

Atelier Scientifique MED FRIEND  
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# Climate change and its predictable impacts on water resources

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**General objectives:**

1. Improve the knowledge on the predictable impacts of climate change on water resources & demands (2050/2100)
2. Update the prospective scenarios on water resources and demands in order to alert stakeholders and decision-makers
3. Promote adaptation strategies and measures (WDM, reuse, trade...)



- 2 main activities:**
1. Scientific approach: in partnership with HSM Lab. (PhD): hydrological modeling, prospective
  2. Regional study on adaptation strategies and measures

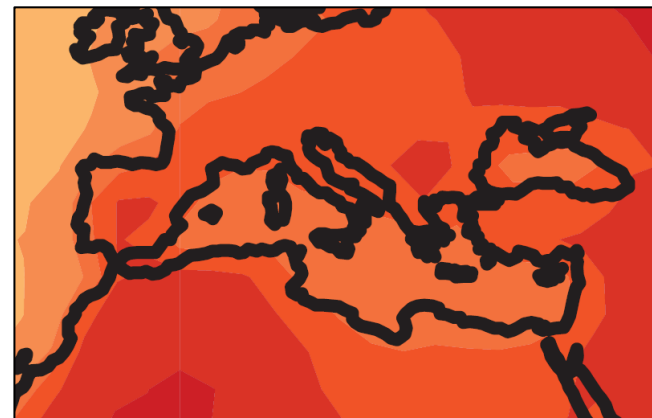
Links with the other PB activities (climate change, energy...)  
Potential inputs for the SWM



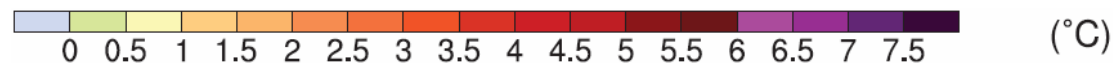
### Mediterranean region: climate change « hot spot »



