European Commission

Drought in western Mediterranean February 2022

GDO Analytical Report

2022

Joint Research Centre

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GDO Analytical Report

Drought in western Mediterranean February 2022

JRC Global Drought Observatory (GDO) of the Copernicus Emergency Management Service (CEMS) - 28/02/2022

Contents

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Executive summary

- A large and severe drought has been affecting the western Euro-Mediterranean region. Dry conditions in the Iberian Peninsula are related to an acute lack of precipitation in the first two months of 2022, preceded by a substantial deficit in the last months of 2021. Over the coastal regions of northern Africa and over Andalucía the drought can be attributed to a longer period of below-average precipitation, most likely overlapping with the recent and intense drought event.
- The vegetation response in the region still shows better than normal conditions, thanks to a slightly warmer than usual winter season. However, the lack of precipitation may cause severe impacts in spring and summer. In northern Africa, the persistent drought conditions already caused bad vegetation conditions.
- The severe precipitation deficit is already posing a threat to water resources and livestock, while heavy impacts on crops and reservoir storage are expected if the drought conditions will persist.
- Severely drier than normal conditions are forecasted in the western Euro-Mediterranean region. These forecasts currently represent the main concern, as they point to a possible evolution of the ongoing drought into an extreme event. Monitoring such evolution in the next months is essential for risk and impact assessment.

Risk of Drought Impact for Agriculture (RDrI-Agri)

The GDO indicator RDrI-Agri estimates the risk of drought impacts by considering both exposure and socio-economic vulnerability of an area, with a focus on agricultural impacts.

The meteorological conditions, shown and discussed in the following sections, translate into medium-to-high values of the RDrI-Agri at the end of January 2022 in a wide region along the coast of northern Africa (Morocco, Algeria, and Tunisia). RDrI-Agri ranges from low to medium values in central Portugal, central Spain, and Andalucía (Fig. 1). The high level of risk in northern Africa is also induced by the lower coping capacity of these countries compared to Spain and Portugal. Drought vulnerability in northern Africa is significantly higher due to their lower GDP and a larger part of their society being dependent on rain-fed agriculture.

Drought in western Mediterranean February 2022

JRC Global Drought Observatory (GDO) of the Copernicus Emergency Management Service (CEMS) - 28/02/2022

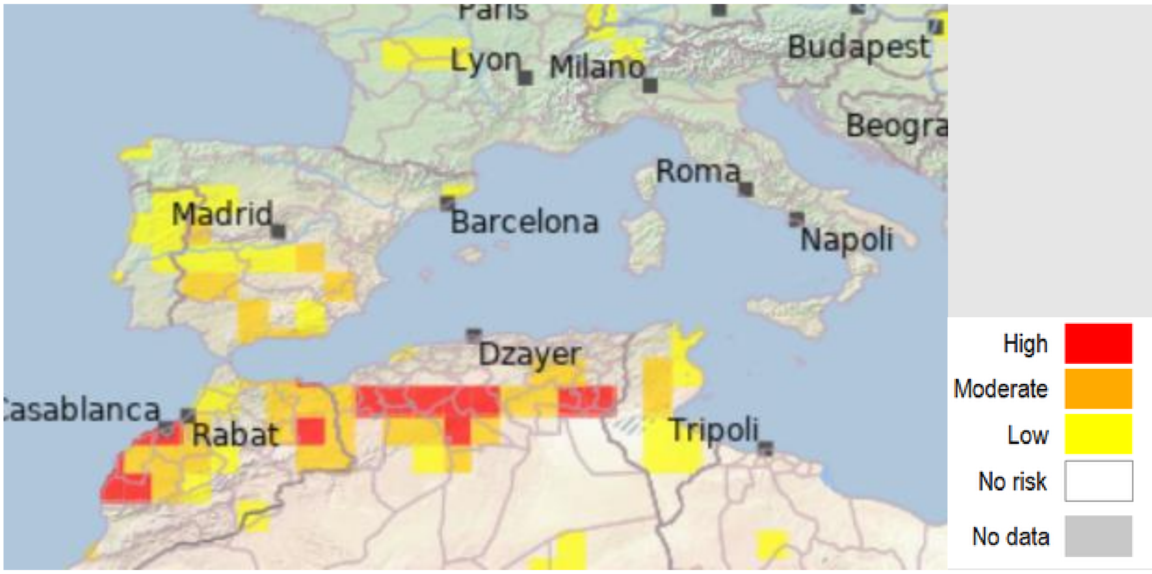


Figure 1: *Risk of Drought Impact for Agriculture (RDrI-Agri) – first ten days of February 2022.*

The risk of drought impact (as estimated by the RDrI-Agri) developed and spread over the Iberian Peninsula relatively fast from November 2021 to January 2022. Over northern Africa RDrI-Agri features higher levels and longer persistence (Fig. 2). The estimated sharp increase in risk is attributable to the overall failure of the ongoing rainy season from October 2021 to now (February 2022). The highest values of RDrI-Agri are visible in northern Africa and southern Spain, also because the previous wet season (2020/2021) was scarce in precipitation. At least a close-to-average residual part of the ongoing rainy season (March-May 2022) would be needed to limit drought impacts.

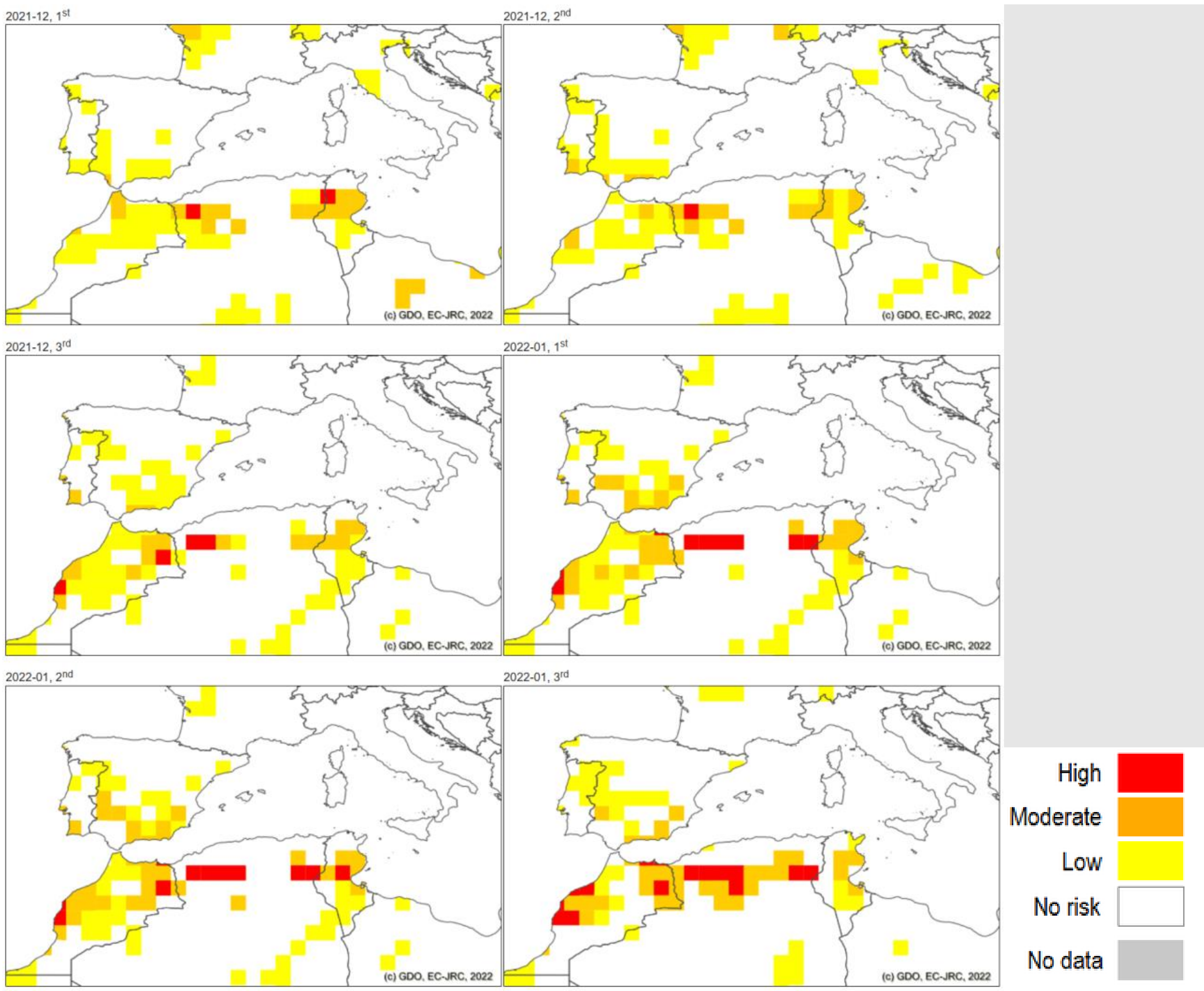


Figure 2: *Risk of Drought Impact for Agriculture (RDrI-Agri) estimated for each 10-day period from the beginning of December 2021 to the end of January 2022.*

In the following paragraphs, we analyse the conditions in some of the main affected regions in more detail: Portugal (Alentejo), Spain (Andalucía), Morocco (Oriental) and Algeria (Sidi Bel Abbes).

In all these selected regions, RDrI-Agri has been increasing in extent and severity from autumn 2021, starting earlier in North Africa (September-October 2021) and somewhat later in the southern part of the Iberian Peninsula (November-December 2021). A higher risk is estimated for the northern African regions due to both the earlier start of the rainfall deficit and the higher vulnerability (Figs. 3, 4, 5, and 6).

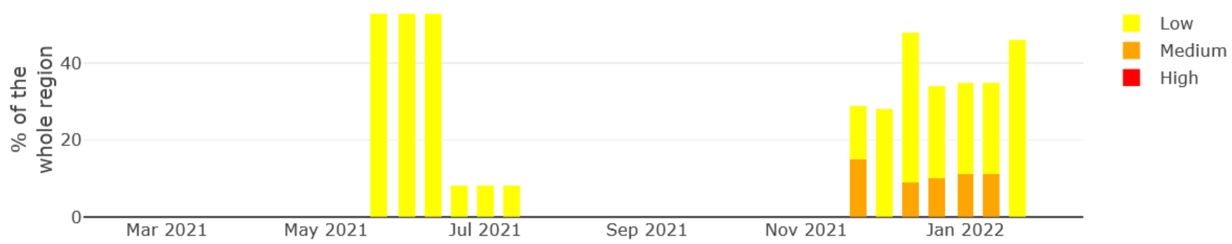


Figure 3: *Risk of Drought Impact for Agriculture (RDrI-Agri) – temporal evolution in Portugal (Alentejo) in 2021.*

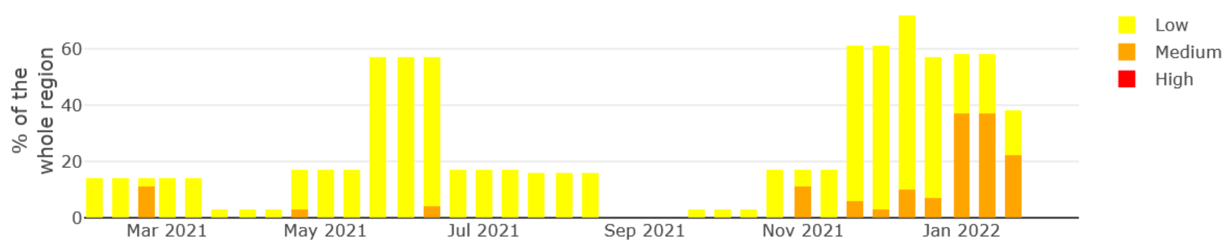


Figure 4: *Risk of Drought Impact for Agriculture (RDrI-Agri) – temporal evolution in Spain (Andalucía) in 2021*

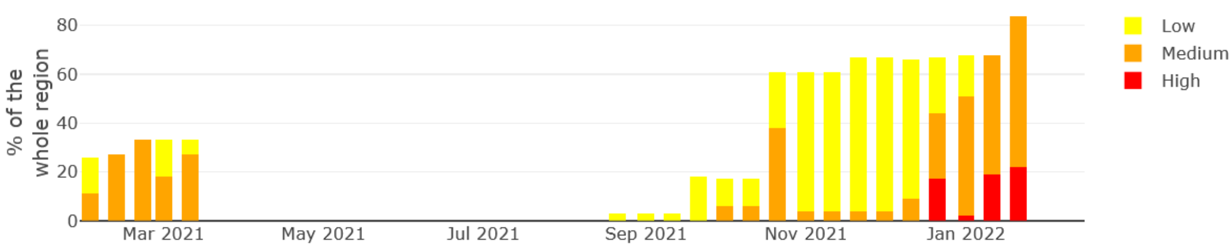


Figure 5: *Risk of Drought Impact for Agriculture (RDrI-Agri) – temporal evolution in Morocco (Oriental) in 2021*

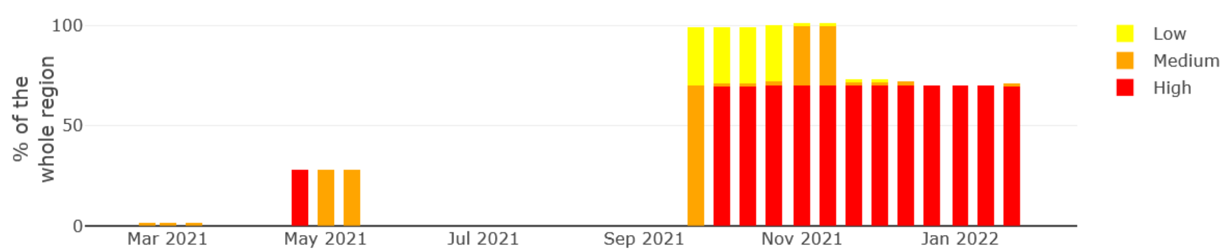


Figure 6: *Risk of Drought Impact for Agriculture (RDrI-Agri) – temporal evolution in Algeria (Sidi Bel Abbes) in 2021*

Precipitation

Total monthly precipitation is the main factor in understanding and characterising drought events. The climatic conditions of the analysed regions are similar and are characterised by one main wet season from October to May. In the Iberian Peninsula, and especially in Portugal, the rainy season is more concentrated from October to February and a higher average precipitation is usually expected. In the other regions of the Western Mediterranean, the average precipitation is lower but the wet season is usually one month longer.

