

DROUGHT MONITORING BULLETIN

12th June 2017

HOT SPOT

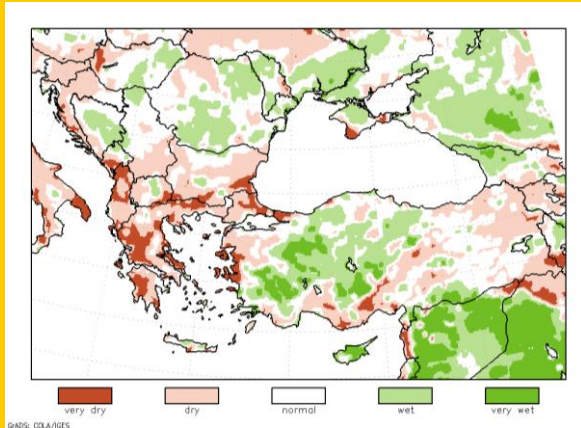
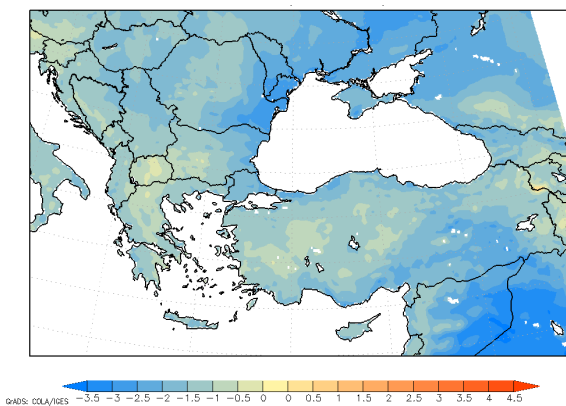


Figure shows accumulated water balance anomaly for the time period from 22nd March 2017 to 20th May 2017. It was the driest 60-day window across the region since early March with vast area of dry condition spreading across the region. Water deficit of up to 120mm was present in eastern Turkey and north-western Balkan Peninsula while several scattered parts in southern half of the region, especially in Greece and Albania, experienced extreme drought with water deficit of 180-210mm.

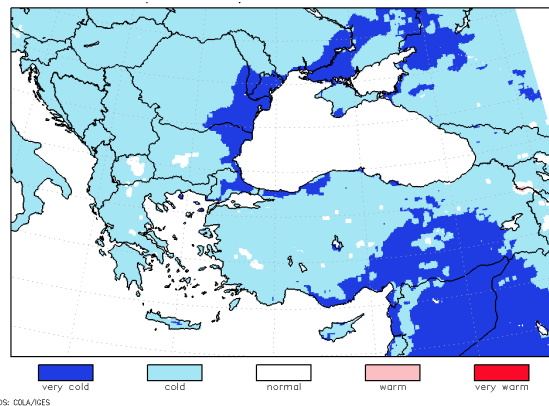
AIR TEMPERATURES AND SURFACE WATER BALANCE

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 **water balance** in percentile classes for 60-day period from 1st April to 30th May 2017.