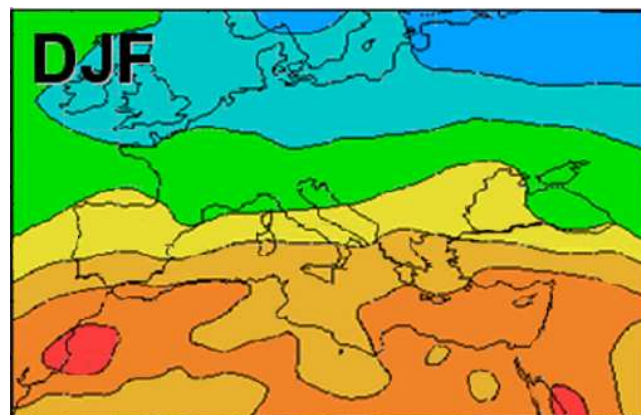
A1B : 2011 – 2030



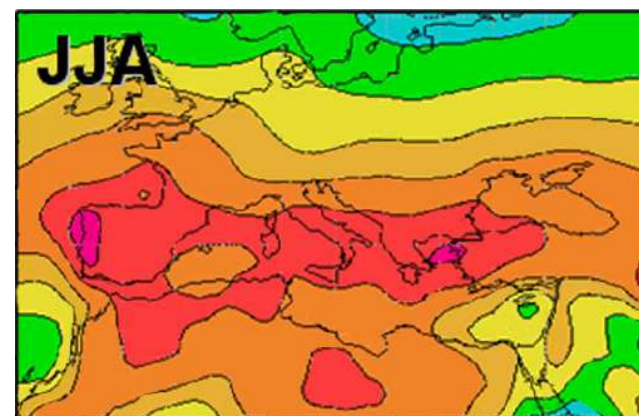
A1B : 2080 – 2099



Source: IPCC, 2007



DJF



JJA

A1B : 2071 – 2100



Source: Giorgi et Lionello, 2008



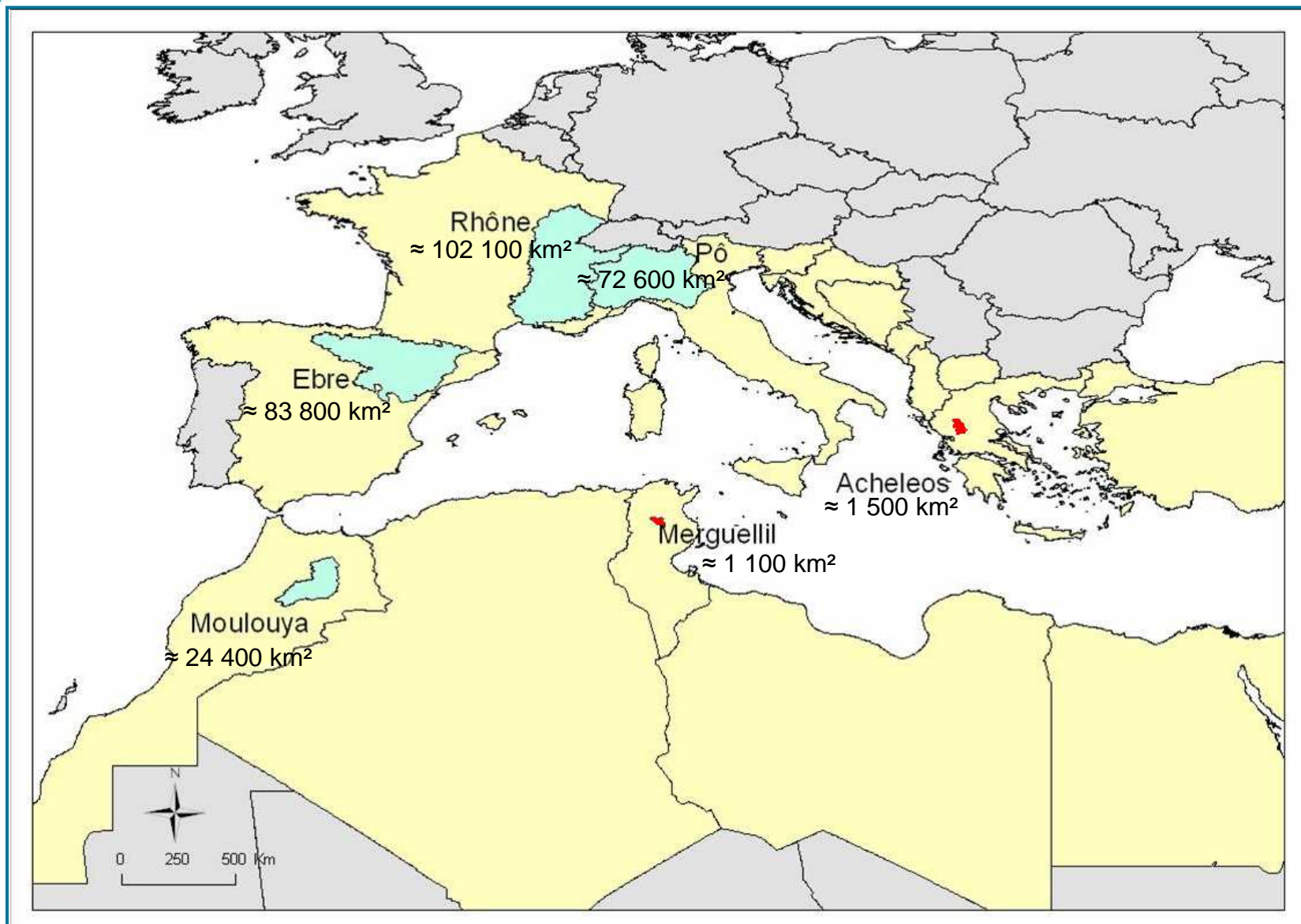
- ✚ **Works achieved during the Master training:**
  - **Study area**
  - **Hydrological model description**
  - **Climate change potential impacts on the water resources of 4 main Mediterranean catchment areas**
  
