

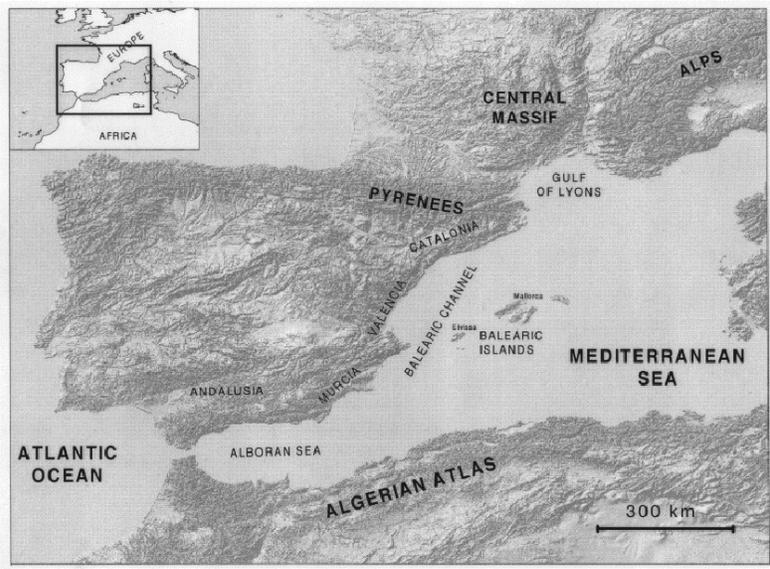
# Roles of Atlas Range and Iberian Topography on a Heavy Precipitation Case in the Western