AVERAGE AIR TEMPERATURE
ANOMALY (°C)
1st APRIL – 30th MAY 2017

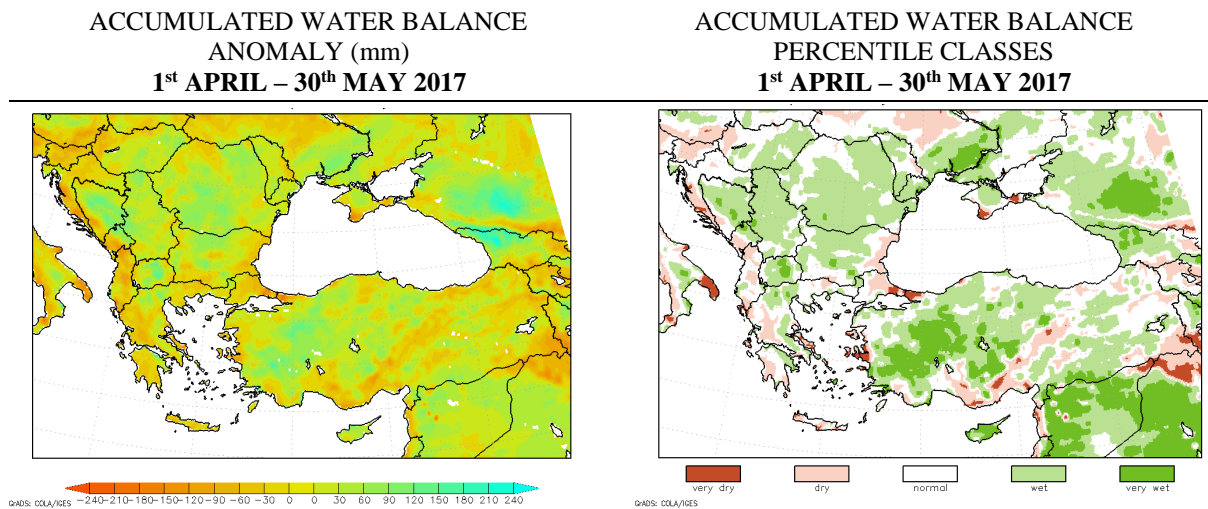


AVERAGE AIR TEMPERATURE
PERCENTILE CLASSES
1st APRIL – 30th MAY 2017



Air temperatures of 2-3 °C below the long-term average that reached north-western Balkan Peninsula in late April persisted over that part of the region in first decade of May as well. Second and third decade of May brought slightly warmer temperatures to that area as mean air temperature raised to reach average values. The opposite trend of changes in air temperatures throughout the month was present over the rest of the region: as values of air temperatures in first decade of May were ranging from average conditions over most of eastern and southern

Balkan Peninsula to up to 3 °C over northern Turkey, negative trend of air temperatures later in May resulted in decrease of air temperature to 3 °C below the average in southern and eastern Balkan Peninsula and 4 °C below the average over entire Turkey and areas around the Black Sea. Scattered parts in central and southern Turkey experienced air temperatures of even up to 5 °C below the long-term average. As seen on the left figure above, negative anomaly of air temperature for the last 60 days was present over the entire region. Southern Turkey and areas along the west coastline of Black Sea experienced air temperatures classified in the 5% of the coldest air temperatures of the record for that time of year.

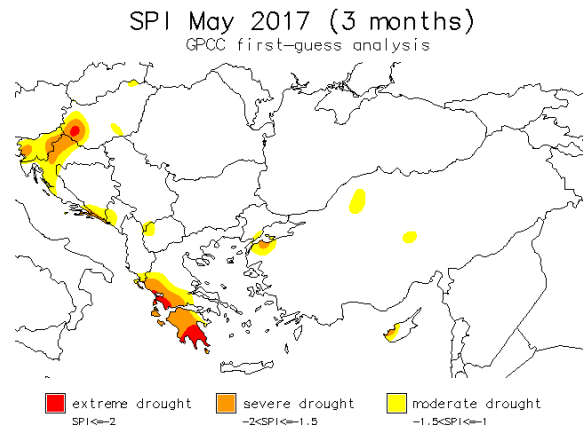
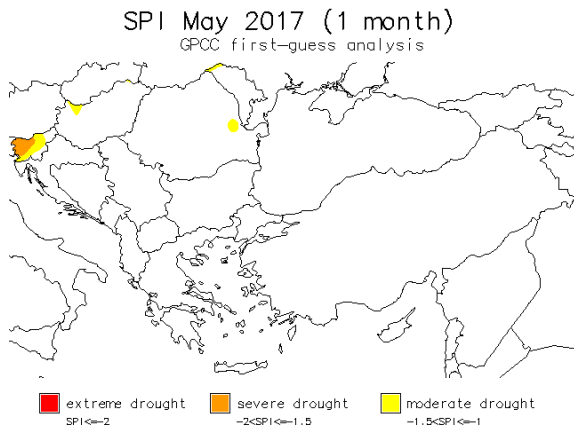


Values of accumulated water balance were mainly positive over the last two months, indicating wet conditions over most of the region. Western half of Turkey and most of central Balkan Peninsula had positive water balance anomaly with values ranging mainly between 60-120mm. Even wetter conditions with the water balance surplus of up to 180mm were present in parts of western Turkey, Macedonia, Romania and Bosnia and Herzegovina. Despite precipitation excess in many parts of the region, dry conditions present in April persisted also in May over north-western part of the region, far eastern Turkey and areas along the Adriatic Sea coastlines. Values of water balance deficit in those areas ranged between 90-120mm, partly even up to 150mm.

