

Temperature change in the Mediterranean region



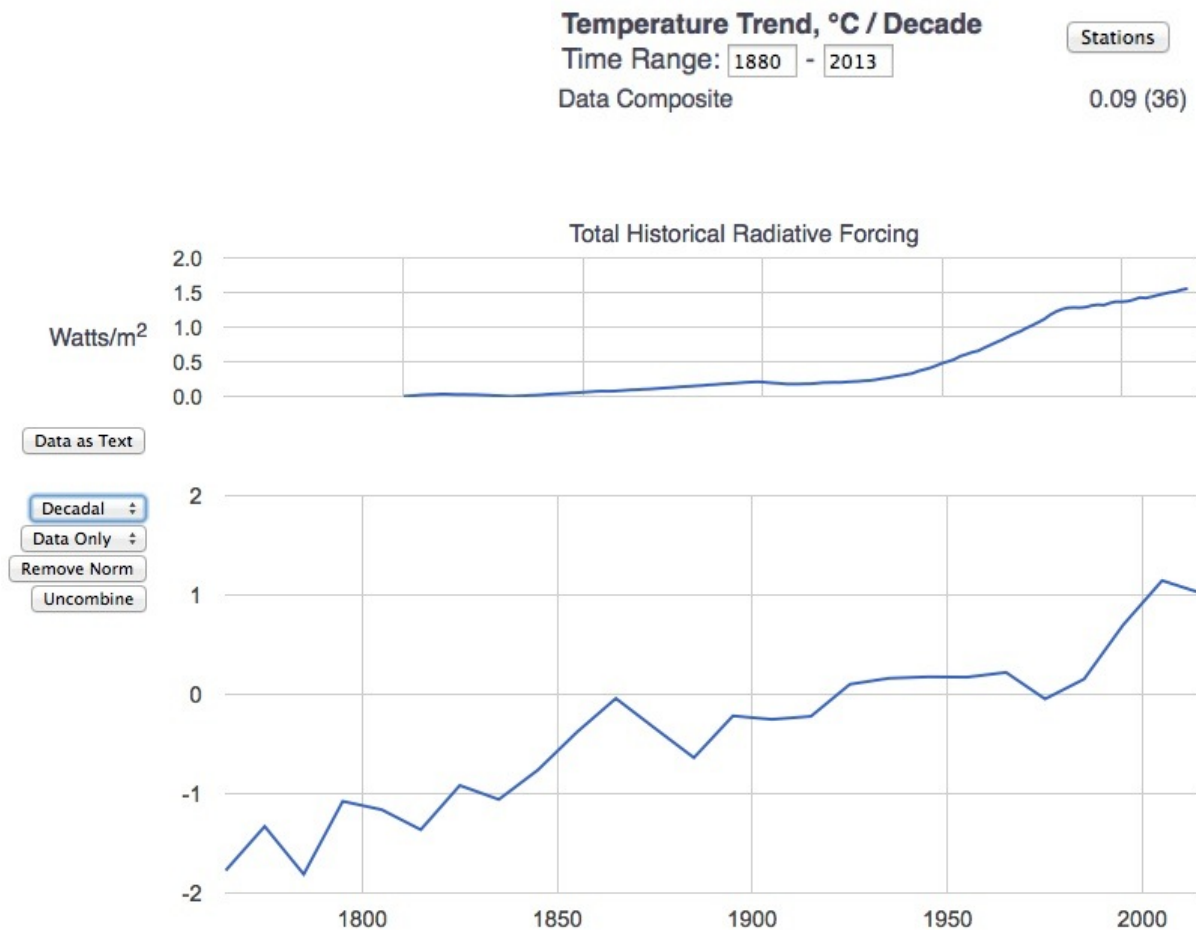
*Term project for “Global warming - the science of climate change -
by prof. David Archer”*

fall 2013

In this project we are examining the temperature changes gathered from stations in south Europe, Asia minor, and north Africa.

There are 36 stations from the whole region selected, each of them having great data to be worked with, from year 1850-1900, till present.