Mediterranean

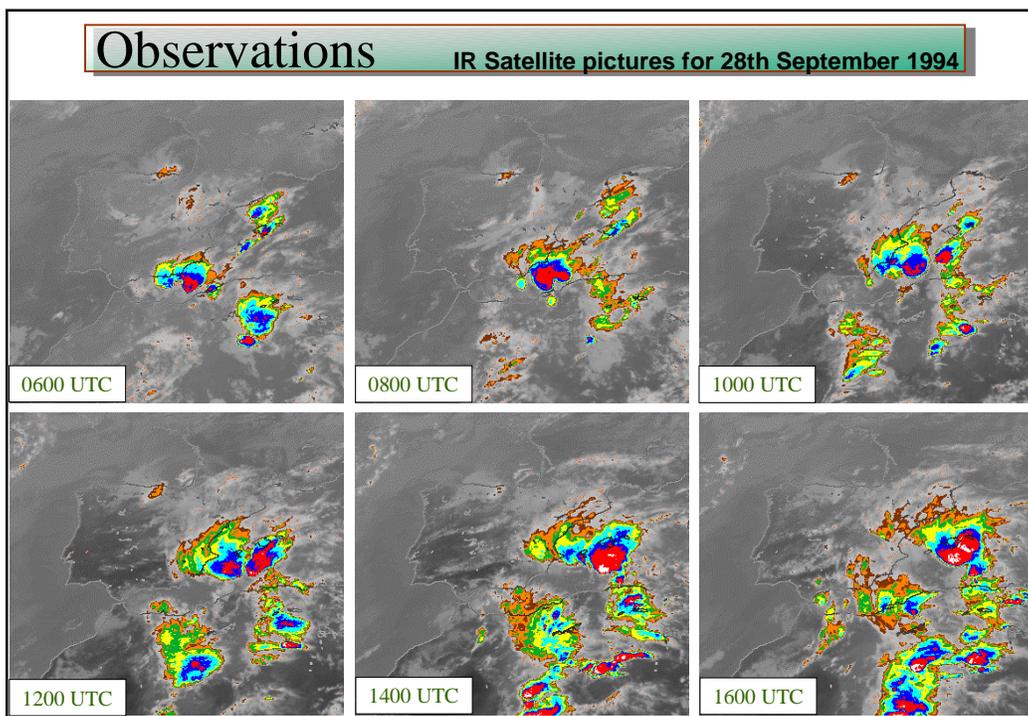
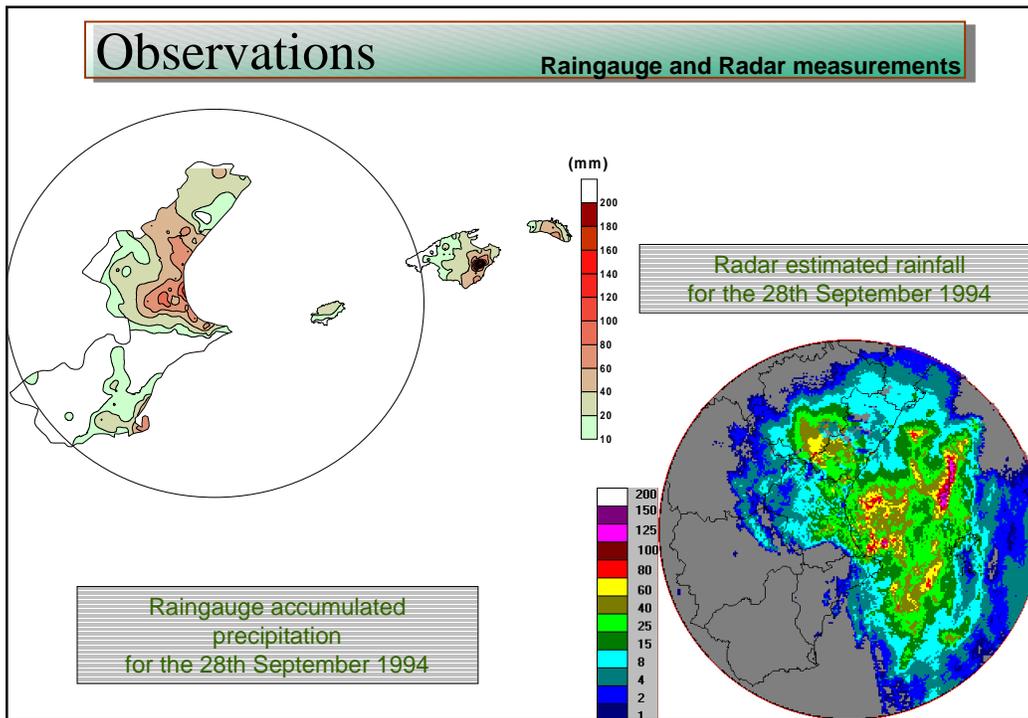
C. Ramis V. Homar R. Romero S. Alonso