In Portugal (Alentejo), the ongoing wet season has almost completely failed and since October 2021 a continuously increasing precipitation deficit has been observed. Previous seasons were close to average, with no deficit in cumulative values until September 2021 (Fig. 7).

In Spain (Andalucía), March to June 2020 precipitation was close to average, but already in autumn 2020 the wet season was extremely poor, resulting in an increasing deficit since October 2020, and drastically worsened by the ongoing almost completely failed wet season (Fig. 8).

In Morocco (Oriental), the situation is similar to the one in Spain. Variable and intermittent precipitation events have led to a less pronounced cumulative deficit, but with some dry months during the wet season. The ongoing wet season is almost completely dry (Figure 9).

Finally, Algeria (Sidi Bel Abbes) shows a pattern similar to the one in Portugal, but with a more severe cumulative deficit. The ongoing winter wet season is lacking in precipitation as was the initial part of the previous one. However, spring precipitation from March to June was close to the average in the last two years, allowing for a partial recovery (Fig. 10).

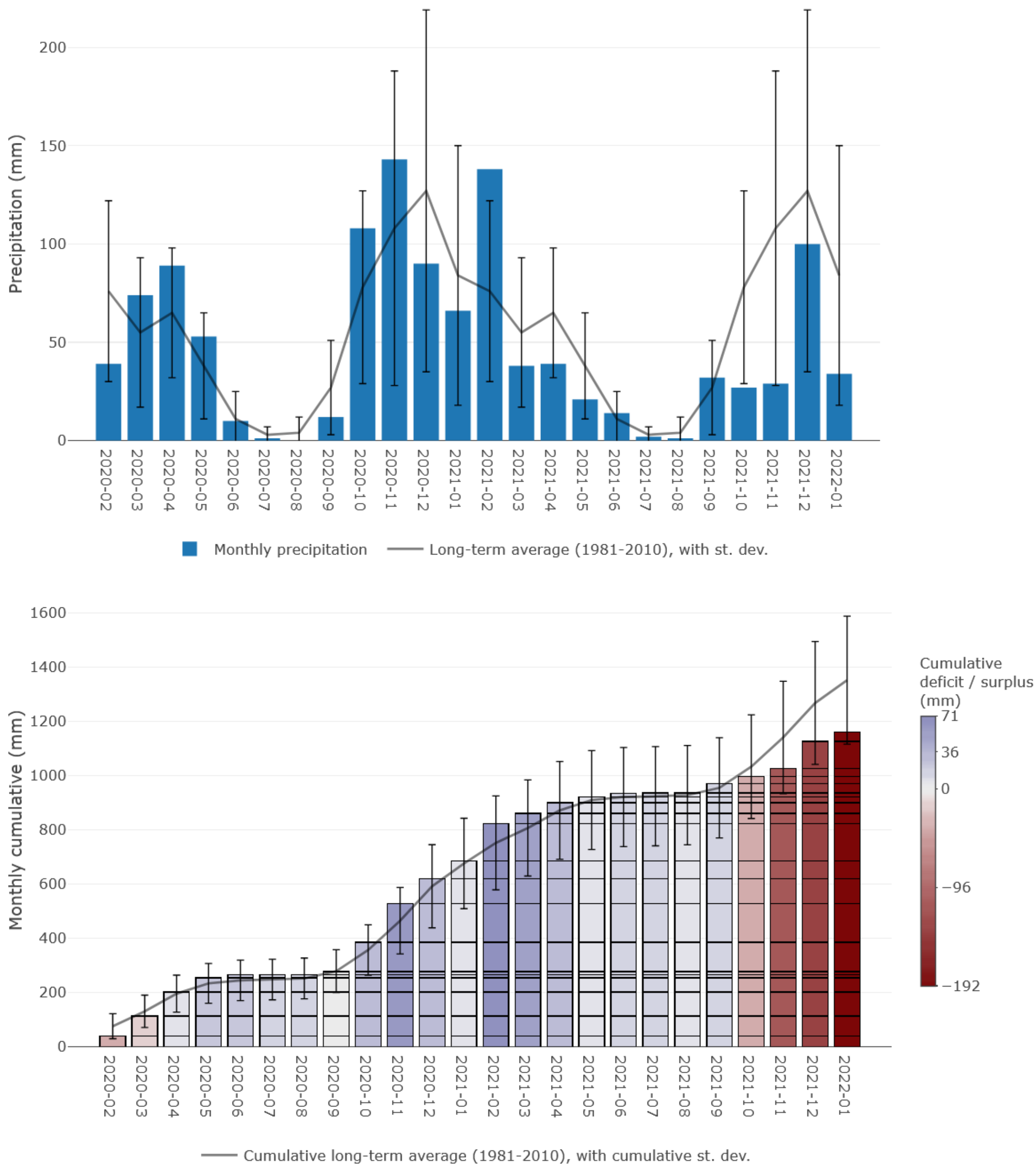


Figure 7: *Monthly total (upper panel) and cumulative (lower panel) precipitation – temporal evolution in Portugal (Alentejo; 38° N, -8.3° E) from February 2020 to January 2022.*

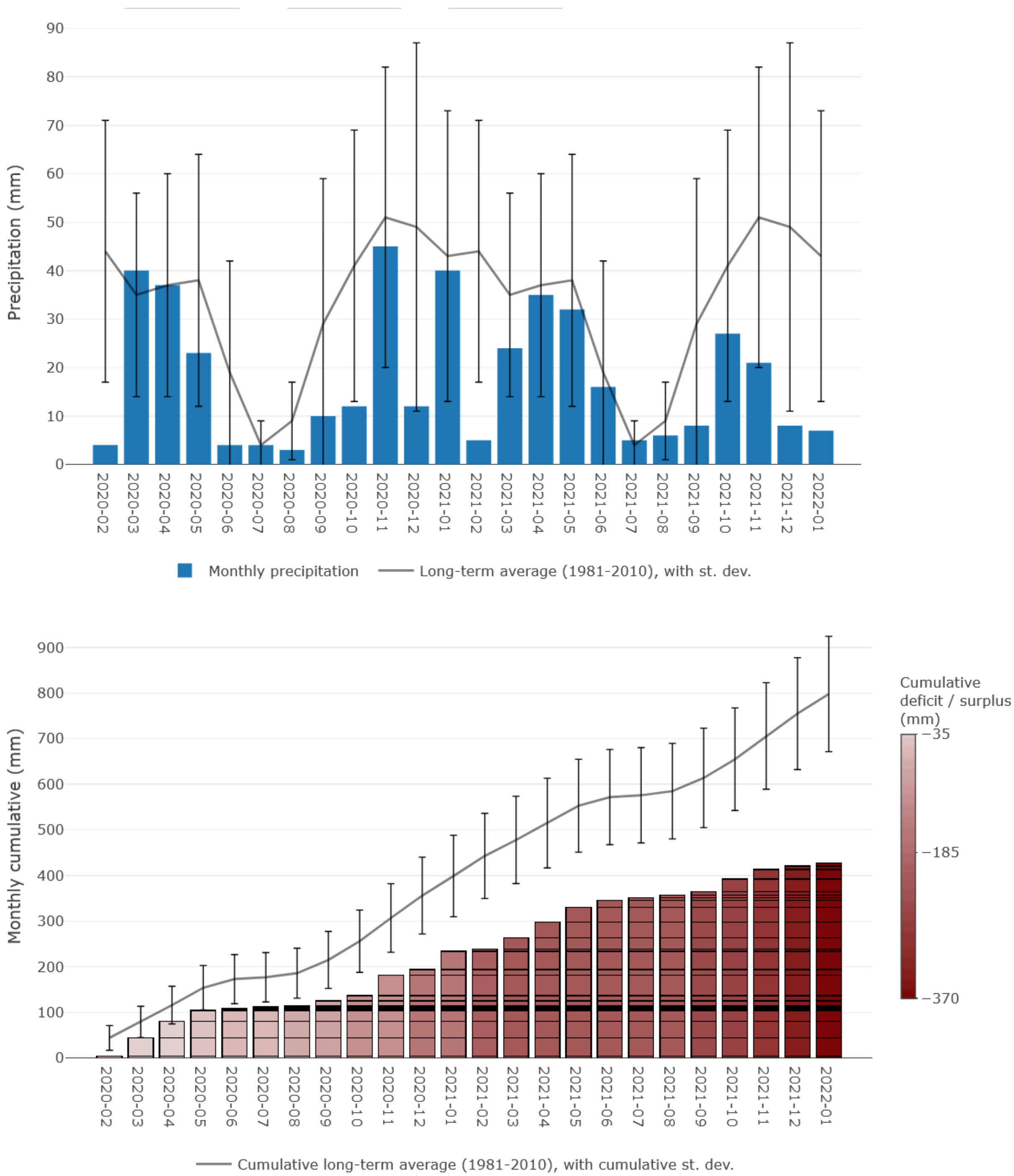


Figure 8: *Monthly total (upper panel) and cumulative (lower panel) precipitation – temporal evolution in Spain (Andalucía; 37.6° N, -2.7° E) from February 2020 to January 2022.*

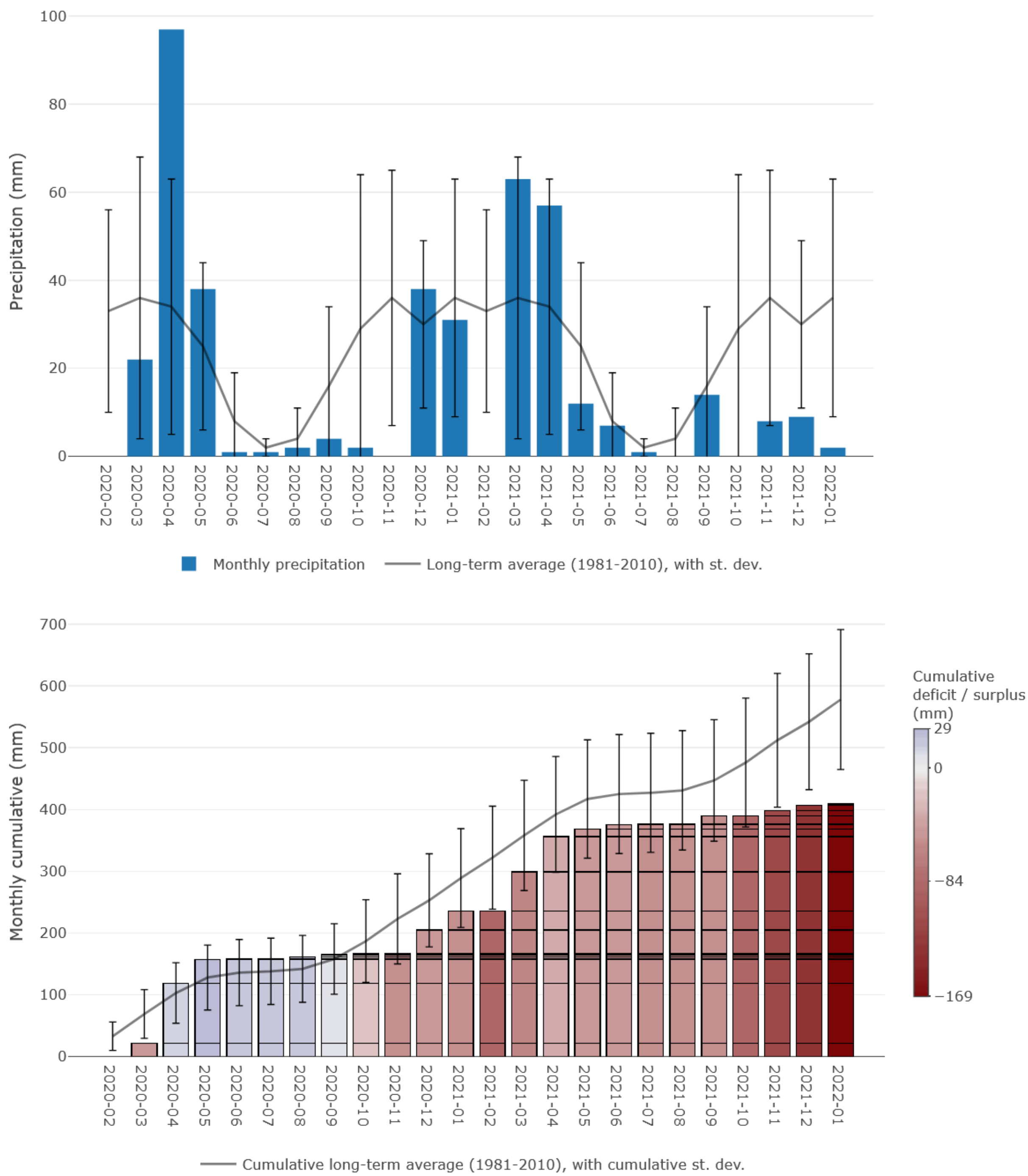


Figure 9: *Monthly total (upper panel) and cumulative (lower panel) precipitation – temporal evolution in Morocco (Oriental; 34.5° N, -2.6° E) from February 2020 to January 2022.*

