



European
Commission

Agro-meteorological monitoring relevant for fruit supply in the EU

Market Observatory Stone Fruit

2 June 2023

Joint
Research
Centre



Issued: 22 May 2023
JRC MARS Bulletin Vol. 31 No 5

JRC MARS Bulletin Crop monitoring in Europe May 2023

Weather conditions marked by contrasts
Overall fair yield outlook maintained, except in Iberian Peninsula

The weather observed during this review period was marked by contrasting patterns of drier- and wetter-than-usual conditions across Europe, which affected crops in many areas.

Continued and intensified drought conditions in the Iberian Peninsula further worsened the outlook for crops in Spain and Portugal. In both countries, the yield forecast for all main crops have dropped to well below last year's poor level. Details on the drought in the Maghreb region can be found in the JRC MARS bulletin on North Africa. A distinct rainfall surplus and/or colder than usual conditions caused delays to the sowing of summer crops and impaired other field operations in a large belt extending from Ireland to Bulgaria and Ukraine. An important positive aspect of the rainfall surplus is that, from a crop-water supply perspective, soil moisture and ground water levels in most of the areas affected are currently at a very favourable level for this time of year. While north-western Italy is recovering from the drought reported in April, extreme rainfall events in the north-east caused locally severe loss of production of wheat and barley and substantial damage to permanent crops.

AREAS OF CONCERN - CROP IMPACTS



Winter crops impacted Spring and/or summer crops impacted

Contents:

1. Agrometeorological overview
2. Remote sensing – observed canopy conditions
3. Grasslands in Europe – regional monitoring
4. Sowing update
5. Country analysis
6. Crop yield forecast
7. Atlas

Covers the period from 1 April until 14 May

Crop	Yield t/ha				
	Aug 2022	April Bulletin	MARS 2023 Forecasts	1923-22 Avg	% Diff April
Total cereals	5.44	5.50	5.60	+3	+0
Total wheat	5.50	5.74	5.79	+4	+1
Soft wheat	5.81	5.96	6.01	+4	+1
Durum wheat	5.50	5.54	5.48	-0	-2
Total barley	4.90	4.92	4.89	-0	-1
Spring barley	4.19	4.04	3.90	-7	-3
Winter barley	5.77	5.93	6.00	+4	+1
Grain maize	7.48	7.67	7.64	+2	-0
Rye	5.98	4.30	4.26	-7	-1
Triticale	4.22	4.39	4.32	+2	-2
Rape and turnip rape	3.10	3.31	3.34	+8	+1
Potato	34.1	36.0	36.4	+7	+1
Sugar beet	72.6	77.5	76.7	+6	-1
Sunflower	2.21	2.29	2.22	+0	-3
Soybean	2.76	2.84	2.85	+5	+0

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Contents

- JRC MARS AGRI4CAST
 - Meteorological Data Infrastructure
 - JRC MARS Explorer – Fruit tree monitoring
- Overview of Winter and Spring Conditions:
 - Prolonged drought conditions in Iberian Peninsula
 - Frost events with potential impacts
 - Flood events

AGRI4CAST Purpose and Objectives

- Provide independent, timely, and accurate information on the condition of crops and crop yield forecasts for the EU and its neighbourhood, thus contributing to the transparency of market information
- Provide *ad-hoc* analysis of extreme weather situations and their impacts on agriculture

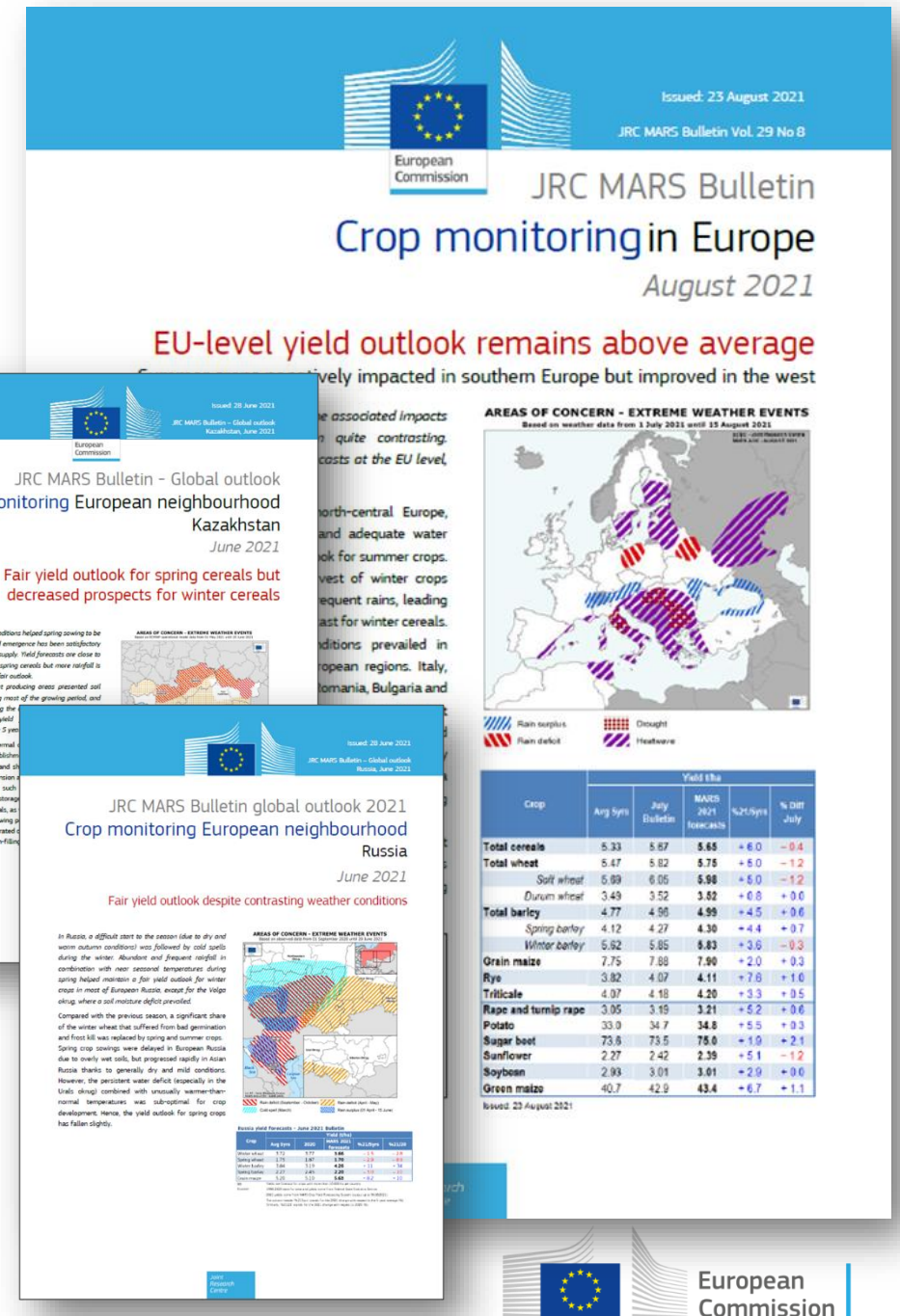


Directly implements

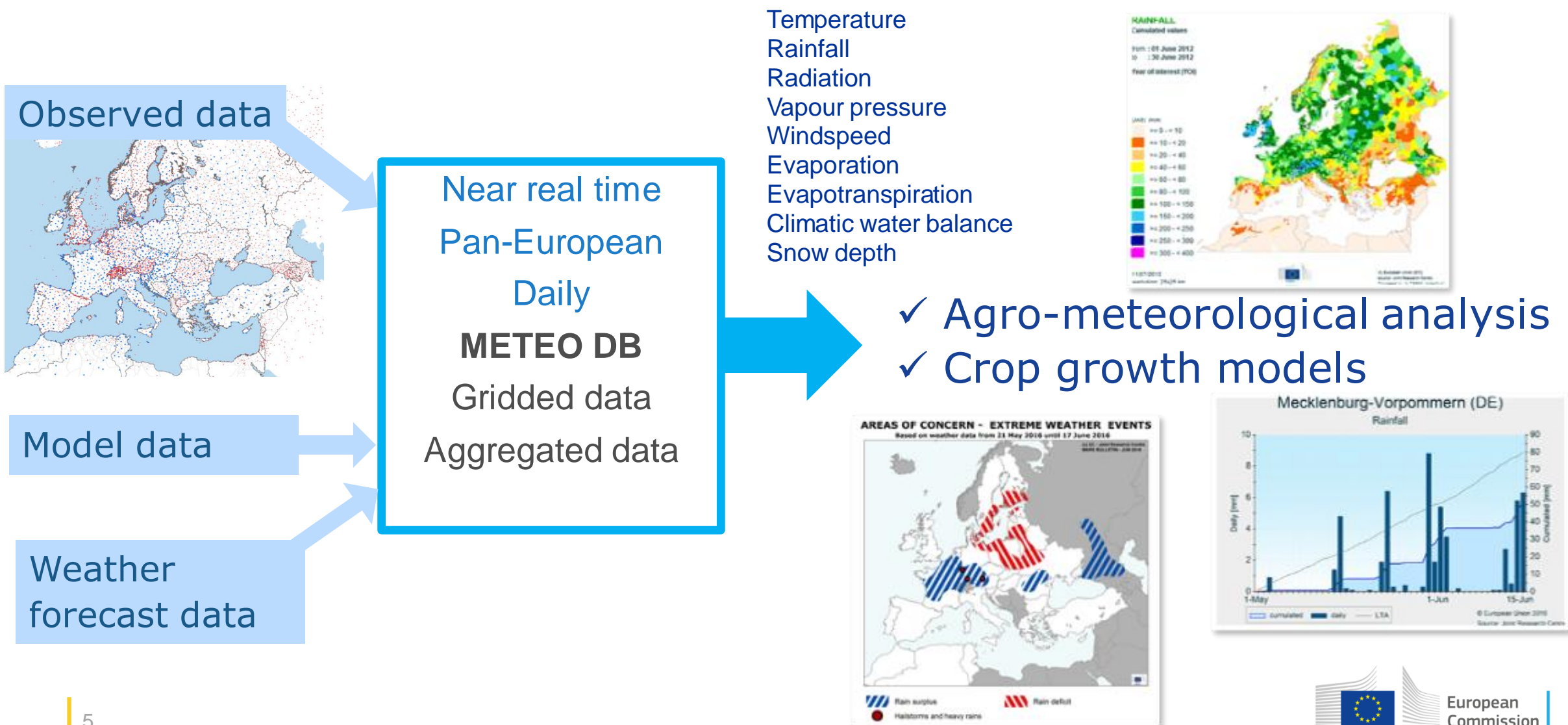
Article 25 of REG 2021/2116 on Monitoring Agricultural Resources (MARS)

