DROUGHT MONITORING BULLETIN

Early spring 2018

HOT SPOT

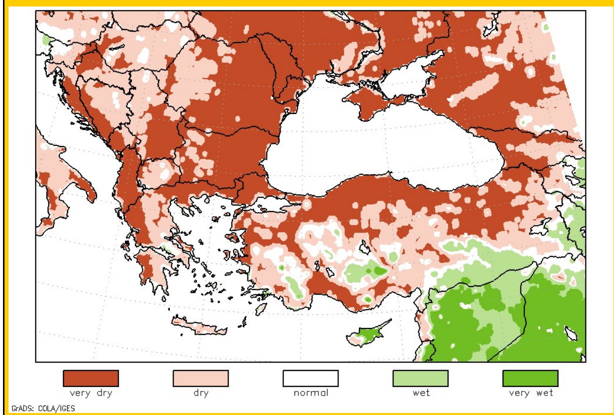
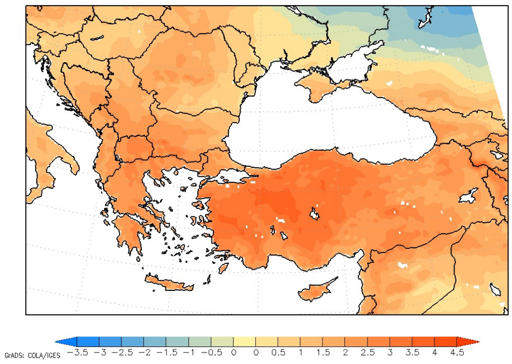


Figure on the left presents anomalies of **surface water balance in April** in percentile classes. With exception of areas in southern Turkey where accumulated water balance surplus ranged between 60–90 mm, the rest of the region experienced dry conditions. Extreme lack of rain across the most of the region and unusually warm air temperatures resulted in water balance deficit that classifies among the highest of the record for that time of year. It was most intense in eastern half of Balkan Peninsula, northern half of Turkey and in areas along the Adriatic Sea where negative anomalies ranged between 90–150 mm, locally even up to 210 mm.

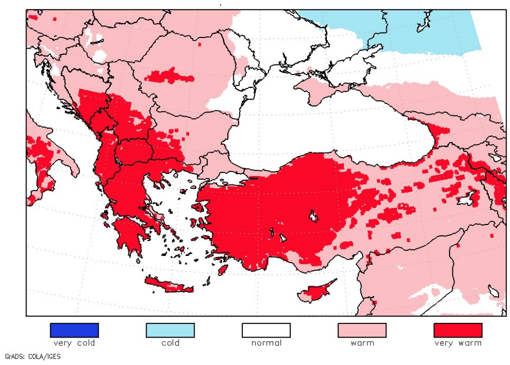
AIR TEMPERATURES AND SURFACE WATER BALANCE

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 2nd March to 30th April 2018****.*

AVERAGE AIR TEMPERATURE
ANOMALY (°C)
2nd MARCH – 30th APRIL 2018



AVERAGE AIR TEMPERATURE
PERCENTILE CLASSES
2nd MARCH – 30th APRIL 2018

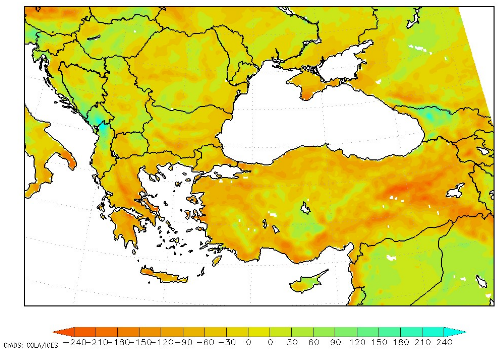


Norther parts of the region were unusually cold throughout entire March when air temperatures were between 1–2 °C, locally even 3 °C below the average across Slovenia, continental Croatia, Hungary and Moldova. On the other hand, March as a whole was unusually warm in Turkey when air temperatures were 2–4 °C, locally in mid-March even up to 6 °C above the average across most of Turkey. Also the rest of the region was unusually warm most of the month, air temperatures were between 2–4 °C higher than usual, but sudden cold spell in last week of March saw air temperature drop to 1–3 °C, in central Balkan Peninsula also up to 4 °C below the long-term average.

