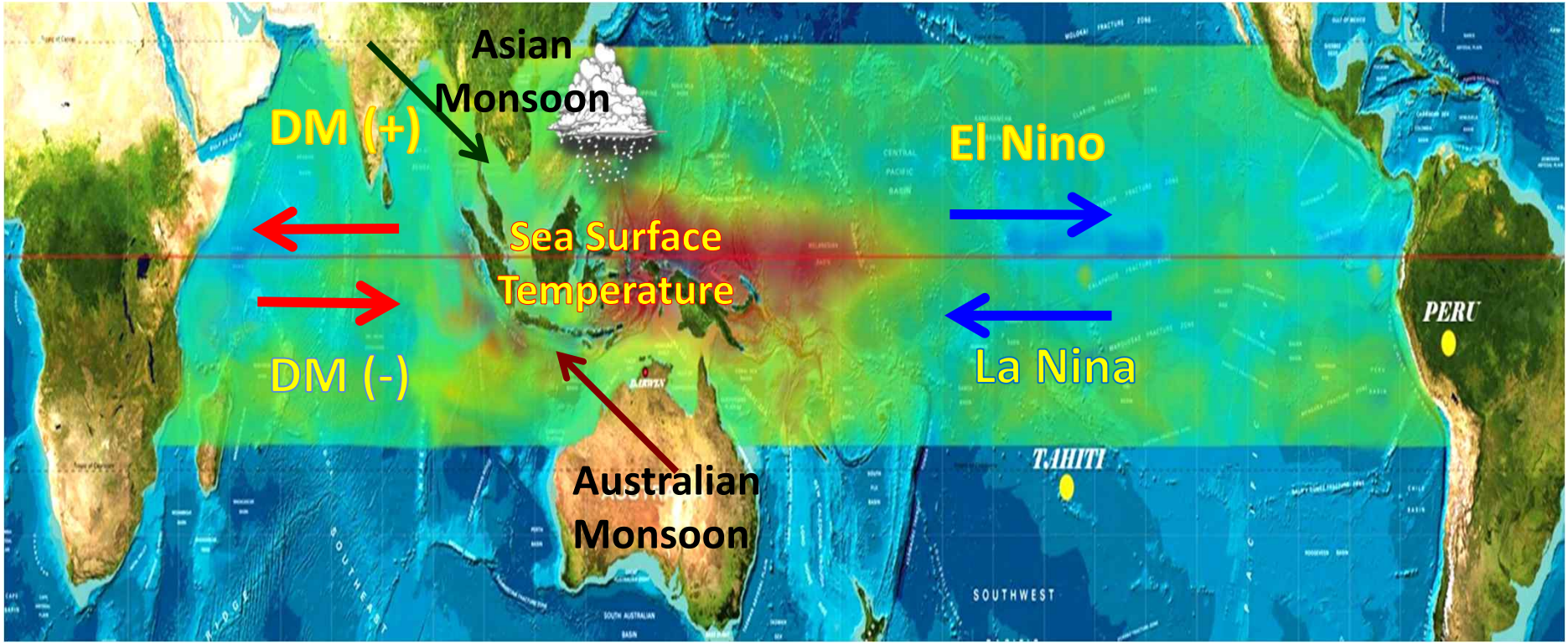
Overview

- Introduction :
  - Main Climate Driving Force in Indonesia
  - SPI
  - Composites Map During El Nino
  - ENSO Indices
- Scatter Plot Precipitation and SPI Vs Nino 3.4
- SVD Analysis
- Spatial Correlation SPI3 with ENSO Indices
- Summary

Introduction

Main Climate Driving Force in Indonesia



Introduction …. (cont)