AGRI4CAST Key Products

- JRC MARS Bulletin - Crop monitoring in Europe since 1992, monthly
- JRC MARS Bulletin - Crop monitoring European neighbourhood; since 2017, 2 times per year for 5 regions
- Data, maps, and graphs in [AGRI4CAST toolbox](#), incl. Resources Portal and [MARS Explorer](#)
- Results of *ad-hoc* analysis following requests from DG AGRI, sometimes published as Bulletin updates



AGRI4CAST Meteorological Data Infrastructure





JOINT RESEARCH CENTRE AGRI4CAST ToolBox

<https://agri4cast.jrc.ec.europa.eu/>

mission > EU Science Hub > AGRI4CAST Toolbox



JRC MARS Bulletins

The JRC MARS Bulletin offers in an operational context analyses and information on crop growth conditions and yield forecasts at the level of EU Member States and neighbouring countries, such as Ukraine, Russia, Turkey and the Maghreb.

We need your help: JRC MARS Bulletins Survey

The JRC MARS Bulletins Survey aims to help us better understand how you use the JRC MARS Bulletin. This will allow us to improve our service in the future. It should take less than 10 minutes of your time to complete the survey. All information collected will be anonymous, no personal information is requested.

The survey is available at 2022 JRC MARS Bulletin - Crop Monitoring in Europe Survey



JRC MARS Bulletin – Archive

This Archive stores all the JRC MARS bulletins published since 2007.



JRC MARS Explorer

The JRC MARS Explorer provides quick access to more than 2000 high-resolution maps and graphs displaying recent information on weather conditions and the progress of crop growth across the EU. [This service is currently suspended and will be resumed in 2022.](#)



AGRI4CAST Resources Portal

Datasets of the MARS Crop Yield Forecasting System and Software developed by AGRI4CAST are made freely available to the public for access and reuse.



MARS Crop Yield Forecasting System (MCYFS) wiki

AGRI4CAST JRC MARS Explorer: Extension for Fruit Monitoring

- apples pilot study

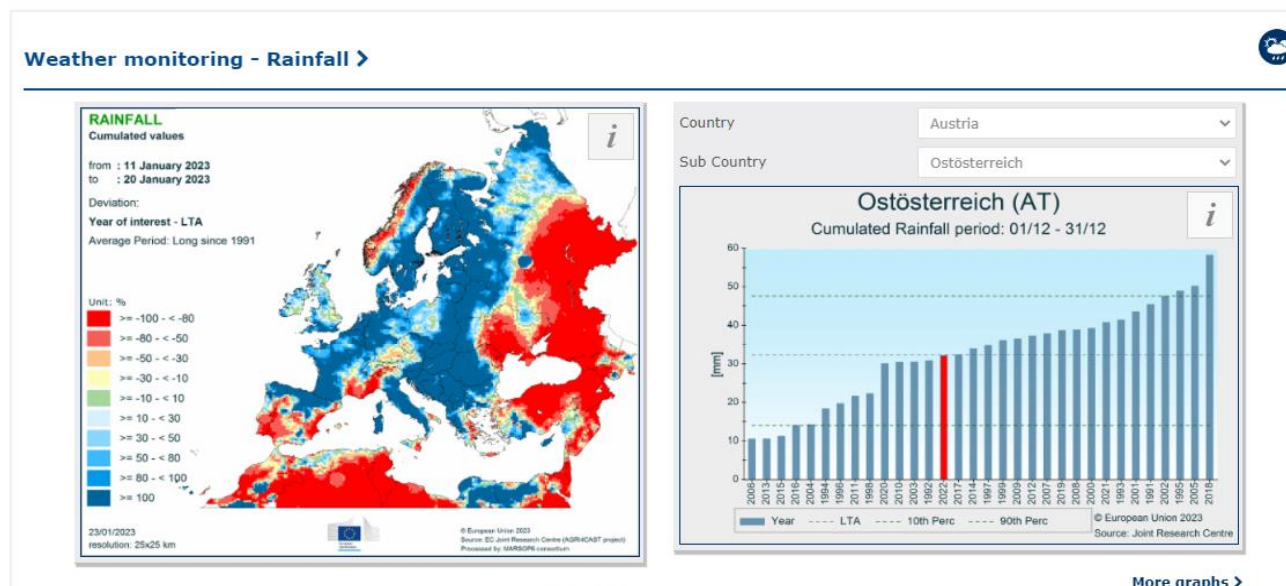


JRC MARS Explorer

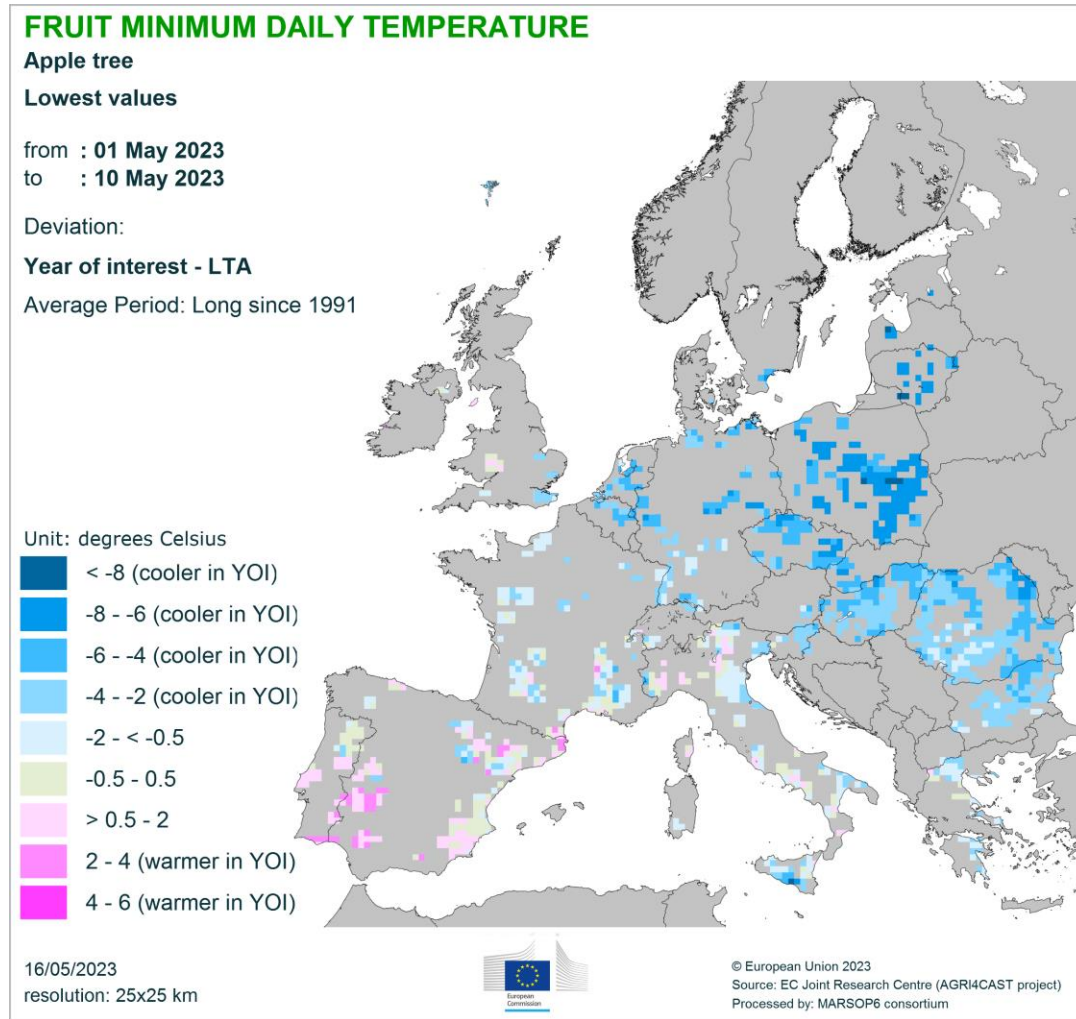
The JRC MARS Explorer is an e-service hosted by Wageningen Environmental Research under contract of the Joint Research Centre (JRC) of the European Commission. It displays information on current weather conditions and the progress of crop growth across the European Union. The data displayed are based on meteorological station data, crop growth simulations and remote sensing observations, originating from the JRC MARS Crop Yield Forecasting System. The graphs and maps displayed on this web page can be downloaded and reused, provided the original format is maintained and the source acknowledged.

A full analysis of weather and crop conditions as well as quantitative forecasts of crop yields in Europe are published in the monthly **JRC MARS Bulletins Crop monitoring in Europe**.