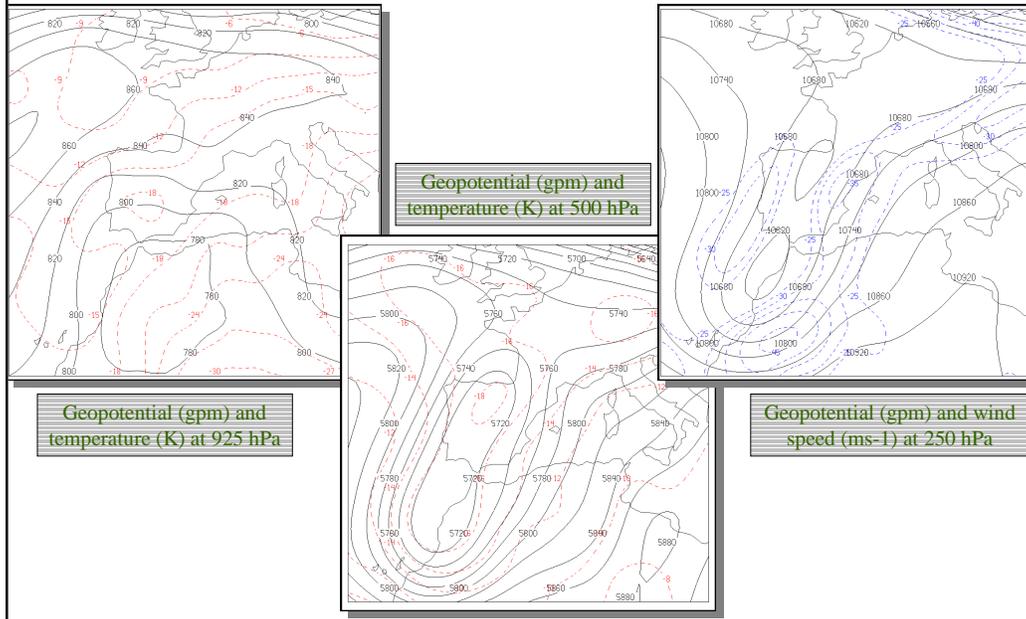
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## Western Mediterranean Area





