

# DROUGHT MONITORING BULLETIN

19<sup>th</sup> October 2017

## HOT SPOT

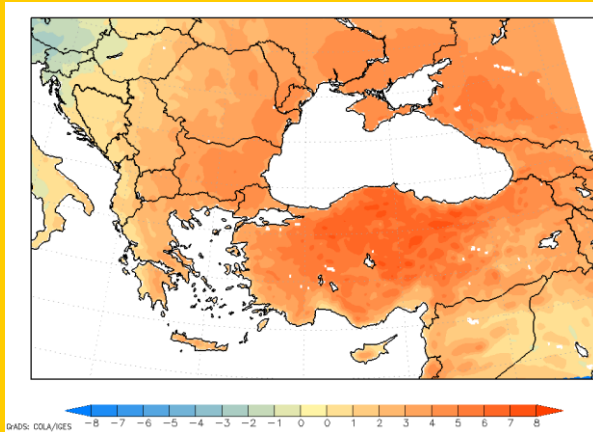
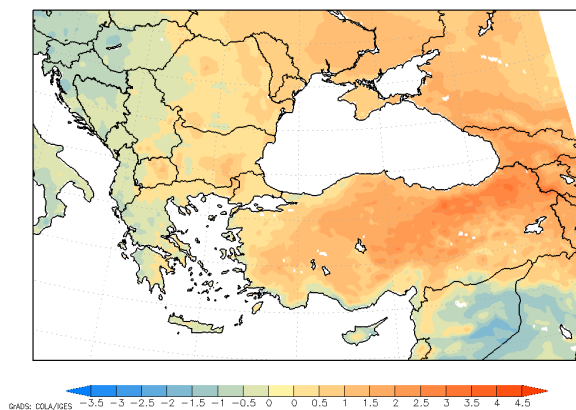


Figure on the left presents **anomaly of 10-day mean air temperature from 8<sup>th</sup>–17<sup>th</sup> September 2017**. That period was the warmest in the region this September and brought air temperatures high above the long-term average to Turkey and eastern half of Balkan Peninsula. Anomalies gradually increased towards southeast of the region with values stretching as high as 4–5 °C over Bulgaria, FYR Macedonia and eastern and southern Romania, and even up to 7–8 °C across vast area in northern Turkey.

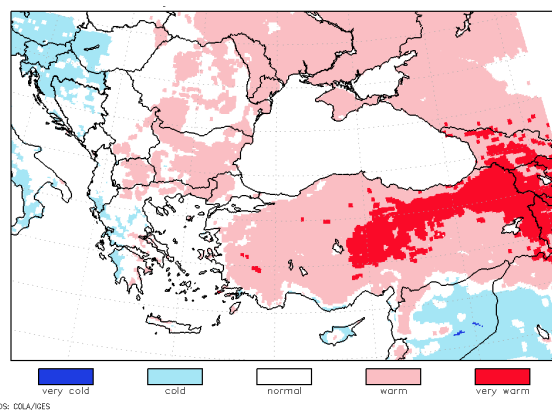
## AIR TEMPERATURES AND SURFACE WATER BALANCE

Figures in this section present anomalies of the average air temperature and accumulated water balance as well as classified values of the average **air temperature** and **surface water balance** in percentile classes for 60-day period from 9<sup>th</sup> August to 7<sup>th</sup> October 2017.

AVERAGE AIR TEMPERATURE  
ANOMALY (°C)  
9<sup>th</sup> AUGUST – 7<sup>th</sup> OCTOBER 2017



AVERAGE AIR TEMPERATURE  
PERCENTILE CLASSES  
9<sup>th</sup> AUGUST – 7<sup>th</sup> OCTOBER 2017



In first week of September, air temperatures ranged mainly around the average values. In far north-western part of Balkan Peninsula and areas along the western and southern Black Sea coastline, air temperature was up to 1 °C below the average but anomalies increased to positive values deeper into the continents, stretching up to 2 °C over southern Serbia and FYR Macedonia and up to 3 °C in eastern half of Turkey.