Combining all stations together to get an average temperature change we can see that from the period of 1880 till present day the temperature of the mediterranean region has been rising of 0.09 degrees C per decade, meaning that the temperature has increased of about 1.2 degrees C. Comparing that rise with the global average temperature rising from the same period of about 0.85 degrees C, we can see that the mediterranean region has been effected by a bigger rise of temperature for 0.35 degrees C. From the graph below it's interesting to see the significant increase of temperature from the 70's up until now.



Next we are examining all the AR5 models, to see which ones had the best fit with the data for historical and historicalNat.

	bcc-csm1-1	BNU-ESM	CanESM2	CCSM4	CNRM-CM5	CSIRO-Mk3-6	GISS-E2-H	IPSL-CM5A	MIROC-ESM	MRI-cgcm3	NorESM1-M
historical	0.11	0.12	0.04	0.07	0.02	0.02	0.05	0.12	0.03	0.07	0.04
historicalNat	0.03	0.02	-0.02	-0.01	0.00	0.03	-0.01	0.3	0.02	0.00	0.01

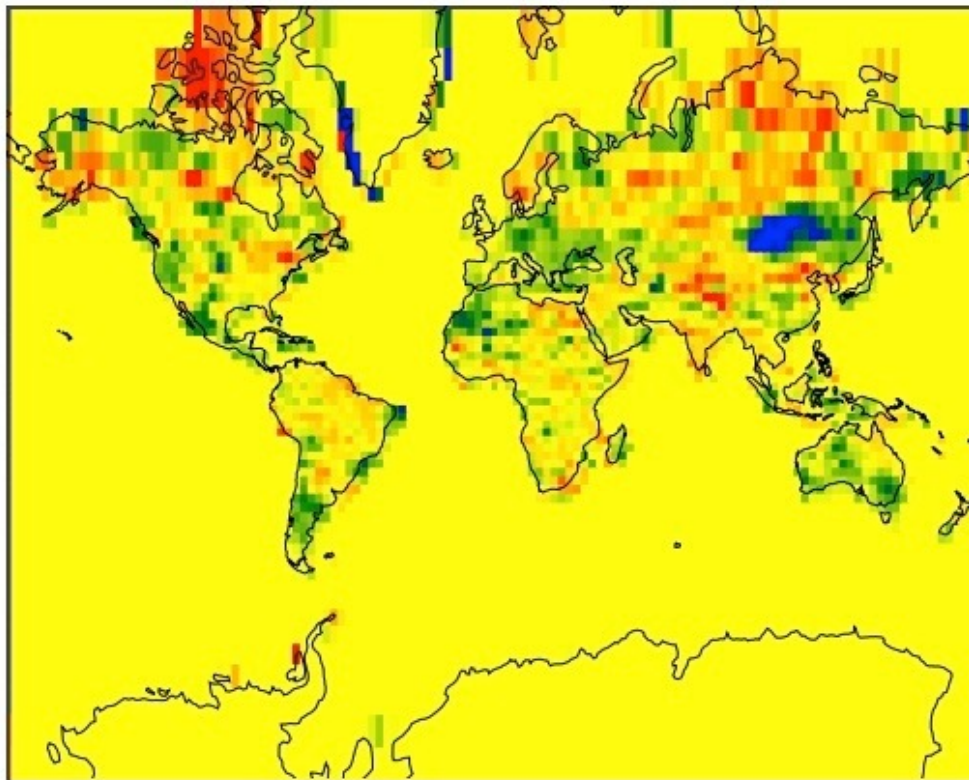
From the table above, we can see that the ‘bcc-csm1-1’ model, “CCSM4” model and “MRI-cgcm3” model are closest to the region’s temperature change per decade of 0.09 degrees C. It is interesting to see that all this models have a historicalNat (without human impact) temperature change that is either 0 or very close to 0.

By getting a better view of what model is giving a close estimate to the real changes that are happening in the region, we can use this models to predict how the soil moisture would change by the end of this century.