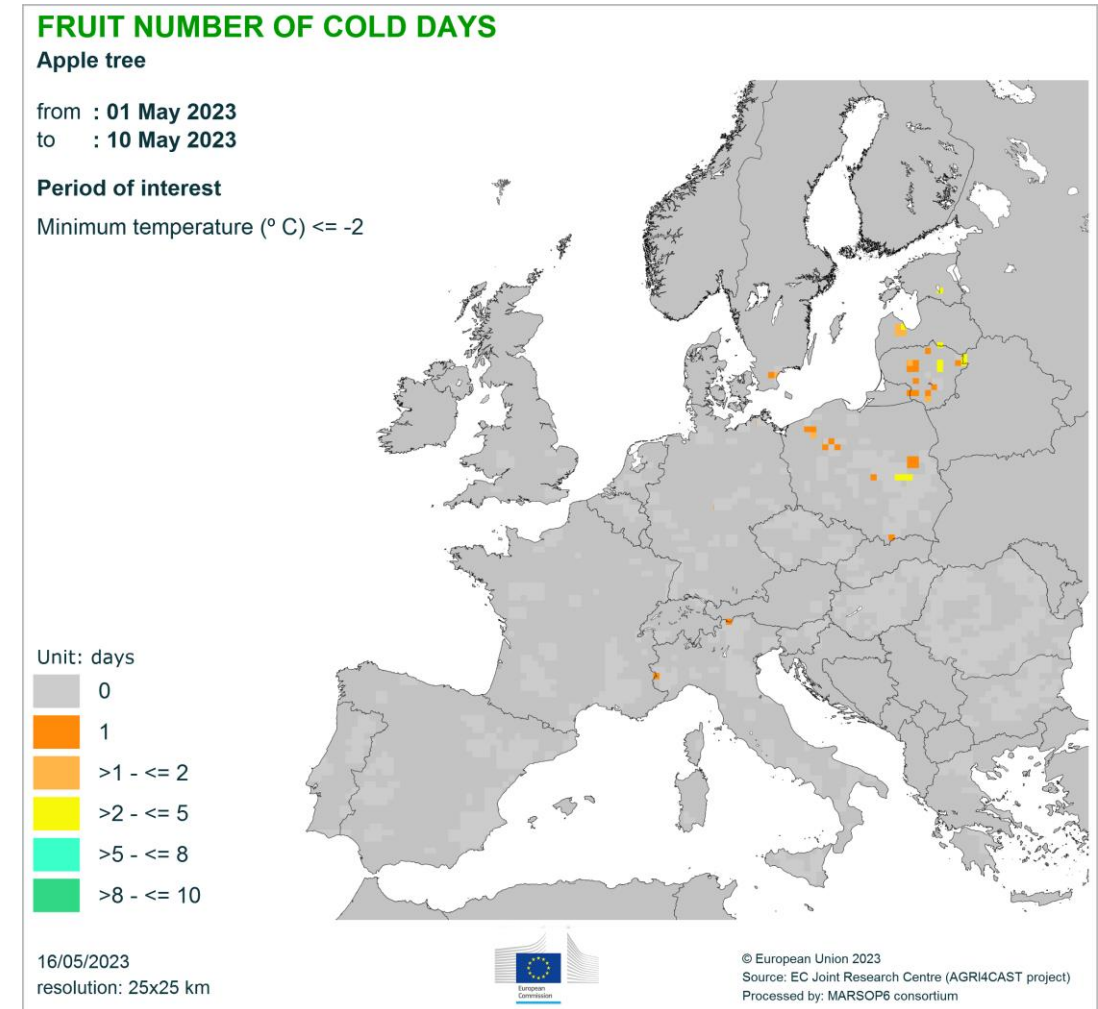
For further information on the crop monitoring and yield forecasting activities of the JRC, please see the **JRC AGRI4CAST Toolbox**.



JRC MARS Explorer, Fruit Monitoring – frost related indicators at 10-day (dekadal) time step

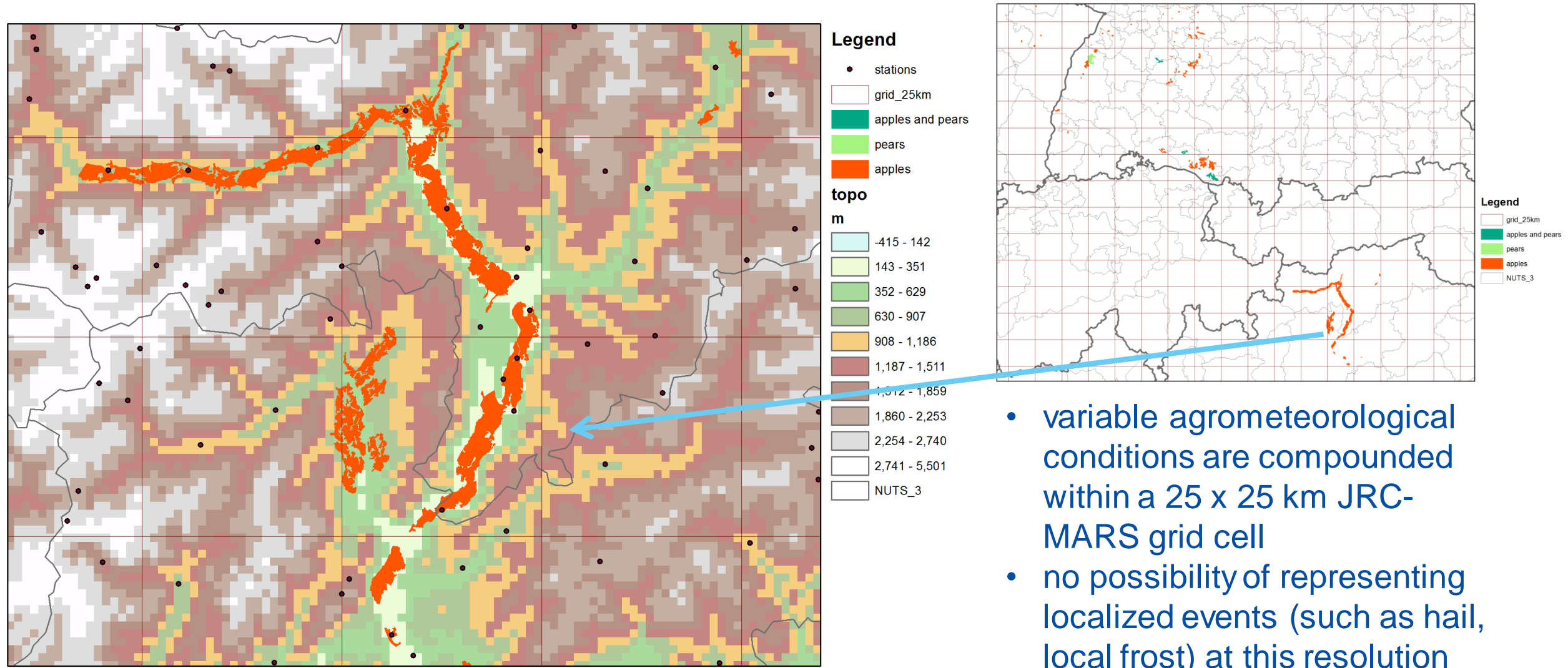


Min. daily temperature vs. LTA (Long Term Average)



Number of cold days (min. temp < -2°C)

Spatial variability of apple and pear orchards vs. JRC-MARS grid scale



- variable agrometeorological conditions are compounded within a 25 x 25 km JRC-MARS grid cell
- no possibility of representing localized events (such as hail, local frost) at this resolution

Example of spatial distribution of apple orchards in the landscape of Bolzano-Bolzen/Trento, Italy, weather station density, and associated 25x25 km weather grid used in the JRC-MARS data information system

Winter Temperatures: Dec 2022 - Feb 2023

AVERAGE DAILY TEMPERATURE

Averaged values

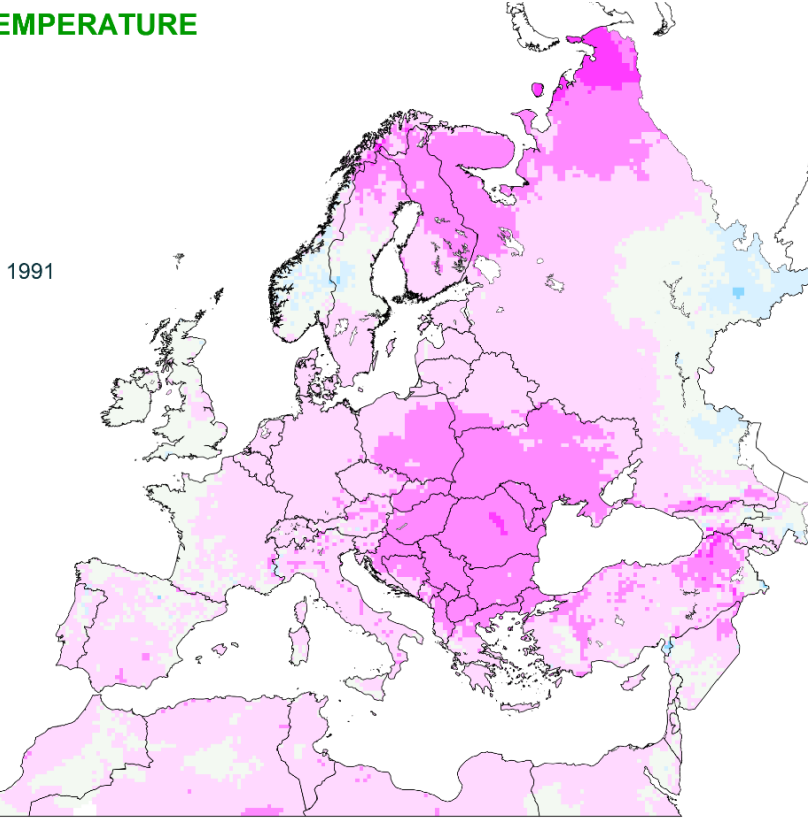
from : 01 December 2022
to : 28 February 2023

Deviation:

Year of interest - LTA

Average Period: Long since 1991

Unit: degrees Celsius



13/03/2023
resolution: 25x25 km



© European Union 2023
Source: EC Joint Research Centre (AGRI4CAST project)
Processed by: MARSOP6 consortium

Average temperature in respect to long term average (LTA)

