

# On the relationship between atmospheric circulation indices and precipitation in the Eastern Mediterranean

Mathbout S (1, 3), Lopez-Bustins JA (1), Martin-Vide J (1), Rodrigo FS (2) and Bech J (3)

(1) Climatology Group, University of Barcelona, Catalonia, Spain

(2) Department of Chemistry and Physics, University of Almeria, Spain.

(3) Department of Astronomy and Meteorology, University of Barcelona, Catalonia, Spain.



## Introduction

Spatial and temporal variability of precipitation in the Mediterranean is partly related to atmospheric circulation patterns (low-variability modes) such as the North Atlantic Oscillation (NAO), the Western Mediterranean Oscillation (WeMO) and the Mediterranean Oscillation (MO), among others. Most of the total precipitation amount in the Eastern Mediterranean (EM) is associated with mid-latitude cyclones and this fact leads us to hypothesize that some teleconnection patterns may exert an important influence on the EM precipitation behaviour.

## Objectives, Data and Methods

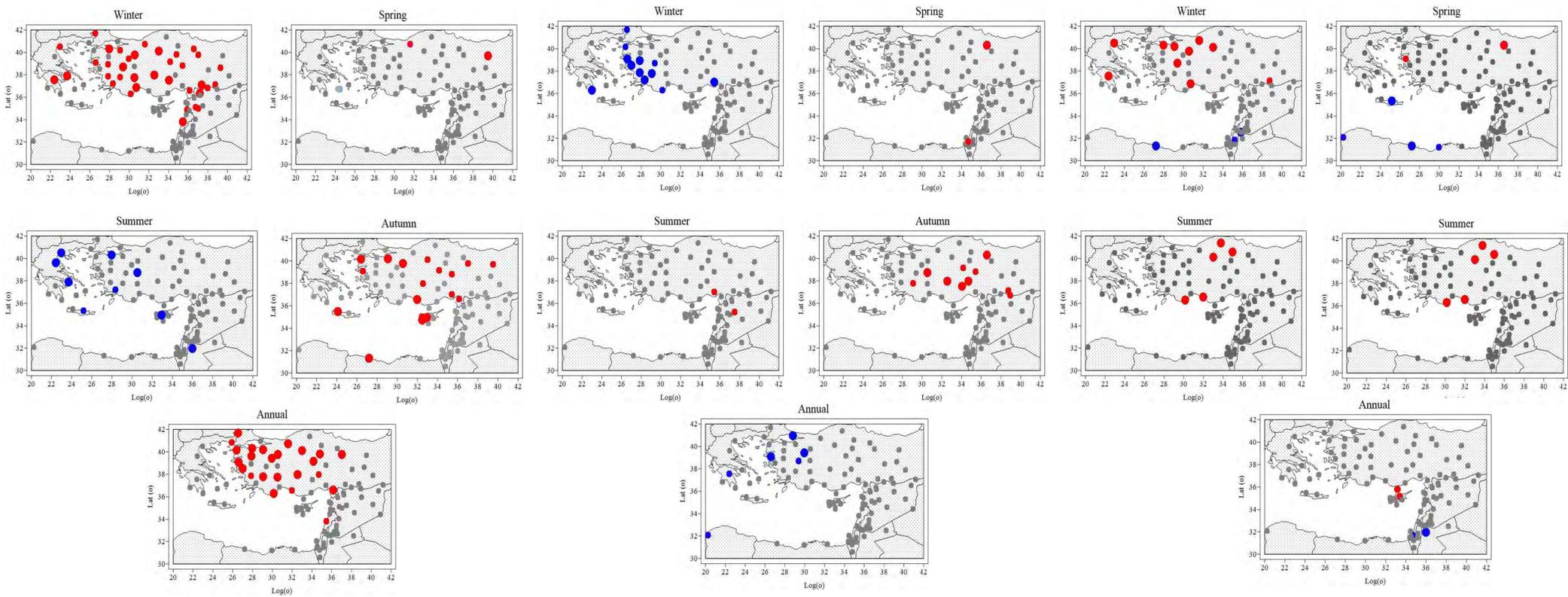
- ❖ **This work aims to** quantify the relationships between the teleconnection patterns and precipitation variability over the EM and define the strongest teleconnection pattern in the Eastern Mediterranean explaining the precipitation variability over the Eastern Mediterranean.
- ❖ Monthly precipitation data for 103 weather stations that cover all climatic regions within the study area were used over the 1961-2013 period.
- ❖ Linear correlations between the three indices (NAOi, WeMOi and MOi) and precipitation were calculated to quantify the relationship between the teleconnection patterns and precipitation variability over the Eastern Mediterranean.

## Results

NAOi

WeMOi

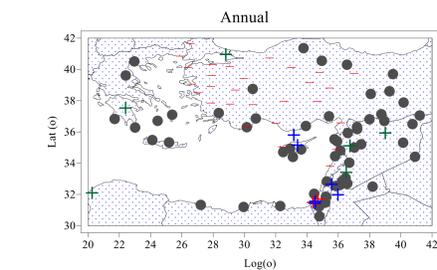
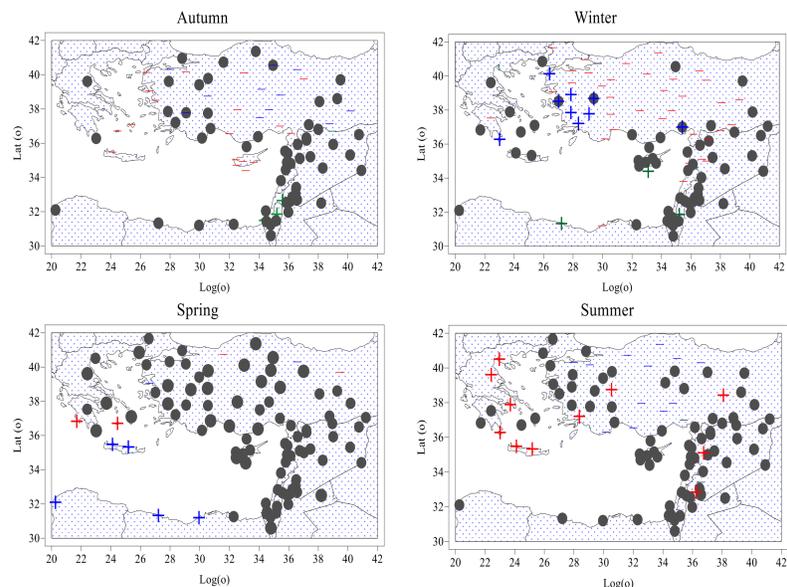
MOi



Spatial distribution of correlations between the NAOi, WeMOi, MOi and seasonal and annual precipitation

- Positive correlation  $p < 0.01$
- Positive correlation  $p < 0.05$
- Negative correlation  $p < 0.01$
- Negative correlation  $p < 0.05$
- No statistically significant

## Conclusion



The most correlated +/- index with precipitation at  $p < 0.05$  and  $p < 0.01$ . NAO (red), WeMOi (green), MO (blue), and dots represent no statistically significant correlation.

Spatial distribution patterns of the most correlated teleconnection indices with seasonal and annual precipitation.

### Acknowledgements:

We show appreciation to the Climatology Group (2014 SGR 300, Catalan Government) at University of Barcelona, Catalonia and the WEMOTOR (CSO2014-55799-C2-1-R, 2015-2017, Spanish Ministry of Economy and Competitiveness) project. The first author is financially supported by scholarship from European Union (ERASMUS MUNDUS) project. Some meteorological data were taken from the Meteorological Agencies in Cyprus, Greece, Turkey, Syria and Israel.