

Climate Change assessment to quantify current and future hydrological behavior of a small Mediterranean catchment

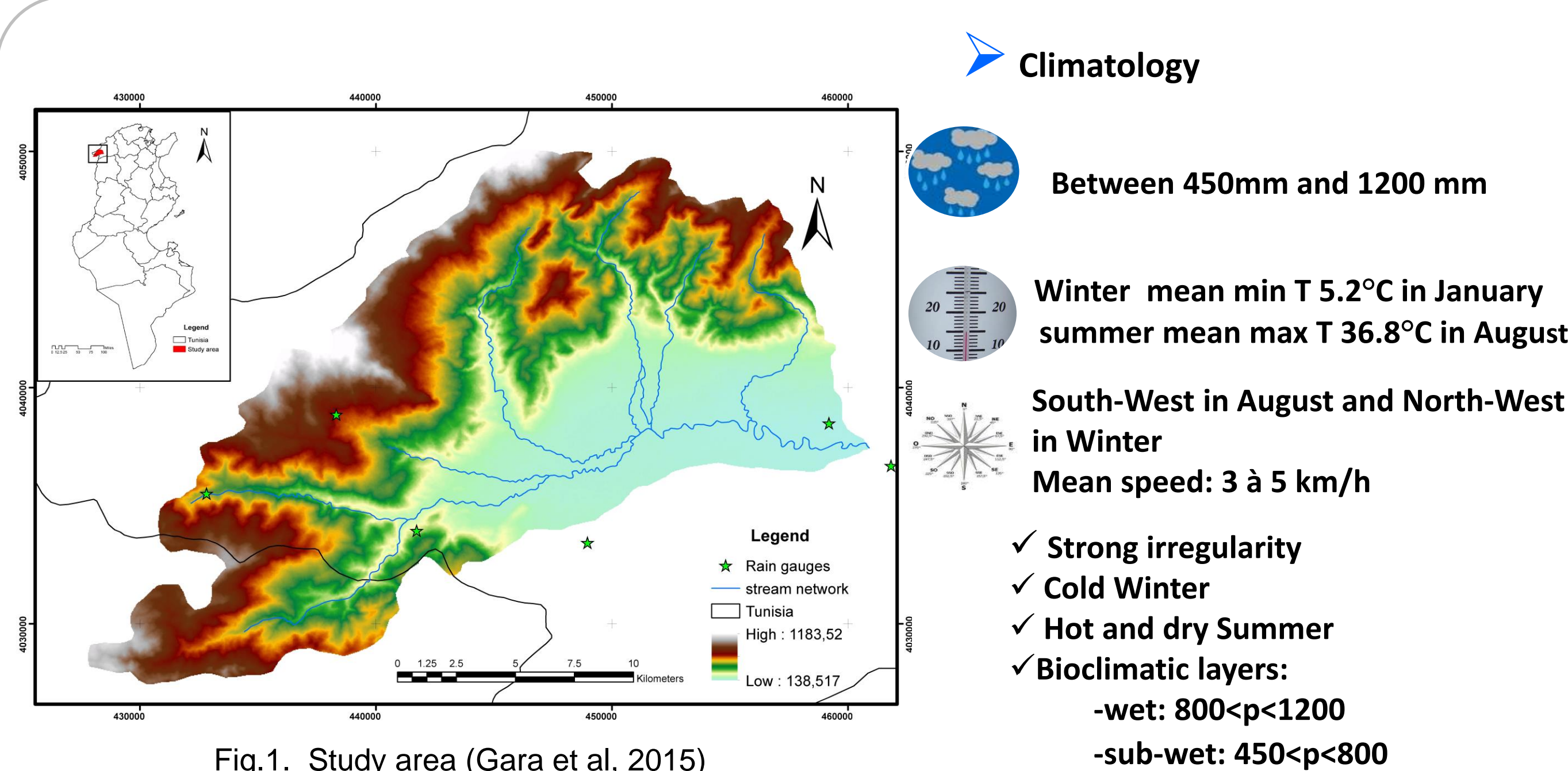
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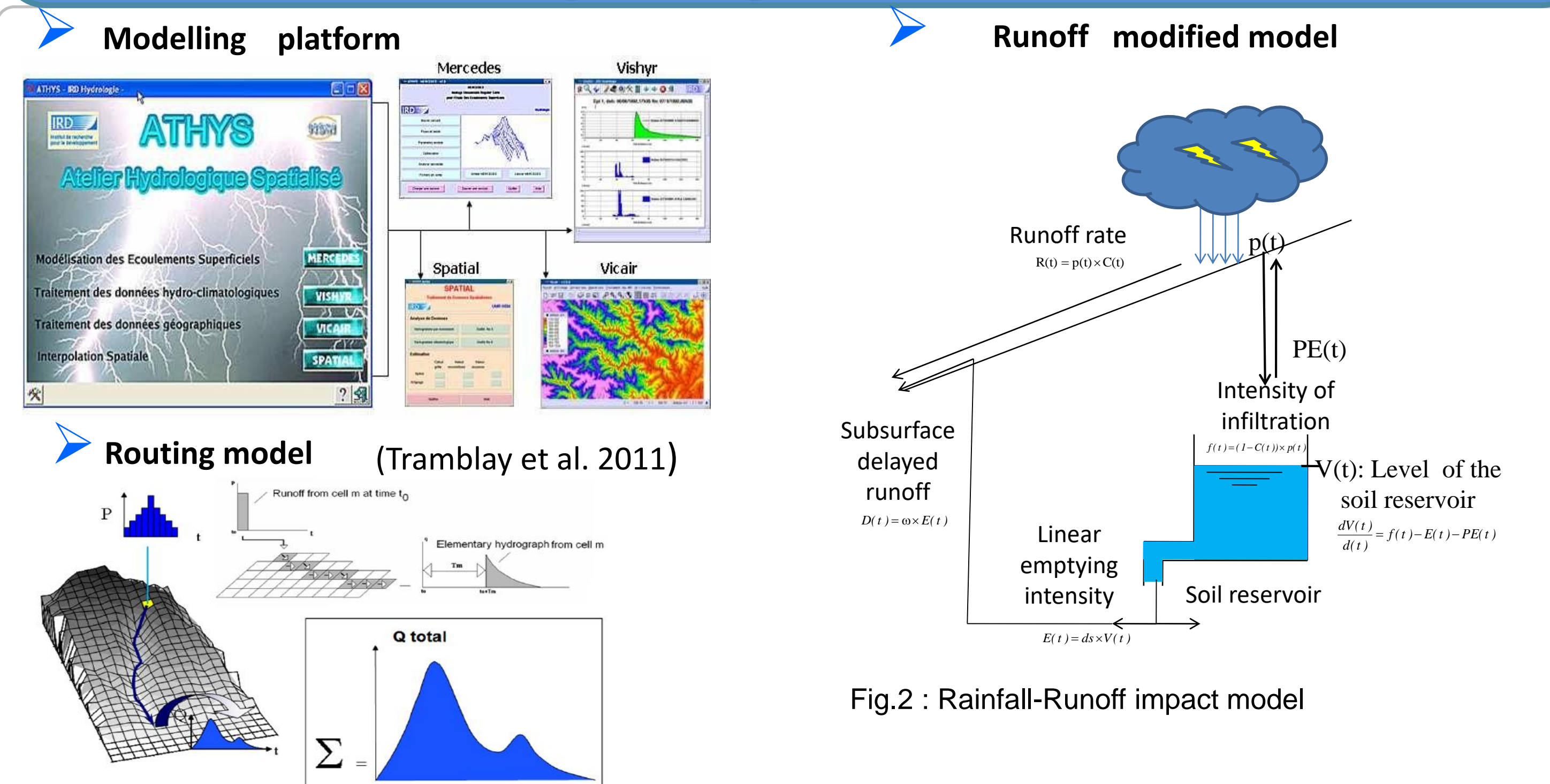
Motivations and objectives

- Deficiency of available water resources in the Mediterranean catchment which is expected to face further complications through the 21st century (Jacob et al, 2015) . Effective assessments of climate change impact on flow regime require reliable climate model simulations and a robust hydrological impact model validated at catchment scale for variable current climate conditions.
- We aim to evaluate the hydrological behavior of a Mediterranean catchment under climate change for current and future conditions.
- Validating the hydrological selected model for present conditions for a small Mediterranean catchment and testing the quality of climate models for the CORDEX framework projections e.