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 periods (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.

According to standardized precipitation index for May (SPI 1 month), there were no significantly dry areas in the region except at its north-western part where Slovenia experienced severe drought conditions over the last month. SPI for the 3-month period covering meteorological spring shows moderate to extreme drought in areas of north-western and south-western parts of Balkan Peninsula, mainly as a result of dry March in northern parts and dry April in southern parts of the region.

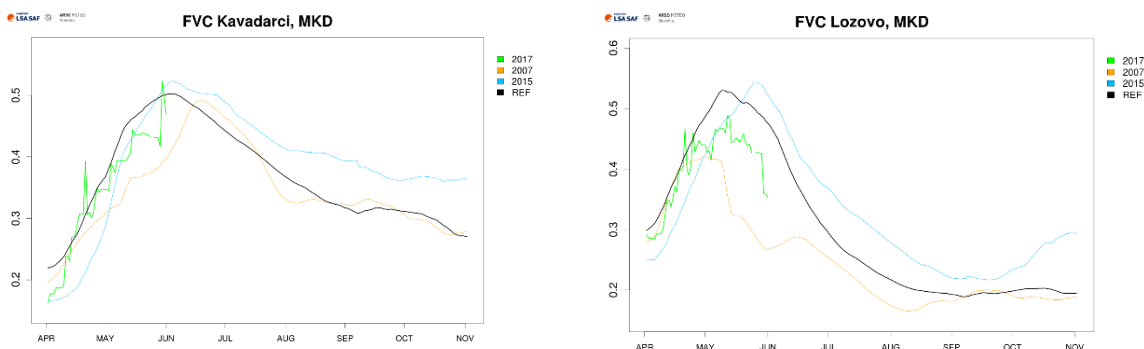


REMOTE SENSING – FRACTION OF VEGETATION COVER

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. Line shape depends on sort of the vegetation.

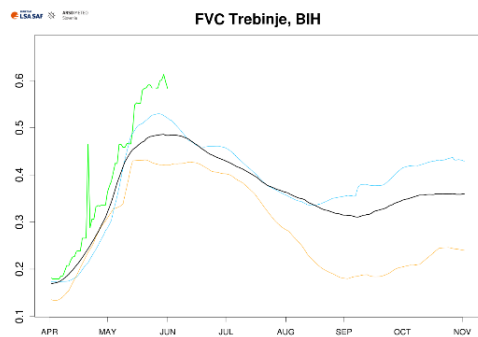
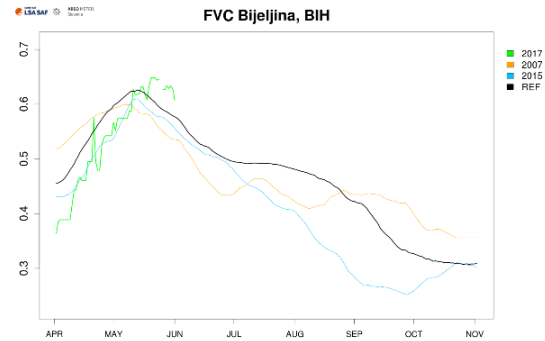
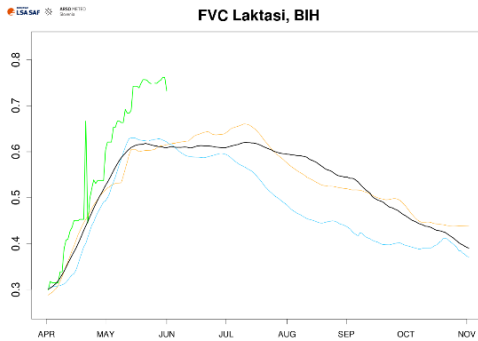
Graphs below present the **vegetation situation** as recorded on **31st May 2017** in some regions of South-eastern Europe. FVC values for year 2017 are presented as green line. Graphs also include reference line (2007–2016) in black, and lines in blue (year 2015) and yellow (year 2007) for comparison.

FYR MACEDONIA



Despite improved 60-day water balance conditions compared to April situation, May brought slight decline of vegetation cover to central Macedonia. While FVC index for Kavadarci followed the reference line throughout the month, vegetation development in May at its peak of the year did not reach the average conditions in region of Lozovo.

