

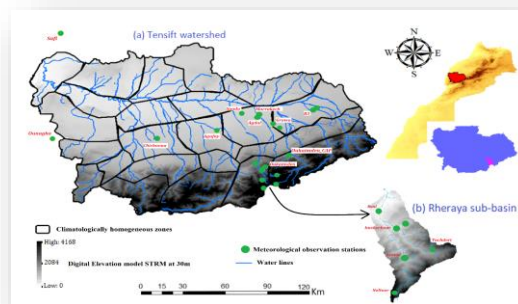
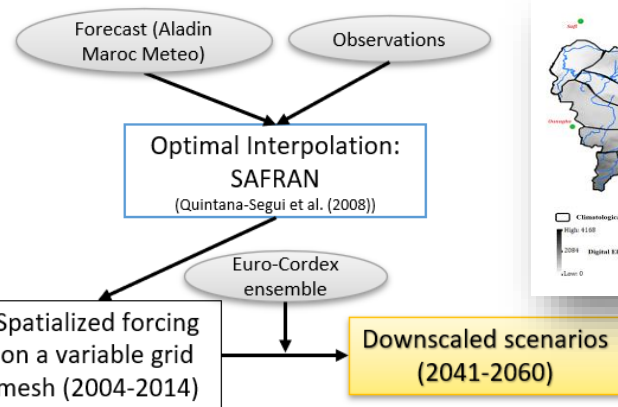
High-resolution futuristic climate forcing over semi-arid catchments: Case of the Tensift (Morocco)

Moucha, A.; Hanich, L.; Trambalay, Y.; Saaidi, A.; Gascoin, S.; Martin, E.; Le Page, M.; Bouras, E.; Szczypta, C.; Jarlan, L. Present and Future High-Resolution Climate Forcings over Semiarid Catchments: Case of the Tensift (Morocco). Atmosphere 2021, 12, 370. <https://doi.org/10.3390/atmos12030370>

Introduction

- The southern Mediterranean region is known as a “Hot spot” for Climate Change (Giorgi, 2006; Giorgi and Lionello, 2008; Seager et al., 2019).
- Accentuation according to the IPCC scenario (Warming, Drying) (IPCC, 2005).
- The mountainous region is expected to face increased warming compared to the surrounding plains in the future (Pepin et al., 2015).

Methodology



Downscaled scenarios (2041-2060)

Step 1: Disaggregation of the plain and the mountain station using Q-Q

Step 2: Application of the transfer functions to Euro-CORDEX scenario

Step 3: Application of the delta change coefficients to SAFRAN for RCP4.5 and RCP8.5 at 2041-2060.

Results

	Tmax (°C)		Tmin (°C)		Pr (mm/year)	
	Marrakech	Oukaïmeden	Marrakech	Oukaïmeden	Marrakech	Oukaïmeden
RCP4.5	+1,6	+1,9	+1,3	+1,8	-48 (-22%)	-96 (-19%)
RCP8.5	+2,2	+2,8	+1,9	+2,7	-70,8 (-32%)	-181,2 (-35%)

Tb. 1: Annual changes considering the median of temperature (Tmax, Tmin) and precipitation (reduced or gain) by the model ensembles on the stations of Marrakech and Oukaïmeden_CAF over 2050.

Fig. 1: The future projections of minimum and maximum temperature and precipitation at the Marrakech (left) and Oukaïmeden_CAF (right) stations according to the two scenarios RCP4.5 and RCP8.5 for the horizon 2041-2060. The lines represent the mean of the models, and the hatched section corresponds to the mean $\pm$ standard deviation of the 4 RCM models.

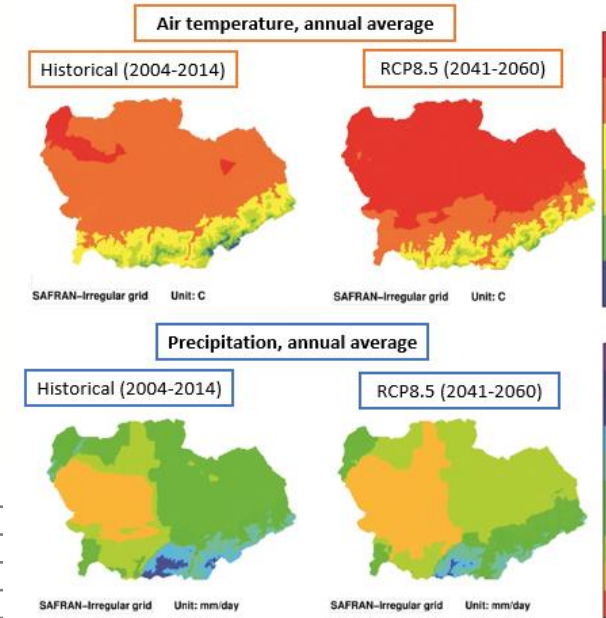
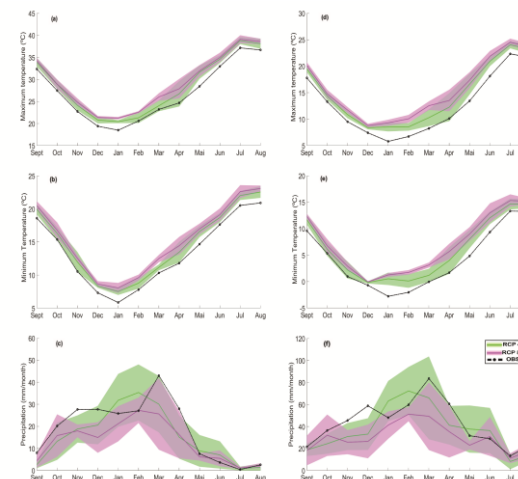


Fig. 2: Futuristic projections of SAFRAN-irregular grid on the Tensift Basin, according to RCP8.5 for 2041-2060.

	Mean temperature (°C)			
	RCP45		RCP85	
	SAFRAN	Euro-CORDEX	SAFRAN	Euro-CORDEX
basin	+1,64	+1,5	+2,38	+2,2
plain	+1,48	+1,5	+2,12	+2,1
mountain	+1,71	+1,7	+2,5	+2,5

	Precipitation (mm/year)			
	RCP45		RCP85	
	SAFRAN	Euro-CORDEX	SAFRAN	Euro-CORDEX
basin	-32,99 (-11%)	-36,2 (-15%)	-58,5 (-20%)	-72,31 (-31%)
Plain	-34,66 (-16%)	-35,78 (-16%)	-65,19 (-30%)	-69,33 (-31%)
mountain	-32,22 (-9%)	-37,32 (-14%)	-55,4 (-16%)	-80,30 (-32%)

Tb. 2: Annual changes considering the mean of temperature (Tmax, Tmin) and precipitation (reduced or gain) by Euro-CORDEX and SAFRAN on the basin, the plain and mountain part over 2050.