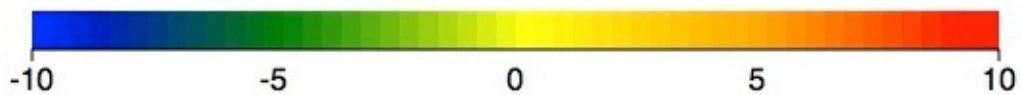
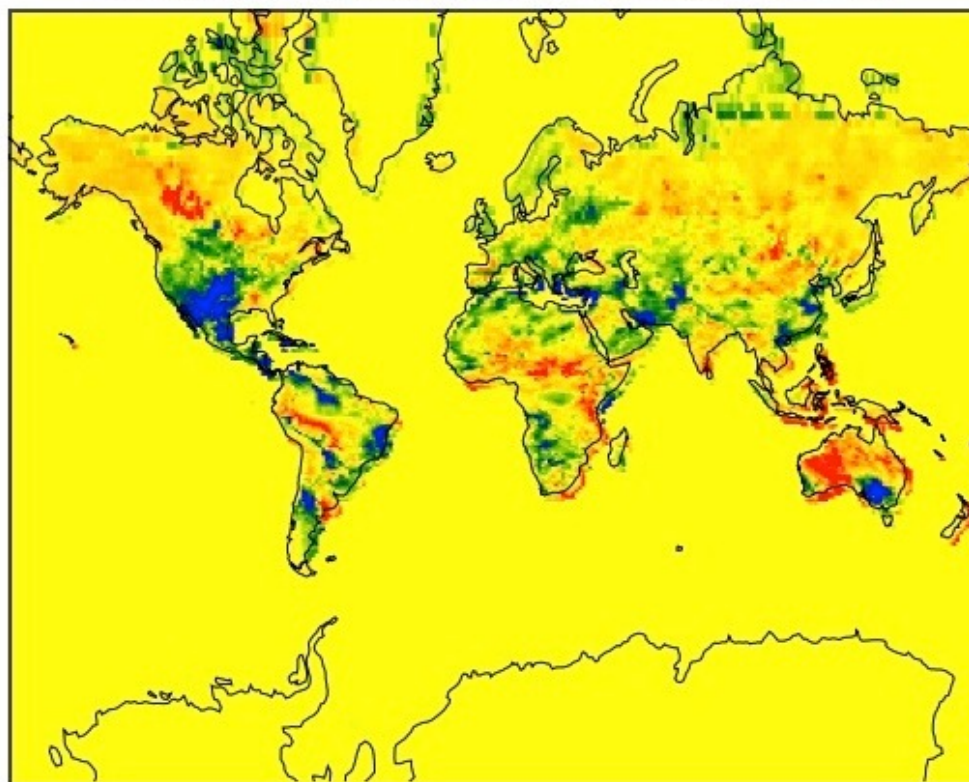
We are going to use the AR5 Climate model mapper, from where we are going to choose the ‘bcc-csm1-1’ model and the “CCSM4” model (the “MRI-cgcm3” model is not available for soil moisture) , to give us the anomalies of the soil moisture from the period of year 2013 to year 2099.

As you can see from the pictures below, even tho they are different from each other, both of them more or less are predicting that the mediterranean region will possibly have a severe drought problem by the year 2099.

bcc-csm1-1 Soil Mois Annual Mean, 0.37 Depth 2099 Anomaly



CCSM4 Soil Mois Annual Mean, 0.37 Depth 2099 Anomaly



References

1. Climate Time Series Browser with selected stations :
[http://climatemodels.uchicago.edu/timeseries/
#CPGmEBGIEIpIihEKDaKDmFBrMBkOBbBbIpIYIDCCBCBwBcMCrCqCc](http://climatemodels.uchicago.edu/timeseries/#CPGmEBGIEIpIihEKDaKDmFBrMBkOBbBbIpIYIDCCBCBwBcMCrCqCc)
2. AR5 Climate Model Mapper : <http://climatemodels.uchicago.edu/maps/>
3. <https://www2.ucar.edu/climate/faq/how-much-has-global-temperature-risen-last-100-years>