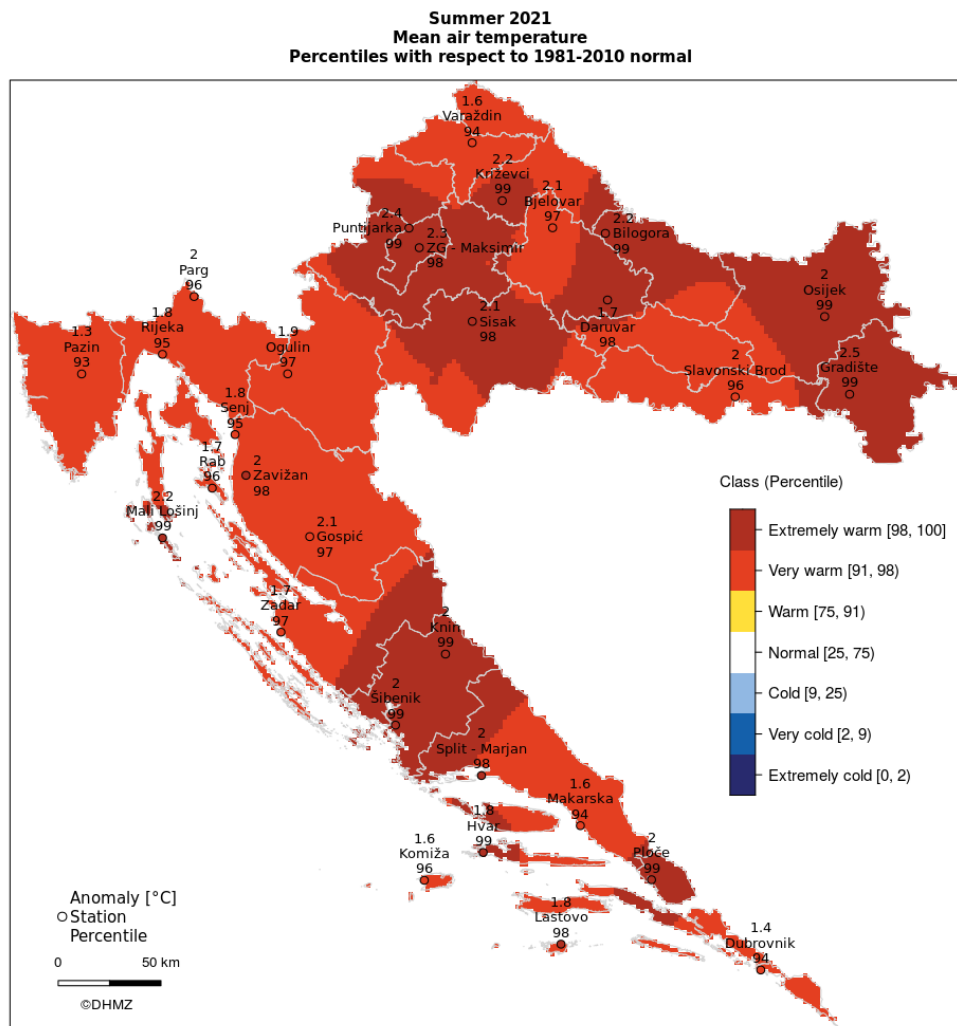


Climate Report for Croatia for Summer 2021

Air temperature anomalies for Croatia in summer 2021

Anomalies of the mean air temperature for summer 2021 with respect to the normal 1981 - 2010 are in the range from 1.3 °C (Pazin) to 2.5 °C (Gradište). At all stations, the air temperature was significantly higher than the multi-annual average.

According to the percentile ranks and classification ratings, thermal conditions in Croatia for summer 2021 are described in the following categories: **very warm** (parts of eastern and central Croatia, mountainous Croatia, northern Adriatic, parts of middle and southern Dalmatia) and **extremely warm** (in the rest of the country).