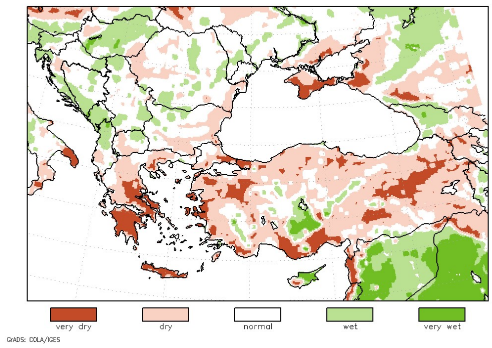
April was characterized by air temperatures well above the average across entire region, especially in last two decades of the month. In first days of April, anomalies ranged between 1–2 °C along coastal areas of the region and eastern Turkey, up to 3 °C in continental Balkan Peninsula, and up to 4 °C over northern Turkey. In second decade, air temperatures rose even higher above the average over Balkan Peninsula and western Turkey, and persisted at this level until the end of the month. That time, anomalies ranged between for 5–6 °C over most of Balkan Peninsula while its northern part experienced air temperatures as high as 7-8 °C above the average. Meanwhile, positive anomalies of 1–2 °C remained over eastern half of Turkey.

Also on a 60-day average between 2nd March and 30th April, air temperatures were higher than usual over the entire region. Anomalies from the average were the lowest, around 1–1.5 °C, in northwestern and eastern Balkan Peninsula but stretched to as high as 2–2.5 °C elsewhere in Balkan Peninsula and eastern Turkey, and to 3–4 °C over central and western Turkey.

ACCUMULATED WATER BALANCE ANOMALY (mm)
2nd MARCH – 30th APRIL 2018



ACCUMULATED WATER BALANCE PERCENTILE CLASSES
2nd MARCH – 30th APRIL 2018



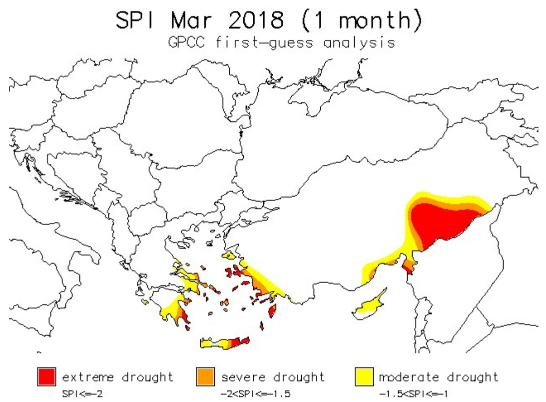
In northern half of Balkan Peninsula, water balance was favourable in March but April brought dry conditions. Over the 60-day window in early spring, accumulated surface water balance in that part of the region resulted in mainly favourable conditions although anomalies ranging from –60 mm up to 60 mm can be seen alternating across that area. Noticeable water balance surplus of up to 90 mm was present over Hungary and Slovenia, and surplus of even up to 210 mm over Montenegro and northern Albania.

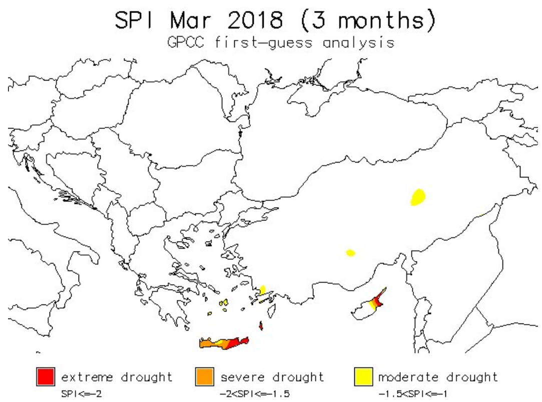
At the same time, lack of rain and warmer-than-usual air temperatures resulted in negative water balance anomalies in early spring over vast areas in southern part of the region. Negative anomalies ranged between 60–120 mm in western Romania, southern Bulgaria, FYR Macedonia and northern Greece. Accumulated water balance deficit was even lower in southern half of Greece and Turkey where anomalies of even up to –180 mm in central Greece and –240 mm in eastern Turkey were among the driest 5 % of the record.