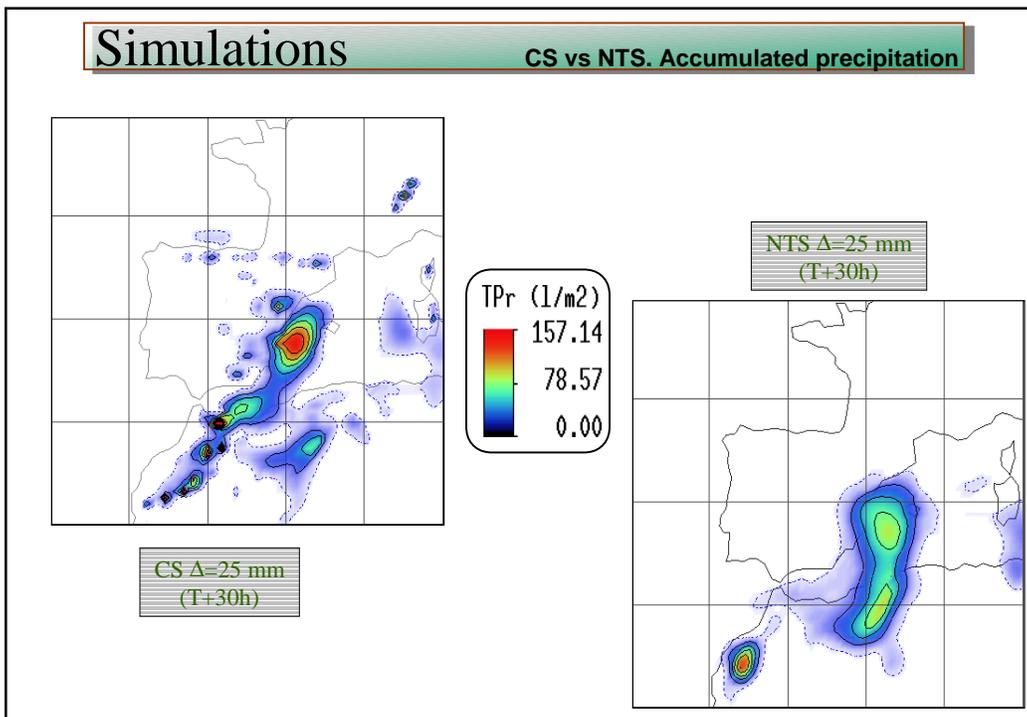
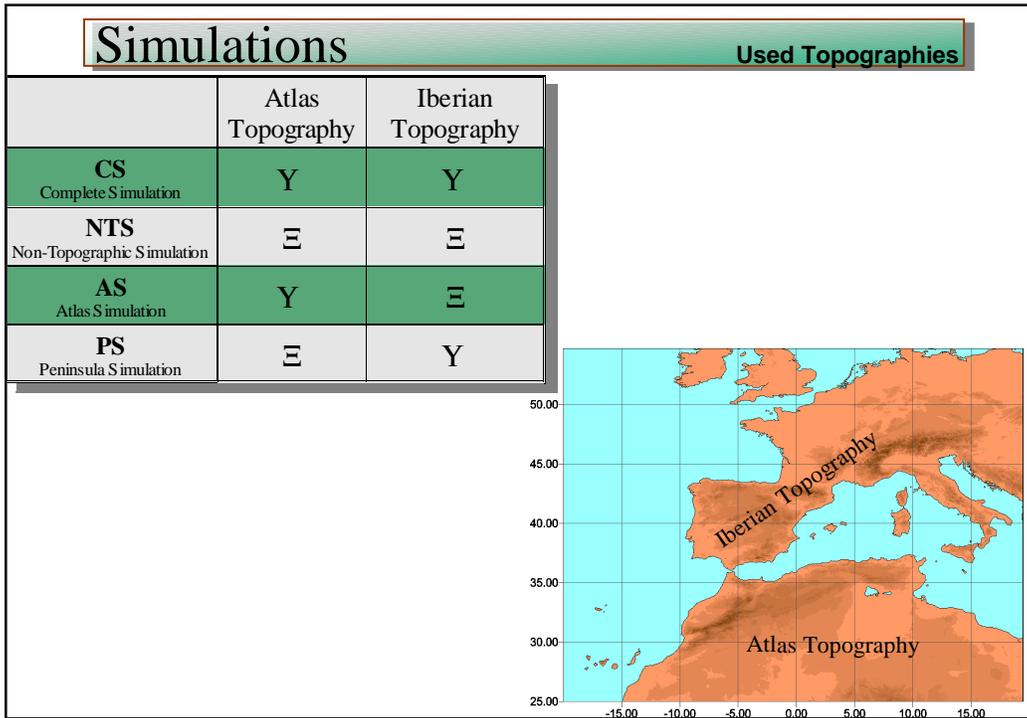
## Observations ECMWF Analyses for 28th Sept. 1994 at 1200UTC