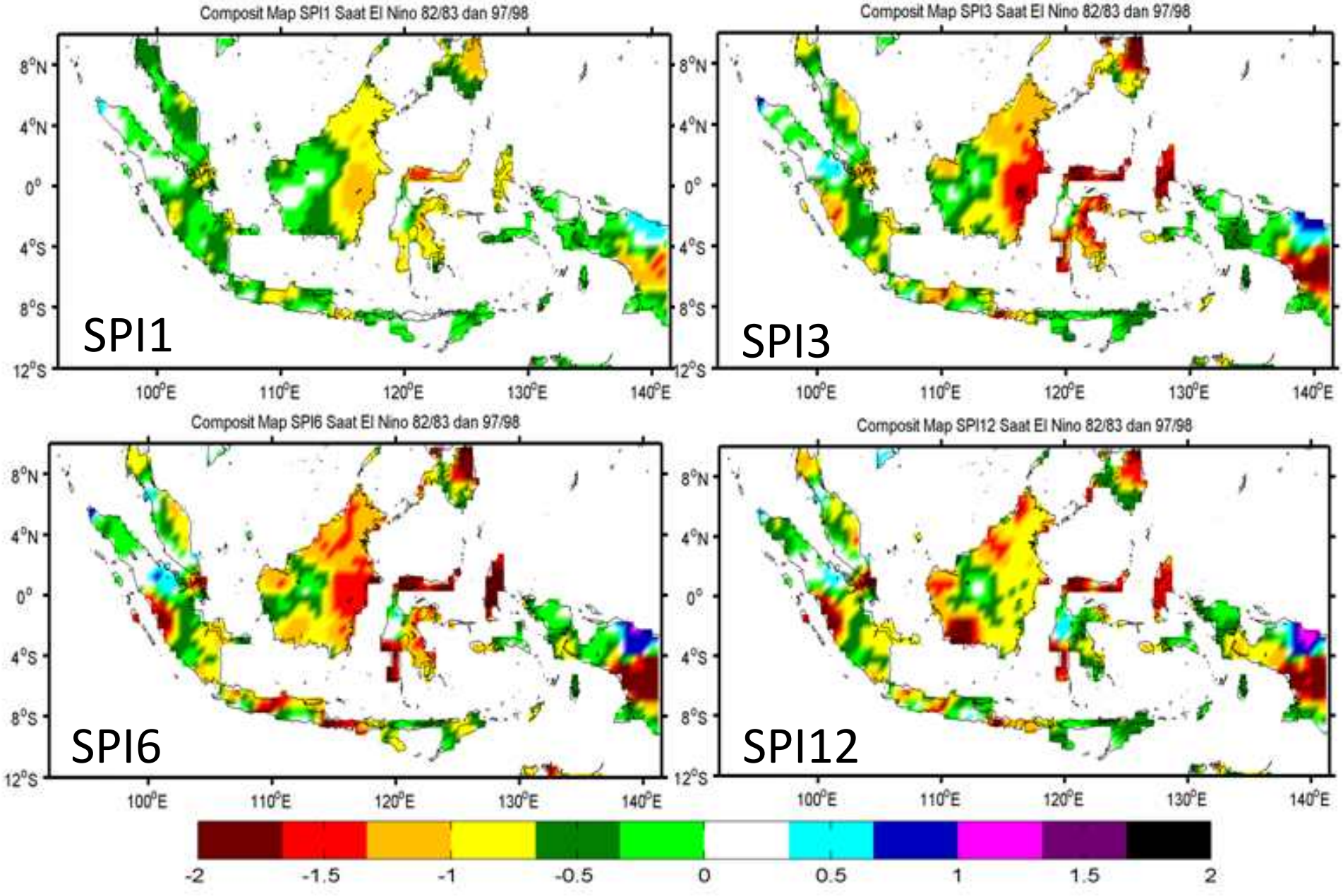
- ENSO (El Nino phase) decreases precipitation over Indonesia region, meteorological drought induced by this condition can occurs
- WMO recommends that all NMHS are supposed to use the Standardized Precipitation Index (SPI) method in meteorological drought monitoring
- SPI is a way of measuring drought based on the probability of precipitation for any time scale (McKee et al. 1993)

Introduction …. (cont)

SPI advantages (McKee et al. 1993) :

- can be calculated for time scales and different regions,
- can be used for early warning and drought classification,
- the calculation is much simpler and its value changes according to the period of data used

Composite Map SPI during El Nino



Various ENSO Indices

- ENSO Precipitation Index (ESPI);
- Cheliah and Arkin OLRA ENSO Index (CA92);
- Eastern Central Pacific Outgoing Longwave Radiation Anomaly Index (ECP-OLRA);
- Sea Surface Temperature Anomaly (SSTA) Nino 1 +2, Nino 3, Nino 4, Nino 3.4;
- Southern Oscillation Index (SOI);
- Oceanic Nino Index (ONI),
- the Japan Meteorological Agency SSTA ENSO Index (JMA-SSTA);
- Multi-variate ENSO Index (MEI)
- Trans Nino Index (TNI)