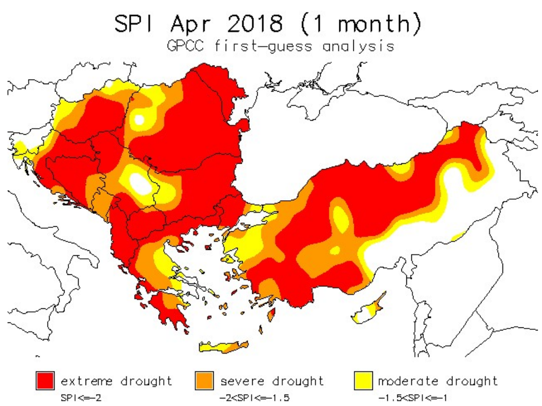
STANDARDIZED PRECIPITATION INDEX

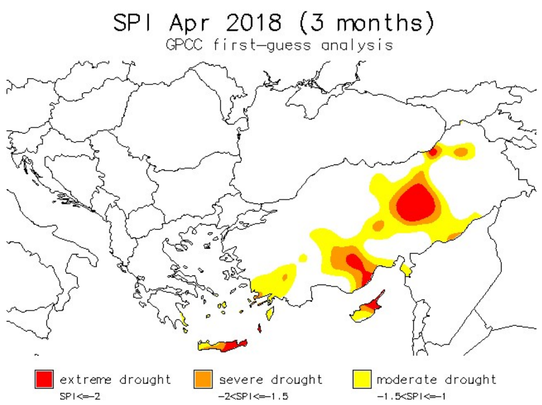
The drought situation with regard to the precipitation accumulation is presented by Standardized Precipitation Index (SPI). The SPI calculation is based on the distribution of precipitation over long-time period (30 years, in our case long–term average 1961–1990 was used). The SPI can be calculated at 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.

Standardized precipitation index for March and April are shown in figures below. SPI for one month indicate possibly drought conditions which can have impact on vegetation, while SPI in three month period can be related also with surface water status.
Only islands at the south of the region and part of south-eastern Turkey were outstanding in March (SPI 1) with moderate to extreme drought conditions.
Significantly different was situation in April due to the lack of precipitation which coincides with very high air temperatures. Major part of the region experienced extreme drought conditions. Only north-western part and south, south-eastern Turkey are labelled as areas with no-drought conditions. SPI for three-month period in April (approximately from February to April) show negative values, meaning negative anomalies in amount of precipitation, in parts of central and southern Turkey.





