

## Cyclones producing floods in Italy in the second half of twenty century

M.Reale (1), P.Lionello (1,2), L.Congedi (2), P.Valente (3)

(1)University of Salento, Department of Material Sciences,via per Monteroni, 73100, Lecce, Italy  
(reale.marco82@gmail.com ), (2) CMCC,73100,Lecce (3) University of Parma, 43100, Parma

### Introduction

In this study the link between cyclones and floods in North and South Italy is explored. The analysis considers the winter and summer season of the second half of the 20th century. Data for the analysis of the cyclones are provided by the ERA-40 (ECMWF Re-Analysis) dataset. Data for the analysis of floods are provided by SICI ( Sistema informativo sulle catastrofi idrogeologiche) produced by AVI (Aree Vulnerate Italiane) project and hosted by CNR (<http://sicimaps.irpi.cnr.it/>). This analysis does not account for any "preconditioning" due to previous meteorological events in the areas selected.

### Areas selected for the analysis



Fig.1 Areas selected for the analysis

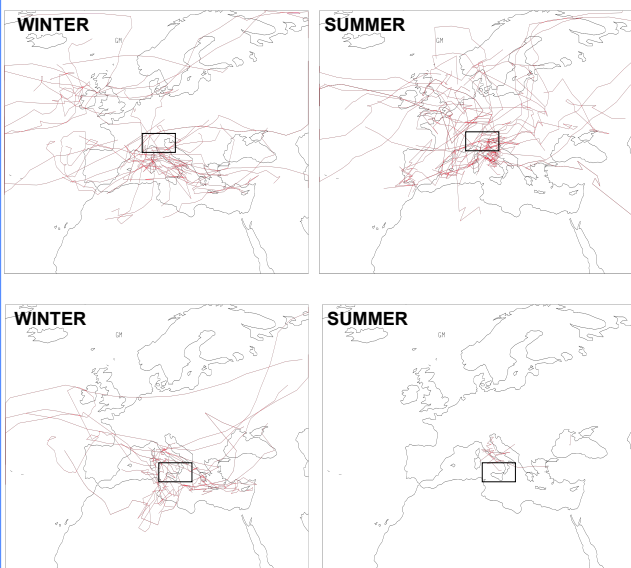


Fig.3 Trajectories of cyclones producing floods.The black square is the area where floods have been recorded

### Conclusion

This analysis provides different results for northern and southern Italy :

- Over northern Italy systems producing floods are either of Atlantic origin or secondary cyclones associated with the passage of major cyclones north of the Mediterranean basin
- Over southern Italy, many cyclones producing floods are generated inside the basin itself.
- A relevant fraction of floods over southern Italy (and also over northern Italy) are produced by cyclones that are generated over northern Africa.
- Large depth, extension and gradient are characteristics of cyclones producing floods in Northern Italy, both in winter and in summer. Large depth, low speed and great amount of moisture in the middle troposphere are characteristics of cyclones producing floods in Southern Italy in winter. There is no clear picture for southern Italy in summer (few cases and probably local systems)

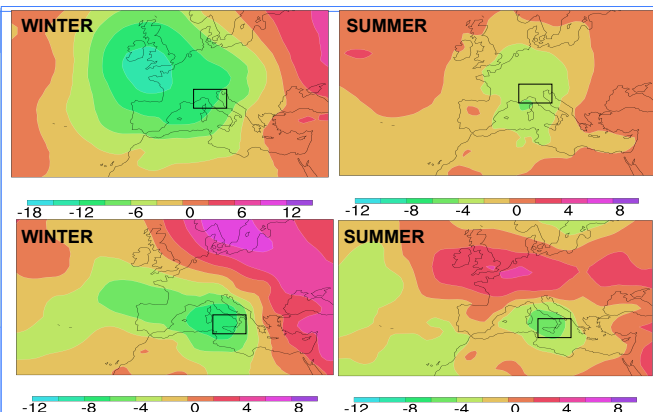


Fig.2 Composite SLP field (hPa) associated to flood events.The black square is the area where floods have been recorded

The figures below compare two classes of cyclones : those producing floods (green dot) over and those passing without producing floods nearby (pink dot) Northern (N) or Southern (S) Italy in winter (W) and summer (S) ; the coordinates of each dot are the mean of the distribution of each variable reported over the axes; Error bar=st.dev for that variable/5; Thick black bar=statistically significant difference between the two categories of cyclones for that variable.