Precipitation amounts for Croatia in summer 2021

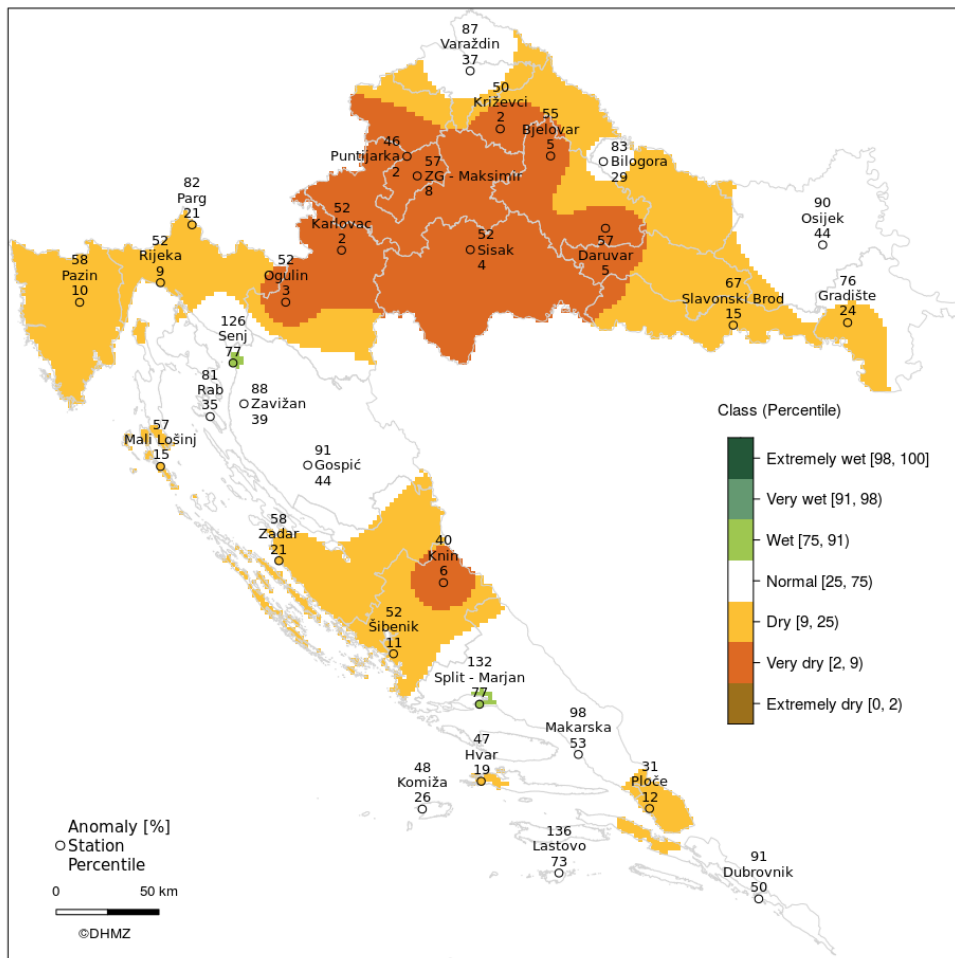
The anomalies of the precipitation amount in summer 2021 compared to the normal 1981-2010 are in the range from 31 % of the multi-year average in Ploče (40.2 mm) to 136 % at the station on island Lastovo (95.6 mm). The analysis of anomalies in precipitation amounts for summer 2021, expressed as a percentage (%) of the multi-annual average (1981-2010), shows that precipitation amounts were below multi-annual average in most of Croatia.

Precipitation conditions expressed in percentiles for the summer of 2021 were normal or dry in most parts of the territory, but also very dry to wet (in smaller parts of the territory).