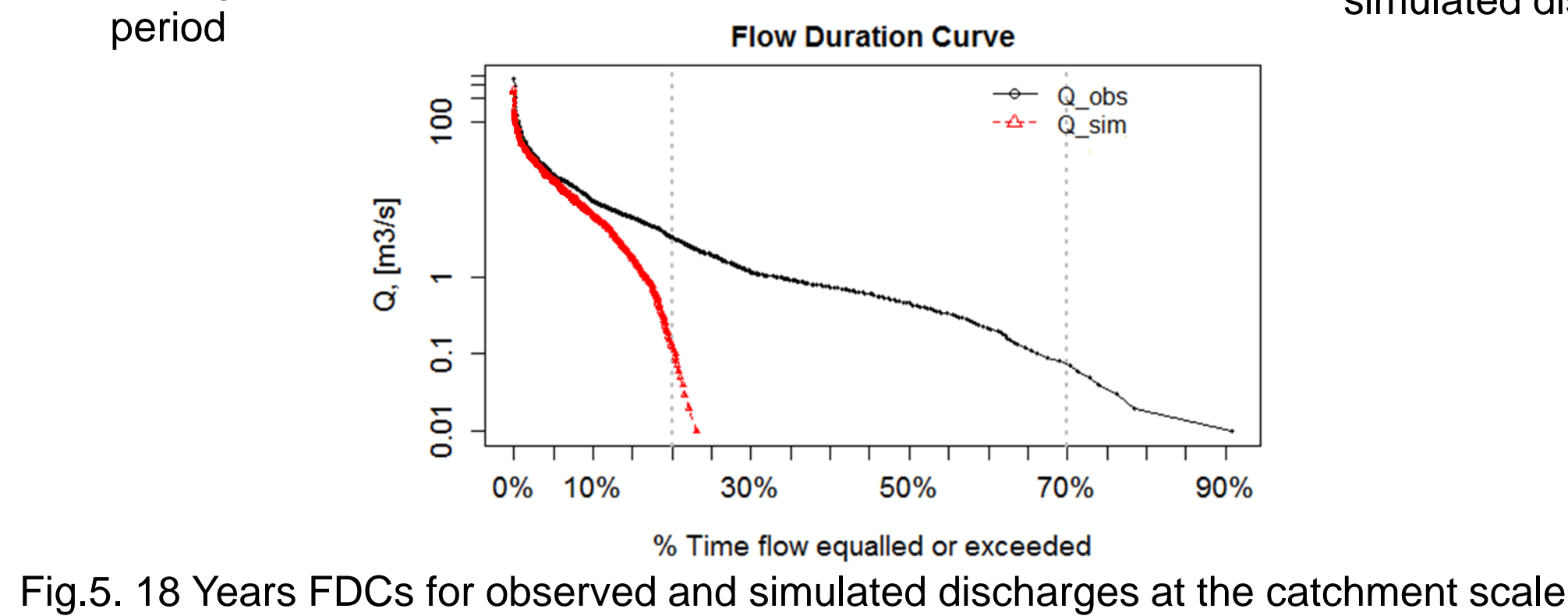