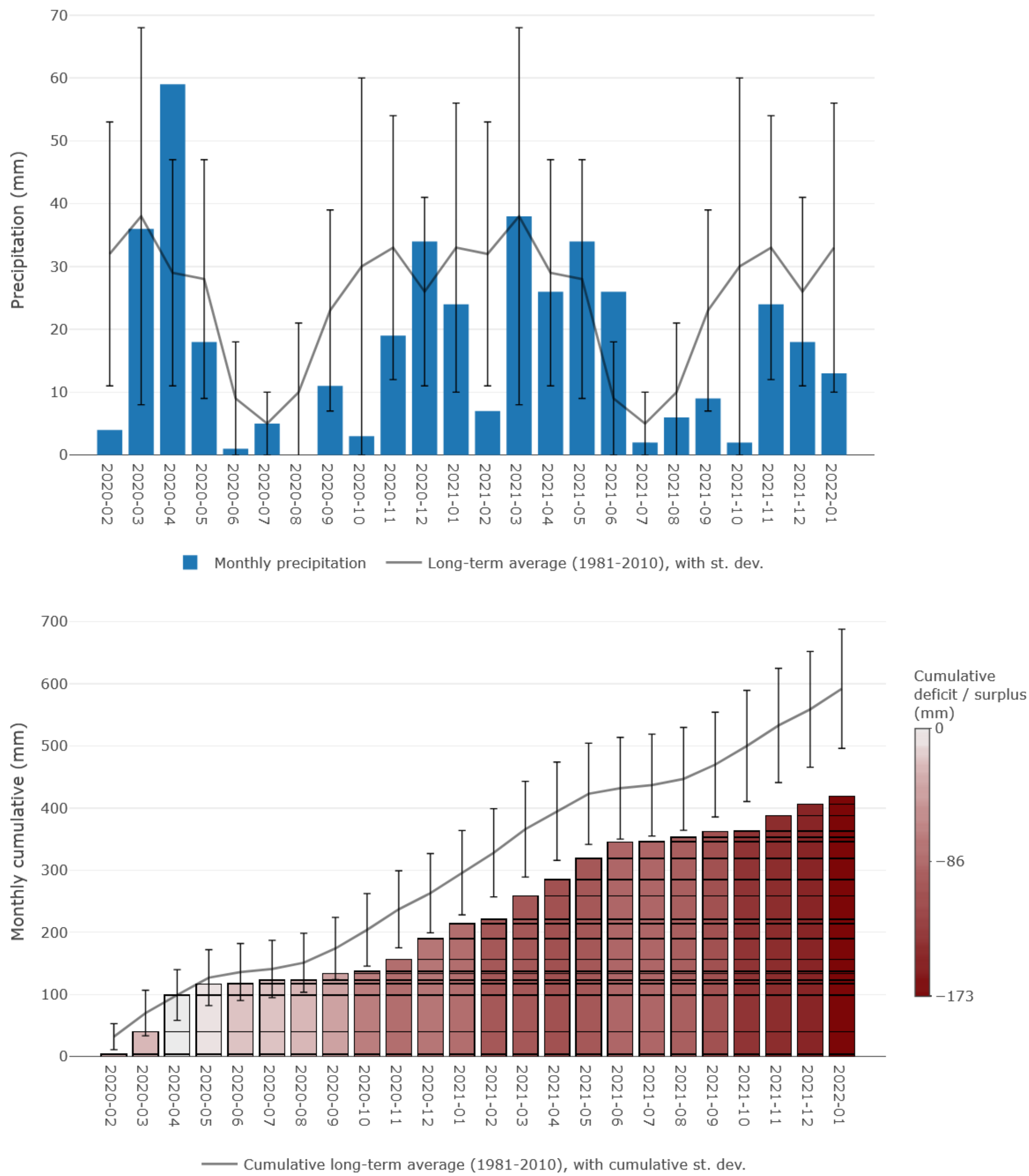


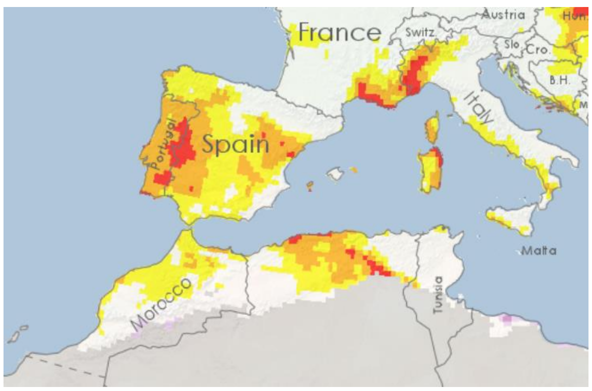
Figure 10: *Monthly total (upper panel) and cumulative (lower panel) precipitation – temporal evolution in Algeria (Sidi Bel Abbes; 34.7° N, -0.5° E) from February 2020 to January 2022.*

Drought in western Mediterranean February 2022

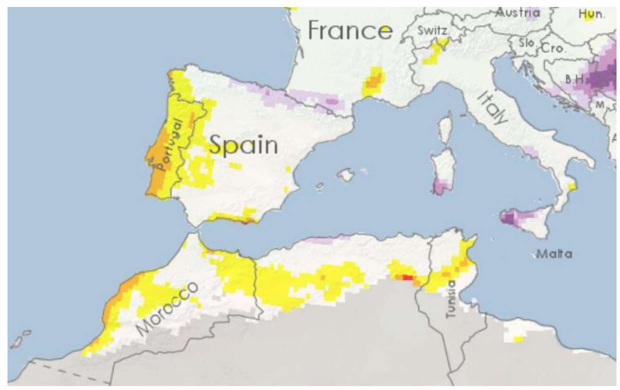
JRC Global Drought Observatory (GDO) of the Copernicus Emergency Management Service (CEMS) - 28/02/2022

Standardized Precipitation Index (SPI)

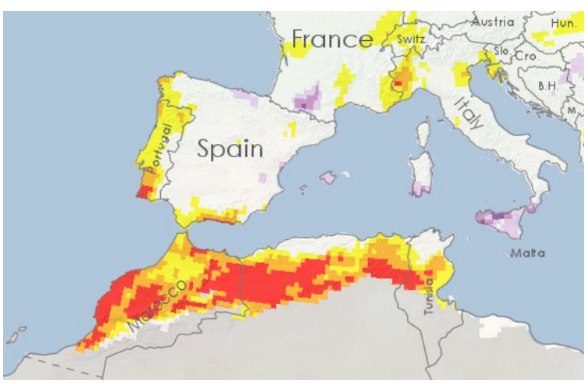
The SPI[1] provides information on the intensity and duration of the precipitation deficit (or surplus). By analysing data for different accumulation periods, the dry conditions in Portugal and western Spain appear to be mainly related to the January 2022 deficit, as detected by the SPI-1. On the contrary, over the coastal regions of northern Africa and over the coast of Andalucía the drought can be attributed to a longer period of below-average precipitation, concentrated especially in October-November 2021 (Fig. 11).



SPI-1 (one month accumulation)



SPI-3 (three months accumulation)



SPI-6 (six months accumulation)

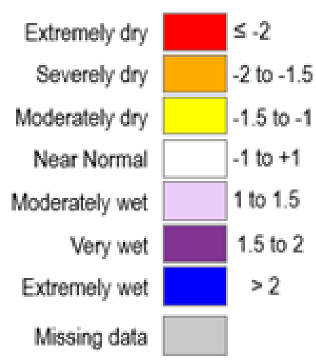


***Figure* 11** *Standardized Precipitation Index (SPI-1; SPI-3; SPI-6) January 2022.*

By comparing the monthly SPI-3 maps, the onset of the drought event in the Iberian Peninsula can be located in November 2021. In April - May 2021 (not shown here) a quite severe dry

[1]SPI is used to monitor the occurrence of drought. The lower (i.e. more negative) the SPI, the more intense is the drought. SPI can be computed for different accumulation periods: the 3 months period is often used to evaluate agricultural drought and the 12 month accumulation period can be used for hydrological drought, when rivers fall dry and groundwater tables lower.

period was completely restored by precipitation in summer/autumn. Instead, in northern Africa drought has persisted longer. The drought moved and expanded from Morocco (July - August 2021) to Algeria and Tunisia (September - November 2021) and then shifted back to the west into Morocco and expanded north into the southern part of the Iberian Peninsula (December 2021; Fig. 12).

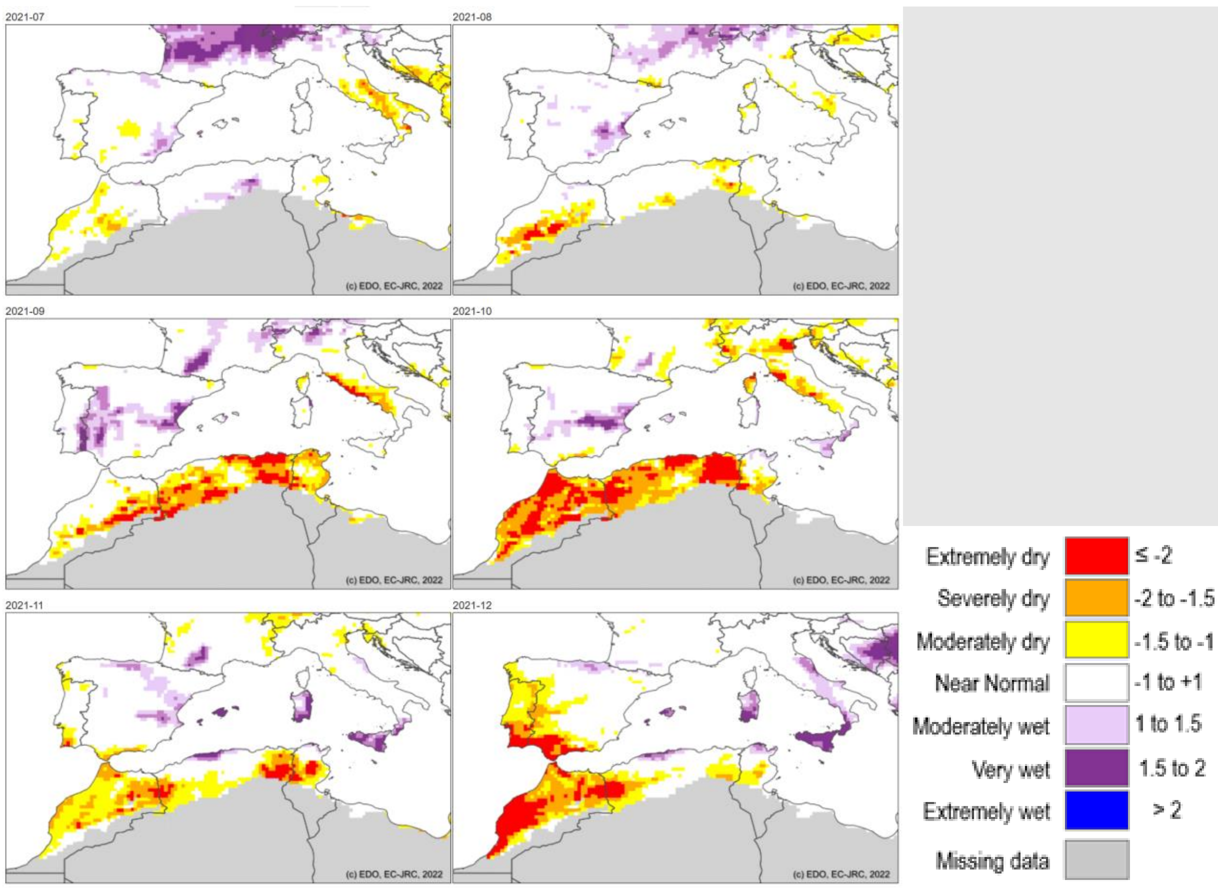


Figure* 12*:* *Standardized Precipitation Index (SPI-3) monthly maps from July 2021 to December 2021.

The SPI temporal evolution over the last five years (from February 2017 to January 2022) in the selected regions shows differences in terms of the onset and the severity of the drought events. Since the end of 2021, they seem to be connected, or at least overlapping, laying the basis of a potentially extremely critical situation.

In Portugal, the severity of the event is moderate and the SPI is in the range of variability of the last five years. Since the end of summer 2021, a worsening dry sequence is detected. Shorter accumulation periods feature lower values of SPI, confirming that drought is at its initial status in Portugal. The coming months will determine the evolution of this drought event and the impacts (Fig. 13).

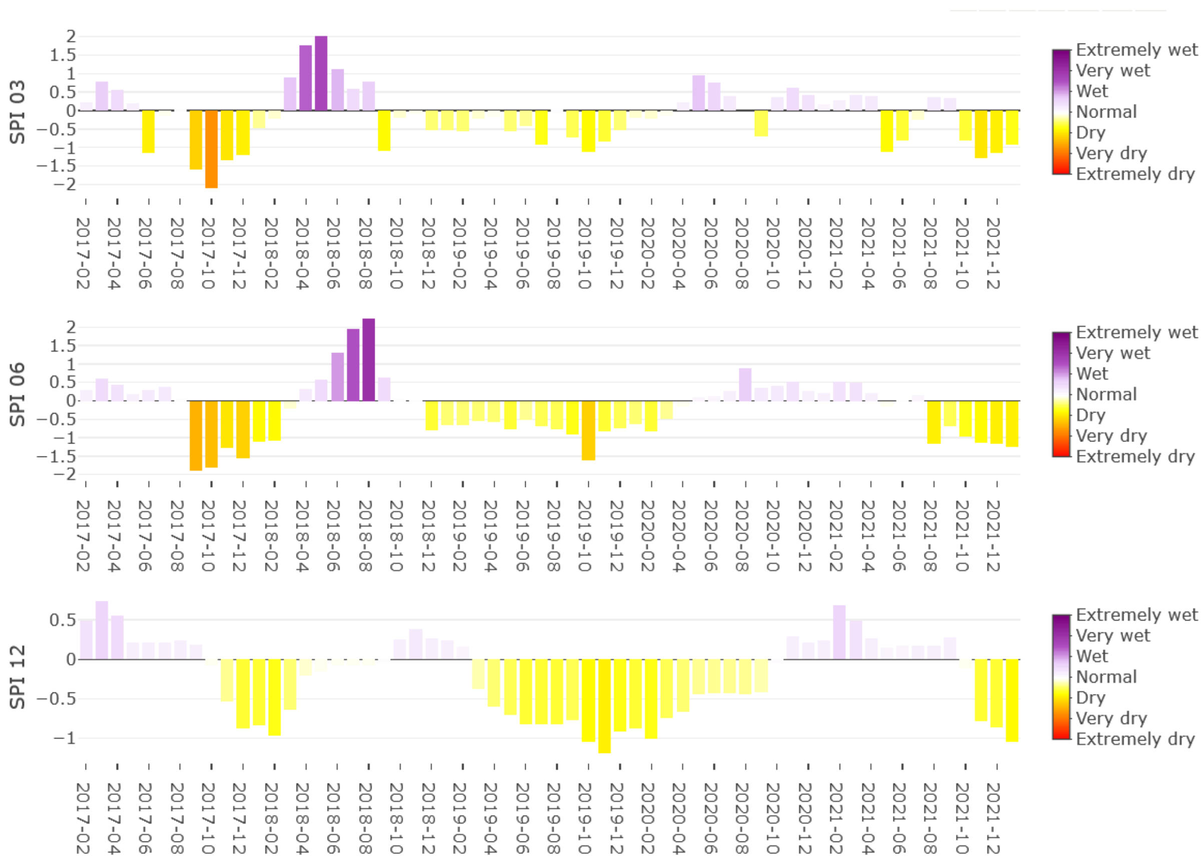


Figure 13: *Standardized Precipitation Index for 3-, 6- and 12-month accumulation periods (SPI-3, SPI-6, SPI-12) displaying the long-term drought evolution in Portugal (Alentejo) from February 2017 to January 2022.*

In Spain, the onset of the drought is detected already at the beginning of 2020. But it is by the end of 2020 that it becomes more severe. The SPI-3 and SPI-6 histograms show that the recent persistent and moderate drought is now turning into a more severe drought event (Fig. 14). The understanding of the dynamic link of the recent and the ongoing drought requires an in-depth evaluation.