NUMBER OF COLD DAYS

from : 01 January 2023
to : 28 February 2023

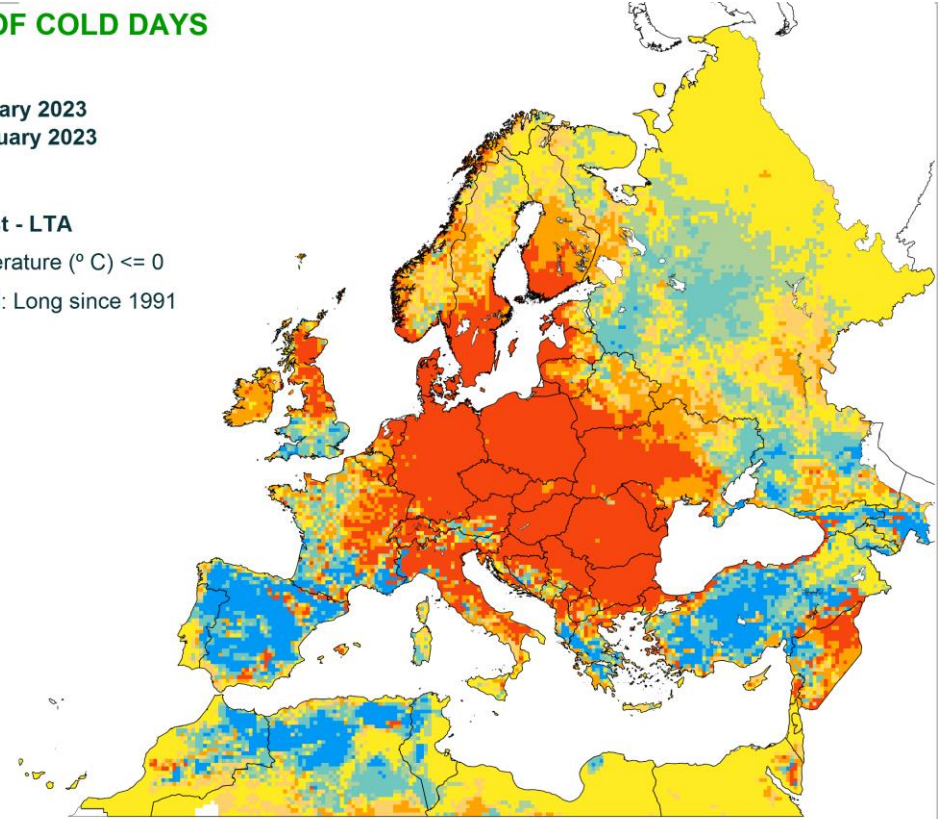
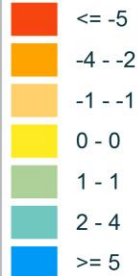
Deviation:

Year of interest - LTA

Minimum temperature ($^{\circ}\text{C}$) ≤ 0

Average Period: Long since 1991

Unit: days



23/05/2023
resolution: 25x25 km



© European Union 2023
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium

Number of cold days (with min. temperature $< 0^{\circ}\text{C}$) in respect to long term average (LTA)

Spring Temperatures: March - May 2023

AVERAGE DAILY TEMPERATURE

Averaged values

from : 01 March 2023
to : 23 May 2023

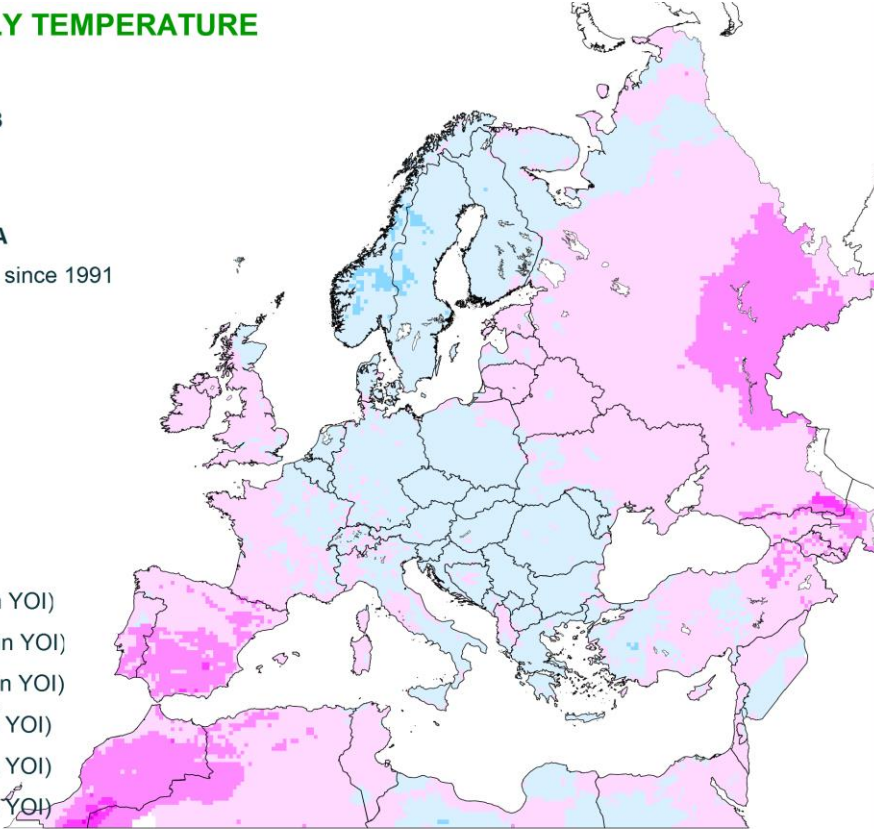
Deviation:

Year of interest - LTA

Average Period: Long since 1991

Unit: degrees Celsius

- 4 - -2 (cooler in YOI)
- 2 - < 0 (cooler in YOI)
- >0 - 2 (warmer in YOI)
- 2 - 4 (warmer in YOI)
- 4 - 6 (warmer in YOI)
- 6 - 8 (warmer in YOI)



23/05/2023
resolution: 25x25 km



© European Union 2023
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium

NUMBER OF COLD DAYS

from : 01 March 2023
to : 23 May 2023

Deviation:

