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Impact of climate change on hydrological extremes in Dobrogea region, Romania

Constantin Buta and Carmen Maftei
Ovidius University of Constanta, Romania (costi_buta@yahoo.com)

Over time, Dobrogea territory has faced with fluctuations more or less severe in terms of basic parameters such as temperature, precipitations and annual discharges of rivers.
It is highlighted the trend of aridity in the area, because of the fact that Dobrogea receives small amounts of water, ranging between 200-450 mm/year, with annual average temperatures lying around and above the average of 11ºC. This fact is also proceeding from the many studies realized by other researchers.
For this area there are also characteristic torrents (form of rainfall during the summer), the storms and floods accompanying these torrents of water on the narrow valleys, often intermittent, sometimes causing significant damage and even fatalities.
Torrential rainfalls and flash floods are sometimes very strong and produce catastrophic damages, as happened at Constanta (in 2001), at Tulcea (in 13.07.2004 and in 29.08.2004), at Tuzla, Pantelimon, Agigea and others.
At the opposite pole of the sporadic excess rainfall is drought, which is the largest meteorological phenomenon (both in time and in space) and the most obvious in Dobrogea climate. Drought represents the main argument of semi aridity of this region and the most visible image component which is observed by the inhabitants of this environment.
Correlation and study of hydro-meteorological extremes is performed using indices that take into account meteorological and hydrological parameters such as precipitations, temperature, discharges of rivers etc. Hydro-meteorological indices used for this study are: Angot rainfall index; Peguy Climograms; de Martonne drought index; Thornthwaite index Moduli coefficients and Deciles. According to the studied indices, for the accomplishment of this present paper, we can say that Dobrogea is among the driest regions in the country.
History of drought in Romania includes many dry years, of which are mentioned: 1894, 1888, 1904, 1918, 1934, 1945, but the droughts years with greater durations, more extensive in territory and severe, were those of 1946 and 2000, which affected Dobrogea region.
According to this study and analysis carried out for the period 1965-2005 (regarding of temperatures and precipitations) at eight stations in the Dobrogea region, and for the period 1965 to 2011 (regarding the discharges of rivers) there can be mentioned several dry years, but between them some of them have proved extremely dry, such as the range of years 1973 - 1976, 1980 - 1983, 1986 - 1987 and 2000, and the years with risk by excess of water were: 1966, 1969, 1988, 1997, 2004 and 2005.