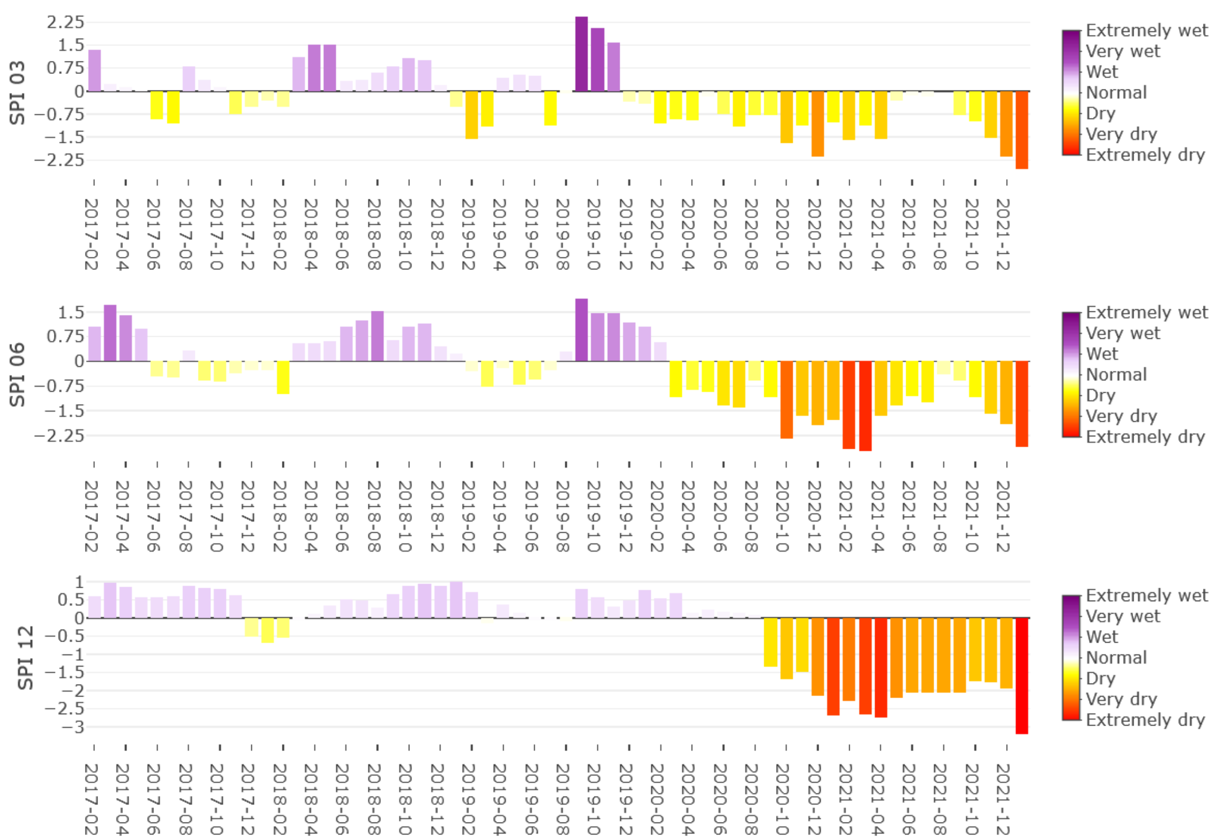


***Figure 14:** Standardized Precipitation Index for 3-, 6- and 12-month accumulation periods (SPI-3, SPI-6, SPI-12) displaying the long-term drought evolution in southern Spain (Andalucía) from February 2017 to January 2022.*

In Morocco, a sequence of at least three very severe droughts is visible by analysing the SPI-3 and SPI-6 data. The drought is recurring on a yearly basis during failed wet seasons. The long accumulation period of 12 months (SPI-12) shows how the region has been in hydrological drought conditions almost continuously since April 2019 with a slight and brief recovery just in mid-2020 (Fig. 15).

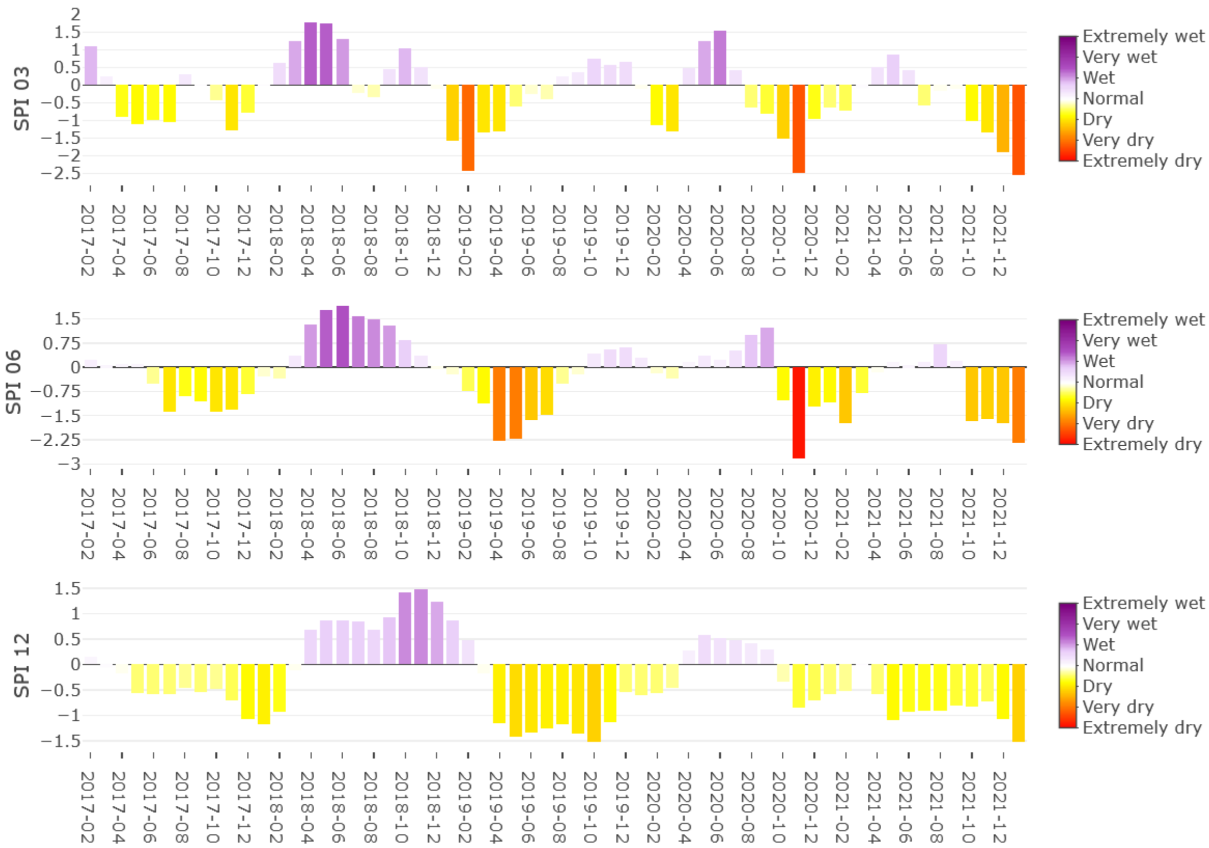


Figure 15: *Standardized Precipitation Index for 3-, 6- and 12-month accumulation periods (SPI-3, SPI-6, SPI-12) displaying the long-term drought evolution in Morocco (Oriental) from February 2017 to January 2022.*

In northern Algeria, temporal SPI patterns are similar to the ones estimated for southern Spain, with less severe values but higher persistence. Also in this case, the recent drought event (that started in September-October 2021) seems to be linked with a less severe but persistent drought (Fig. 16). More in-depth analysis, e.g. using field data for confirmation, is required to confirm this hypothesis.

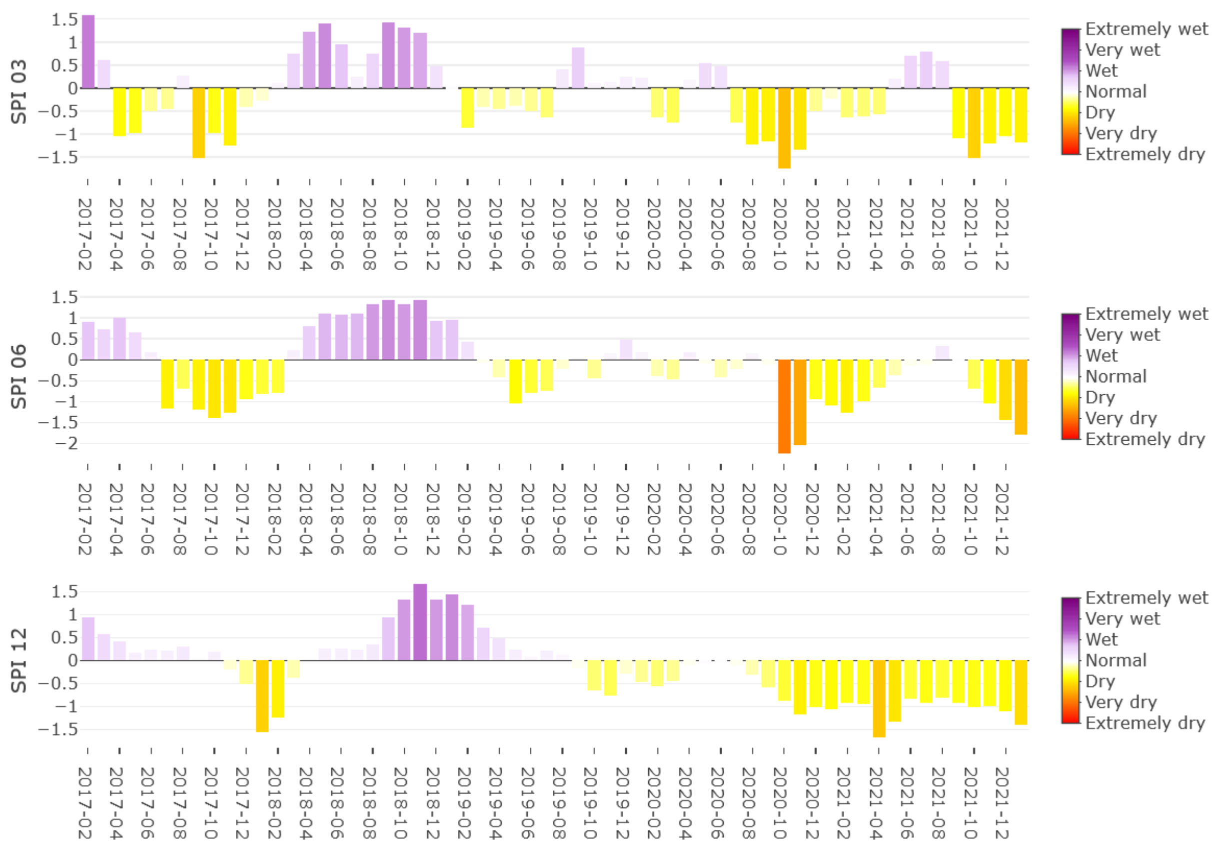


***Figure 16:** Standardized Precipitation Index for 3-, 6- and 12-month accumulation periods (SPI-3, SPI-6, SPI-12) displaying the long-term drought evolution in Algeria (Sidi Bel Abbes) from February 2017 to January 2022.*

Soil moisture anomaly

The lack of precipitation induces the reduction of the soil water content. The aim of the EDO soil moisture indicator is to provide an assessment of the topsoil water content, which is a direct measure of drought conditions associated with the difficulty for plants to extract water from the soil.

During the first 10-day period of February 2022, drier soil moisture conditions were observed in the Iberian Peninsula and in northern Africa (Fig. 17). The long dry period, exacerbated by the sharp worsening of the drought since September-October 2021, resulted in a large extended and severe drier than normal condition along almost all the coastal regions of north-western Africa. Similar conditions can be found in the Mediterranean coastal regions of Spain. Dry anomalies are detected across many other parts of Europe too. In spite of the shorter dry period in Portugal, the soil is much drier than normal due to the total lack of rainfall in December 2021 and January 2022.