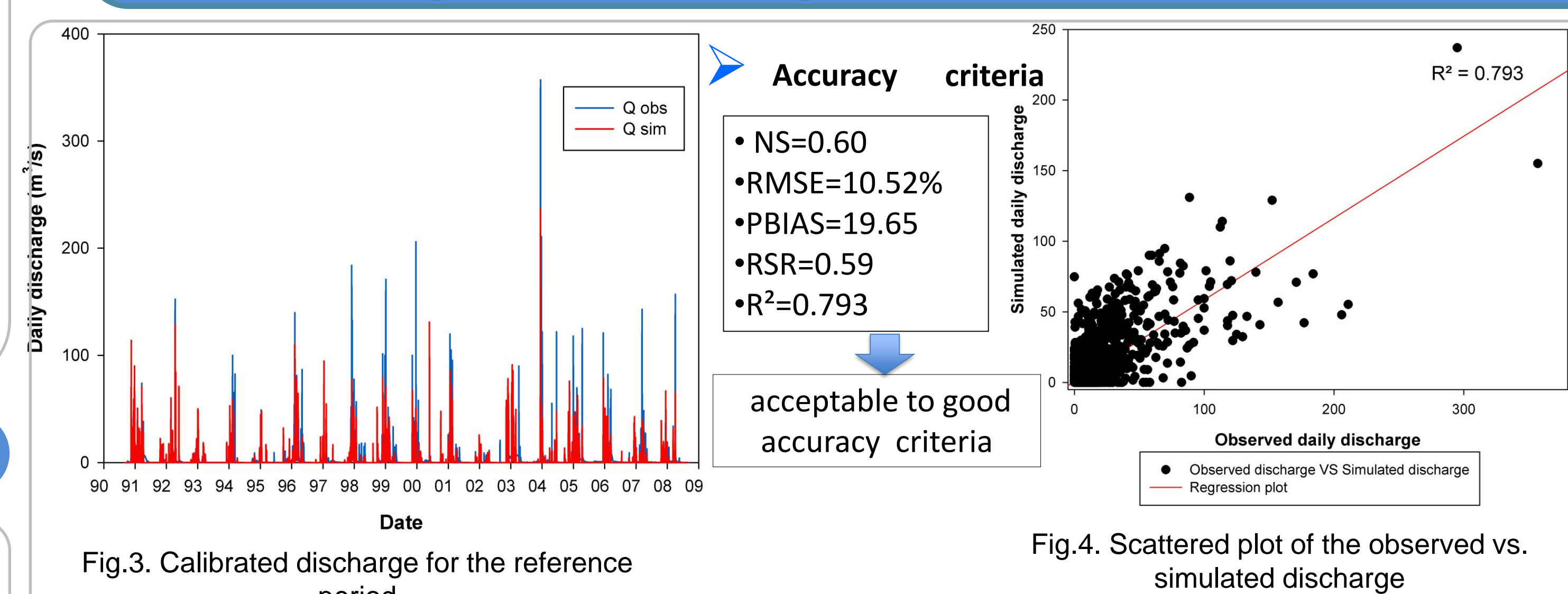
Study area description