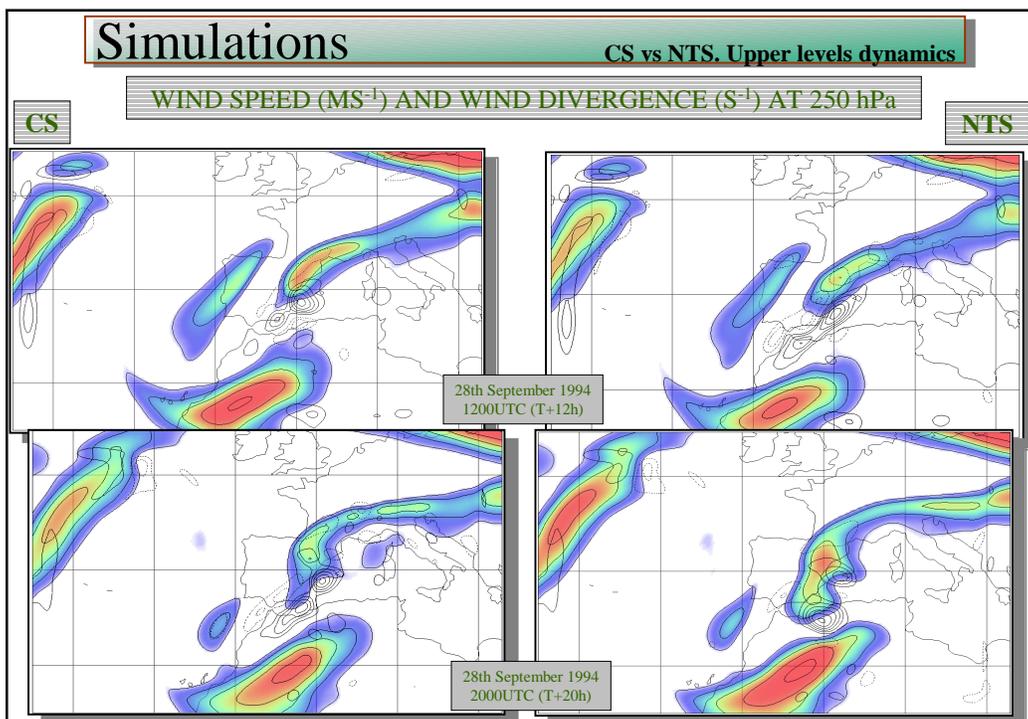
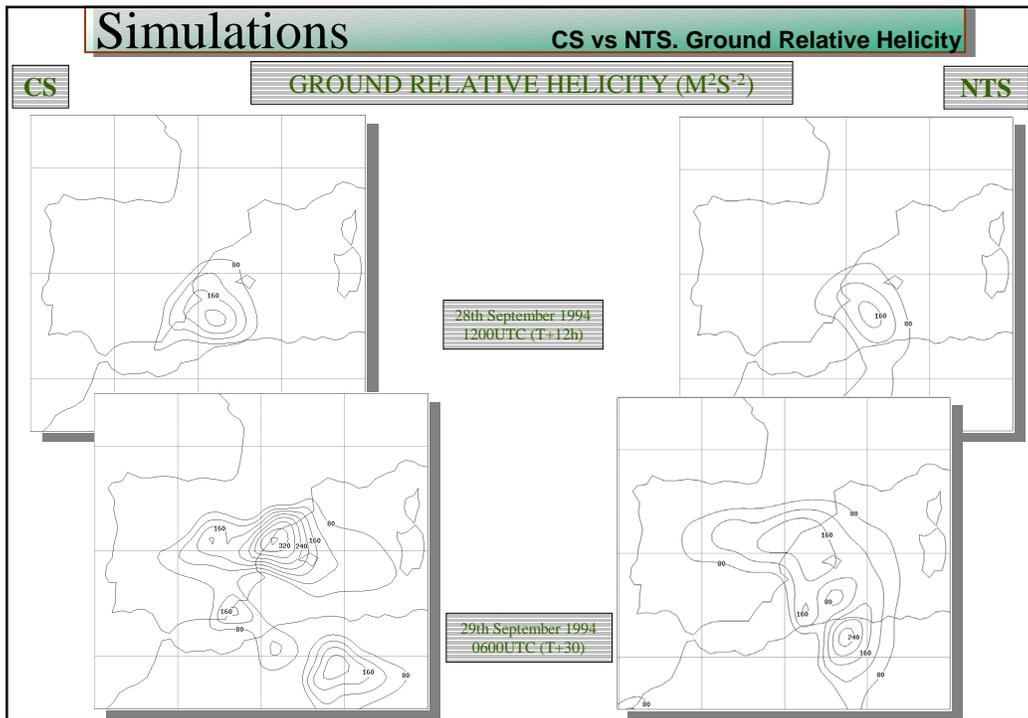