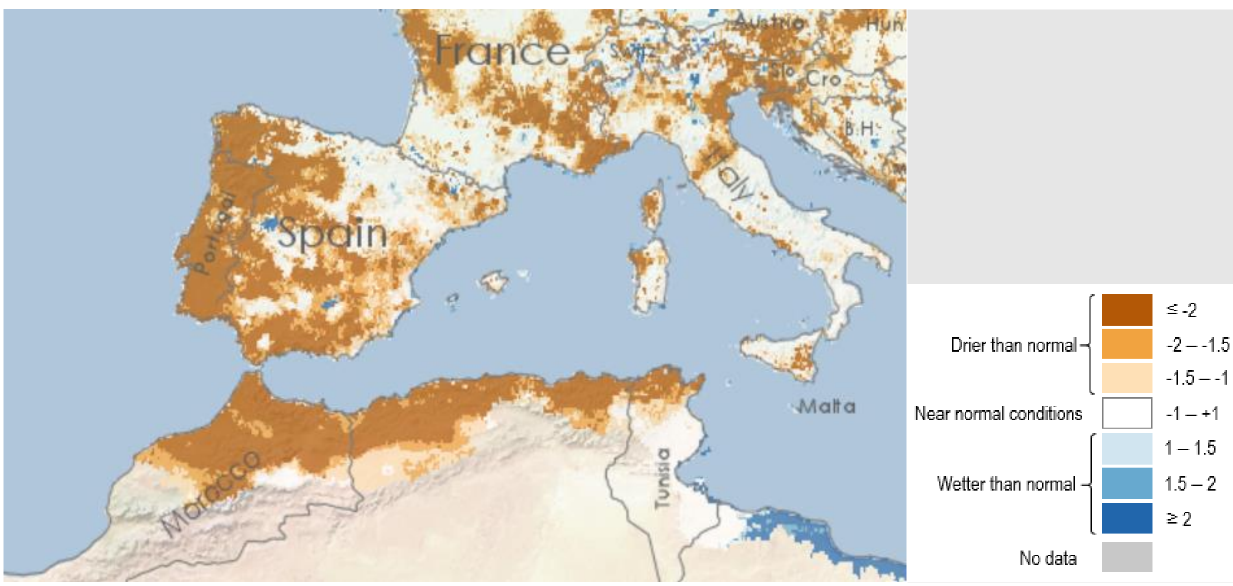


Figure 17: *Soil Moisture Anomaly - first ten-day period of February 2022*

In June 2021, the whole Iberian Peninsula experienced wetter than normal soil conditions and only local and slightly drier than normal conditions were observed in Morocco and Tunisia. During summer 2021, the whole western Mediterranean region (normally dry in that period) was drier than normal, with the most severe soil moisture anomalies observed in northern Morocco. In September 2021, meteorological conditions led to a full soil moisture recovery in the Iberian Peninsula (except for Andalucía). In northern Africa, only a very slight improvement was visible instead. During autumn, a slow but continuous increase of the dry anomaly has been observed, which drastically exacerbated in January 2022 (Fig. 18).

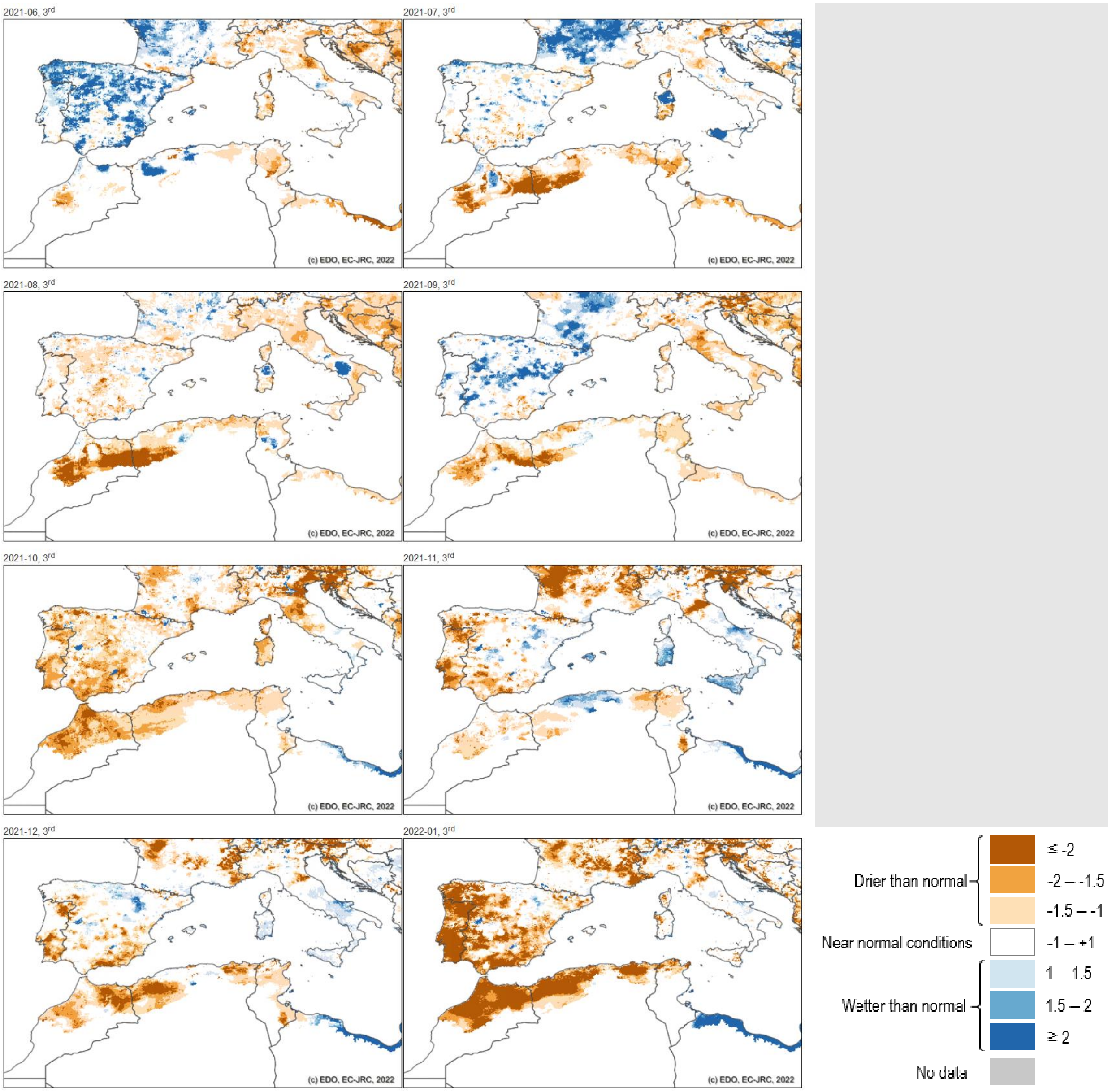


Figure* 18*: *Soil Moisture Anomaly – end of each month from June 2021 to January 2022.*

fAPAR anomaly

The satellite based GDO indicator fraction of Absorbed Photosynthetically Active Radiation (fAPAR) estimates the fraction of the solar energy absorbed by leaves. fAPAR anomalies, specifically the negative deviations from the long-term average over the same period, are an indicator of possible drought impact on vegetation.

The vegetation response to the lack of rainfall seems to be delayed with respect to the other indicators. In the Iberian Peninsula, despite the effective lack of precipitation and dry soil moisture conditions, the fAPAR anomaly shows better than normal conditions. In contrast, the impact on vegetation is visible in Morocco and the western coast of Algeria, given that drought lasted longer and the partial role of a climatologically shorter wet season (Fig. 19).

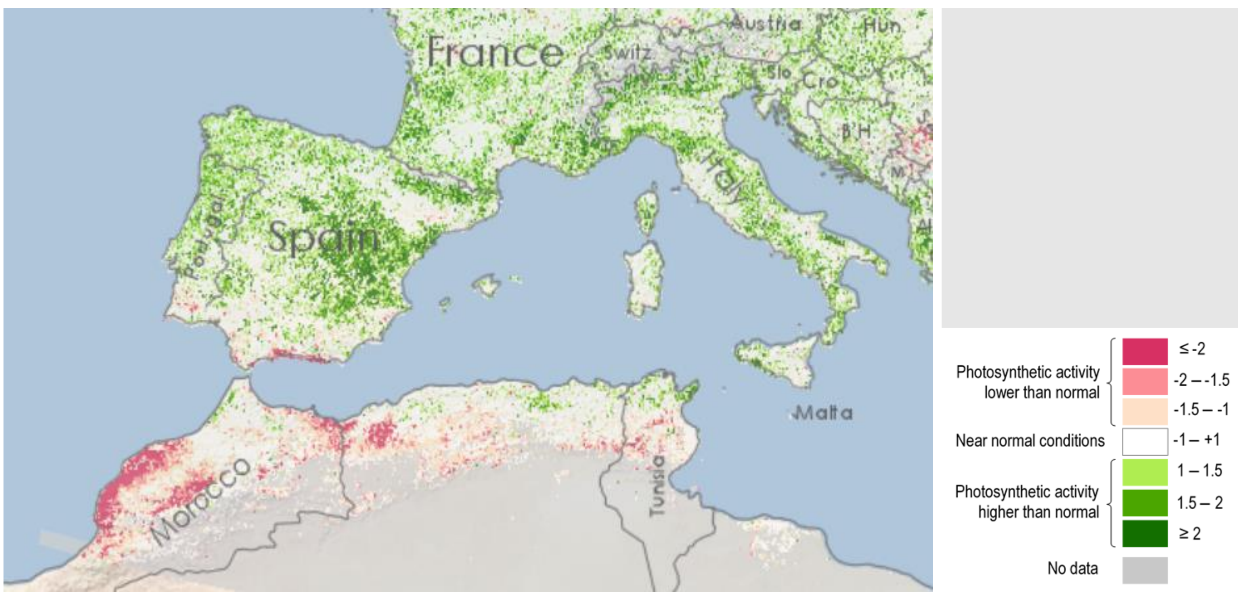


***Figure* 19*:** *fAPAR Anomaly - first ten-day period of February 2022.*

The temporal evolution of the fAPAR anomaly confirms the long and persistent drought in northern Africa affecting vegetation in Algerian coastal regions since June 2021, and expanding towards Morocco since November 2021 with a sharp worsening in January 2022. In the Iberian Peninsula, the vegetation maintained better than normal conditions almost everywhere till the beginning of winter, when first signals of negative anomalies appeared in the southern coastal regions (Fig. 20). The spring and summer evolution will be extremely important for the drought impacts.

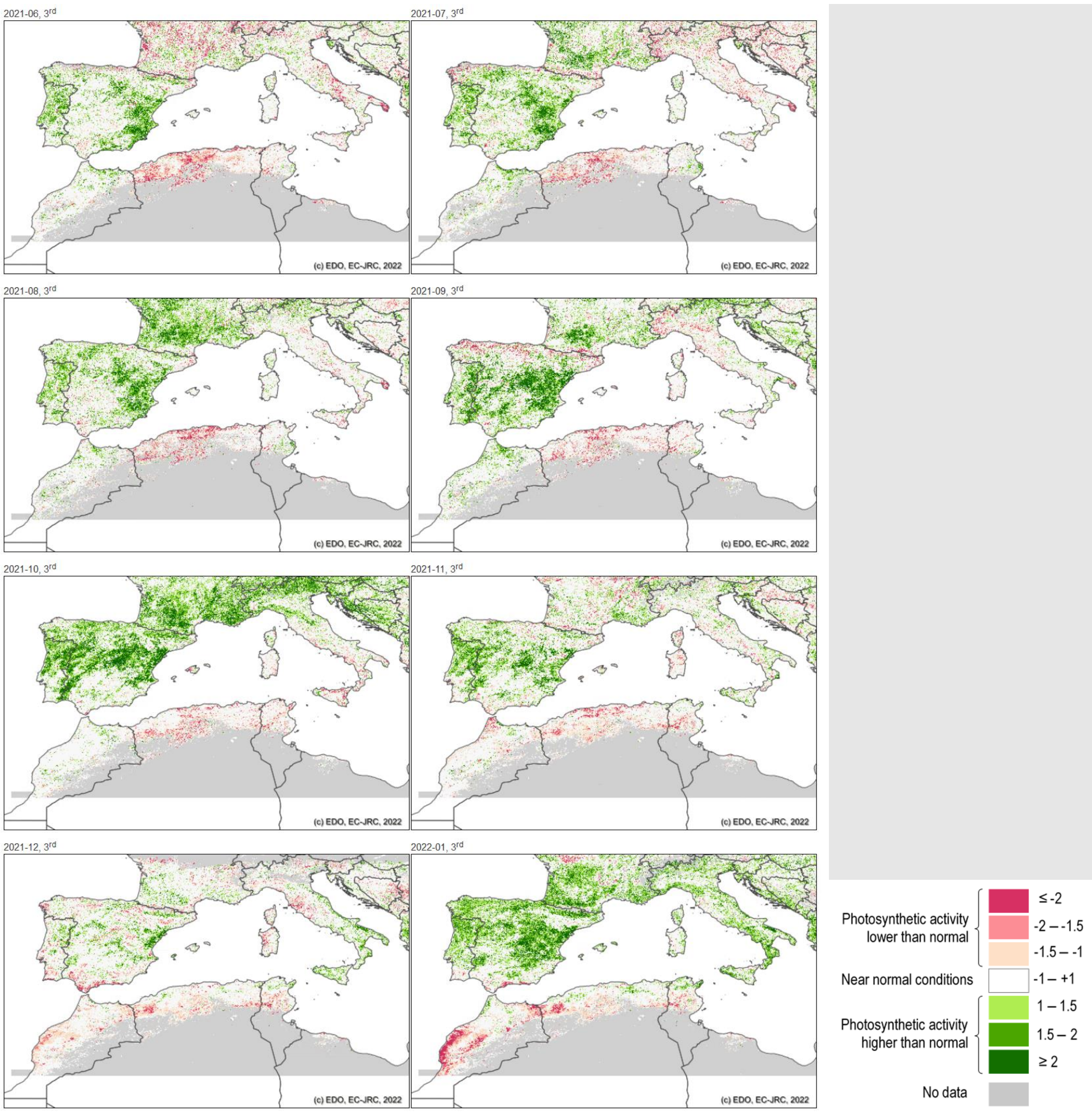


Figure 20: *fAPAR Anomaly - end of each month of from June 2021 to January 2022.*

Combined Drought Indicator (CDI)

The Combined Drought Indicator (CDI) of the European Drought Observatory (EDO) is used to identify areas affected by agricultural drought, and areas that may be affected. The CDI is derived by combining the previously analysed Standardized Precipitation Index (SPI), the Soil Moisture Anomaly (SMA), and the fAPAR Anomaly. Areas are classified according to three primary drought classes: (1) “Watch”, indicating that precipitation is less than normal; (2) “Warning”, indicating that also soil moisture is in deficit; and (3) “Alert”, indicating that also vegetation shows signs of stress. Three additional classes – namely “Full Recovery”, “Temporary Soil Moisture Recovery” and “Temporary fAPAR Recovery” – identify the stages of drought recovery processes in terms of its impacts on soil moisture and vegetation. Here the CDI is presented in a revised and improved version (v.2.0), using the same input data, but different from the one operationally available on the EDO website (v.1.5.0) in terms of computational algorithm. The main changes in the revised CDI version are the inclusion of a constraint on the temporal consistency, based on CDI’s value in the preceding ten-day period, and the addition of two temporary recovery classes (for soil moisture and for vegetation conditions). This improves the temporal continuity of the indicator. The three main stages of drought ("Watch”, "Warning” and "Alert”) and the "Full Recovery” stage remain unchanged.[2]

At the begin of February 2022, CDI classifies the drought with an “alert” level in northern Morocco, Algeria, Tunisia and the coast of Andalucía (Spain) and Algarve (Portugal). The “Warning” level is assigned to almost all the investigated regions (i.e., the Iberian Peninsula and the Mediterranean coast of Africa), giving the relevance of the events in terms of extent, severity and duration (Fig. 21). As already mentioned, the temporal evolution in the next months (March-April) will be essential to understand and assess the severity of the ongoing drought over the western Mediterranean and its potential impacts.