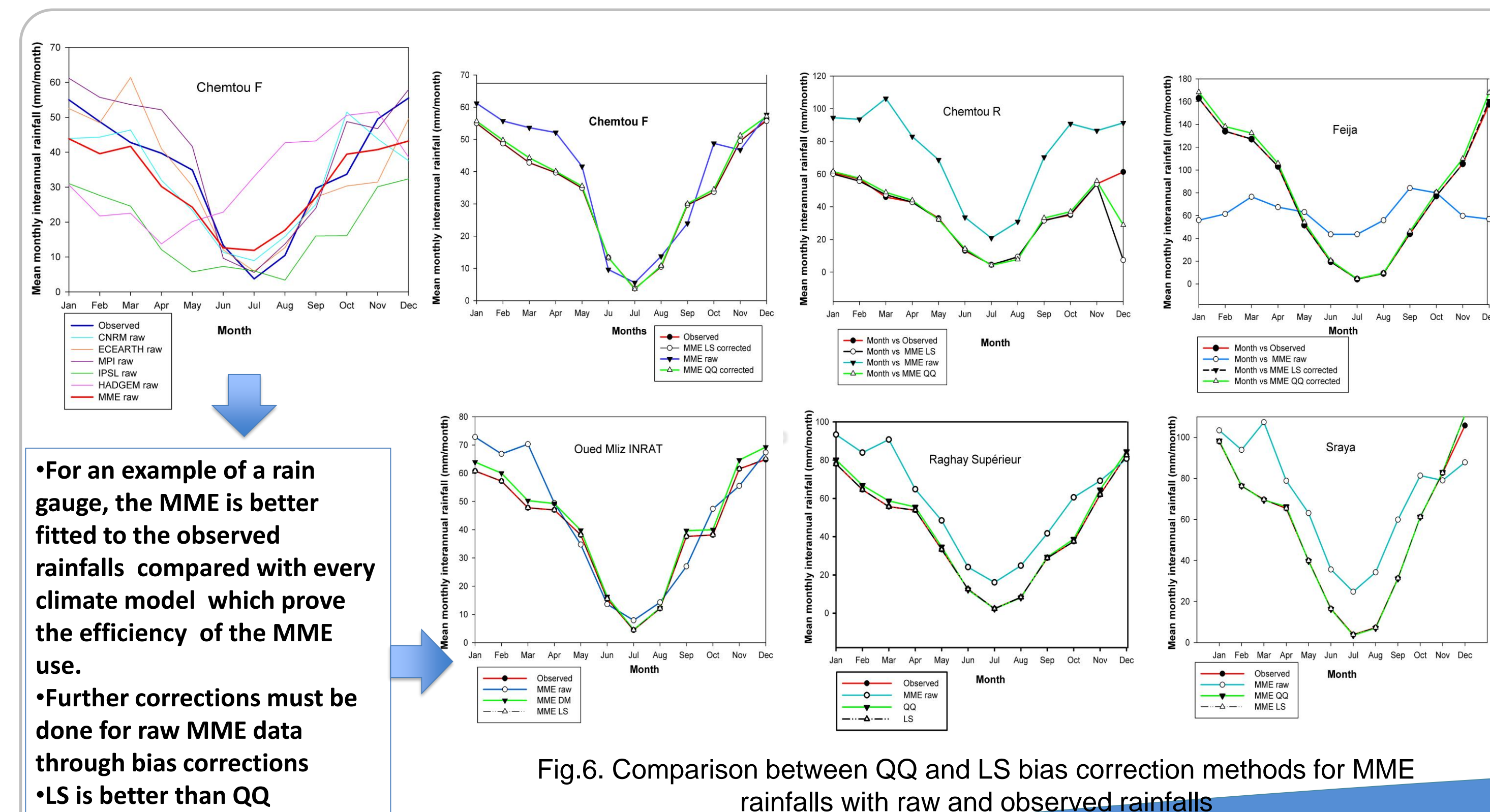
Hydrological model