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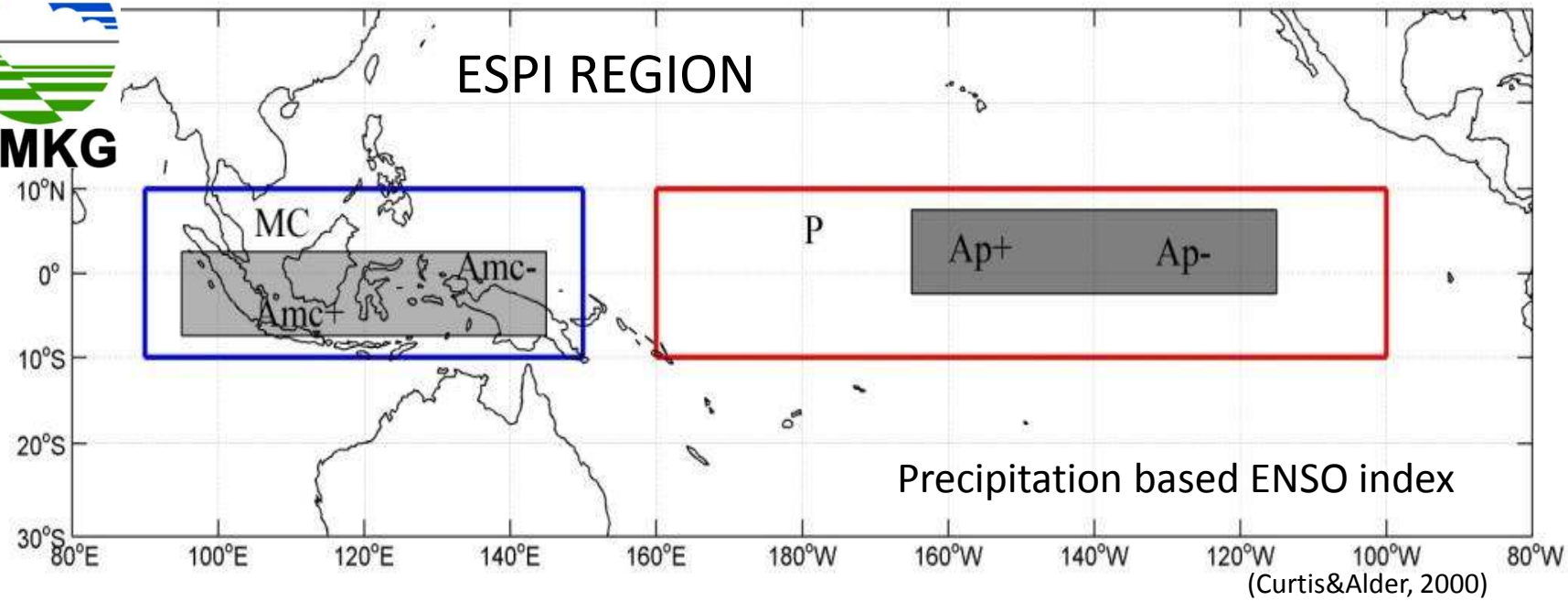
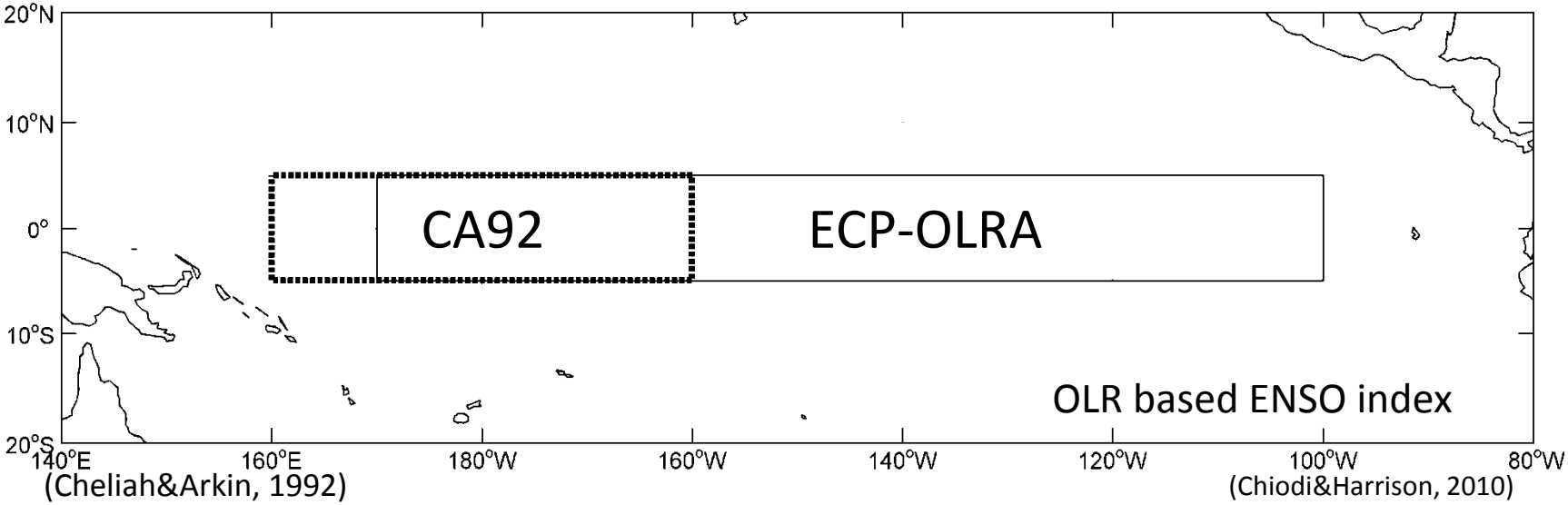
ESPI REGION