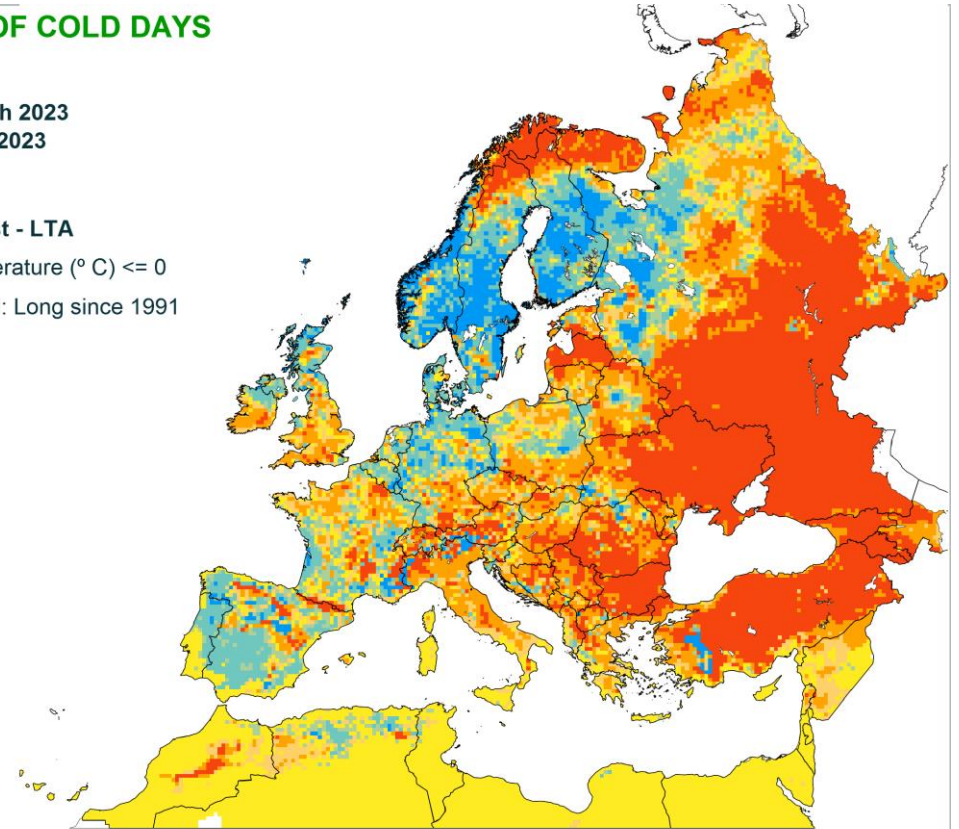
Year of interest - LTA

Minimum temperature ($^{\circ}$ C) ≤ 0

Average Period: Long since 1991

Unit: days

- ≤ -5
- 4 - -2
- 1 - -1
- 0 - 0
- 1 - 1
- 2 - 4
- ≥ 5



23/05/2023
resolution: 25x25 km

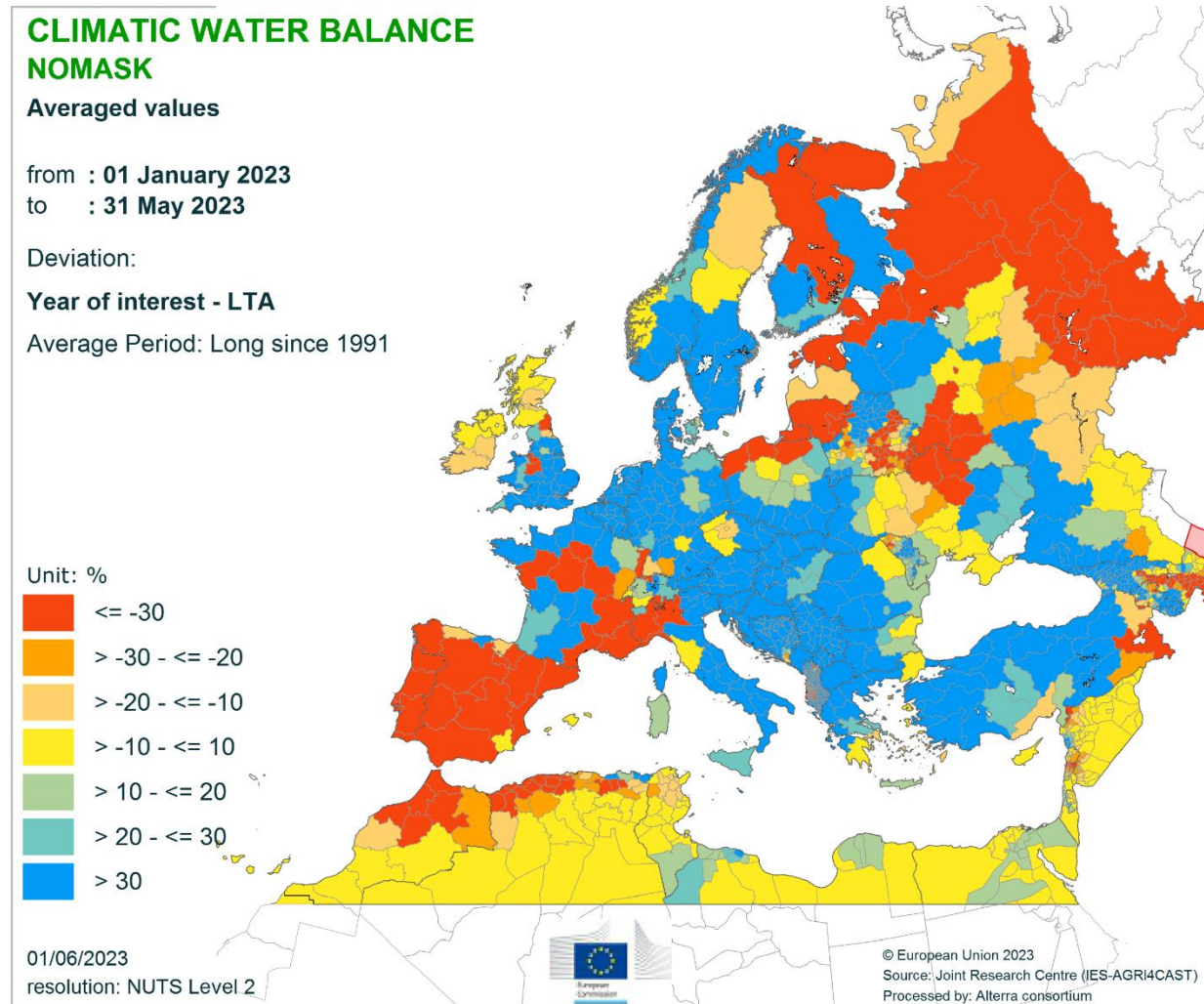


© European Union 2023
Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium

Average temperature in respect to long term average (LTA)

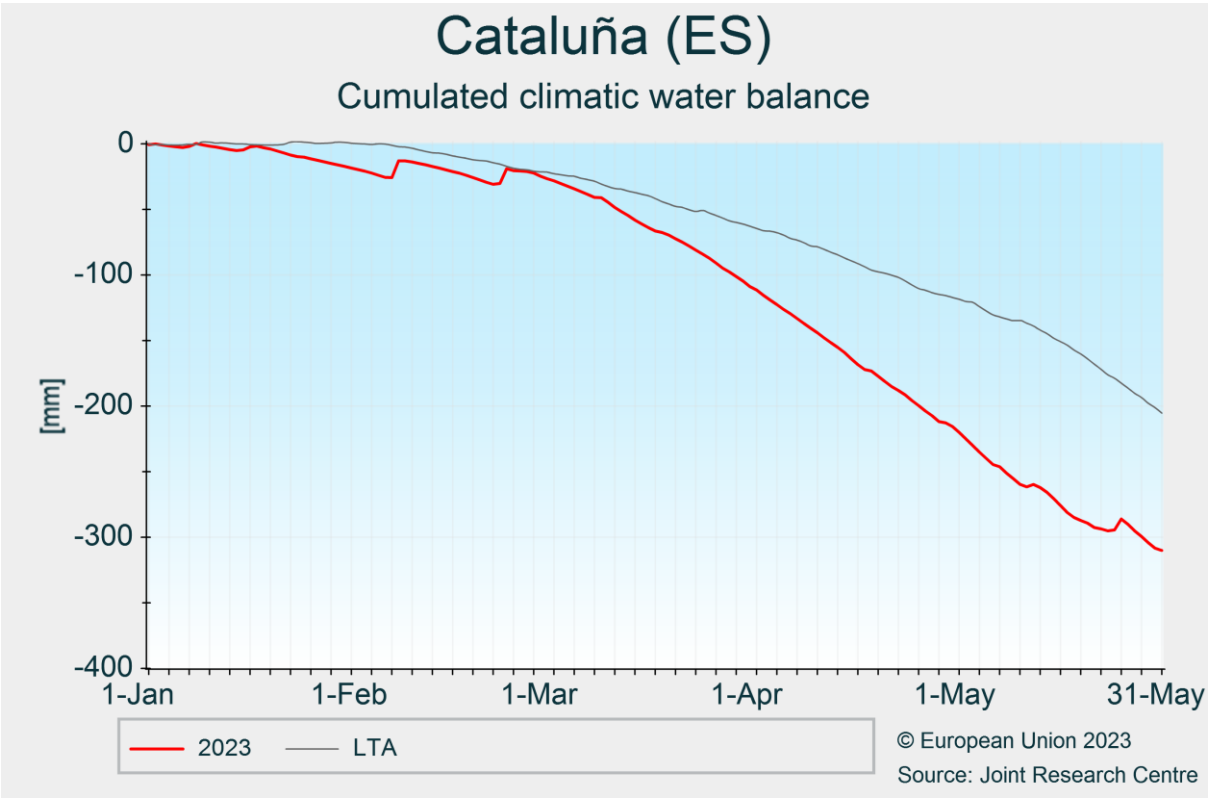
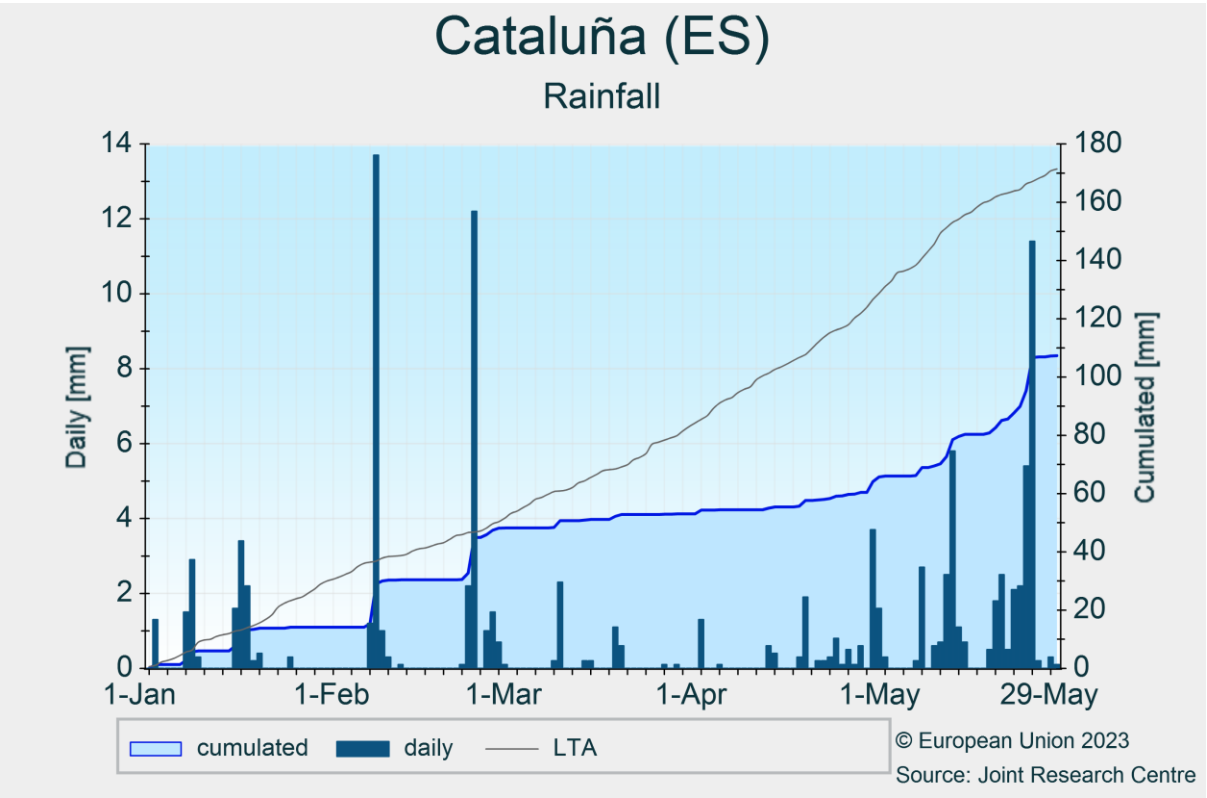
Number of cold days (with min. Temperature $< 0^{\circ}$ C) in respect to long term average (LTA)