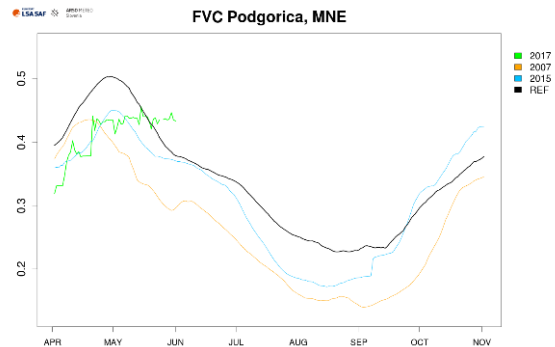
BOSNIA AND HERZEGOVINA (REPUBLIC OF SRPSKA)



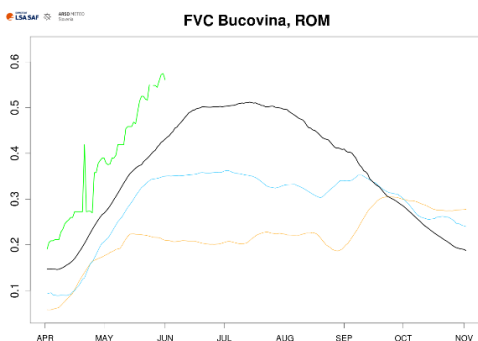
Positive water balance in May across the entire Bosnia and Herzegovina boosted vegetation growth in all parts of the country. Graphs for both Laktaši in the north and Trebinje in the south show high excess of vegetation cover in comparison to normal state, around 15% in both areas. According to FVC index, vegetation was developing as expected also in Bijeljina in eastern Bosnia and Herzegovina.

MONTENEGRO

Water balance situation improved over the last month in Montenegro but still remained dry in southern and western parts of the country. It can also be seen from the graph of FVC index for Podgorica where values remained below the reference line throughout most of May.

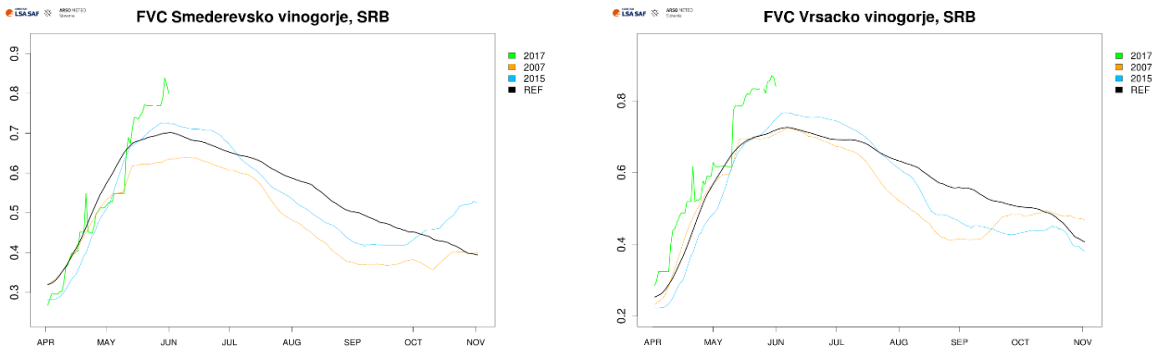


ROMANIA



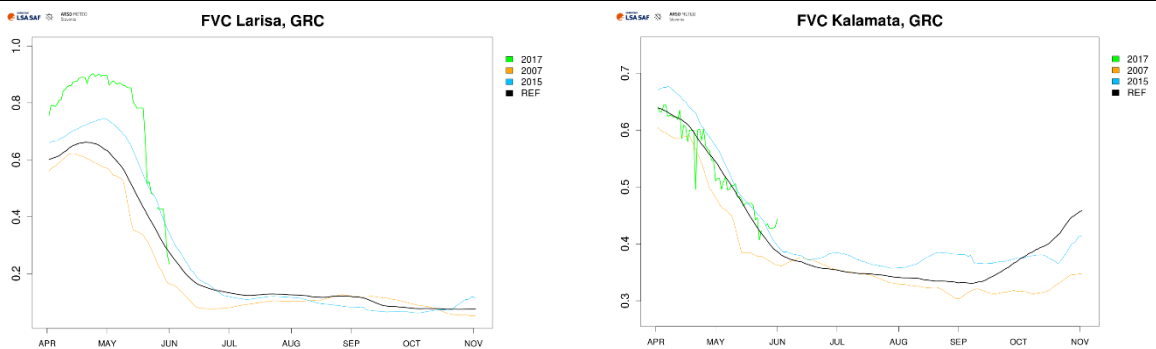
Vegetation development in Bucovina area has been exceeding the average conditions since the beginning of vegetation season. As seen from the graph for Bucovina, values of FVC index remained well above the reference line in May as well, indicating further progress in vegetation development in areas of north-eastern Romania.