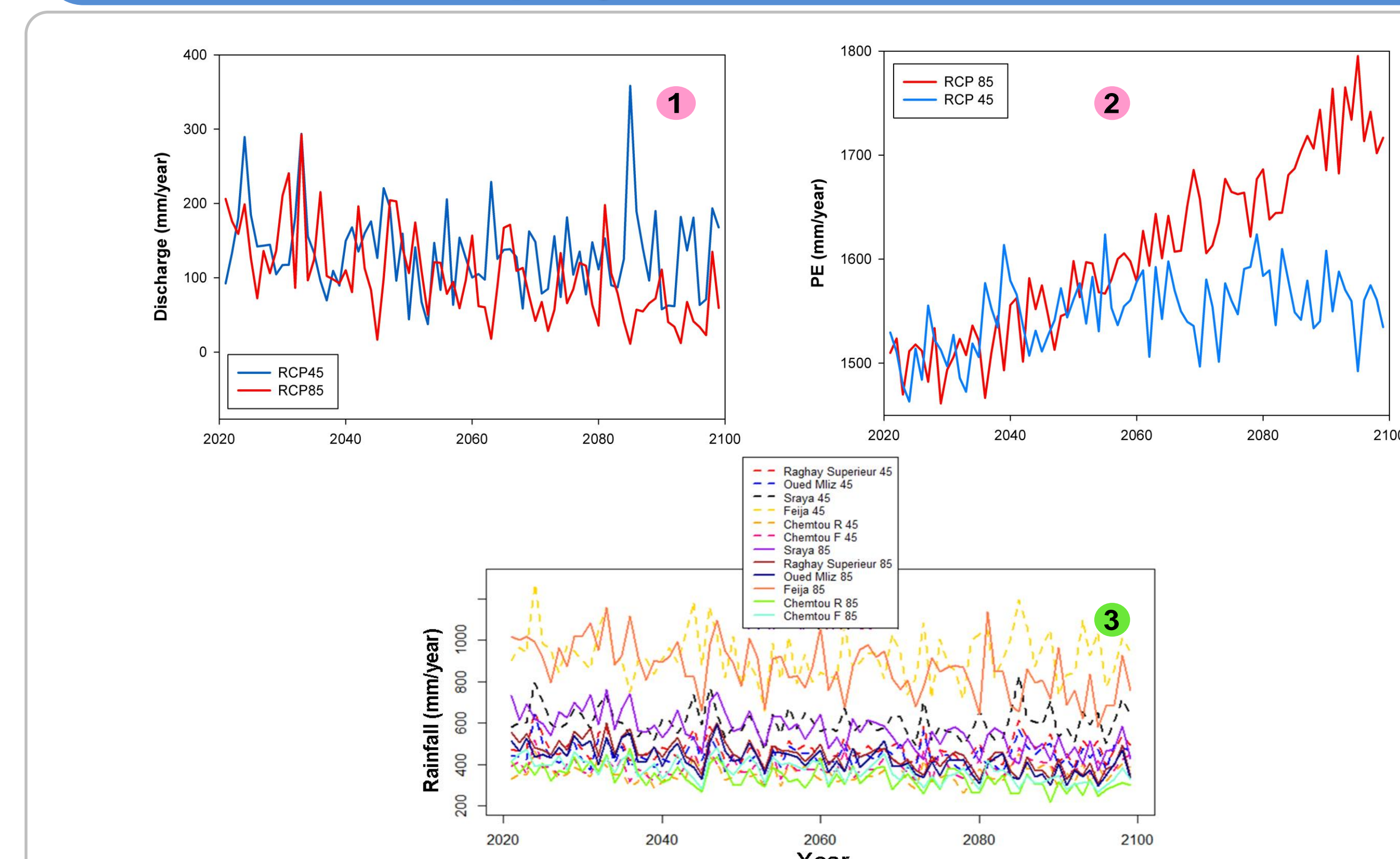
Modelling results using current climate conditions