Climatic Water Balance: January - May 2023

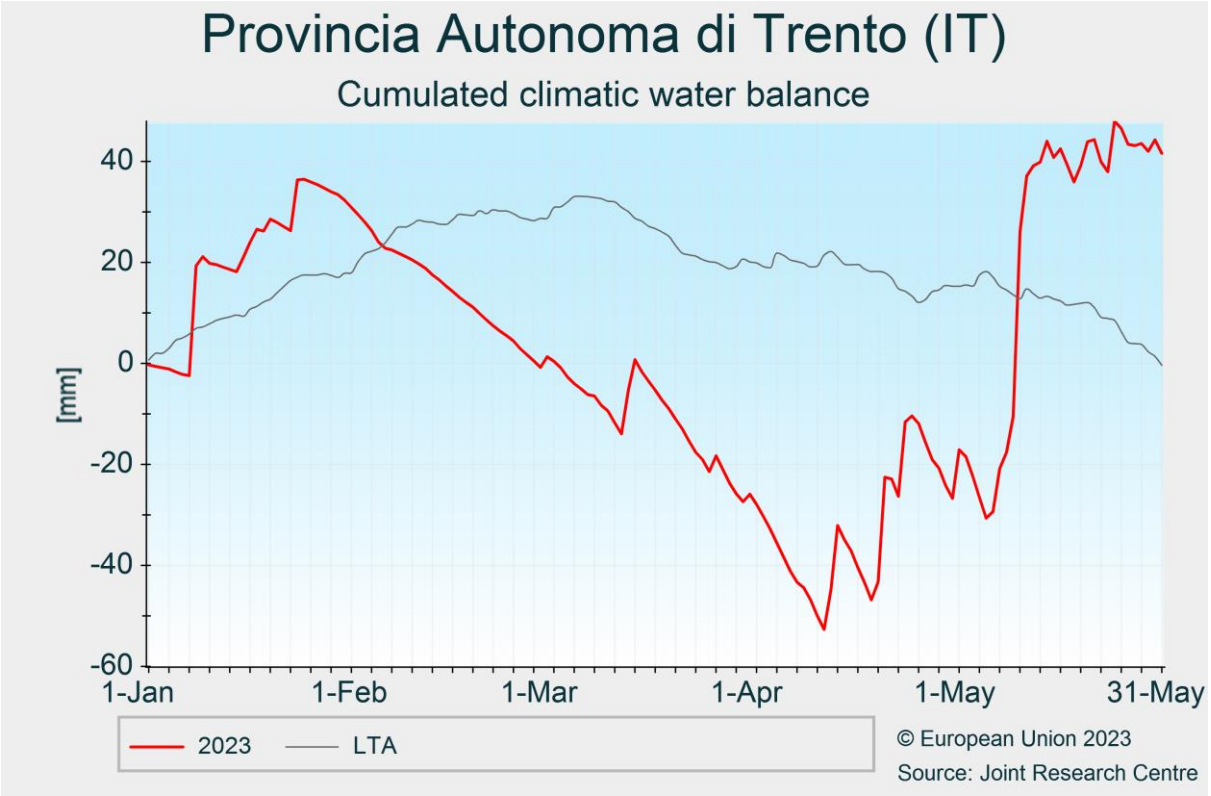
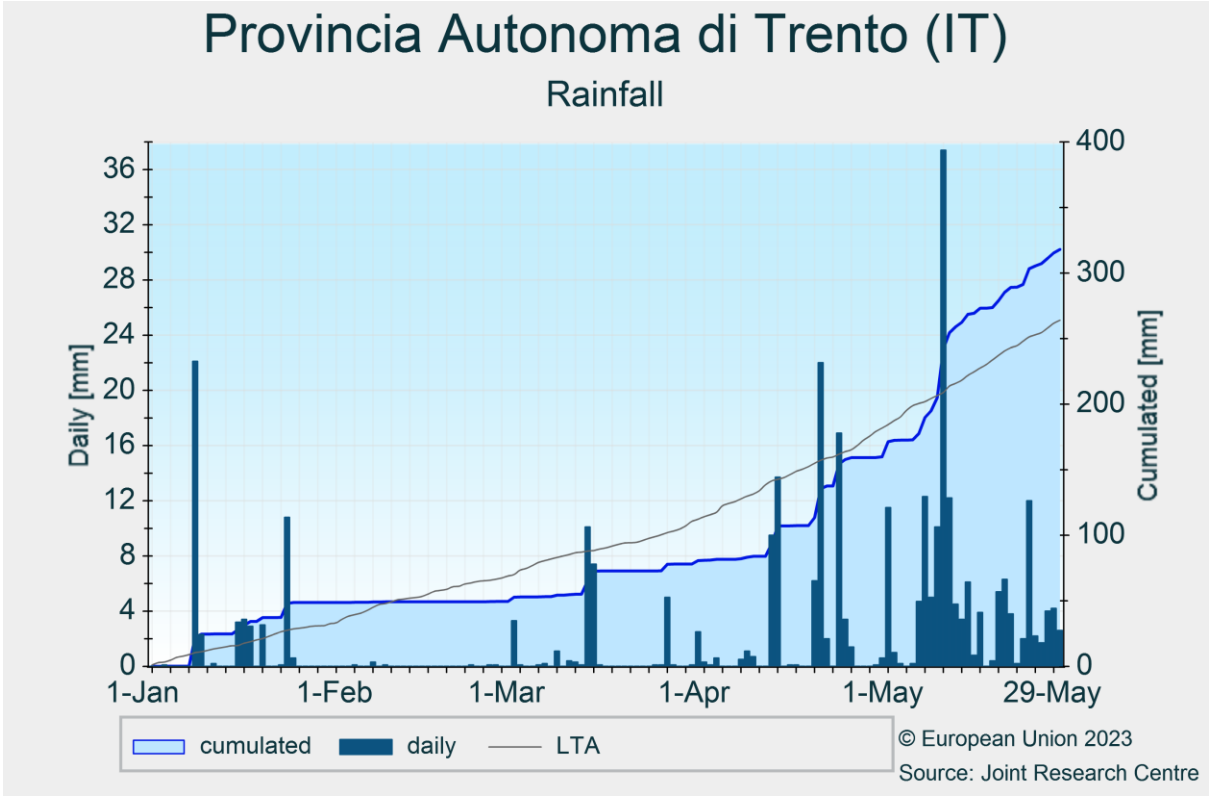


Climatic Water Balance = Rainfall – Evaporation

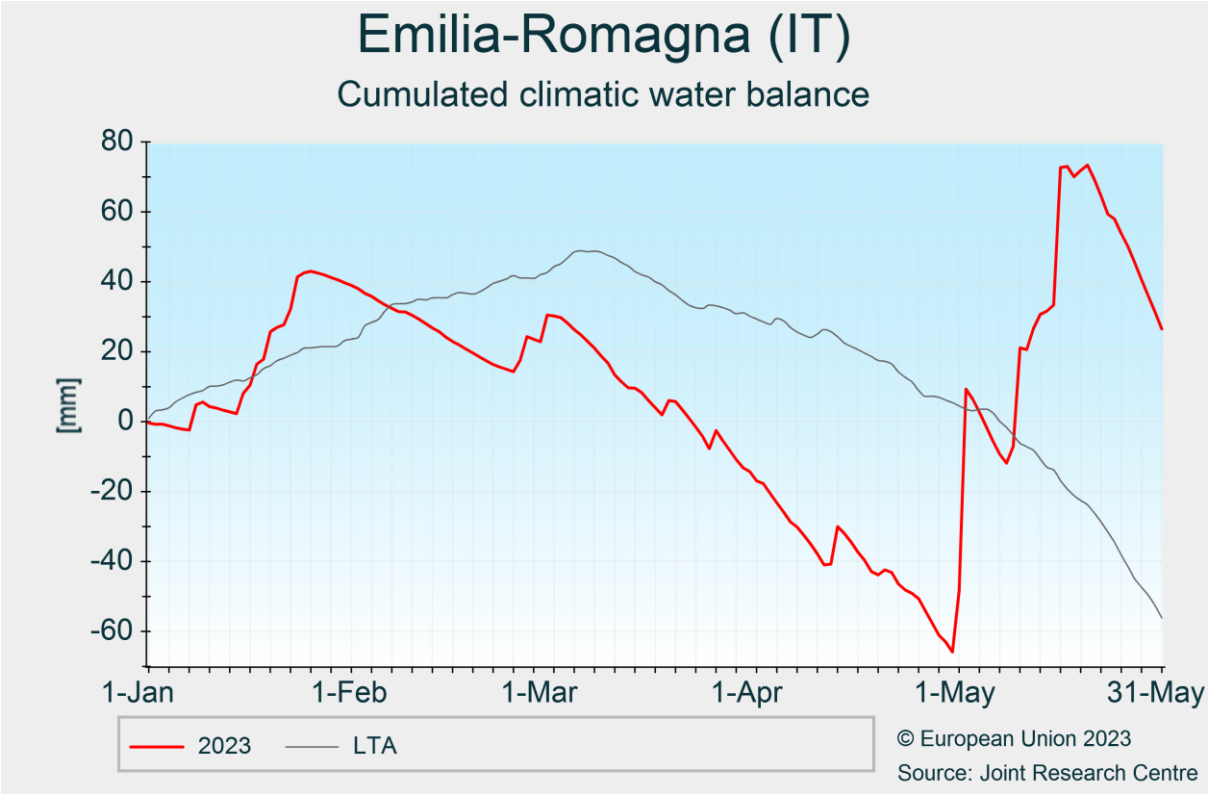
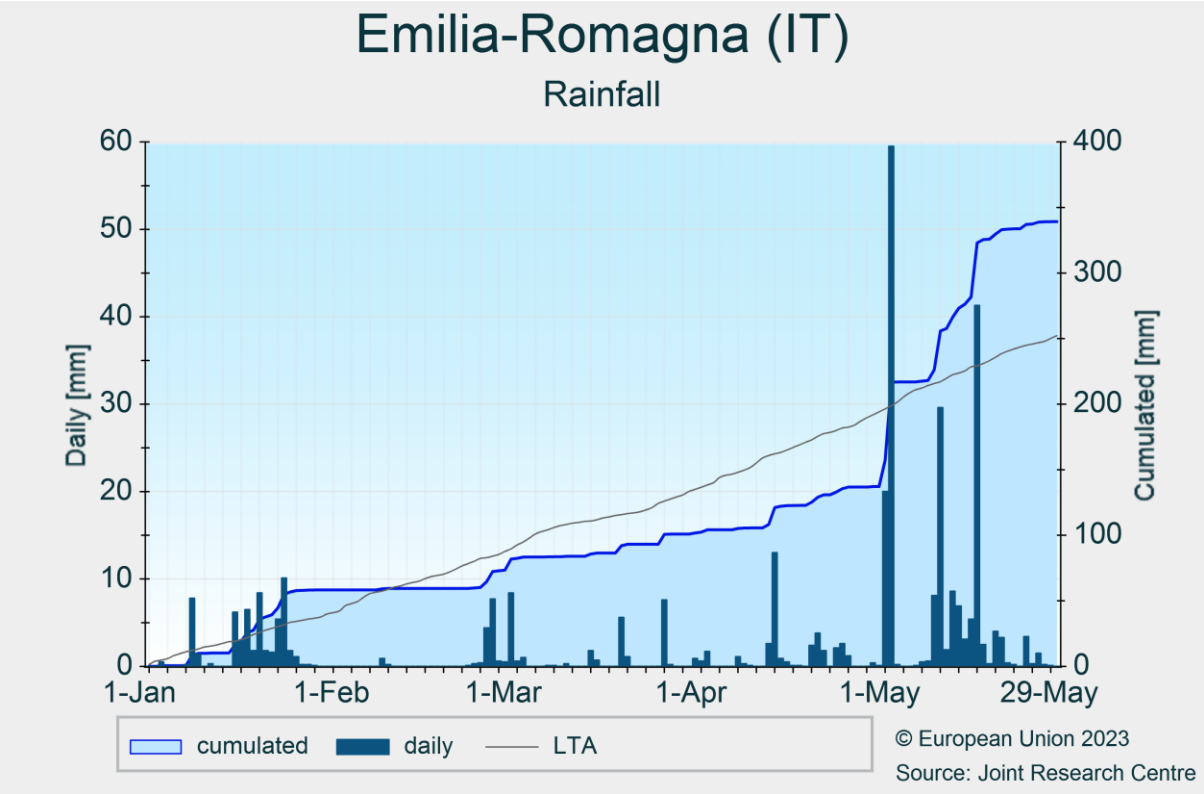
Cataluña - drought developing since January