Precipitation conditions are described in more detail in the following categories: **very dry** (part of central Croatia and wider area of Knin - Dalmatian hinterland), **dry** (parts of central and eastern Croatia, part of mountainous Croatia – Gorski kotar, part of Kvarner, Istra, Lošinj, part of northern Dalmatia and the hinterland, area around town of Hvar, area around Ploče and part of peninsula Pelješac), **normal** (far east of the territory, area around Bilogora, north part of central Croatia, part of Kvarner, in most part of mountainous Croatia and in central and southern Dalmatia) and **wet** (in area around Senj and Split).

*Regarding the accumulated precipitation it must be mentioned that during summer precipitation is often in the form of local thunderstorms, which results in unevenly distribution of precipitation. The wet category of area around town of Split during summer is mainly a consequence of intense thunderstorm in the second part of August (ie. on August 28th). Similar (but with a few rainy episodes) happened in July in Senj.

**Summer 2021
Precipitation amount
Percentiles with respect to 1981-2010 normal**



Air temperature anomalies for Croatia in June 2021

The anomalies of the mean air temperature in June 2021 with respect to the normal 1981 - 2010 were within the range from 1.8 °C (Makarska and Hvar) to 4.0 °C (Bilogora, Puntjarka and Parg). At all stations air temperature values were significantly higher than the respective multi-annual average. Absolute maximum temperatures were recorded at two stations in June (Daruvar and Slavonski Brod – Table 1).

According to the percentile ranks and classification ratings, thermal conditions in Croatia for June 2021 are described in the following categories: **warm** (area around Makarska), **very warm** (area around Slavonski Brod, hinterland of Istra and mostly whole Dalmatia and its hinterland) and **extremely warm** (almost whole eastern, central and mountainous part of Croatia and north Adriatic).

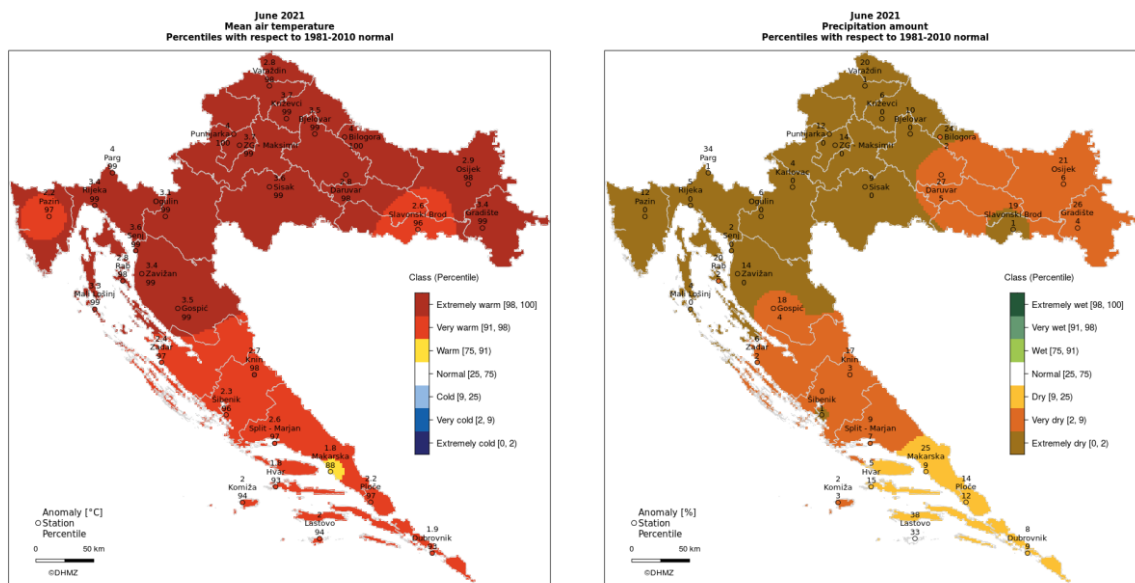
Table 1 - Absolute maximum temperature in June 2021 and comparison with available series of measurement (these stations are included in the analysis of climate anomalies in Croatia)

