Geophysical Research Abstracts
Vol. 17, EGU2015-7898, 2015
EGU General Assembly 2015

Mediterranean summer climate and the importance of Middle-East Topography

Isla Simpson, Richard Seager, Tiffany Shaw, and Mingfang Ting
Lamont-Doherty Earth Observatory, Columbia University, United States (isla@ldeo.columbia.edu)

In summer, the atmospheric circulation over the Mediterranean is characterized by localized intense subsidence and low level northerlies over the central- to eastern portion of the basin. Here, simulations with the Community Atmosphere Model, version 5 are used to investigate the influence of the elevated terrain of North Africa and the Middle East on this summertime circulation. This builds on previous work that recognized a role for North African topography in localizing the Mediterranean subsidence.

By flattening the two regions of elevated terrain in the model it is demonstrated that, while they both conspire to produce about 30% of the summertime subsidence, contrary to previous work, the mountains of the Middle-East dominate in this topographic contribution by far. This topography, consisting primarily of the Zagros Mountain range, alters the circulation throughout the depth of the troposphere over the Mediterranean, and further East. The model results suggest that about 20% of the Mediterranean summertime moisture deficit can be attributed to this mountain induced circulation. This topography, therefore, plays an important role in the climate of the Mediterranean and the large scale circulation over the rest of Eurasia during the summer.

Further stationary wave modelling reveals that the mountain influence is produced via mechanical forcing of the flow. The greatest influence of the topography occurs when the low level incident flow is easterly, as happens during the summer, primarily due to the presence of condensational heating over Asia. During other seasons, when the low level incident flow is westerly, the influence of Middle-East topography on the Mediterranean is negligible.