Trento - recovery from drought



Emilia-Romagna - flood events



AoC Weather Events

Contrasting patterns of drier- and wetter-than-average conditions, affecting winter as well as spring and/or summer crops in many regions

❖ Drought

- Continued & intensified – Iberian Peninsula, Maghreb
- Recovering – NW Italy

❖ Rainfall Surplus / Floods

- Many parts of Europe experienced rainfall surplus
- Triggering floods in some regions

❖ Rainfall Deficit

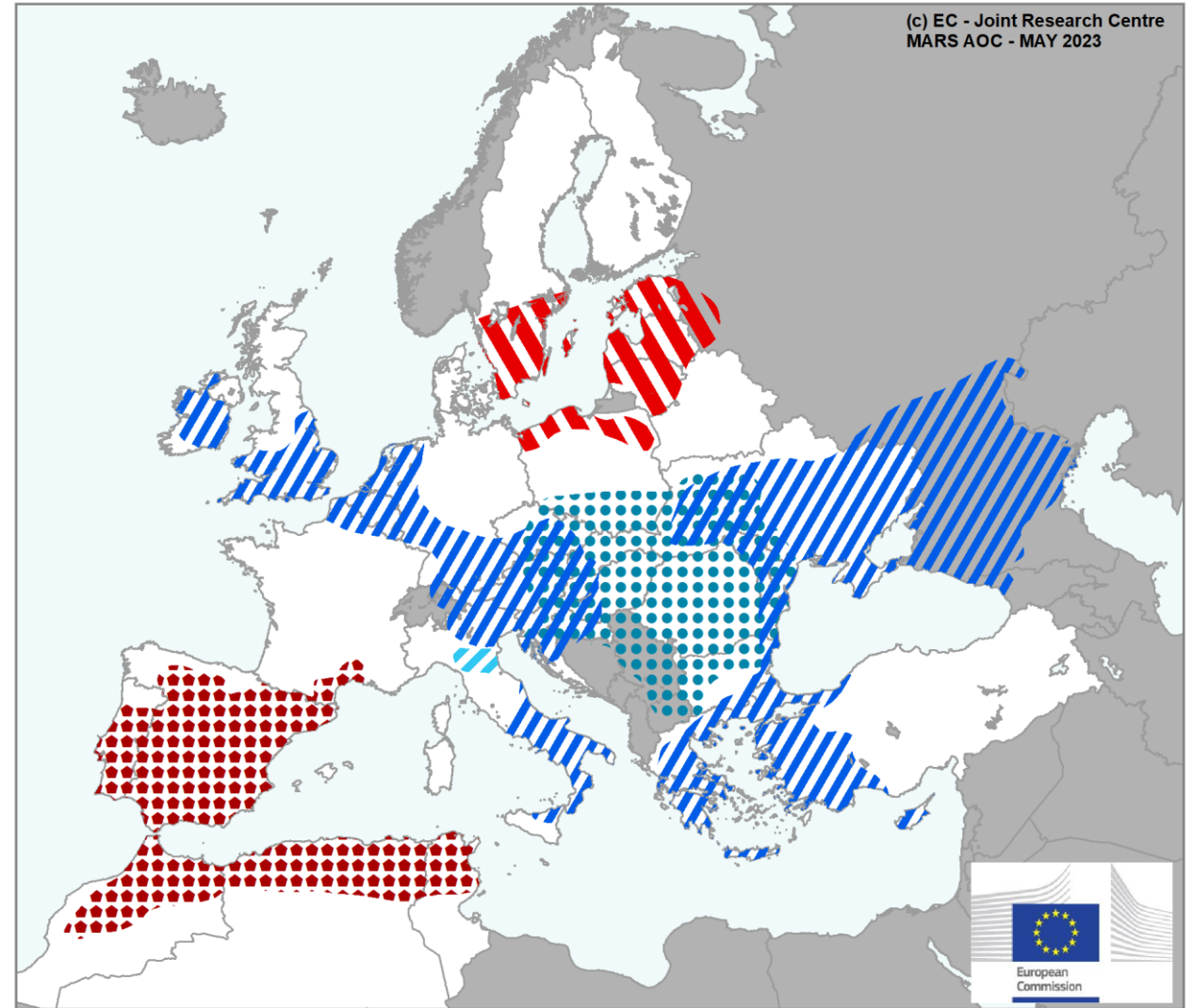
- N Poland
- S Sweden & Baltic Countries