- ✚ **Objectives to be achieved during the Ph-D**



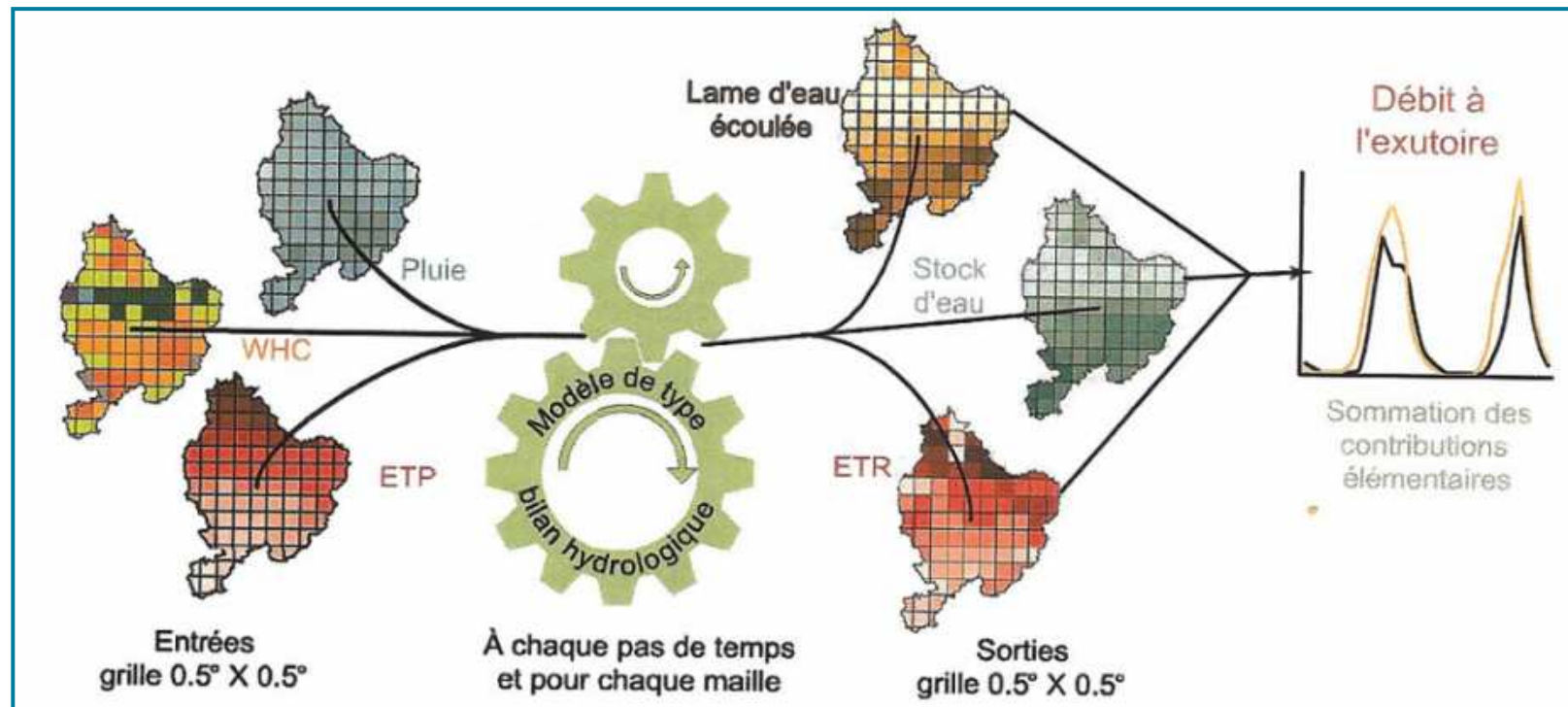
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GR2M - Génie Rural à 2 paramètres au pas de temps mensuel



Source: Ardoin-Bardin, 2004

MODEL'S LIMITS

- High water level often underestimated
- Low water level overestimated
- Longer low water level time period (≈ 1 month)

