Characteristic features of climate variability and change over the Maghreb region

Fatima Driouech
National Centre for Meteorological Research
Direction de la Météorologie Nationale, Morocco

Köppen classification for the long-term average climate (1901–2010).
http://hanschen.org/koppen
CPC Precip Climatology (1971-2000)

Seasonal Fraction of Annual Precipitation
based upon climatological precipitation using the 1981-2010 base period
from the monthly CPC Merged Analysis of Precipitation (CMAP) dataset
Seasonal Fraction of Annual Precipitation
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annual mean temperature anomaly in Tunisia

Soumay Ben Rached (INM, Tunis)
Trends of temperature (°C/décennie) : 1960-2012

Trends of warm extreme events at different locations in Morocco: hot days and heat waves

With thanks to Wafae Badi
Trends of cold extreme events at different locations in Morocco:
cold days and cold waves

With thanks to Wafae Badi

Evolution of annual precipitation in Oran (Algeria)

Source: TABET-AOUL Mahi (« Agriculture et développement rural
durables en Méditerranée » 8-10 mai 2008. Institut agronomique méditerranéen de Bari)
Evolution of annual precipitation in Tunisia

With thanks to Soumay Ben Rached (INM, Tunis)

Annual total amounts of precipitation in Tunis for 1961-2007

The trend is not significant and its sign change if we replace the 2003 value with the normal value.

Driouech et al. (2010)
Evolution of annual total rainfall in Morocco

- The country has experienced several drought events (1980-1985, 1994-1995 . . . )
- During a dry year, the deficit of rainfall can exceed, in some regions, 60% of the climatological value
- Rainfall amounts registered since 1961 show a negative trend at national and regional scales

Trends of maximum number of consecutive dry days in Morocco: 1960-2012
Many regions became more arid between 1961 and 2008 (Oujda, Taza, Kenitra, Rabat, Meknès, Rabat ...)

Trends of pnl90: 1960-2012

Driouech (2010)
Future changes

Precipitation

CCMa_rCP45
Annual
Horizon 2030

CCMa_rCP85
Annual
Horizon 2030

Z. Amouch, W. Sadiki, F. Driouech, W. Badi

Uncertainties related to future changes for precipitation

Changement moyen

Changement maxi

Nombre de modèles projetant une augmentation

Changement mini

a) Top: Mean change for mean precipitation (11 RCM) in %.
   Down: Number of models giving an increase in precipitation
b) Maximum change (top) and minimum change (down) in %

Driouech (2010)
Extreme precipitation quantiles computed from the observed distribution in the different stations and projected changes by the RCM ensemble (the significant changes at the 10% level are in bold).

From Tramblay et al (2012)
Global Climate model: AREPEGE-Climat

Aladin-Climat → RCM

With thanks to K. El RHAZ

With Thanks

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