[2] For more detailed information refer to C. Cammelleri et al.: A revision of the Combined Drought Indicator (CDI) Nat. Hazards Earth Syst. Sci., 21, 481–495, 2021 https://doi.org/10.5194/nhess-21-481-2021

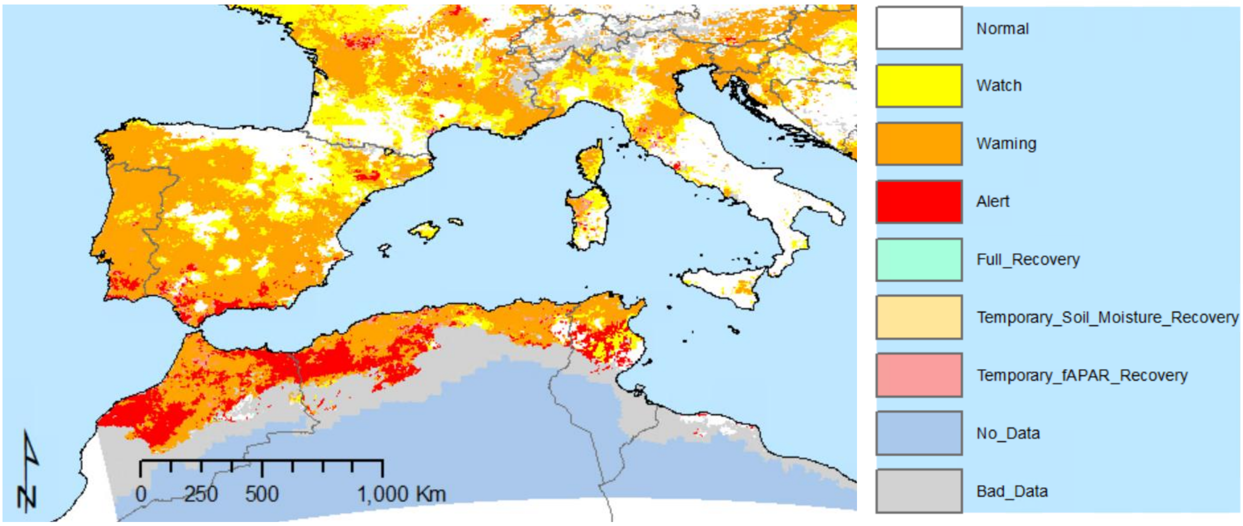


Figure 21: *Combined Drought Indicator (CDI), v.2.0 – beginning of February 2022. The index is not computed over the desert areas of northern Africa, as drought indicators and impacts in such areas are neither relevant nor possible to compute or assess.*

Seasonal forecast

According to the GDO seasonal forecasts, severely drier than normal weather conditions are expected over the whole Iberian Peninsula in the period February-April 2022 (Fig. 22). Less severe, but nevertheless drier than normal conditions are forecasted for northern Africa. Considering that the climatological wet period is already close to its end, and summer is characterized by generally scarce precipitation in these regions, even in case of normal precipitation, this may not significantly change the drought situation. These very negative forecasts are the main concern for the evolution of the drought that could become an extreme and persistent event. Monitoring of the next months is essential for risk and impact assessment (Fig. 22).

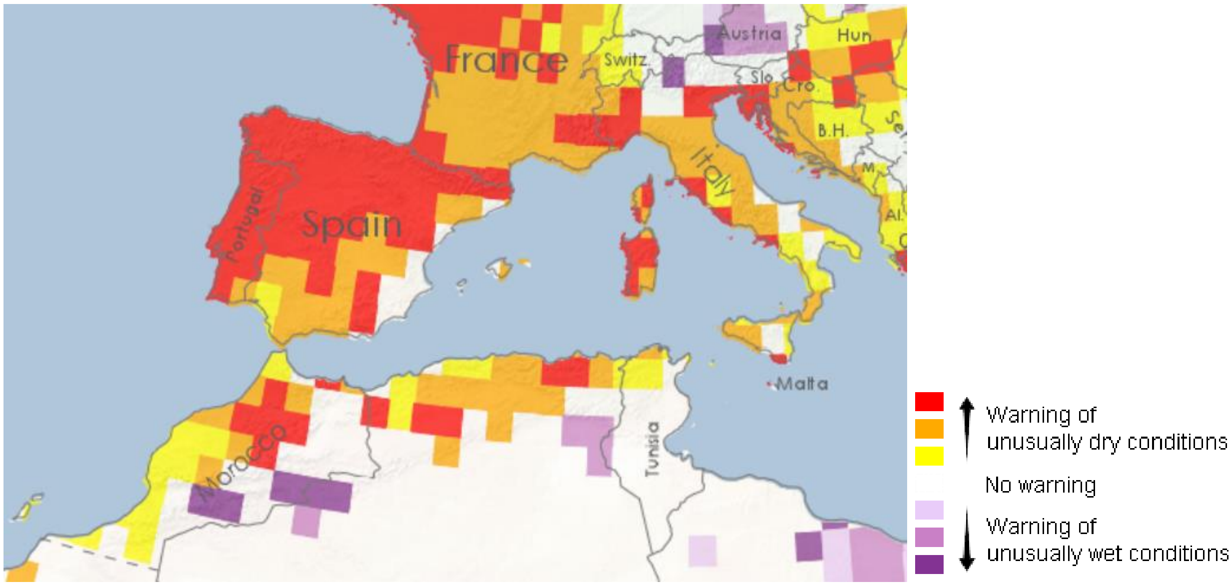


Figure 22: *Indicator for forecasting unusually wet and dry conditions for 3 months, February to April 2022.*

Under currently forecasted conditions, the vegetation will be further affected in the coming months by the persistence of dry conditions.

Focus on Portugal[3]

According to the Palmer Drought Severity Index (PDSI; Fig. 23) produced and made available by the Portuguese Institute for Sea and Atmosphere (IPMA), the onset of the drought goes back to the beginning of the expected rainy season (October) in the southern region, extending to the whole territory in the subsequent months and increasing in intensity until February 15th. The southern region and some areas in the districts of Bragança and Castelo Branco (inner regions) are now under extreme drought (as estimated by the IPMA-PDSI).

[3] Source: Portuguese Sea and Atmosphere Institute - Instituto Português do Mar e da Atmosfera (IPMA) and Agência Portuguesa do Ambiente (APA)

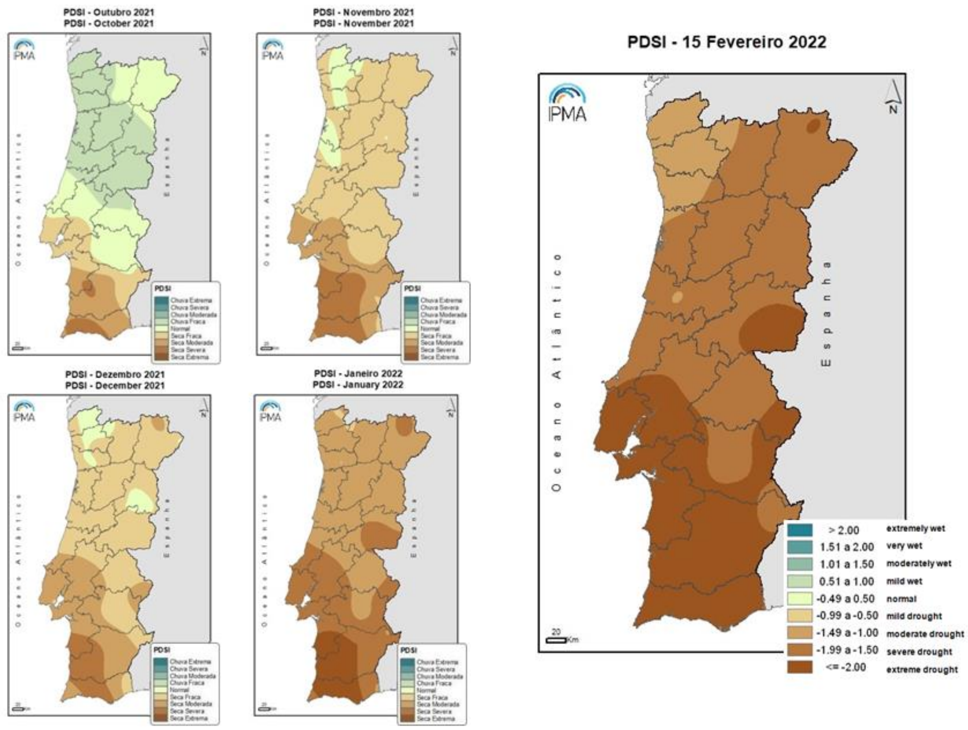


Figure 23: *Spatial distribution of the IPMA-PDSI between October 2021 and February 2022.*

The accumulated precipitation since the beginning of the 2021/22 hydrological year is well below the average value for 1971-2000, especially in the very dry months of November and January. Compared to other drought years, this is one of the driest: only 1998/99 shows a higher deficit in February (Fig. 24).

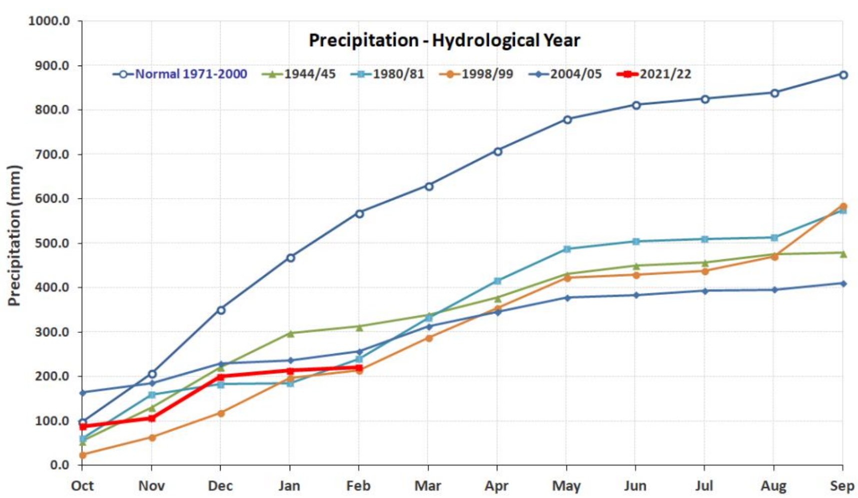


Figure 24: *Monthly precipitation accumulated in the hydrological years: 1944/45, 1980/81, 1998/99, 2004/05, and 2021/22. The blue line shows the 1971-2000 normal values.*

In the southern regions (Alentejo and Algarve) a continuous precipitation deficit has been observed in the previous hydrological years, with a slight recovery in the last one (Fig. 25):

• Évora/Alentejo: in the last 7 years, 5 had values below normal; a slight recovery was observed in in 2019/20.

• Beja/Alentejo: last 5 years below normal.

• Mértola/Aentejo: 9 consecutive hydrological years below normal, with a slight recovery in 2019/20.

• Vila R. S. António/Algarve: last 8 years below normal.