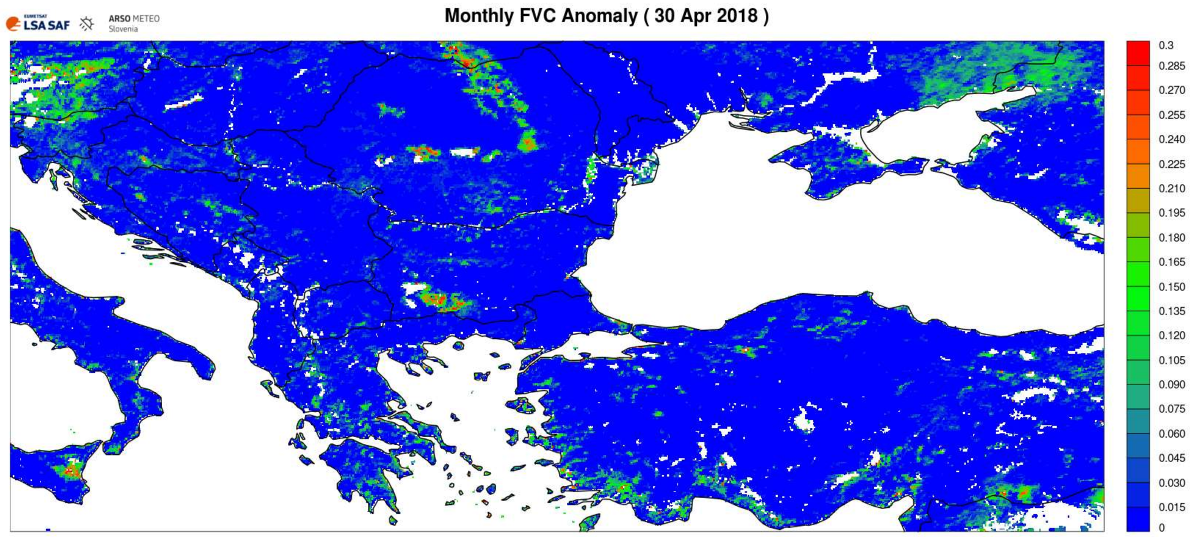


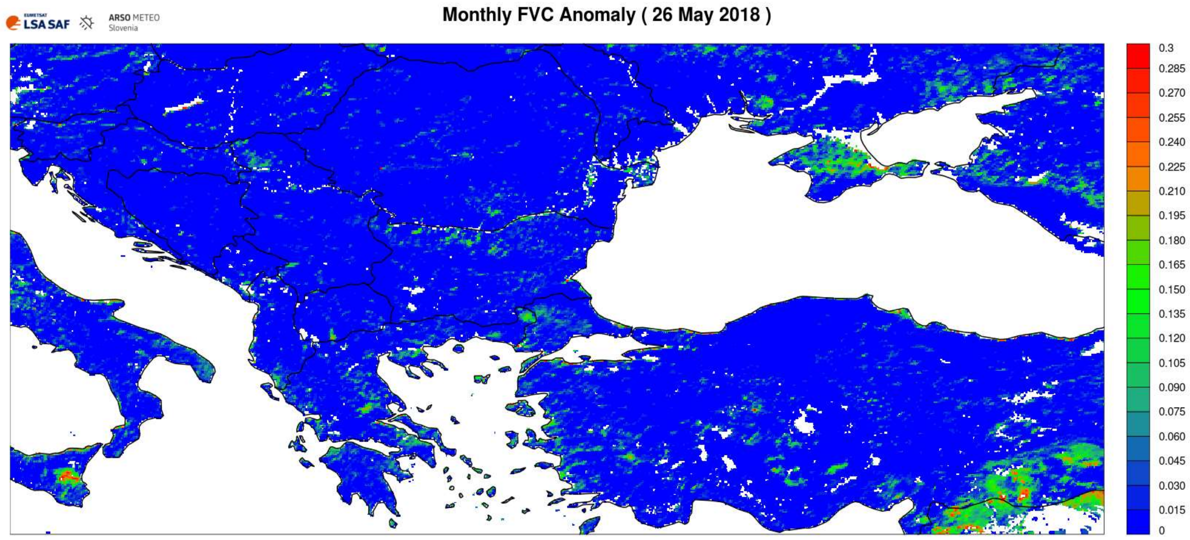


REMOTE SENSING – FRACTION OF VEGETATION COVER

Fraction of vegetation cover (FVC) is vegetation index, based on multi–channel remote sensing measurements (data from Eumetsat's LSA SAF data base is used for products in this bulletin). FVC shows fraction of the total pixel area that is covered by green vegetation, which is relevant for applications in agriculture, forestry, environmental management and land use, it has also proved to be useful for drought monitoring. Values vary according to the vegetation stage and of course to the damages of possible natural disasters (including drought). FVC values are lower at the beginning of the growth season, the highest at the full vegetation development and then FVC slowly drops with vegetation senescence.

Figures below shows negative anomaly of **accumulated 30-day FVC** recorded on **30th April** and **26th May 2018** in comparison with the past 14 years (2004–2017) and is used experimentally.





Monthly FVC accumulation for April (first figure) shows negative deviations of up to 15 % mainly across mountainous part of the region, from north-western part through Dinaric Alps to the mountainous Peloponnesus, in mountain area of southern Bulgaria, in Romanian Carpathians and southern Turkey. The situation has improved in one month period. Figure made at the end of the May (second figure) shows anomalies on locally larger areas in Greece and southern Turkey, which extends in wider area at the south-eastern Turkey, where anomalies reached values up to 20 %.

IMPACT REPORTS

No drought impacts on environment were reported around the region.

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–hydrostatical 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.