Geophysical Research Abstracts
Vol. 19, EGU2017-18726-1, 2017
EGU General Assembly 2017

The role of atmospheric circulation in the Mediterranean precipitation response to climate change.

Giuseppe Zappa, Brian Hoskins, and Ted Shepherd
University of Reading, Reading, United Kingdom (g.zappa@reading.ac.uk)

The Mediterranean region has been identified as a climate change hot-spot, due to a projected reduction in precipitation which could have large socio—economic impacts by affecting fresh water availability for agricultural and societal needs. However, the mechanisms that control such precipitation change are not well understood and there is large uncertainty in the amplitude of the projected precipitation change. We here show that more than 80% of the variance in the wintertime precipitation change in the CMIP5 models projections is linked to uncertainty in the atmospheric circulation response to climate change. This is demonstrated by introducing a simple index of atmospheric circulation based on the intensity of the westerly flow in North Africa. It is shown that the relationship between precipitation and circulation under climate change is consistent to what is found in the year to year variability. However, many CMIP5 climate models have biases in their ability of capturing the observed relationship between circulation and precipitation. This suggests that climate models may tend to underestimate the realised precipitation change for any given change in the atmospheric circulation.