Precipitation based ENSO index

(Curtis&Alder, 2000)

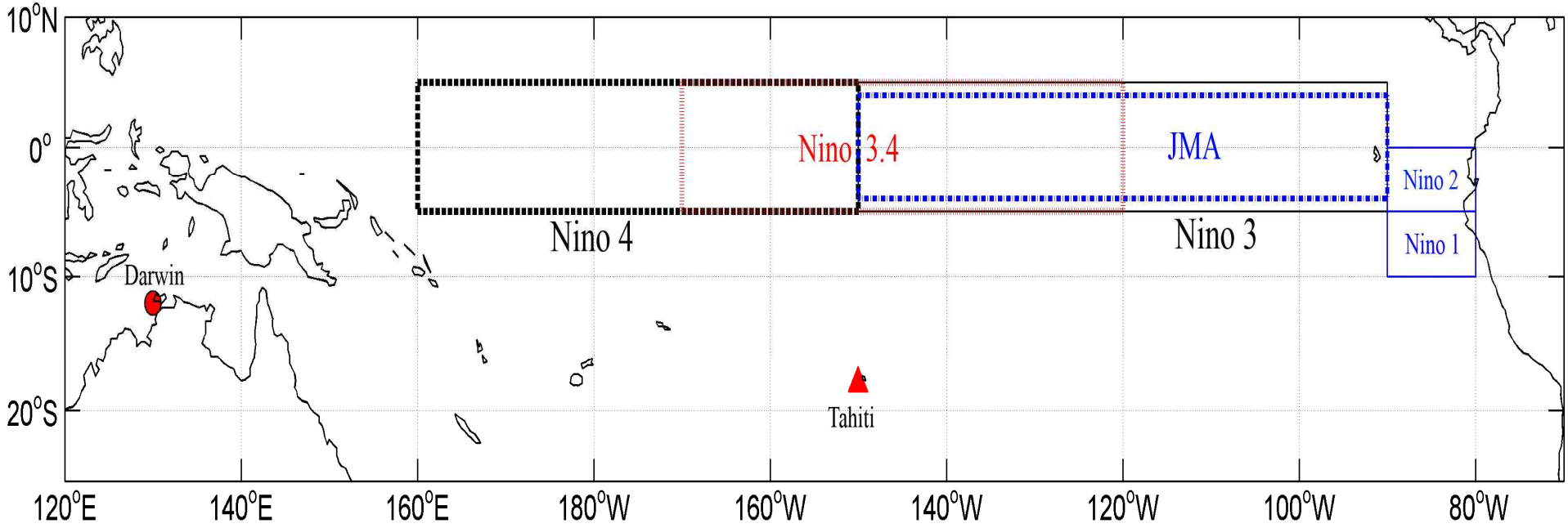


OLR based ENSO index

(Cheliah&Arkin, 1992)