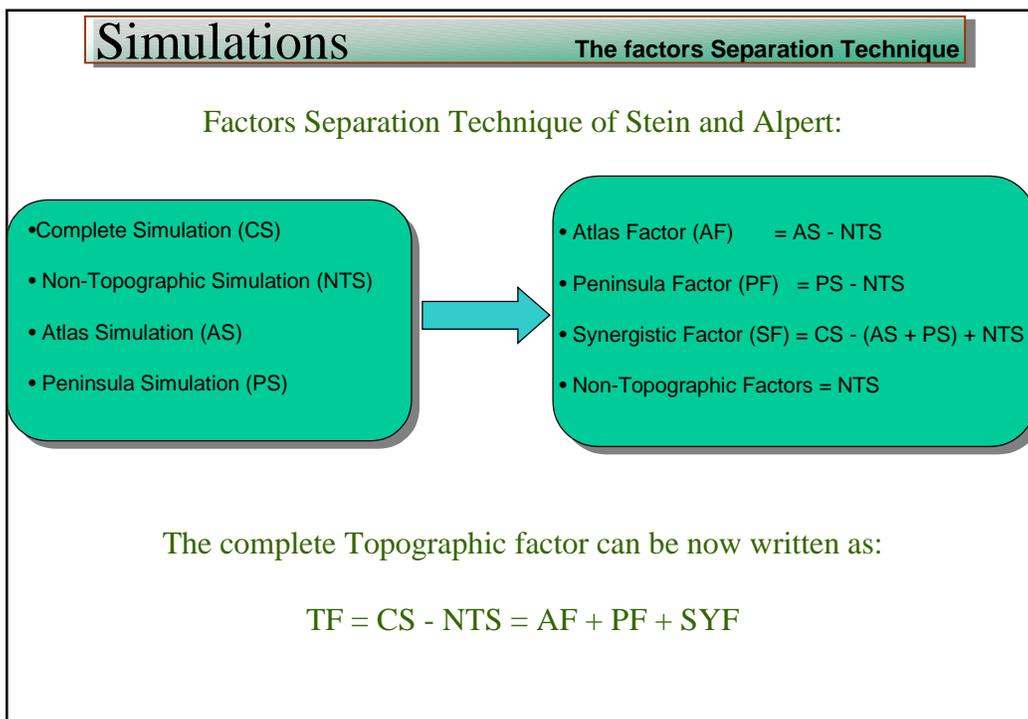
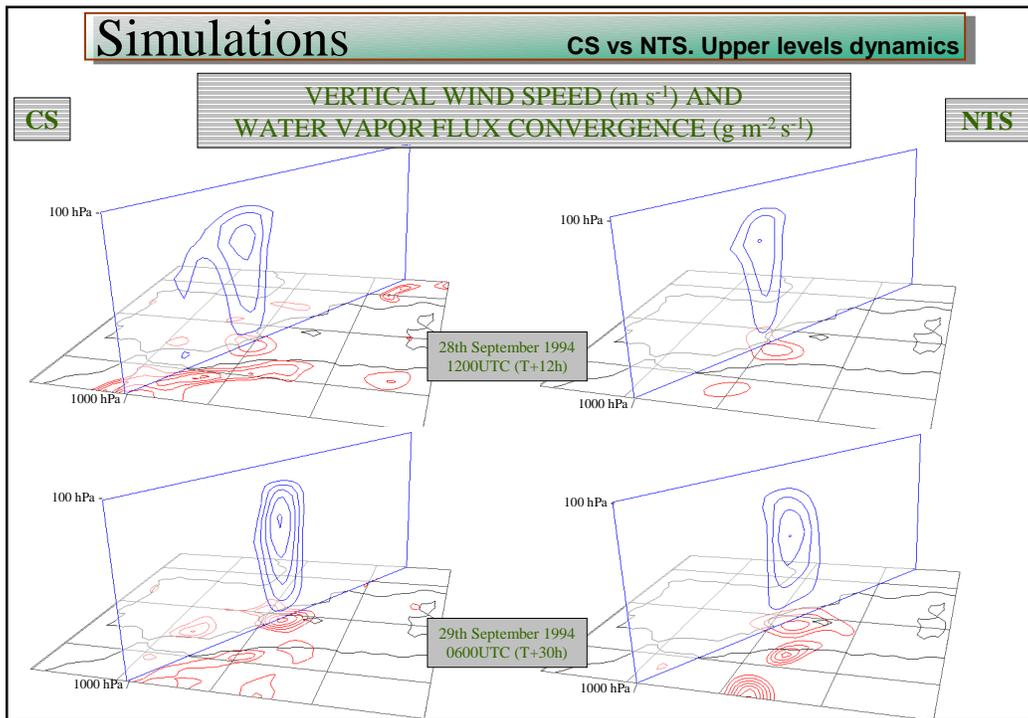
## Simulations Model characteristics and specific configuration