Naziv meteorološke postaje	Godina od kada su raspoloživi podaci	Vrijednost najviše izmjerene temperature (°C) u lipnju (do 2020.) u razdoblju od kada su raspoloživi podaci	Datum kada je postignuta najviša vrijednost (* označava nepotpuni niz)	Vrijednost najviše izmjerene temperature (°C) u lipnju 2021.	Datum kada je postignuta vrijednost najviše izmjerene temperature u lipnju 2021.
Dubrovnik	1961.	37.5	28.6.2019.*	34.6	23.6.
Senj	1948.	36.3	12.6.2003.*	34.6	24.6.
Šibenik	1949.	37.6	25.6.2007.	34.1	30.6.
Slavonski Brod	1963.	37.0	28.6.1963.	37.6	24.6.
Knin	1949.	39.3	29.6.2006.	38.2	23.6.
Rijeka	1948.	36.7	12.6.2003.	33.7	23.6.
Karlovac	1949.	39.2	30.6.1950.	35.9	29.6.
Osijek	1899.	39.6	20.6.1908.*	38.0	24.6.
Hvar	1858.	38.0	28.6.2019.*	32.8	24.6.
Pazin	1961.	35.8	27.6.2019.	33.7	28.6.
Split - Marjan	1948.	38.1	14.6.2003.	35.6	24.6.
Ogulin	1949.	35.6	30.6.1950.	34.1	24.6.
Komiža	1981.	37.2	29.6.2006.	34.9	28.6.
Sisak	1949.	38.1	30.6.1950.	36.5	24.6.
Daruvar	1978.	35.5	13.6.2003.	35.7	24.6.
Mali Lošinj	1961.	35.6	12.6.1996.	34.5	28.6.
Poreč	1981.	33.6	27.6.2019.*	33.2	29.6.
Zagreb - Maksimir	1949.	37.6	30.6.1950.	35.6	24.6.
Bjelovar	1949.	36.7	24.6.2003.	35.7	24.6.
Varaždin	1949.	36.0	23.6.2003.	35.3	24.6.
Gospić	1872.	35.4	28.6.1935.*	34.1	23.6.
Lastovo	1948.	36.2	24.6.2002.*	33.7	28.6.
Zadar	1961.	35.1	28.6.2019.	32.4	28.6.
Parg	1950.	32.4	27.6.2019.*	30.1	23.6.
Puntijarka	1981.	29.6	27.6.2019.	28.4	24.6.
Zavižan	1953.	26.4	14.6.2019.*	25.3	23.6.

Precipitation anomalies for Croatia in June 2021

Precipitation anomalies expressed as a percentage (%) of the multi-annual average were in June 2021 within the range from 0.2 % in Šibenik (with precipitation amount of 0.1 mm) to 38 % at Lastovo (13.1 mm). Analysis of precipitation anomalies in June 2021, expressed as a percentage (%) of the multi-annual average shows that precipitation amounts were significantly below average at all stations.

Precipitation conditions in June 2021 are described in more detail in the following categories: **extremely dry** (area around Slavonski Brod, central and the most part of mountainous part of Croatia, north Adriatic and area around Šibenik), **very dry** (eastern Croatia, part of mountainous Croatia (around Gospić) and central Dalmatia and its hinterland) and **dry** (rest of the territory).



Mean air temperature (left) and precipitation amount (right) - June 2021- percentiles with respect to 1981-2010 normal

