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The Seasons' length in 21st Century CMIP5 projections over the Eastern Mediterranean

Assaf Hochman (1,2,3), Tzvi Harpaz (1,2), Hadas Saaroni (2), and Pinhas Alpert (1)

(1) Department of Geophysics, School of Geosciences, Tel-Aviv University, Tel-Aviv, Israel, 69978 (assafhochman@yahoo.com), (2) Department of Geography and the Human Environment, School of Geosciences, Tel-Aviv University, Tel-Aviv, Israel, 69978, (3) Porter School of Environmental Studies, School of Geosciences, Tel-Aviv University, Tel-Aviv, Israel, 69978

The eastern Mediterranean (EM) is expected to be influenced by climate changes that will significantly affect ecosystems, human health and socio-economic aspects. One aspect of climate change in this vulnerable area is the length of the seasons especially that of the rainy winter season against the warm and dry summer.
Here, the synoptic seasons' definition of Alpert et al. (2004) was applied to an ensemble of eight CMIP5 models, under RCP8.5 and RCP4.5 scenarios, to predict the changes in the lengths of EM seasons during the 21st century. It is shown that the ensemble adequately represents the annual cycle of the main synoptic systems over the EM.
The analysis further suggests that at the end of the 21st century, the duration of the synoptic summer, characterized by the occurrence of the Persian Trough, is expected to be lengthened by 49%, while the synoptic winter, characterized by the occurrence of the Cyprus Low, is expected to be shortened by 56% under the RCP8.5 scenario. This may lead to substantial changes in the hydrological regime and water resources, reduce the potential of dry farming, increase the risk of fires and air pollution and change the timing of seasonal health hazards.
The predicted changes in the regional synoptic patterns, leading to changes in the length of the seasons, may be related to several processes as follows; strengthening of the south Asian Monsoon during the summer, expansion of the Hadley Cell, land-sea temperature gradient increase and migration of the mid-latitude winter cyclone tracks northward. The predicted northward shift of Mediterranean cyclones also finds expression in the increased frequency of the Red Sea Trough during autumn, winter and spring.

Citation
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Reference
Alpert P, Osetinsky I, Ziv B, Shafir H. 2004. A new season's definition based on classified daily synoptic systems: an example for the eastern Mediterranean. International Journal of Climatology 24: 1013-1021. DOI: 10.1002/joc.1037