TRENDS



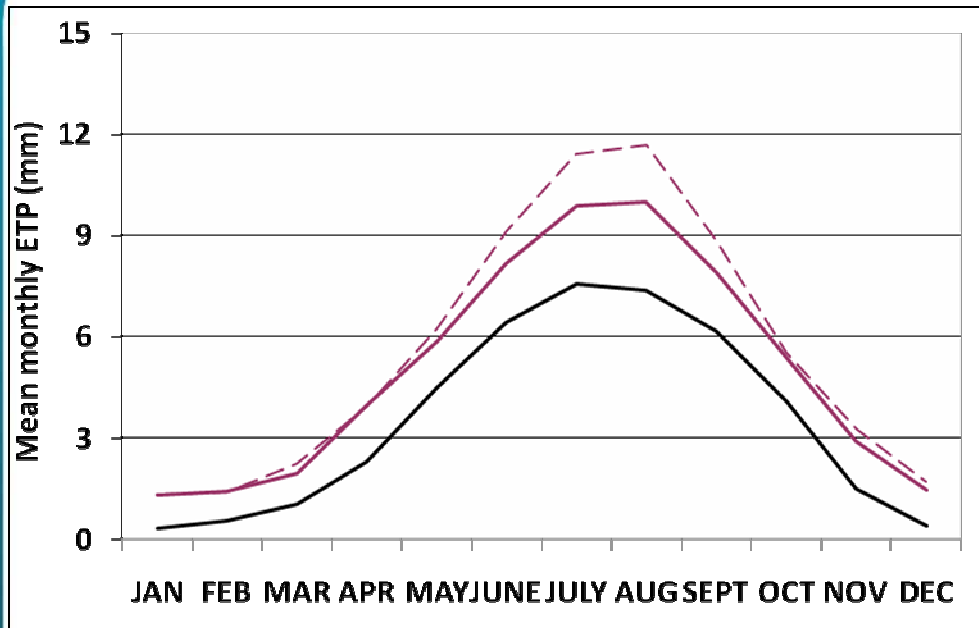
*Temperature evolution*

Horizon	IPCC	AOGCMs studied
2050	+2.5 à +3°C	+5 à +8°C
2100	+4.5°C	+10°C

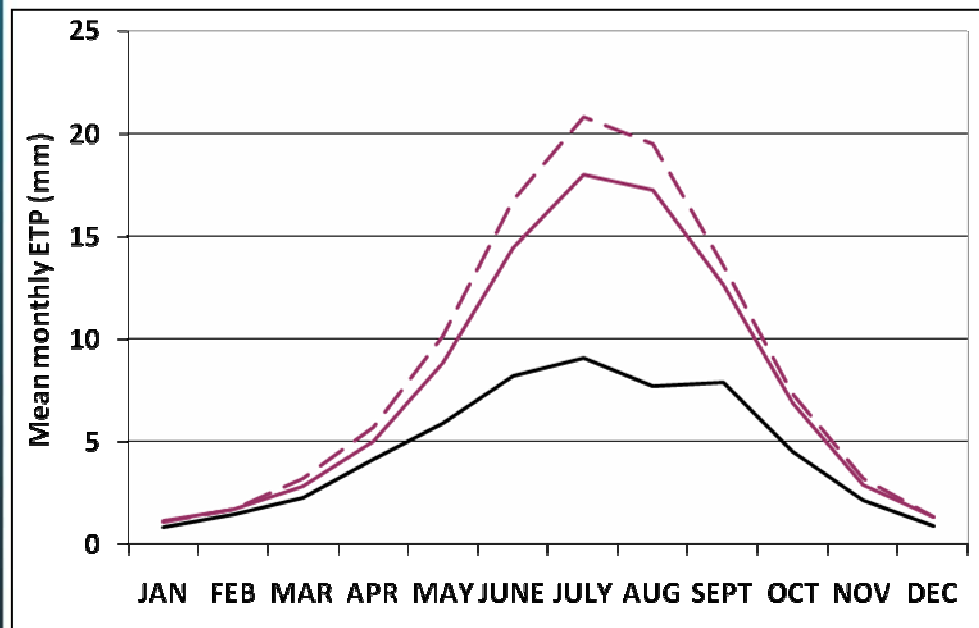
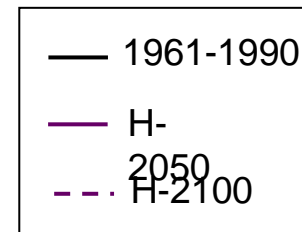
**WARNING !!!**