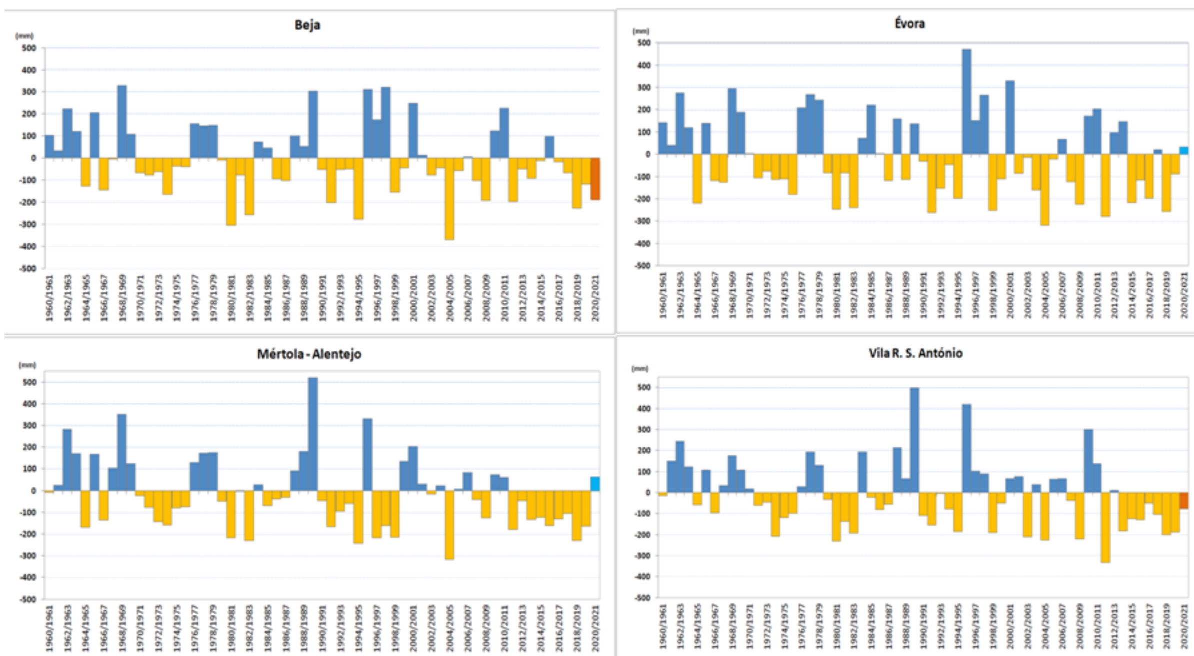


Figure 25: *Precipitation anomalies (w.r.t. 1971-2000) in the hydrological year from 1960/61 to 2020/21.*

The Drought State Reservoirs Index (DSIR) is used to assess the effect of the drought over the reservoirs storage. The actual stored volume is compared with the average, and the minimum and maximum values of the historic data series.

The analysis of the monthly stored volume in the reservoirs for the main river basins shows that a significant area of the territory is in the Alert or Emergency state. The most critical situations are on the north-western and south-western Portugal, namely the Lima, Cávado, Ave, Mira, Ribeiras do Algarve (Barlavento) river basins (Fig. 26).

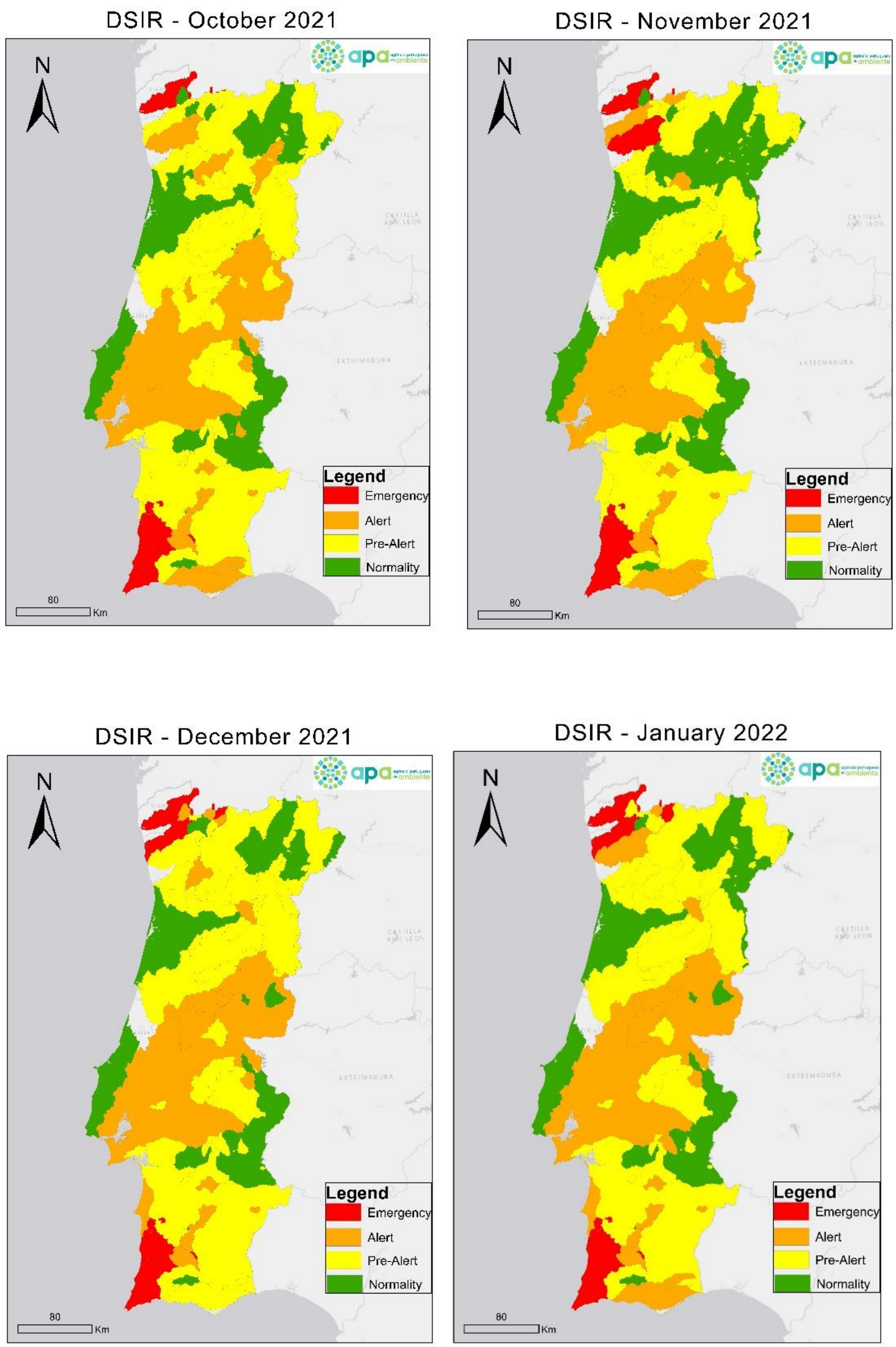


Figure 26: *Drought State Reservoirs Index (DSIR) from October 2021 to January 2022*

This hydrological year Portugal is facing an unusual deficit of rain all over the country with a major impact on the reservoirs water volume.

The graphs show the DSIR index of the monthly volume for the historic data series for reservoirs which have in January of 2022 the total capacity below 20%, namely Alto Lindoso (Lima river basin), Monte da Rocha e Campilhas (Sado river basin), Bravura (Ribeiras do Algarve).

Alto Lindoso dam has registered this hydrological year the five lowest values of the historic monthly volume series (30 years), as it can be seen in fig. 27.

Monte da Rocha, Campilhas e Bravura dams register the longest period on the alert and emergency drought levels hydrological, worse than the historical drought of 1990/92, as it can be seen in figures 28, 29 and 30, respectively.

This critical hydrological situation forced the National Water Authority, the Portuguese Environment Agency, to restrict the use of water in some reservoirs for hydroelectric power and irrigation in order to assure the water for human consumption and ecological flow.

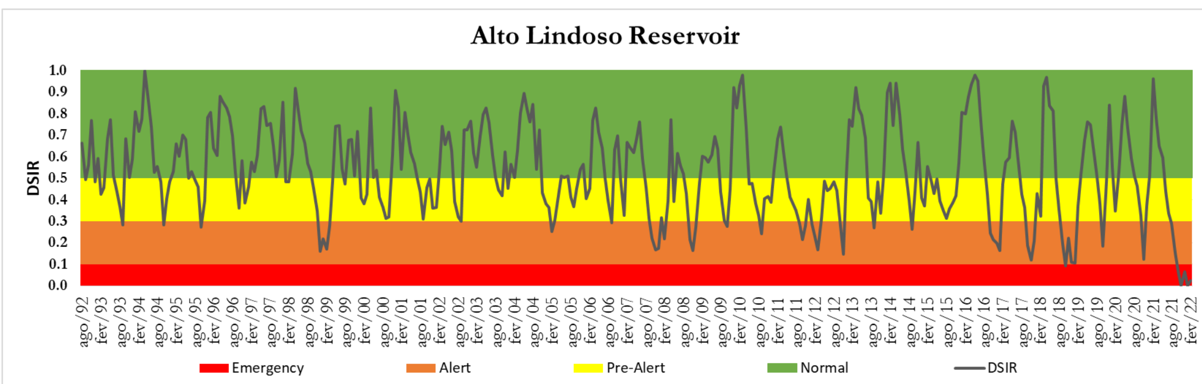


Figure 27: *Drought State Index for Reservoirs for Alto Lindoso reservoir from 1992 to 2022*

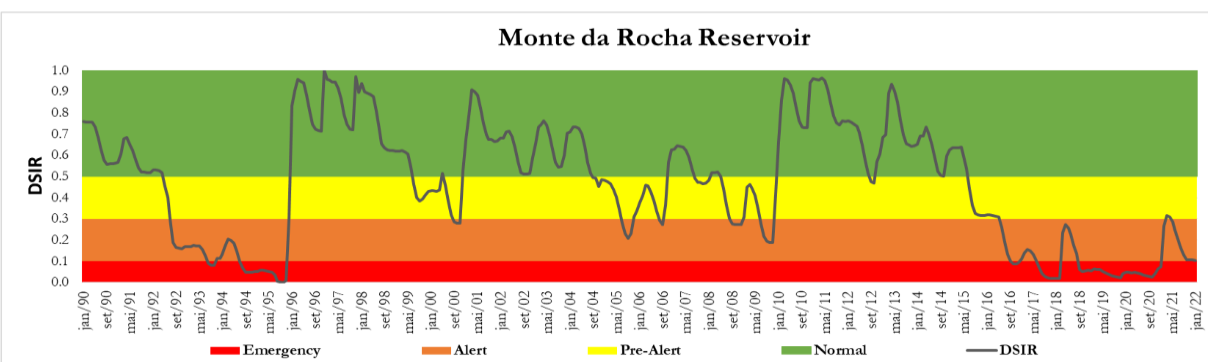


Figure 28: *Drought State Index for Reservoirs for Monte da Rocha reservoir from 1992 to 2022*

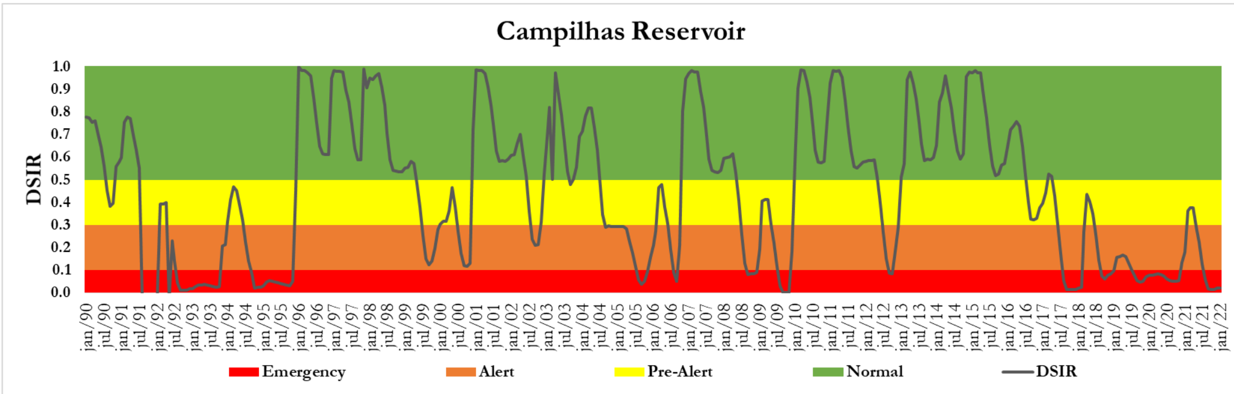


Figure 29: *Drought State Index for Reservoirs for Campilhas reservoir from 1990 to 2022*

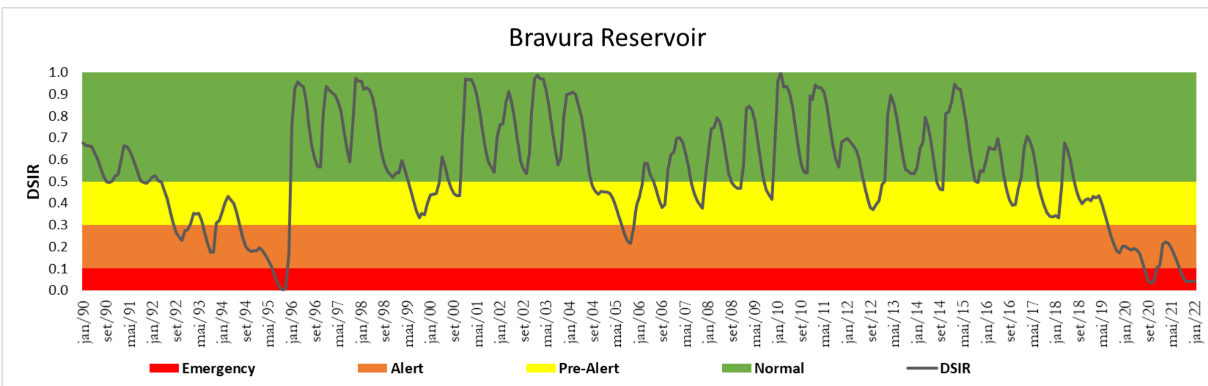


Figure 30: *Drought State Index for Reservoirs for Bravura reservoir from 1990 to 2022*

The evolution of the groundwater reserves since October 2021 shows a decrease of the water stored in most of the aquifers, due to the deficit of precipitation. There are several groundwater bodies that are in a critical situation, since the beginning of the 2018-2019 hydrological year. These situations relate to bodies of water where levels below the 20th percentile persist over some months (Fig. 31). In order to preserve underground reserves for public supply and animal watering, the APA imposed some conditions on the licensing of new abstractions, namely in aquifers in critical condition.