REPUBLIC OF SERBIA



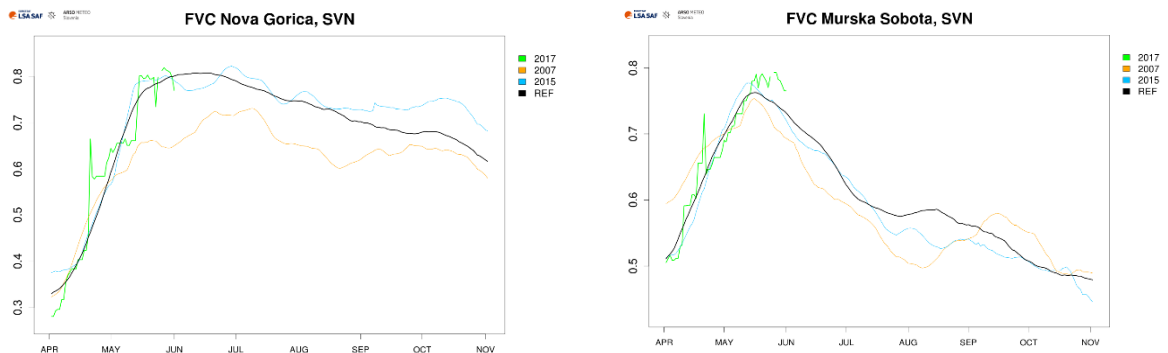
Positive water balance conditions of May brought welcome changes in vegetation development in central and north-eastern Serbia. Graphs for both Malo Orašje in region of Smederevsko vinogorje as well as Veliko Središte in region of Vršacko vinogorje show sudden boost in vegetation growth, exceeding the average vegetation cover for about 10%.

GREECE



Despite a positive start of vegetation development into this year's vegetation season, values of FVC for Larisa dropped rapidly over the last month but still remained ranging around the normal conditions at the end of May. FVC index for Kalamata in southern Greece continued to follow the expected values for this time of year in May as well.

SLOVENIA



Vegetation development in Slovenia continued as expected with values of FVC index for both Nova Gorica and Murska Sobota following well the values of long-term average.

Figure below shows anomaly of **accumulated 30-day FVC** recorded on **31st May 2017** in comparison with the past ten years (2007-2016) and is used experimentally.