❖ Temperature accumulation deficit

- Hungary, Romania, Bulgaria, W Ukraine

AREAS OF CONCERN - EXTREME WEATHER EVENTS

Based on weather data from 1 April 2023 until 14 May 2023



Drought



Flood



Rain deficit



Temperature accumulation deficit



Rain surplus

Frost events with potential impacts on fruit trees – 1st dekad of April

MINIMUM DAILY TEMPERATURE

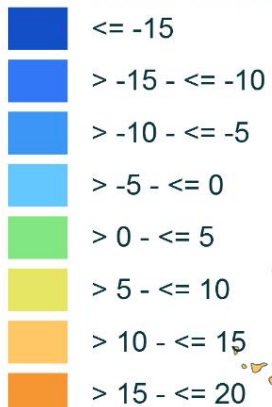
Lowest values

from : 01 April 2023

to : 10 April 2023

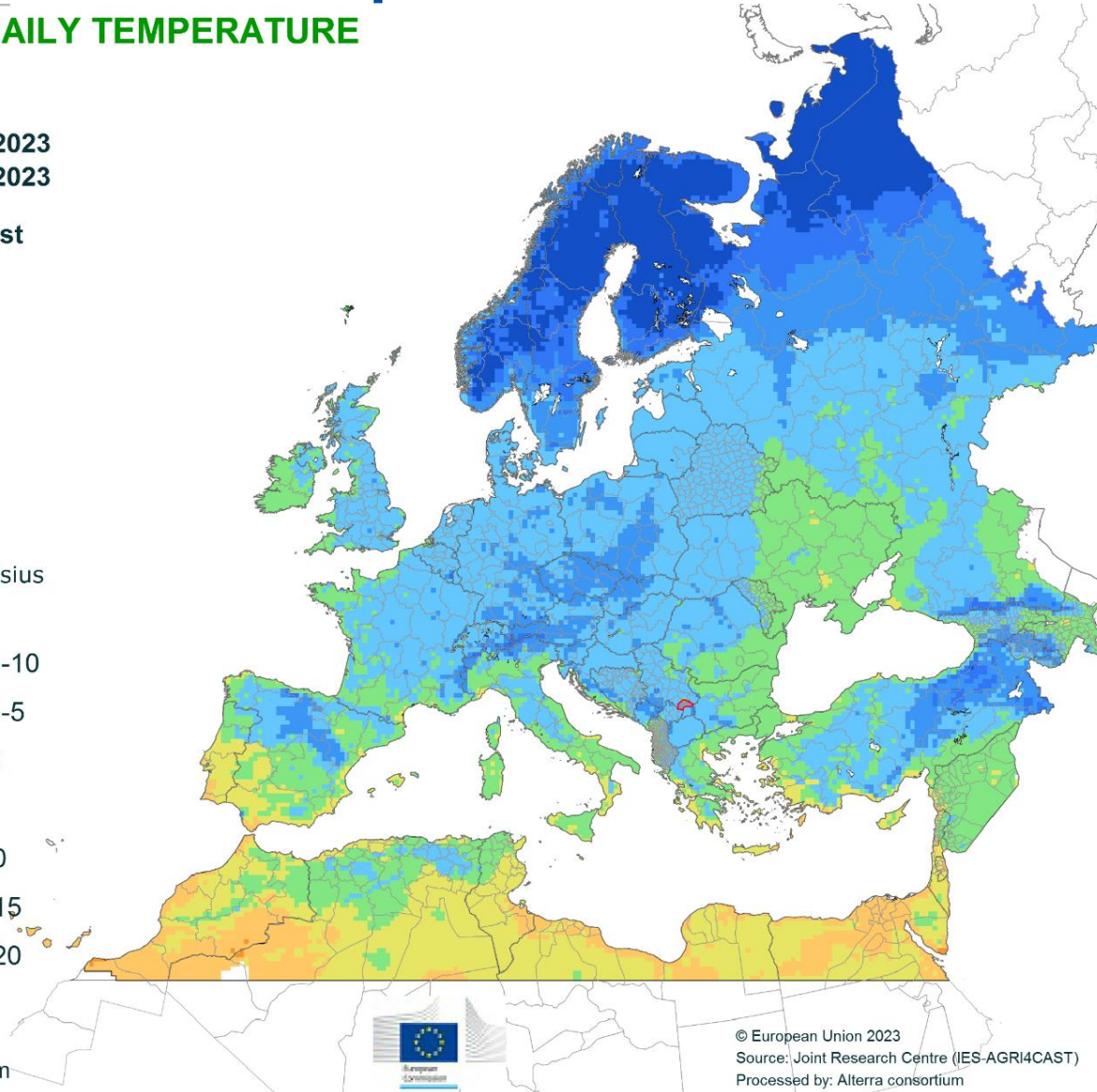
Period of interest

Unit: degrees Celsius



01/06/2023

resolution: 25x25 km



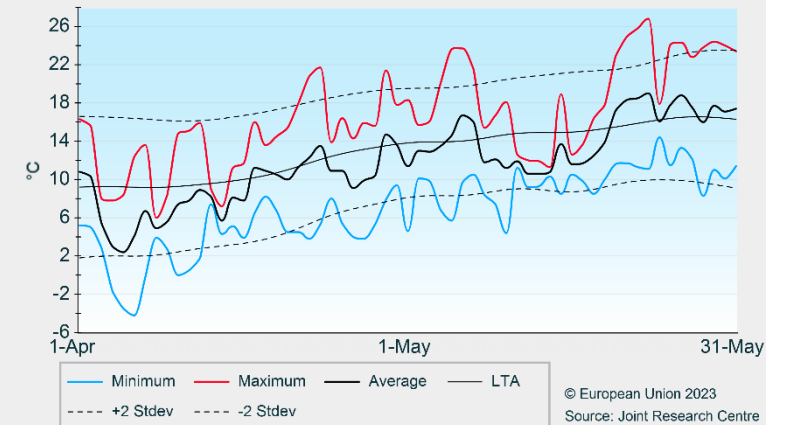
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Source: Joint Research Centre (IES-AGRI4CAST)

Processed by: Alterra consortium

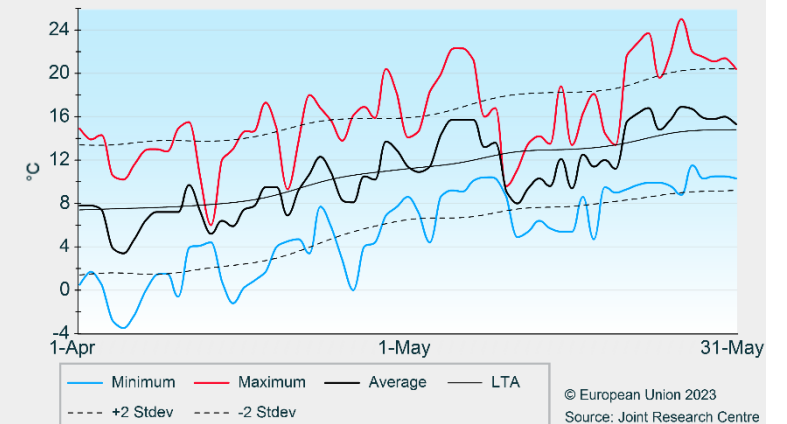
Steiermark (AT)

Minimum, maximum and average daily temperature



Provincia Autonoma di Trento (IT)

Minimum, maximum and average daily temperature



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Frost events with potential impacts on fruit trees – 3rd dekad of April - 1st dekad of May

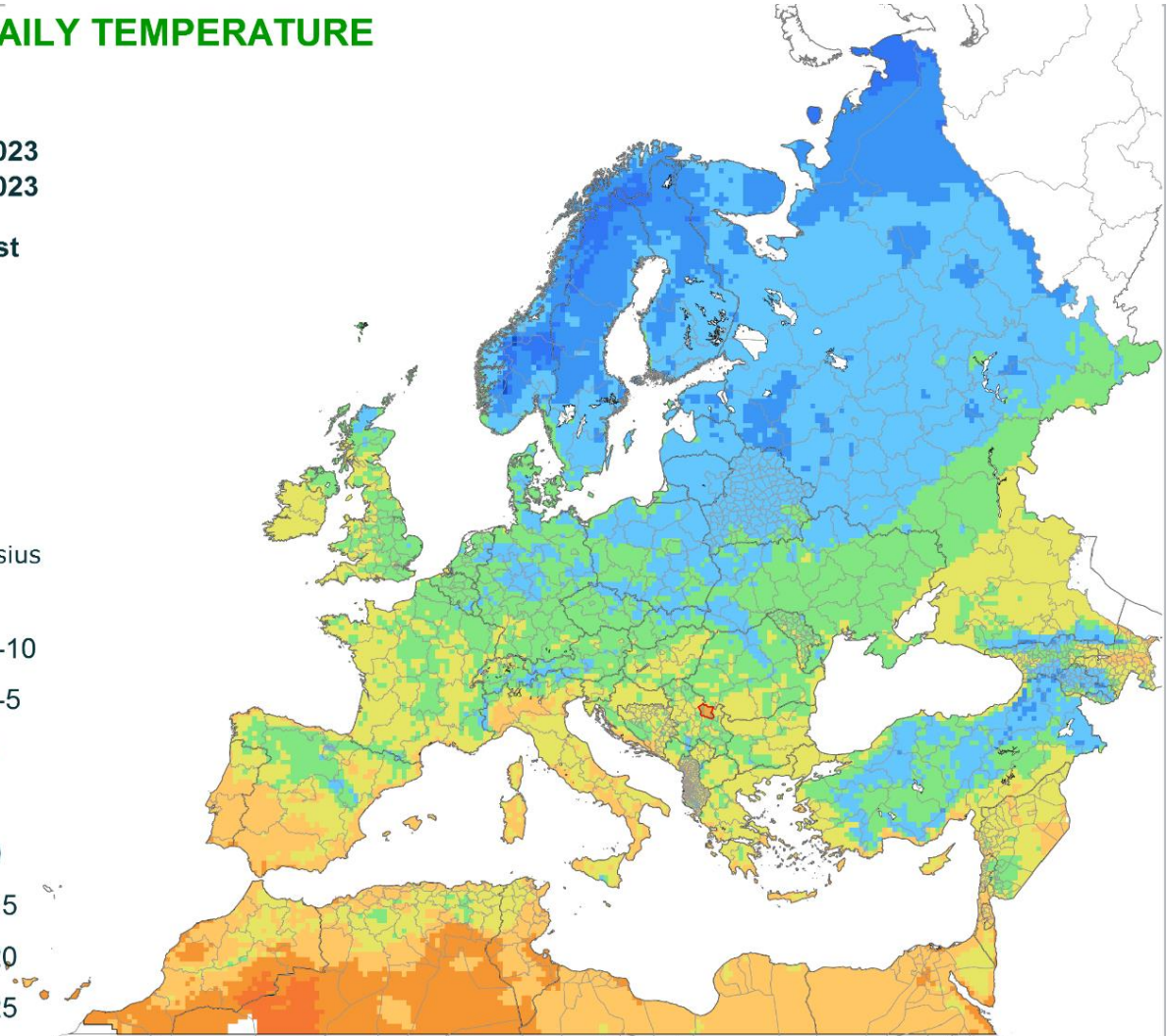
MINIMUM DAILY TEMPERATURE

Lowest values

from : 01 May 2023
to : 10 May 2023

Period of interest

Unit: degrees Celsius



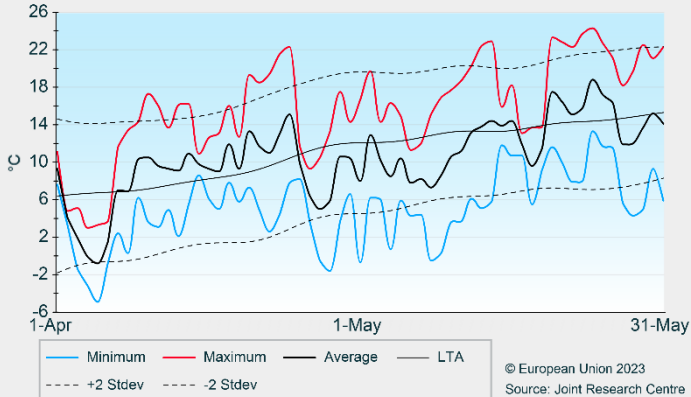
02/06/2023
resolution: 25x25 km



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Source: Joint Research Centre (IES-AGRI4CAST)
Processed by: Alterra consortium

Mazowiecki regionalny (PL)

Minimum, maximum and average daily temperature



FRUIT MINIMUM DAILY TEMPERATURE

Apple tree

Lowest values

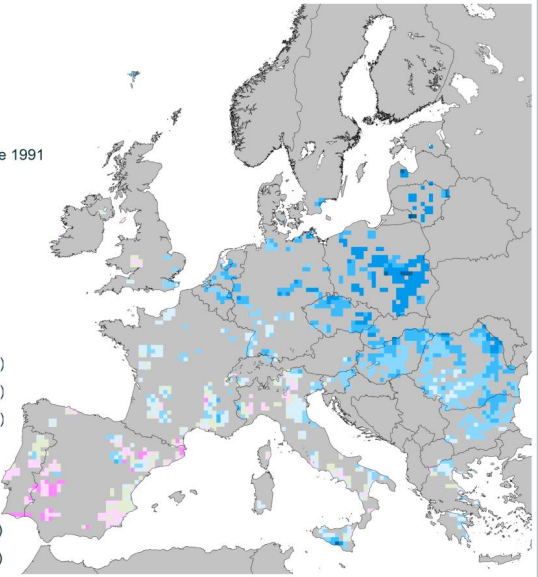
from : 01 May 2023
to : 10 May 2023

Deviation:

Year of interest - LTA

Average Period: Long since 1991

Unit: degrees Celsius



16/05/2023
resolution: 25x25 km



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Source: EC Joint Research Centre (AGRI4CAST project)
Processed by: MARSOP6 consortium



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Thank you

The AGRI4CAST team (JRC D.05)

The JRC MARS Bulletin can be accessed from <https://agri4cast.jrc.ec.europa.eu/>



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