Heat Wave Changes in the Eastern Mediterranean since 1960

Franz G. Kuglitsch (1,2), Andrea Toreti (1,2,3), Elena Xoplaki (1,4), Paul M. Della-Marta (5), Christos S. Zerefos (6), Murat Türkes (7), and Jürg Luterbacher (8)

(1) Institute of Geography, Climatology and Meteorology, University of Bern, Bern, Switzerland, (2) Oeschger Centre for Climate Change Research (OCCR), University of Bern, Bern, Switzerland, (3) Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA), Rome, Italy, (4) EEWRC, The Cyprus Institute, Nicosia, Cyprus, (5) Federal Office for Meteorology and Climatology, MeteoSwiss, Zurich, Switzerland, (6) Biomedical Research Foundation, Academy of Athens, Athens, Greece, (7) Department of Geography, Physical Geography Division, Faculty of Sciences and Arts, Çanakkale Onsekiz Mart University, Çanakkale, Turkey, (8) Department of Geography, Climatology, Climate Dynamics and Climate Change, Justus-Liebig University of Giessen, Giessen, Germany

Heat waves have discernible impacts on mortality and morbidity, infrastructure, agricultural resources, the retail industry, ecosystem and tourism and consequently affect human societies. A new definition of socially relevant heat waves is presented and applied to new data sets of high-quality homogenized daily maximum and minimum summer air temperature series from 246 stations in the eastern Mediterranean region (including Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Cyprus, Greece, Israel, Romania, Serbia, Slovenia, Turkey). Changes in heat wave number, length and intensity between 1960 and 2006 are quantified. Daily temperature homogeneity analysis suggest that many instrumental measurements in the 1960s are warm-biased, correcting for these biases regionally averaged heat wave trends are up to 8% higher. We find significant changes across the western Balkans, southwestern and western Turkey, and along the southern Black Sea coastline. Since the 1960s, the mean heat wave intensity, heat wave length and heat wave number across the eastern Mediterranean region have increased by a factor 7.6 ±1.3, 7.5 ±1.3 and 6.2 ±1.1, respectively. These findings suggest that the heat wave increase in this region is higher than previously reported.