



## Relating precipitation to fronts at a sub-daily basis

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High impact events over Western Iberia include precipitation extremes that are cause for concern as they lead to flooding, landslides, extensive property damage and human casualties. These events are usually associated with low pressure systems over the North Atlantic moving eastward towards the European western coasts (Liberato and Trigo, 2014).

A method to detect fronts and to associate amounts of precipitation to each front is tested, distinguishing between warm and cold fronts. The 6-hourly ERA-interim 1979-2012 reanalysis with  $1^\circ \times 1^\circ$  horizontal resolution is used for the purpose. An objective front identification method (the Thermal Method described in Shemm et al., 2014) is applied to locate fronts all over the Northern Hemisphere considering the equivalent potential temperature as thermal parameter to use in the model. On the other hand, we settled a squared search box of tuneable dimension (from 2 to 10 degrees long) to look for a front in the neighbourhood of a grid point affected by precipitation.

A sensitivity analysis is performed and the optimal dimension of the box is assessed in order to avoid over(under) estimation of precipitation. This is performed in the light of the variability and typical dynamics of warm/cold frontal systems in the Western Europe region. Afterwards, using the extreme event ranking over Iberia proposed by Ramos et al. (2014) the first ranked extreme events are selected in order to validate the method with specific case studies. Finally, climatological and trend maps of frontal activity are produced both on annual and seasonal scales. Trend maps show a decrease of frontal precipitation over north-western Europe and a slight increase over south-western Europe, mainly due to warm fronts.

### REFERENCES

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### ACKNOWLEDGEMENTS

This work is supported by FCT - project UID/GEO/50019/2013 - Instituto Dom Luiz. Fundação para a Ciência e a Tecnologia, Portugal (FCT) is also providing for R. Hénin doctoral grant (PD/BD/114479/2016) and A.M. Ramos postdoctoral grant (FCT/DFRH/SFRH/BPD/84328/2012).