Evapotranspiration evolution



Rhône

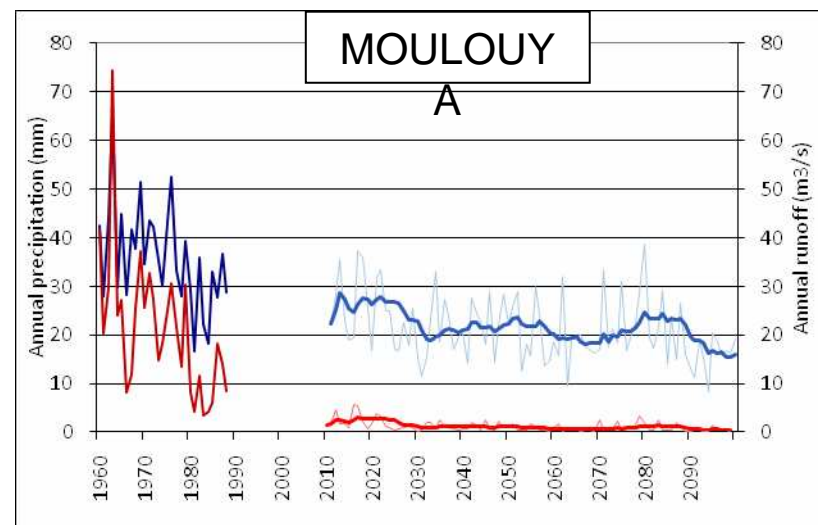
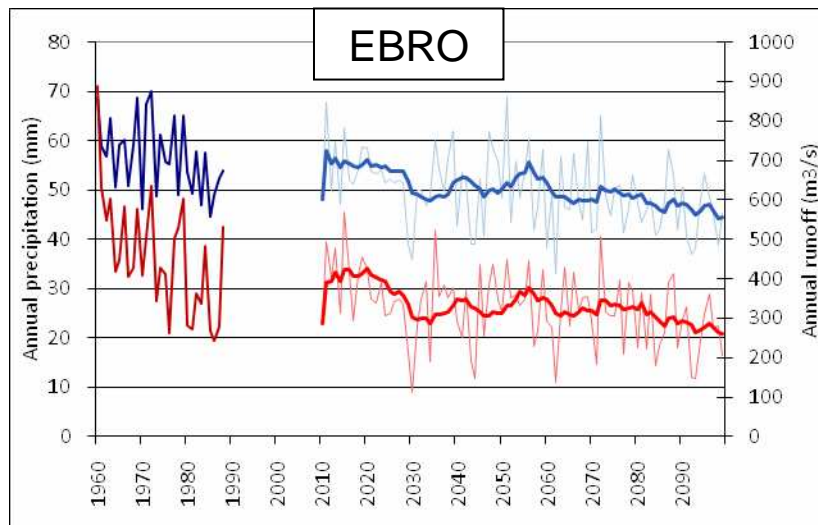
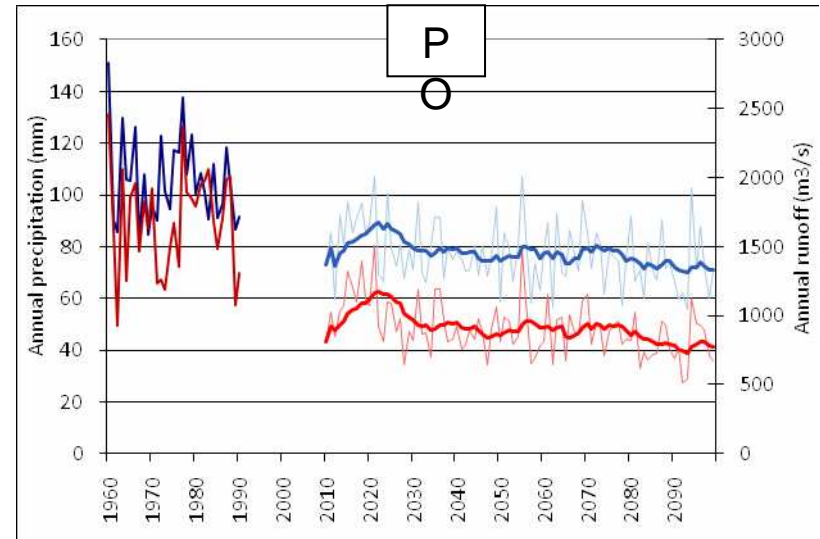
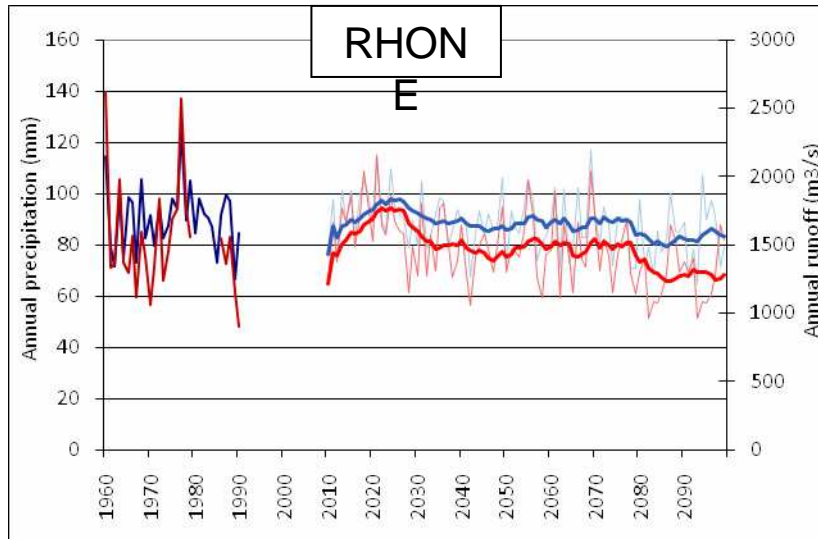