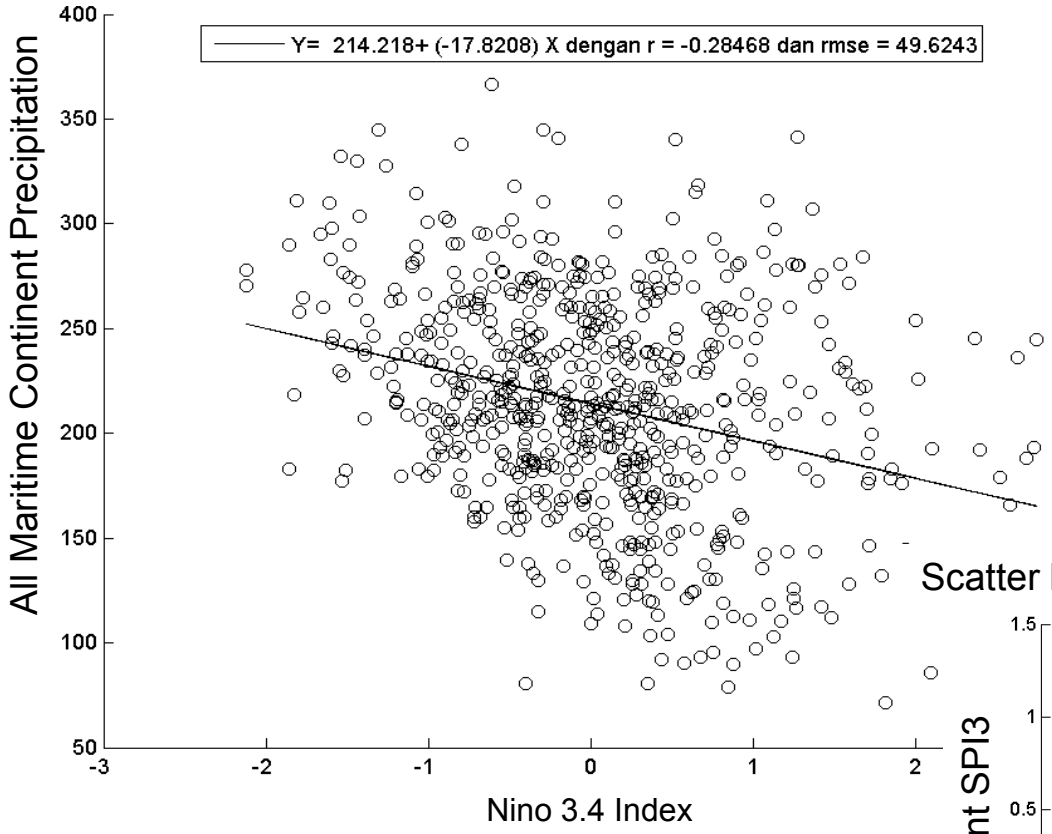
(Chiodi&Harrison, 2010)

Nino Region



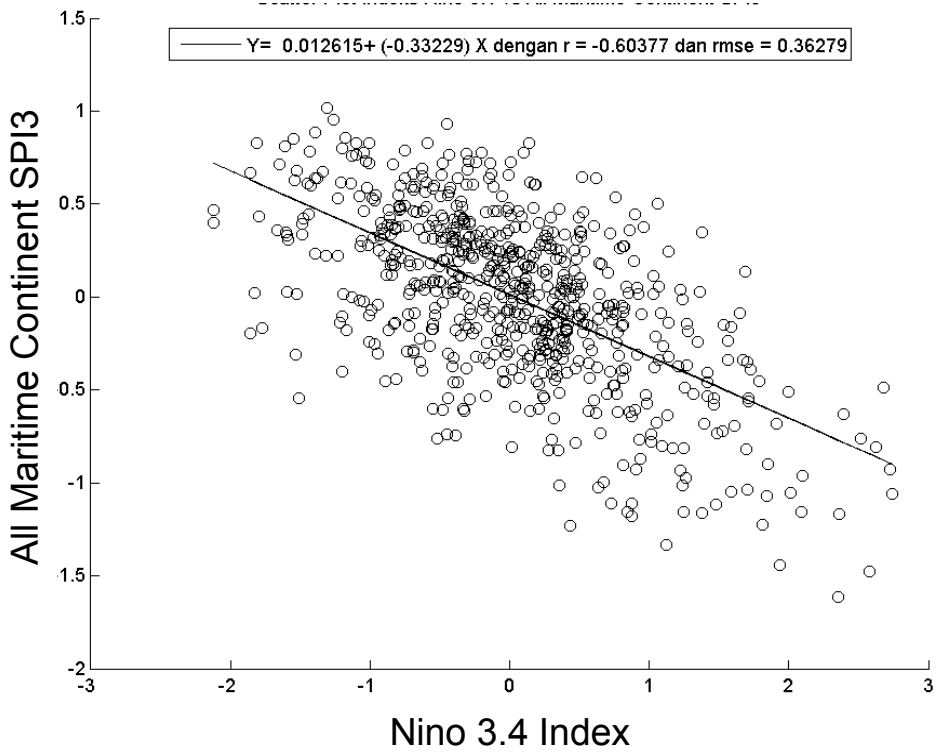
- Sea Surface Temperature Anomaly (SSTA) based ENSO index
- Mean Sea Level Pressure (MSLP) based ENSO index → SOI