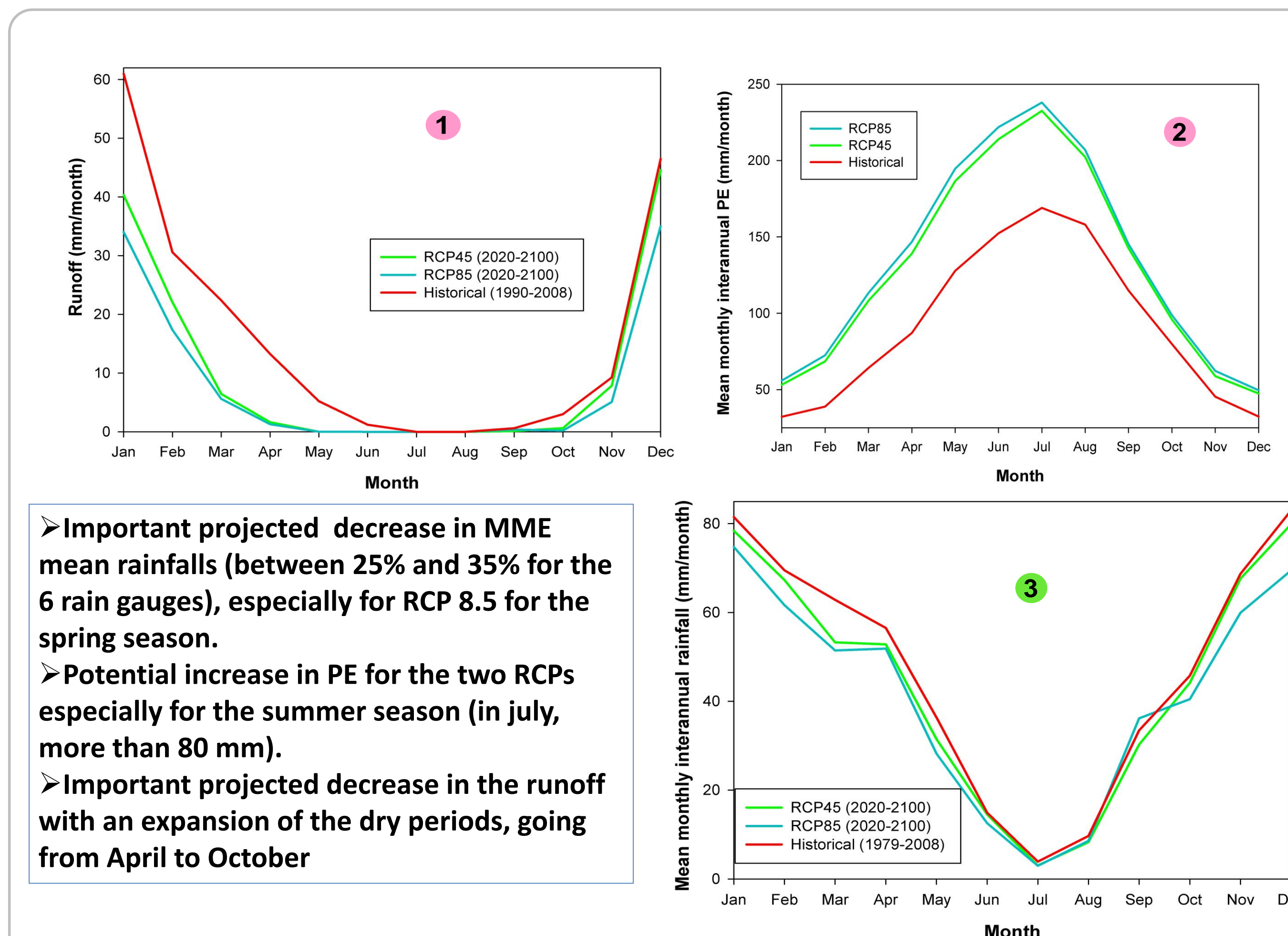
Bias correction methods evaluation



Future projections for the two RCPs



Comparison between current and future hydro-climatic conditions



Conclusions

- A robust hydrological model validated using historical climate conditions considered as an impact model. An 18-year period (1990_2008) of daily rainfalls, PE and discharge was used to catch a large range of past hydro-climatic conditions.
- Multi-Model Mean Ensemble (MME) derived from five Global Circulation Models (GCMs) dynamically downscaled with a Regional Climate Model (RCM) derived from the high resolution CORDEX projections framework. MME approach assessment for climate change and its influence evaluated on several hydrological indicators for the studied Mediterranean catchment.
- Bias correction methods comparison between QQ and LS with the observed rainfalls, confirmed that the simple LS method proved to be better fitted permitting to further minimize uncertainties related to the climate projections.
- Impact model forced with the RCPs 4.5 and 8.5 for the projected period (2020-2100) :
- Remarquable decrease in runoffs for RCP 4.5 (in January: 34 mm/month VS 62 mm/month for current conditions).
- Potential projected decrease in precipitation compared with the historical period for RCP8.5(decrease in precipitation varying between 25% and 35% for the six rain gauges).Important increase in PE for about 35% by the end of the century with an expansion of the dry periods, going from April to October

References

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Acknowledgments

The authors received funding from the project 'Adaptation of water resources management in the Medjerda watershed to the challenges of climate change' through the project 11 - axis 2 of the Wallonia International and Tunisia Joint Commission 2016-18. Brussels . Moreover, part of this research study was accomplished in the Laboratory of HydroSciences in Montpellier with the funding of mobility program provided by the Ministry of Higher Education and Scientific Research in Tunisia.