Air temperature anomalies for Croatia in July 2021

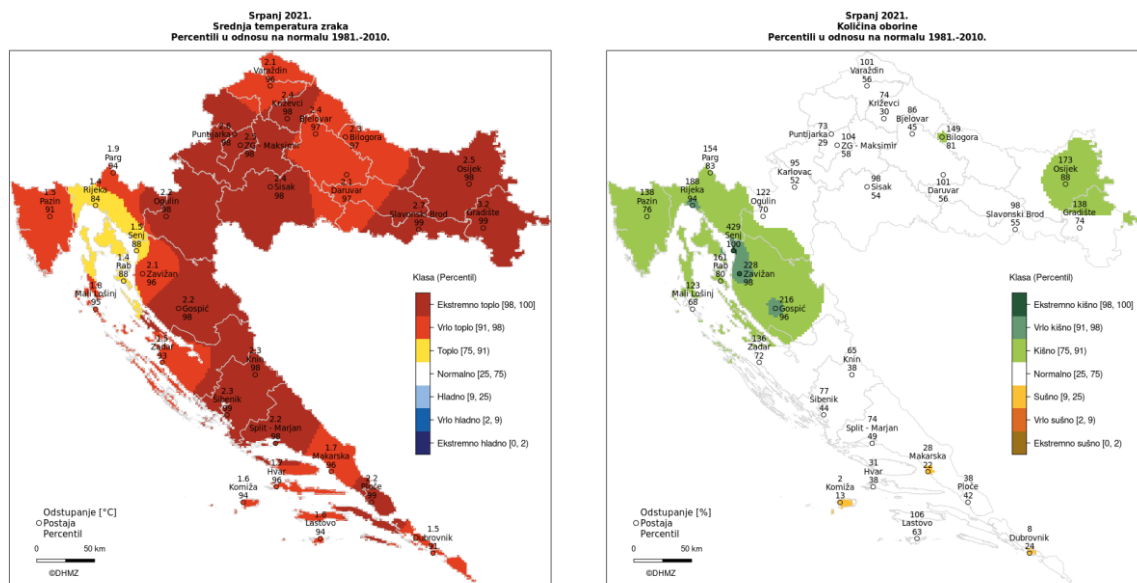
The anomalies of the mean air temperature in July 2021 with respect to the normal 1981 - 2010 were within the range from 1.4 °C (Rijeka and Rab) to 3.2 °C (Gradište). At all stations air temperature values were significantly higher than the respective multi-annual average. Absolute maximum temperatures were not measured.

According to the percentile ranks and classification ratings, thermal conditions in Croatia for July 2021 are described in the following categories: **warm** (part of north Adriatic), **very warm** (part of eastern, northern and mountainous Croatia, Istra, part of central and southern Dalmatia and its hinterland) and **extremely warm** (the rest of the territory).

Precipitation anomalies for Croatia in July 2021

Precipitation anomalies expressed as a percentage (%) of the multi-annual average were in July 2021 within the range from 2 % in Komiza (with precipitation amount of 0.5 mm) to 429 % in Senj (178.3 mm). Analysis of precipitation anomalies in July 2021, expressed as a percentage (%) of the multi-annual average shows that precipitation amounts were normal at about half of the stations and below or above the multi-annual average at the rest of the stations.

Precipitation conditions in July 2021 are described in more detail in the following categories: **dry** (area around Makarska, Komiza and Dubrovnik), **normal** (central and part of eastern Croatia, most of Dalmatia), **wet** (mountainous and part of eastern Croatia, Istra and north Adriatic (Kvarner and islands), **very wet** (area around Rijeka, Senj and Gospić) and **extremely wet** (Senj and Zavižan).



Mean air temperature (left) and precipitation amount (right) - July 2021 – percentiles with respect to 1981-2010 normal

