DETAILED ANALYSIS OF EXTREME HEATWAVES IN SERBIA, SOUTH-EAST EUROPE

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INTRODUCTION:

During the last 20 years, the magnitude and impact of heatwaves in Europe have increased substantially, thus raising concerns not only in the European continent but worldwide. Many studies have emphasized how important is the understanding of present changes, along with the prediction of future occurrences. Heatwaves have devastating impacts on different systems and the first one to think of is the impact on human health. A detailed analysis of extreme heatwave events in Serbia from the biometeorological point of view is presented in this study. For this purpose, the newly developed Heat Wave Magnitude Index daily (HWMId), was used on Physiologically equivalent temperature (PET) for Serbia.

OBJECTIVES:

The main target of this paper is to describe and analyze the meteorological conditions and the consequences of this phenomenon.

METHOD / DESIGN:

For the identification of the most extreme heat waves over South East Europe (SEE) the E-OBS 20.0e dataset in 0.1° horizontal grid spacing was used, which is analogous to that used in the ERA5 reanalysis and CORDEX regional climate models. The HWMId was calculated using daily maximum temperatures for SEE and the events with the higest scores were used for further detailed analysis. The focus was then shifted on biometeorological conditions of heat waves in Serbia. A series of daily maximum air temperature, relative humidity, the wind was used to calculate PET for the iperiod 1979–2019. HWMId is defined as the maximum magnitude of the heatwaves in a year. Here, the heatwave is characterized as 3 consecutive days with maximum PET above the daily threshold for the reference period 1981–2010.

RESULTS:

The analysis revealed that during the investigated period the most intensive heat waves in SEE occurred in 2007, 2012 and 2015. HWMId values for 2007 were as high as 37 indicating extreme heat stress, while for the other two events the values were not as high. In Serbia biometeorological heat waves was very intense during 2007 with HWMId ranging between of 8 to 23. Hourly temperatures revealed that the PET values during the day were as high as 55°C. The nighttime temperatures were very high as well, above 22°C. These high nighttime temperatures are very dangerous as they do not allow people to recover from daytime heat. When warm low temperatures are combined with high humidity, conditions can become dangerous, if not deadly, even in the middle of the night. Without relief from the heat at night, heat stress can continue to build and increase the risk of heat illnesses and death.

CONCLUSIONS:

Thus, the mitigation and adaptation to extreme temperature events are of vital importance for humans and their everyday activities. Future investigation should be oriented towards a way to deal with the oppressive heat. Additionally, more research is needed in order to explain and predict these catastrophic events. The main focus of future activities will be on determining the physical causes which lead to the occurrence of extreme heatwaves.

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