

Hydrological risk: from excess to scarcity of water

Summary

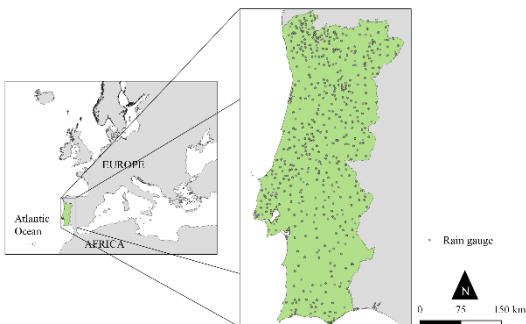
Due to the success of the two previous scientific collaborations between Portugal and Slovakia, it was possible to obtain a third grant for the triennium 2019-2022. The research focused on some of the main topics raised during the previous transnational projects, with emphasis on trend detection in hydrologic time series.

The Transnational Cooperation Agreement between Portugal and Slovakia aims at promoting collaboration and scientific knowledge interchange among researchers from both countries. For that purpose, relevant issues related to surface water were selected by the project teams and submitted for approval.

In order to be eligible, the transnational cooperation projects must bring together not only senior researchers but especially young researchers, namely PhD students from the two countries involved.



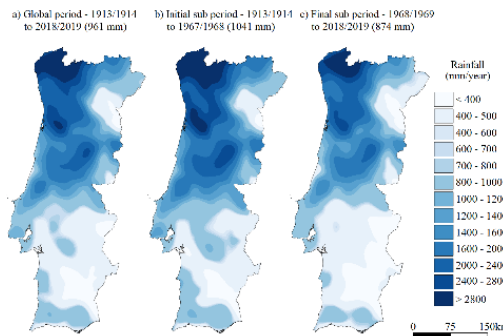
As part of the 2019-2022 research, a comprehensive study of the long-term rainfall trends, their temporal variability and uncertainty over mainland Portugal, was conducted based on monthly, seasonal and annual rainfall series spanning a period of 106 years (October/1913 to September/2019), at 532 rain gauges evenly distributed over the country (DOI 10.3390/cli8120146).



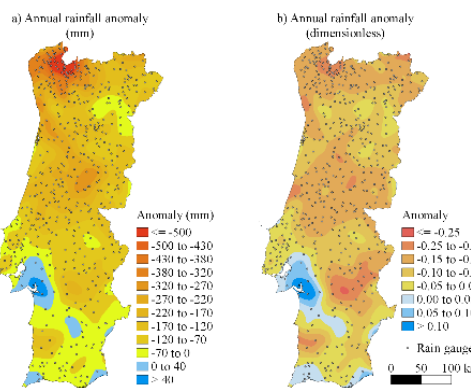
To understand the rainfall behaviour over time, an initial sub-period of 55 years and a final sub-period of 51 years were also analysed along with the global period.

The results showed that after the initial period with prevailing increasing rainfall, the trends in the final 51 years were almost exclusively decreasing and so pronounced that they

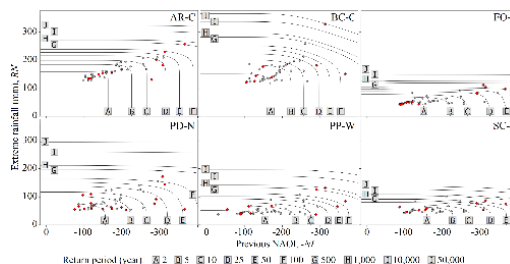
counterbalanced the early rainfall increase and resulted in equally decreasing trends for the global period of 106 years.



The study also shows that approximately from the late 1960s on, the rainy season pattern has changed, with the last months prior to the dry season showing a sustained decrease of their relative contributions to the annual rainfalls. Overall, the results support the hypothesis of less uncertainty on the pronounced decrease of rainfall over mainland Portugal in recent years, which is expected to continue. They also show that the asymmetry between a less wet North, yet still wet, and an arid South is becoming much more marked.



Another example of the research developed in the scope of the project was the application of copulas to ascertain the bivariate modelling of two likely dependent random variables, i.e., of the North Atlantic Oscillation (NAO) coupled with extreme rainfall. This application adopted as a case study the Madeira Island (DOI: 10.3390/cli9050086).



Project Reference

SK-PT-18-0008

Leading Institution

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Partners

IST – Instituto Superior Técnico (Portugal), TUKE – Technical University of Kosice (Slovakia)

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Period

2019-2022

Total

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CERIS

4 600.00€

Project Website

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