Moulouya



### 3. Climate change potential impacts on water resources

#### Precipitation and runoff evolution

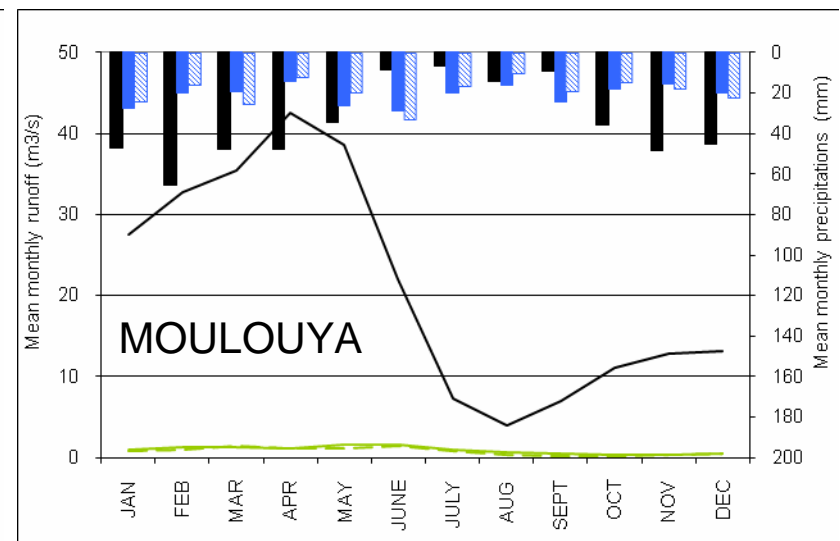
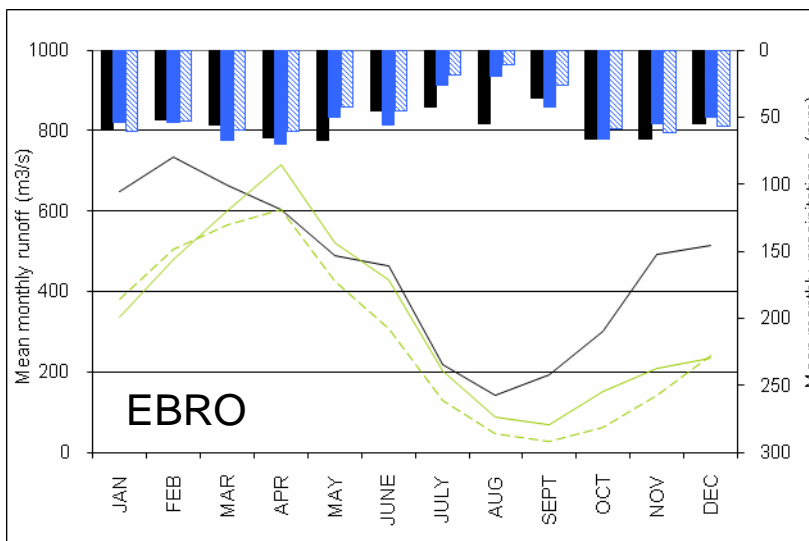
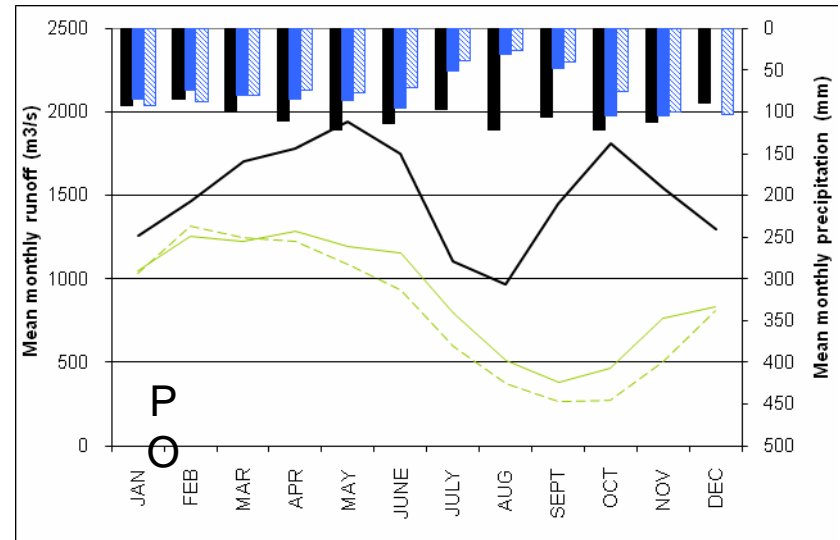
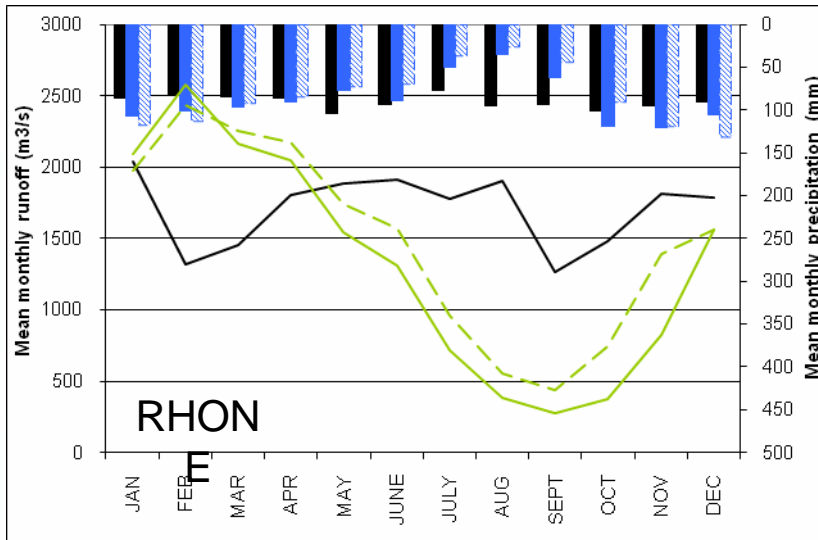


Mean annual precipitation: — 1961-1990 — H-2050 & H-2100 — 10 yrs mobile average  
 Mean annual runoff: — 1961-1990 — H-2050 & H-2100 — 10 yrs mobile average



### 3. Climate change potential impacts on water resources

#### Precipitation and runoff evolution



Mean monthly precipitation  
 1961-1990 2050 2100

Mean monthly runoff  
 1961-1990 2050 2100



*The study's limits*

- ✚ Difficulties of the hydrological model
- ✚ Data criticism
- ✚ Need to extend the study to other Med watersheds (notably in the South and East)



- **Improve the knowledge on predictable impacts of climate change on freshwater resources in the Mediterranean countries**
  - **Other hydrological model(s)**
  - **Mediterranean region scale or compared analysis of country groups**
- **Update Plan Bleu's prospective scenarios on freshwater resources and demands**
  - **Amend trends**
- **Suggest indicators to measure climate change impacts on water resources**



For more information

[www.planbleu.org](http://www.planbleu.org)



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The logo for plan bleu features the text "plan" above "bleu" with a stylized wave graphic below the text.