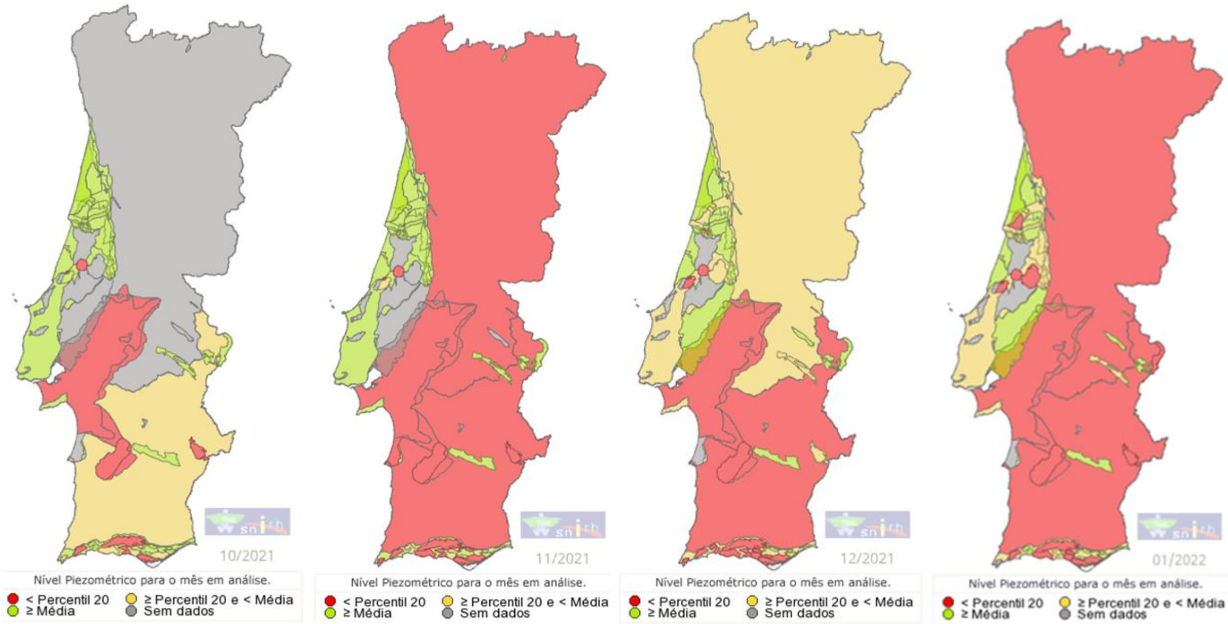


Figure 31: *Evolution of the groundwater reserves on the hydrological year of 2021/2022*

Reported impacts

Iberian Peninsula

An earlier than usual consumption of feed crops stock associated with the potential drop in forage production as well as the general increase in the cost of stock and production factors (fertilizers, seeds and others) has led to a great concern in the agricultural sector. The current main impacts are summarised below.

Agricultural Sector

- In some areas, crops have had lower vegetative development, especially those in thinner soils and with lower moisture retention capacity. The ones that were sown late did not germinate, due to the lack of rain. The situation is very serious in Alentejo and especially in the municipalities of Baixo Alentejo - Castro Verde, Mértola, Almodôvar, Odemira, Ourique and throughout the southwestern part of Alentejo.
- A significant reduction in the area sown with barley is expected.

- Due to the lack of precipitation, farmers in the Algarve are already watering the orchards with an irrigation allocation similar to the summer months, although citrus orchards showed a normal vegetative development.

Livestock Feeding

- Due to the lack of precipitation and lower values of relative humidity, fodder shortages in meadows and pastures have worsened.
- Pastures show only little vegetation growth and the grass that grew has a poor development. Throughout January, feeding continued to be based extensively on straw and hay.
- In Alentejo and Algarve, livestock are being supplied with supplemented stocks of feed crops (straw and hay) and concentrates (rations).[4]

The severe drought has spread across almost all of mainland Portugal in February, threatening water supply (Fig. 32) over an even wider area than during the last record dry spell of 2005. Moreover, global cereals prices are very high[5]. The agriculture Ministers of Portugal and Spain presented a set of proposals to the European Commission to tackle the situation and the risks for the agricultural and the energy sectors[6].

[4] Source: Portuguese Sea and Atmosphere Institute - Instituto Português do Mar e da Atmosfera (IPMA)

[5] Food and Agriculture Organization of the United Nations https://www.fao.org/worldfoodsituation/foodpricesindex/en/

[6] https://www.reuters.com/markets/commodities/portugal-drought-worsens-raising-fears-crops-water-supply-2022-02-21/

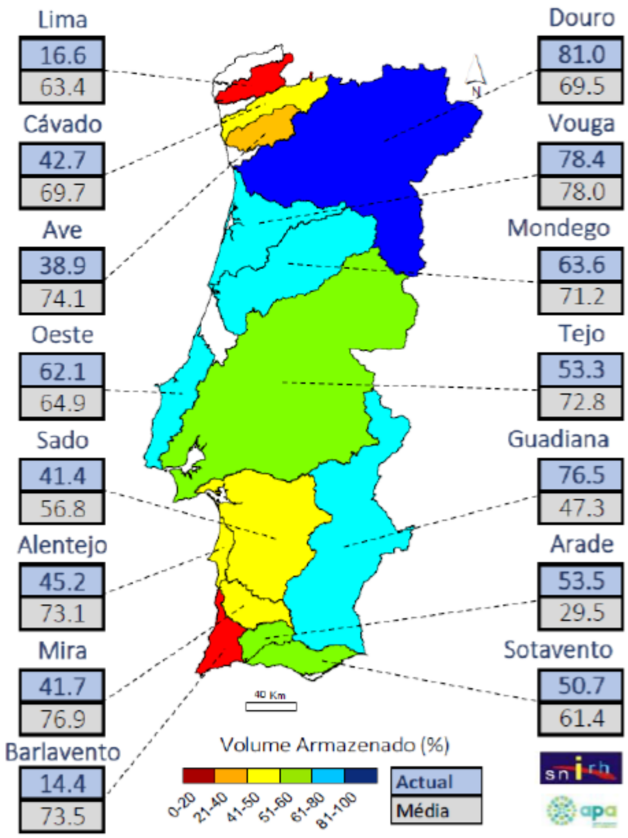


Figure 32: *Storage in the first three weeks of January 2022 by watershed are below the average (1990/91 to 2020/2021) except for the Douro, Vouga, Guadiana and Aarade basins. Source: Environmental Portuguese Agency (APA).*

The negative effects of the severe drought could already be observed across half of mainland Portugal in January 2022. Livestock and especially extensive livestock production has been one of the worst hit sectors, due to poor grazing conditions. Concerning cereals, heavy impacts in both the reduction of sown areas (the lowest in the last hundred years according to current predictions) and the poor vegetative development of rain-fed crops are also expected, if the drought will continue as expected. This drought scenario, combined with the increase of input prices, has already generated uncertainty and concern in the sector.[7]

According to the Environmental Portuguese Agency (APA), in Portugal the drought is already peculiar due to the combination of a slightly positive temperature anomaly with the severely negative precipitation anomaly (with respect to 1971-2000; Fig. 33).

[7] http://www.publicnow.com/view/CD97B93274AB2A50ABFD057268B04B351738C9A6

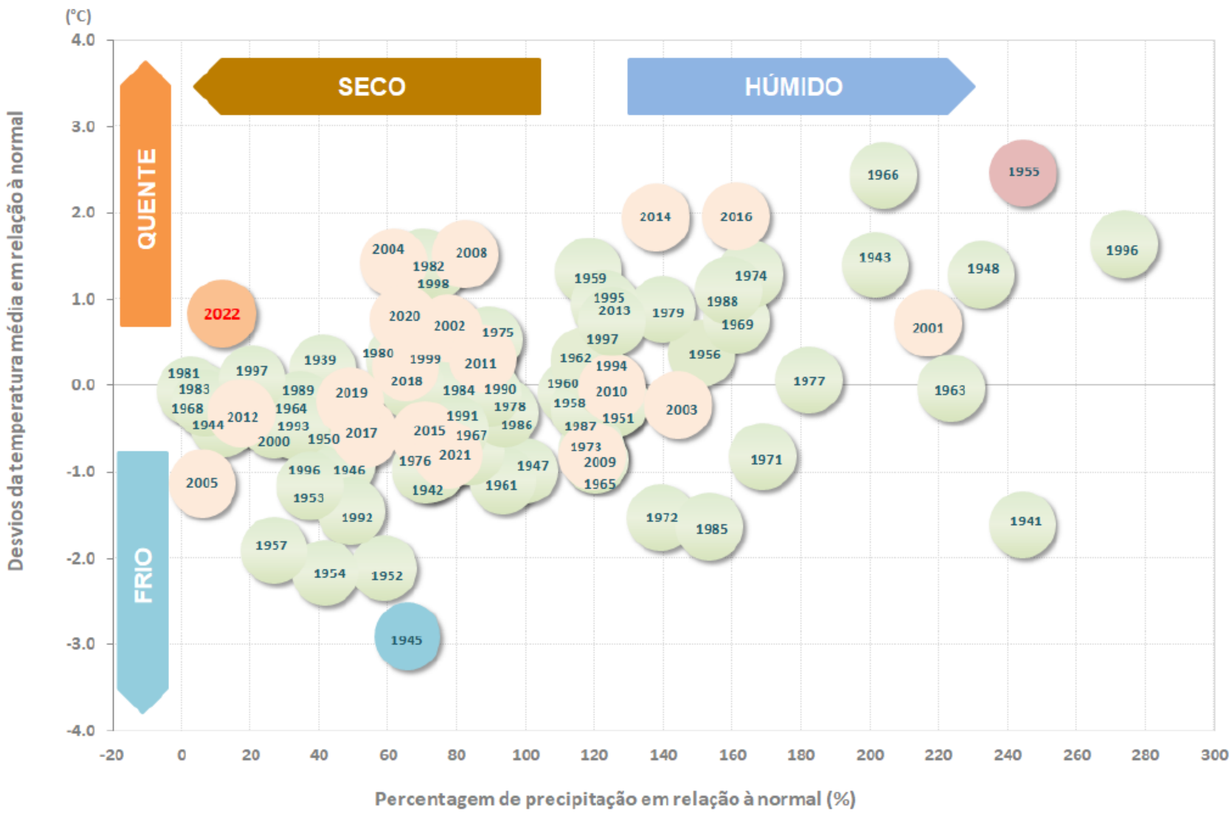


Figure 33: *Deviation of the average air temperature and percentage of precipitation from the normal 71-00 in the month of January (period 1941 – 2022). Source: Environmental Portuguese Agency (APA).*

Northern Africa

Although rainfall amounts have improved considerably in December and January in the central part of northern Algeria, major deficits are still observed in the inland areas of the country. In addition, there is a high probability for continuation of below average rainfall amounts in March.[8]

Early season rainfall in Morocco points to major deficits in most of the country with very dry conditions. In addition, there is a high probability for a continuation of below average rainfall in March.[9]

[8] https://mars.jrc.ec.europa.eu/asap/country.php?cntry=4

[9] https://mars.jrc.ec.europa.eu/asap/country.php?cntry=169

Below average yield is reported for the major production areas of Algeria, most markedly in the north-western and central regions. Higher precipitation would be required to avoid further losses in crop yield potentials. The yield forecast from JRC-MARS is below the 5-year average. In Morocco, the persistent precipitation deficit has led to drought conditions in most agricultural areas. Persisting shortages in water supply could further compromise the cereal campaign if rains will not arrive in the coming weeks[10].

Water shortage in Morocco is causing severe issues. Due to the lack of rainfall during autumn and winter periods, the situation is worsening and farmers are being hit the hardest. The reservoirs are at low levels, with volumes at less than 33%. It should be noted that overexploitation of the Morocco's aquifers is another factor contributing to the seriousness of the situation. The government has announced that it will allocate 10 billion dirhams (940 million Euro) to mitigate the consequences of the drought. The main objective is to help the affected farmers, improve water management to ensure adequate water distribution, improve agricultural insurance and finance supplies of both wheat and livestock feed[11].

[10] The JRC MARS Bulletin – Crop monitoring European Neighbourhood available at https://ec.europa.eu/jrc/en/mars/bulletins

[11] https://atalayar.com/en/content/moroccan-government-allocates-10-billion-dirhams-alleviate-effects-drought

Glossary of terms and acronyms

APA	Agência Portuguesa do Ambiente
CEMS	Copernicus Emergency Management Service
CDI	Combined Drought Indicator
DSIR	Drought State Reservoirs Index
EDO	European Drought Observatory
EC	European Commission
ECMWF	European Centre for Medium-Range Weather Forecasts
ERA5	ECMWF Reanalysis v5
ERCC	European Emergency Response Coordination Centre
FAO	Food and Agriculture Organization of the United Nations
fAPAR	Fraction of Absorbed Photosynthetically Active Radiation
GDO	Global Drought Observatory
GDP	Gross Domestic Product
GPCC	Global Precipitation Climatology Centre
IPMA	Instituto Português do Mar e da Atmosfera
JRC	Joint Research Centre
MARS	Monitoring Agricultural ResourceS
PDSI	Palmer Drought Severity Index
RDrI-Agri	Risk of Drought Impact for Agriculture
SMA	Soil Moisture Index (SMI) Anomaly
SMI	Soil Moisture Index
SPI	Standardized Precipitation Index

GDO indicators versioning:

The GDO/EDO indicators appear in this report with the following versions:

Soil Moisture Index Anomaly, v.2.1.1
fAPAR (fraction of Absorbed Photosynthetically Active Radiation) Anomaly 1.3.2
Indicator for forecasting unusually wet and dry conditions 1.0.0
Precipitation (GPCC) 1.2.0
Risk of Drought Impact for Agriculture (RDrI-Agri) 2.3.2
Standardized Precipitation Index (SPI, GPCC, 1-dd resolution) 1.2.0 for charts; SPI ERA5 (1/4-dd resolution) for maps. SPI ERA5 is a provisional dataset which replaces SPI Blended and Interpolated (v.1.2.0), unavailable in the considered period due to an issue in source data.
Combined Drought Indicator (CDI) 2.0 (beta version not operational)

Check https://edo.jrc.ec.europa.eu/download for more details on indicator versions.

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List of Figures

:

GDO Analytical Report

Drought in western Mediterranean February 2022

JRC Global Drought Observatory (GDO) of the Copernicus Emergency Management Service (CEMS) - 28/02/2022

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