Scatter plot Nino 3.4 Index Vs All Maritime Continent Precipitation



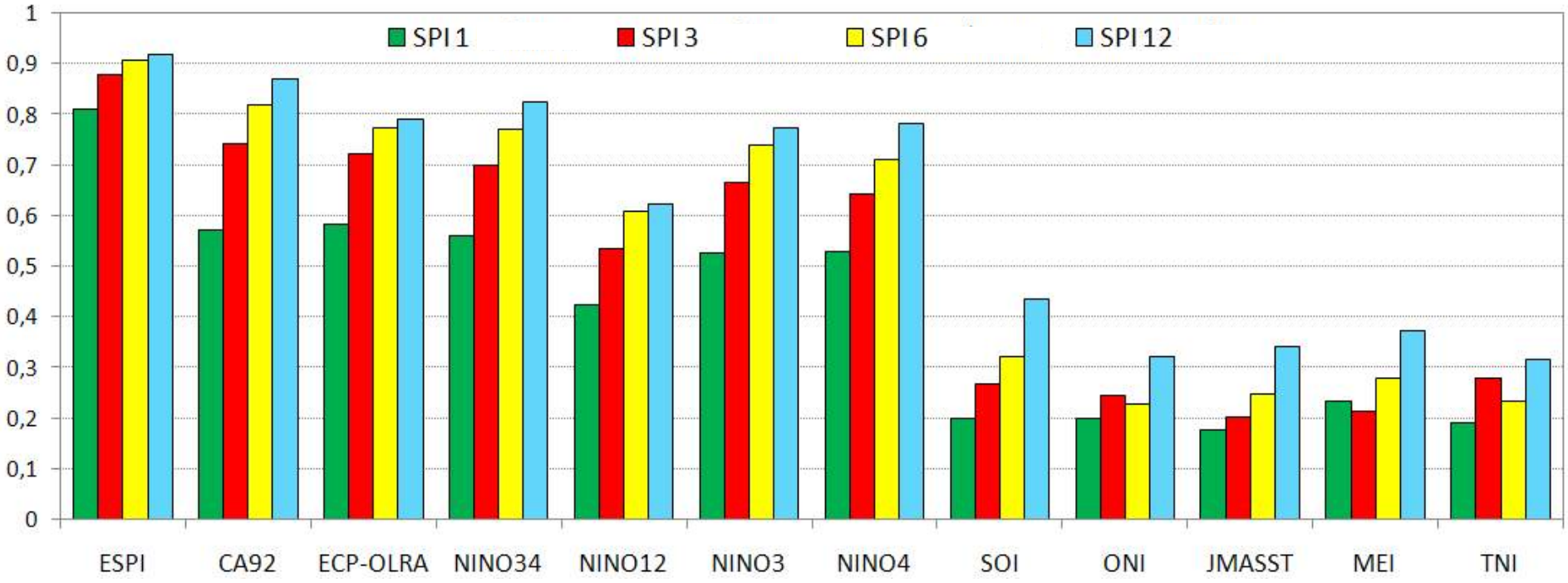
All Maritime Continent Precipitation and SPI3 Vs Nino 3.4

Scatter Plot Nino 3.4 Index vs All Maritime Continent SPI3



SPI is more able to draw the impacts of ENSO events rather than rainfall

SVD Analysis



Correlation expansion coefficient from Singular Value Decomposition (SVD) analysis of Standardized Precipitation Index (SPI) over maritime continent with ENSO index