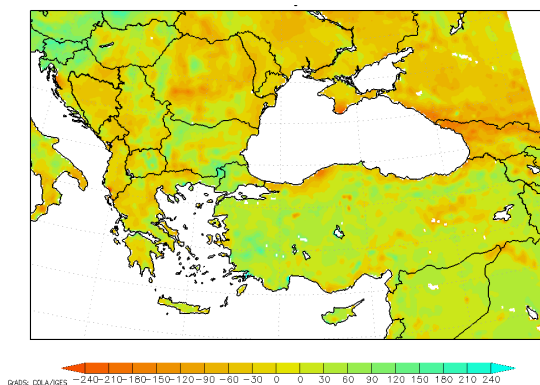
Second decade of September saw sudden increase of air temperature across most of the region. Although negative anomalies of around 1 °C persisted over western Hungary and northern Croatia and deepened over Slovenia where they stretched up to 3 °C below the average, the rest of the region experienced air temperatures high above the average. Positive anomalies from normal conditions ranged from 2–3 °C in eastern Hungary, north-western Romania, Serbia and Greece, and around 4–5 °C in eastern and southern Romania, Bulgaria, FYR Macedonia and south-western and eastern Turkey. Air temperatures of even up to 8 °C higher than normal for this time of year were present over central and northern Turkey.

In third decade of September, mean air temperature dropped below the usual values over most of Balkan Peninsula. Hungary and countries along the Adriatic Sea were all experiencing anomalies of up to –3 °C, in southern Bosnia and Herzegovina it stretched even up to 4 °C below the long-term average. Below-average air temperatures were present also in a belt stretching across the central Balkan Peninsula from eastern Hungary to Greece with values of anomalies of air temperature up to –2 °C. Air temperatures in third decade of September were above-average in Moldova, eastern Romania and eastern Bulgaria where anomalies from normal state ranged between 1–2 °C. In Turkey, unusually warm period of mid-September became less intensive that time of month but above-average air temperature remained in the area. Values ranged from 2–3 °C above the average in western and southern Turkey and gradually increased to 5–6 °C towards northeast of the country.

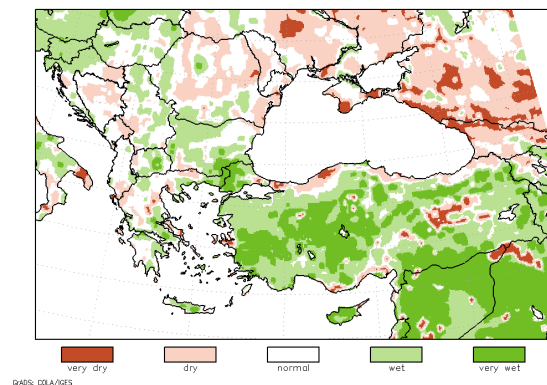
A spell of below-average air temperatures that first came in to the region in mid-September covered entire area in first week of October. Negatives anomalies from normal conditions were the smallest in Albania, coastal Greece and in western and parts of eastern Turkey where they ranged between –1 °C and –2 °C. Air temperatures deviated the most in Moldova, central and southern Romania and in parts of Serbia and Bulgaria where anomalies reached values as low as –4 °C.

Air temperature situation over the 60-day period from 9<sup>th</sup> August to 7<sup>th</sup> September shows negative anomalies present over entire western half of Balkan Peninsula and mainly positive anomalies over eastern half of the region. In Slovenia, Croatia and western Hungary anomalies of air temperatures ranged between –1 °C and –1.5 °C while in areas in a belt stretching from central Hungary, across Montenegro to Greece mean air temperature was around –0.5 °C below the average. On the other hand, 60-day average temperature anomalies show positive values between 0.5–1 °C over Moldova, Romania, Bulgaria, FYR Macedonia and eastern Greece, between 1.5–2.5 °C in western and central Turkey, and up to 3.5 °C in north-eastern Turkey where values classify among the highest 5% of the record for this time of year.

ACCUMULATED WATER BALANCE  
ANOMALY (mm)  
9<sup>th</sup> AUGUST – 7<sup>th</sup> OCTOBER 2017



ACCUMULATED WATER BALANCE  
PERCENTILE CLASSES  
9<sup>th</sup> AUGUST – 7<sup>th</sup> OCTOBER 2017