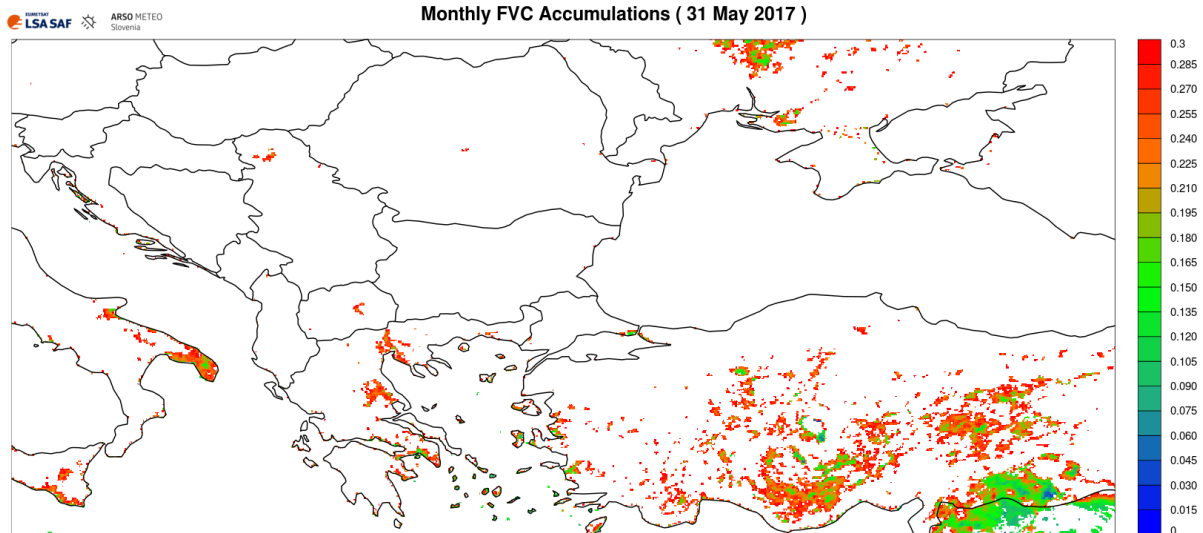


Figure shows wide extend of negative FVC index anomaly mainly in southern and central Turkey as well as areas in Greece. Negative deviation of around 16% was present over south-eastern Turkey while scattered areas in vast region in central Turkey and along the eastern coastline of continental Greece experienced negative anomaly of FVC index of around 21-25%. The rest of the Balkan Peninsula did not experience any significant deviation from normal state over the last month.

IMPACT REPORTS

No impacts on environment due to drought were reported around the region.

OUTLOOK

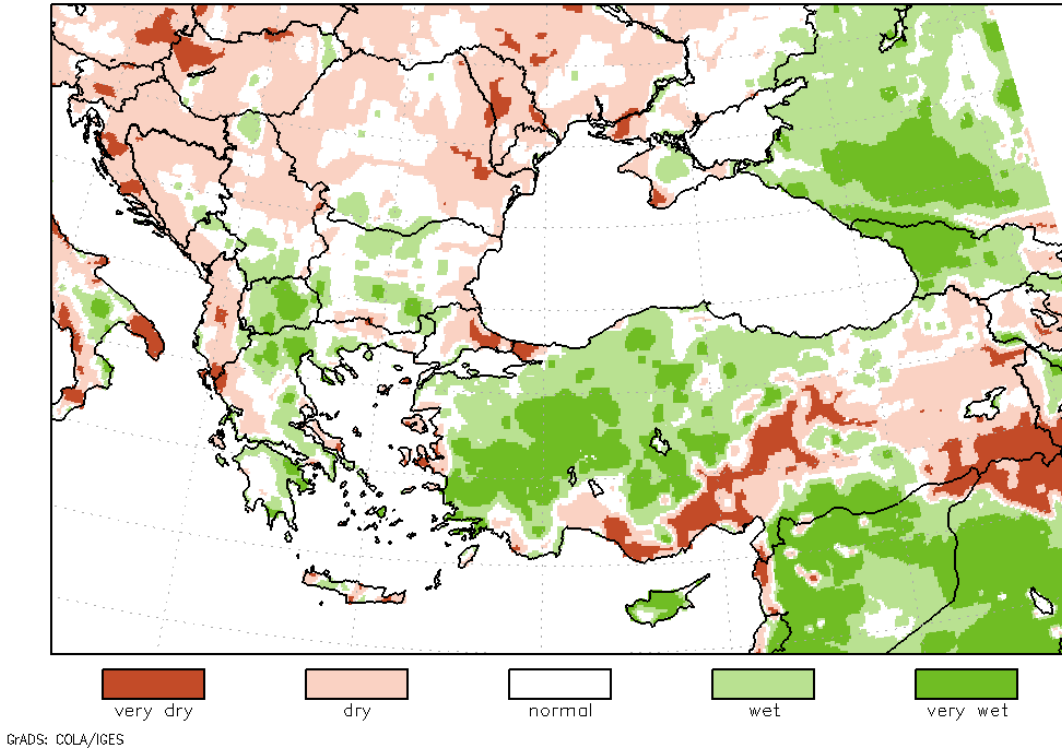


Figure presents the model simulations of the **60-day water balance anomaly** (mm) for the time period from **21st April to 19th June**. Positive water balance will persist over southern Balkan Peninsula and western Turkey where wide areas will remain in very wet conditions. Negative water balance with dry conditions will stretch over eastern Turkey and areas over northern half of Balkan Peninsula while southern Turkey is expected to have very dry conditions in the following days.

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; gpcp.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.