- Hydrostatic HIRLAM model
- Lat-Lon Arakawa-C with 31 p- $\sigma$  hybrid levels
- Two time level, three dimensional semi-implicit and semi lagrangian integration scheme
- Sundqvist Condensation and precipitation scheme, including a modified Kuo convection parameterization

- 0.3° x 0.3° 194x100 grid points covering 6000x3000 km<sup>2</sup>
- 0.75° x 0.75° ECMWF uninitialized initial and boundary conditions
- $\Delta t = 450s$ . From 0000 UTC September 28th to 0600 UTC September 29th (T+30h)



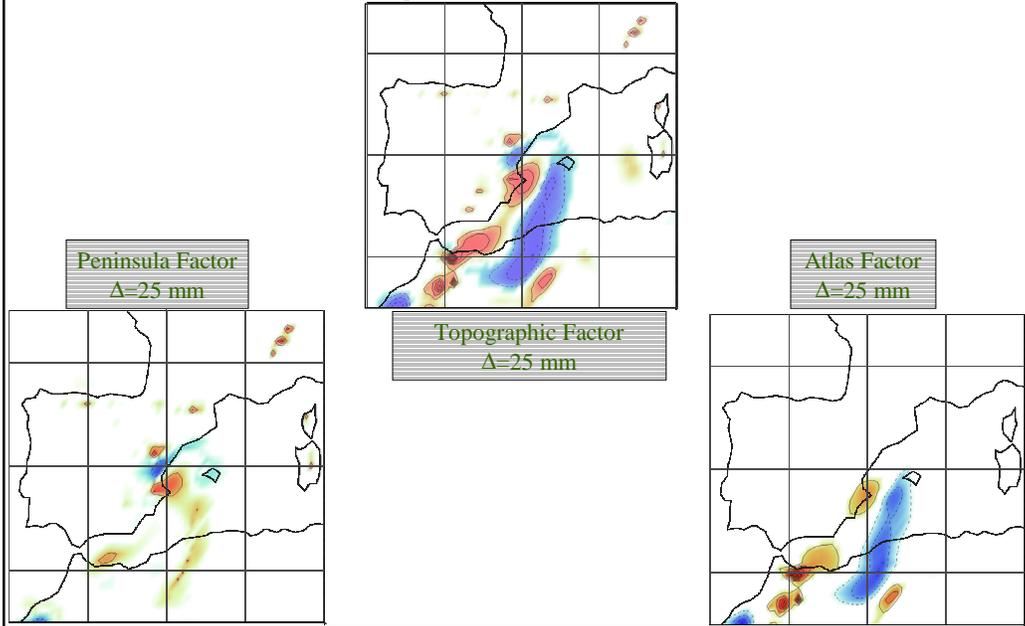




# Simulations

## AF vs PF. Accumulated Precipitation

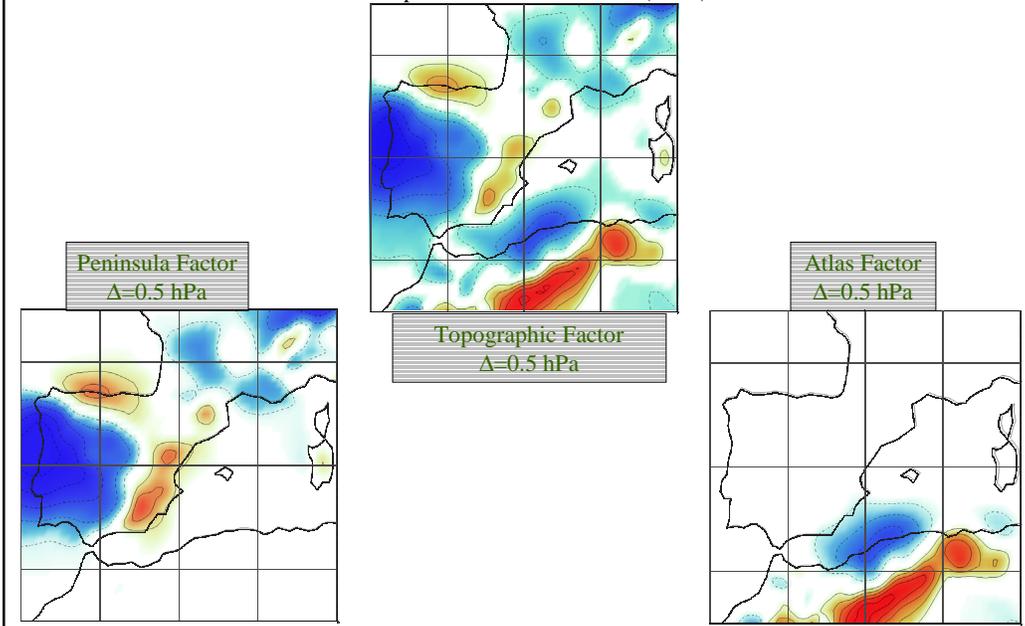
29th September 1994 0600UTC (+30h)



# Simulations

## AF vs PF. Sea Level Pressure

28th September 1994 1200UTC (+12h)



## Conclusions

- A case of deep convection producing heavy rainfall over the sea in the Western Mediterranean region has been presented.
- Satellite pictures have shown the convective development over the region. Convective systems can be followed during all the 28th September 1994. A complex upper levels dynamics governed by a deep trough and three embedded jets is identified in the ECMWF analyses.
- Numerical simulations have revealed a moderate influence of the orography on the case, accounting for slightly less than half of the precipitation field. Important upper level dynamics and upward motion mesoscale systems are obtained even in non-topographic simulations.
- Factors separation technique has been applied to determine the individual role of the Iberian and Atlas topography.
- A local rainfall enhancement can be attributed to the Valencian mountains and a spatial redistribution of the precipitation is mainly produced by the Atlas Range. Separate individual enhancement of the north-easterly surface flow has been shown through the effect of the low of the Atlas dipole together with the high of the Peninsula dipole.
- Further work will consist on the quantitative evaluation of the strong upper levels influence on the case through numerical simulation.