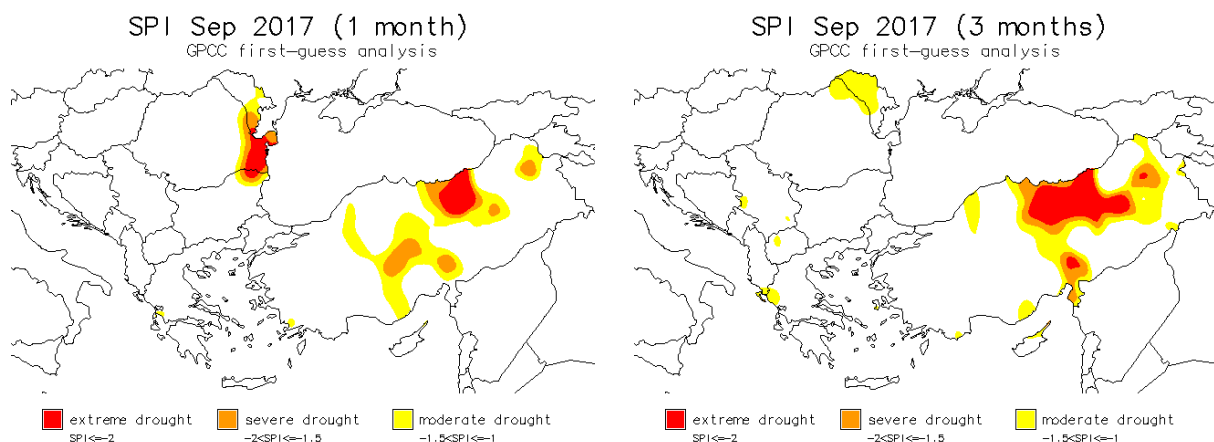


Although water balance anomalies were still mainly negative across most of Balkan Peninsula in August-September period, less intense evapotranspiration and higher rainfall rate helped improve the situation in the region compared to July-August period. Insufficient precipitation amount in southern Moldova, eastern Romania and parts of eastern Turkey contributed to water balance deficit between 30–60 mm, locally even up to 120mm. Water balance remained in negative values also over mountain areas of Balkan Peninsula: water balance deficit ranged between 30–90 mm over Dinaric Alps and western Greece, and between 60–120 mm over Romanian Carpathians. Positive water balance of 120–150 mm was present over Slovenia, northern Croatia and around Bosphorus Strait area while scattered parts in central Balkan Peninsula, mainly in Hungary, Serbia, FYR Macedonia and Bulgaria, and most of western and central Turkey experienced water balance surplus ranging between 30–90 mm.

## STANDARDIZED PRECIPITATION INDEX

*The drought situation with regard to the precipitation accumulation is presented by Standardized Precipitation Index (SPI). The SPI calculation is based on the distribution of precipitation over long-time period (30 years, in our case long-term average 1961–1990 was used). The SPI can be calculated at various time scales which reflect the impact of the drought on the availability of water resources. The long-term precipitation record is fit to a probability distribution, which is then normalised so that the mean (average) SPI for any place and time period is zero. SPI values above zero indicate wetter periods and values less than zero indicate drier periods. Only the dry part of the extreme anomalies is presented on the maps.*

Due to improved precipitation level in September, drought conditions in the region were present to a smaller extent in comparison to previous months. Precipitation deficit was highest in eastern Romania and north-eastern Turkey which brought extreme drought conditions to those parts of the region, according to SPI. Central Turkey as well as parts of eastern Turkey also experienced moderate to severe drought conditions. The rest of the region did not experience significant drought conditions in September. A 3-month overview of SPI index shows extremely dry conditions over wide part of north-eastern Turkey, mostly as a result of extreme drought conditions in the country in July and September. Moderate drought is pictured also over Moldova due to severe to extreme drought conditions present in July and August, as well as over a part of western Greece where extreme drought conditions hit the area in August.



## REMOTE SENSING – FRACTION OF VEGETATION COVER

Remote sensing products are currently not available.

## IMPACT REPORTS

In Bosnia and Herzegovina, unfavourable agrometeorological conditions during the summer accelerated the processes of ripening the crops so that harvest of certain mature crops began earlier than usual. Despite some precipitation period, soil moisture in depth was still very low [1, 2].

As reported in Romania, drought subsequently severely affected also cereal business since flow of the Danube river was very low and barges could not land in ports to load the cargo [3]. Affected was also electricity production as the level of Danube river at Romania's south-western border with Serbia was close to historic minimum of the last ten years and reservoirs levels have fallen to 63% [4].

In Greece, the extensive period of drought this year that hit the main olive-growing zones is thought to be very likely affecting domestic production of olive oil as concentration of olive oil in the fruit is expected to be notably reduced [5, 6].

[1]<http://rhmzrs.com/assets/images/meteorology/Agrometeorology/Agrometeorolo%C5%A1ka%20informacija/bilten%2004.09.-10.09.2017.pdf>

[2]<http://rhmzrs.com/assets/images/meteorologija/Agrometeorologija/Mjesecni%20bilteni/bilten%2018.09.-24.09.2017.pdf>

[3][http://stiri.tvr.ro/seceta-din-vara-aceasta-i-nivelul-scazut-al-dunarii-ii-afecteaza-grav-i-afacerile-cu-cereale\\_821845.html#view](http://stiri.tvr.ro/seceta-din-vara-aceasta-i-nivelul-scazut-al-dunarii-ii-afecteaza-grav-i-afacerile-cu-cereale_821845.html#view)