Air temperature anomalies for Croatia in August 2021

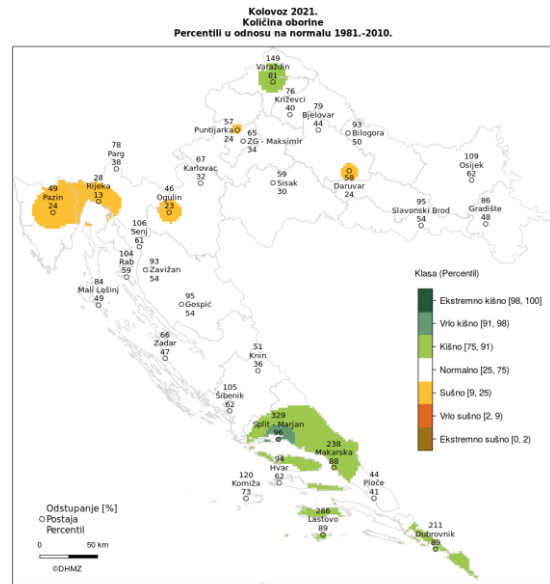
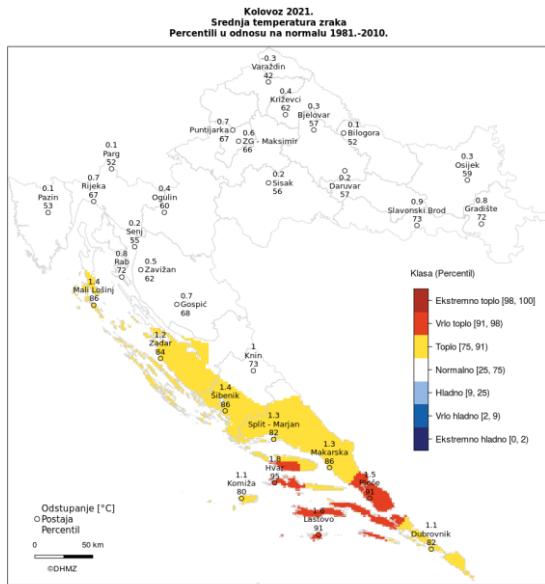
The anomalies of the mean air temperature in August 2021 with respect to the normal 1981 - 2010 were within the range from -0.3 °C (Varaždin) to 1.8 °C (Hvar). At all stations air temperature values were slightly above to significantly above the respective multi-annual average. Absolute maximum temperatures were not measured.

According to the percentile ranks and classification ratings, thermal conditions in Croatia for August 2021 are described in the following categories: **normal** (continental and mountainous Croatia and the north Adriatic except part of islands Cres and Lošinj), **warm** (part of islands Cres and Lošinj and most part of Dalmatia and its hinterland) and **very warm** (the rest of Dalmatia).

Precipitation anomalies for Croatia in August 2021

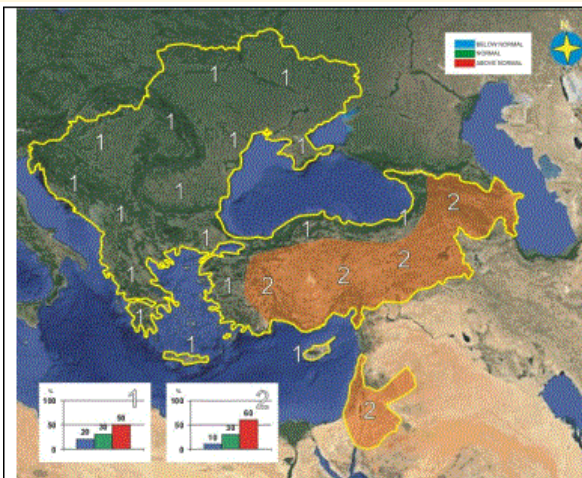
Precipitation anomalies expressed as a percentage (%) of the multi-annual average were in August 2021 within the range from 28 % in Rijeka (with precipitation amount of 30.4 mm) to 329 % in Split-Marjan (121.2 mm). Analysis of precipitation anomalies in August 2021, expressed as a percentage (%) of the multi-annual average shows that precipitation amounts were normal at most stations and below or above the multi-annual average at the rest of the stations.

Precipitation conditions in August 2021 are described in more detail in the following categories: **dry** (area around Daruvar, Puntjarka, Ogulin, Rijeka and hinterland of Istra), **normal** (most of Croatia), **wet** (area around Varaždin and part of central Dalmatia) and **very wet** (area around Split).