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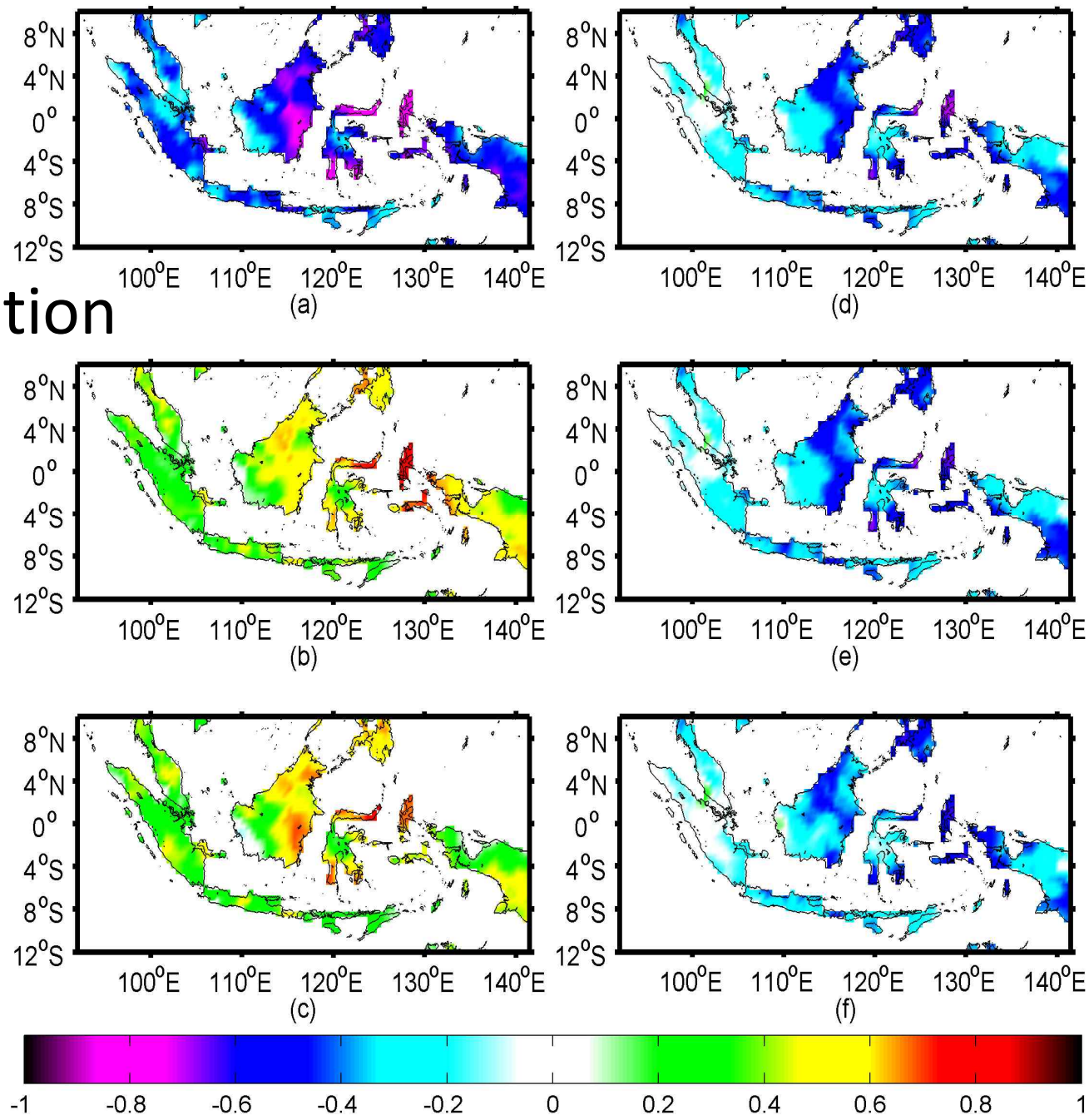
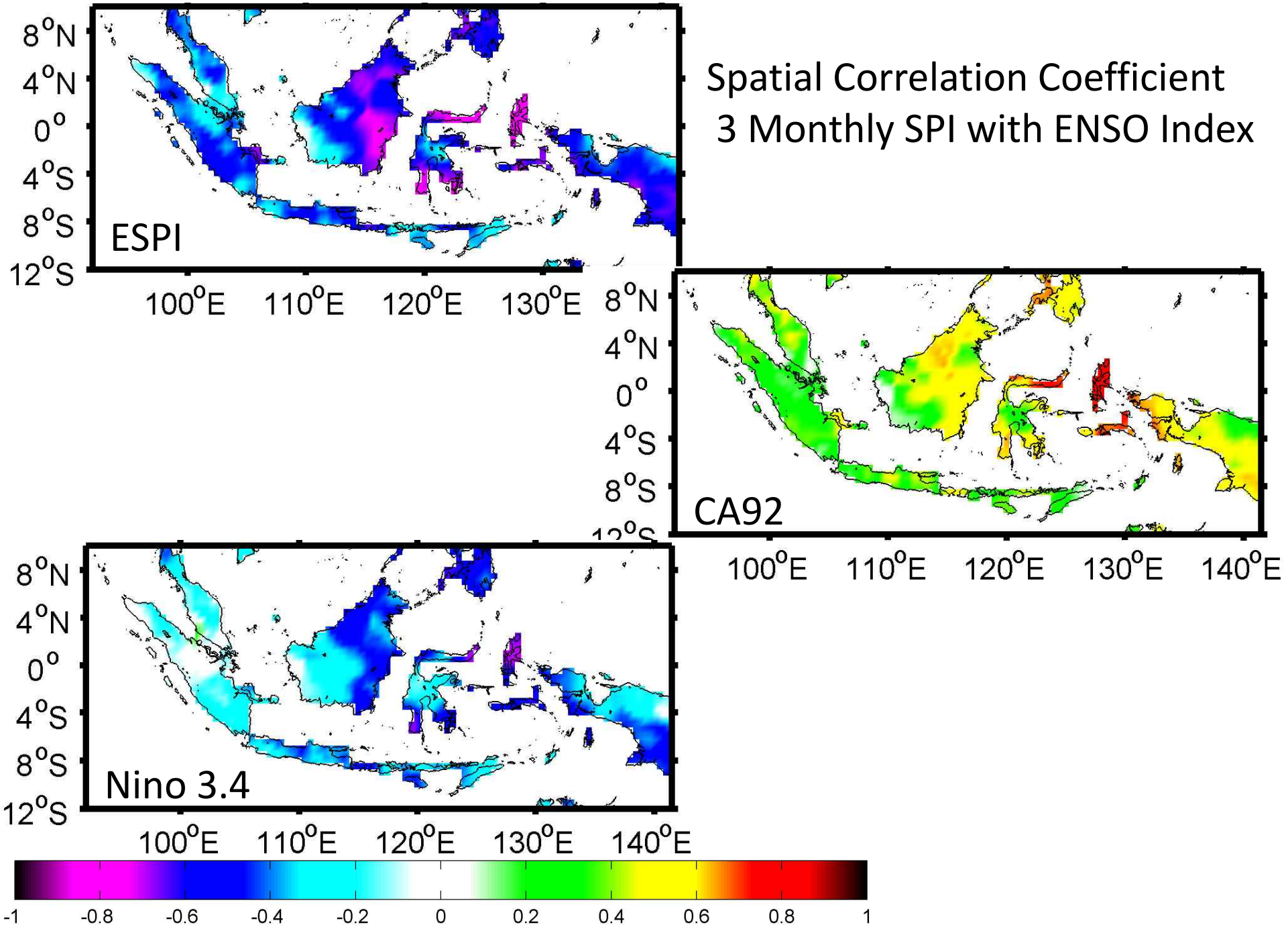
Spatial Correlation
SPI 3 with
(a)ESPI,
(b)CA92,
(c)ECP-OLRA,
(d)Nino 3.4
(e)Nino 3
(f)Nino 4.




Spatial Correlation Coefficient
3 Monthly SPI with ENSO Index
ESPI
CA92
Nino 3.4
8°N
4°N
0°
4°S
8°S
12°S
100°E
110°E
120°E
130°E
140°E
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1

Summary

- SPI is more able to draw the impacts of ENSO events than rainfall data.
- Examination based on Singular Value Decomposition (SVD) analysis between SPI and ENSO Indices shows that the best reference ENSO indices for Indonesian region are ESPI, ECP-OLRA, CA92 and Nino 3.4

Thank You

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