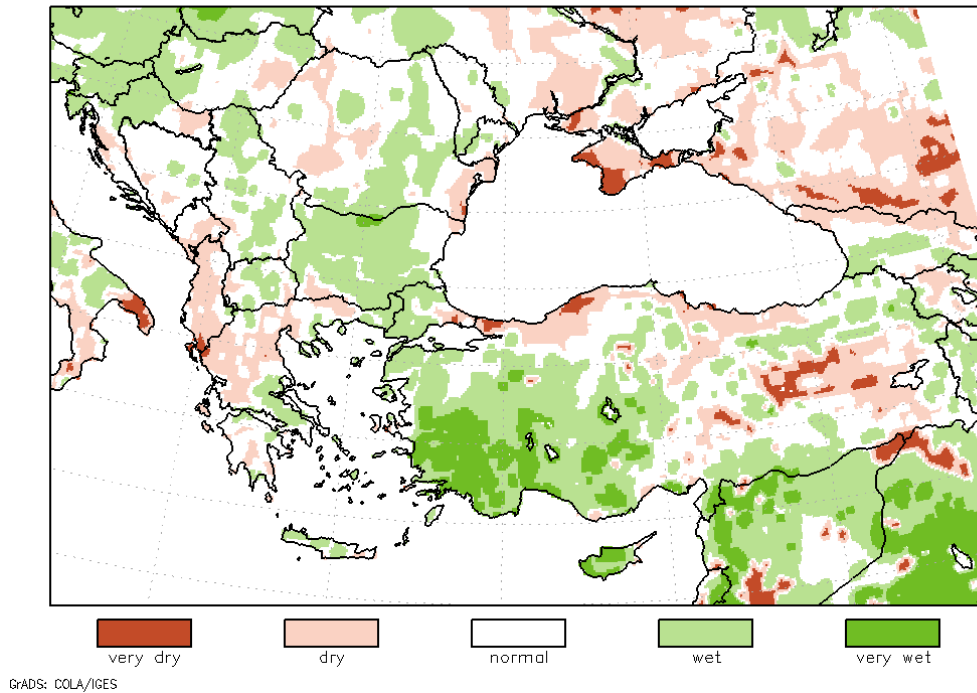
[4][http://stiri.tvr.ro/energia-electrica-afectata-de-seceta-anre-considera-ca-ar-trebui-regandit-intregul-sistem-de-produ\\_821019.html#view](http://stiri.tvr.ro/energia-electrica-afectata-de-seceta-anre-considera-ca-ar-trebui-regandit-intregul-sistem-de-produ_821019.html#view)

[5]<http://www.agronews.gr/ekmetaleuseis/diaheirisi-ekmetalleuseon/arthro/160878/i-anomvria-stafidiase-tis-epitrapezies-elies/>

[6]<http://www.agronews.gr/ekmetaleuseis/elaiones-kai-abelones/arthro/161026/i-xirasia-meionei-fetos-tis-elaioperiektikotites>

## OUTLOOK

Comparison of 60 Days Accumulated Water Balance  
Time Period 29 Aug – 27 Oct 2017 with Historical Percentile Classes



Water balance conditions will mostly remain unchanged across the region compared to situation in previous weeks. Slovenia, Hungary, Serbia, FYR Macedonia and Bulgaria will all remain in wet water balance conditions while northern and parts of eastern Turkey will continue to experience dry conditions. Slight improvement from dry to normal water balance levels is expected over northern and eastern Romania as well as over Bosnia and Herzegovina. Although levels of water balance will decrease over western half of Turkey, the area is still expected to remain in wet conditions. On the other hand, surface water balance conditions will change negatively from normal levels to dry conditions in Montenegro, Albania, Greece and eastern half of Turkey.

### Methodology

Drought monitoring bulletin is based on numerical weather prediction (NWP) model simulations over SE Europe, SPI index calculations and remote sensing. Precipitation data is provided by Global Precipitation data Centre (GPCC; gpcc.dwd.de). NWP simulations are performed with Non-hydrostatic Meso-scale Model (NMM, see: <http://www.dtcenter.org/wrf-nmm/users/>). Historical DMCSEE model climatology was computed with NMM model for time period between 1st January 1979 and 31st December 2016. European Centre for Medium Range Weather Forecast (ECMWF) ERA-Interim data set (see: <http://www.ecmwf.int/en/research/climate-reanalysis/era-interim>) was used as input for simulations. Long term averages (1979–2016), used for comparison of current weather conditions, are obtained from simulated data set. Comparison of current values to long term averages provides signal on potential ongoing drought severity.