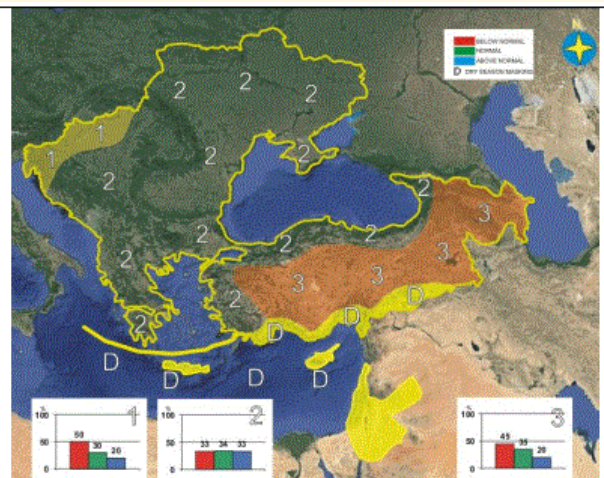


Mean air temperature (left) and precipitation amount (right) - August 2021 – percentiles with respect to 1981-2010 normal

SEECOF-25 CLIMATE OUTLOOK VALIDATION



Graphical presentation of the 2021 summer temperature outlook



Graphical presentation of the 2021 summer precipitation outlook

Air temperature anomalies for Croatia in summer 2021

According to the SEECOF-25 climate outlook, for all Croatian territory, there were chance for above normal summer temperatures. Probability for exceeding the average summer season temperature was 50%. Probability of temperature being lower than normal was 20% and being normal was 30%.

The summer season in Croatia according to multi-annual average 1981-2010 concerning the temperature was for the whole territory above normal (from 1.3 °C to 2.5 °C).

We can conclude that the outlook for the summer 2021 according the temperature was good.

Precipitation amounts for Croatia in summer 2021

According to the SEECOF-25 climate outlook, summer precipitation sum for the part of north Adriatic, part of mountainous Croatia (Gorski kotar) and part of northwestern Croatia was forecasted below-average with probability of 50%, normal with probability of 30% and above-average with probability of 20%. In the rest of Croatia summer precipitation sum had no privileged scenario, which means that climatology (middle tercile) had to be taken as the most likely result.

The actual precipitation amounts in the most of Croatia were mainly below or around the multi-annual average (1981-2010). Only the small part of the territory have deviation from the normal to wet (as explained before*).

We can conclude that the outlook for the summer 2021 according the precipitation on the most part of territory was satisfactory.

Country	Seasonal temperature (JJA)		Seasonal precipitation (JJA)		High Impact Events
	Observed	SEECOF-25 climate outlook for temperature	Observed	SEECOF-25 climate outlook for precipitation	
Croatia	Above normal	Above normal (20,30,50)	Below normal (most of central and eastern Croatia, part of mountainous Croatia – Gorski kotar, part of North	Below normal (50,30,20) part of north Adriatic, part of mountainous Croatia (Gorski kotar) and part of northwestern Croatia No predictive signal (33,34,33)	Summer 2021 was very warm and extremely warm. In all three months heat waves were observed (two in June and August and one in July). In June , in Daruvar and Slavonski Brod, (continental part of Croatia) there were observed maximum air temperatures which exceeded the absolute maximum on record. In all three months convective related severe weather phenomena (thunderstorms, hail, heavy rains,

			<p>Adriatic, part of Dalmatia and the hinterland)</p> <p>Above normal</p> <p>(wider area of town of Split and Senj)</p>	<p>The rest of Croatia</p>	<p>flash floods, waterspouts) were observed mostly all over Croatia.</p> <p>In June, area around town Požega (eastern Croatia) was hit by thunderstorms several times – flood damage and crops damage due to hail were reported and traffic on many local roads were interrupted.</p> <p>Especially in the second half of July convective activity was very frequent in continental part of Croatia and north Adriatic. Urban floods as a result of large amounts of precipitation in a short time were common, especially in eastern part of Croatia.</p> <p>In August, the highest amount of daily precipitation in Croatia was measured in Split-Marjan (central Dalmatia) – on 28th of August - 82.0 mm (also causing flash flood).</p>
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