



Emergency
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Drought Early Warning and Monitoring

- timely information on a slow onset disaster -

Jürgen Vogt

and the JRC Drought Team

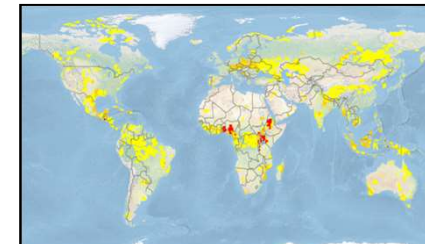
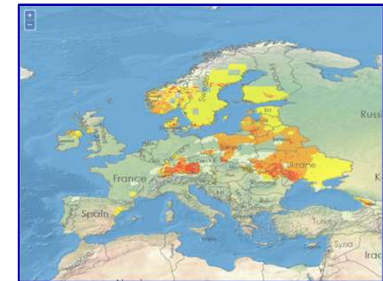
*European Commission
Joint Research Centre (JRC)*



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EMS Drought Observatory - Introduction

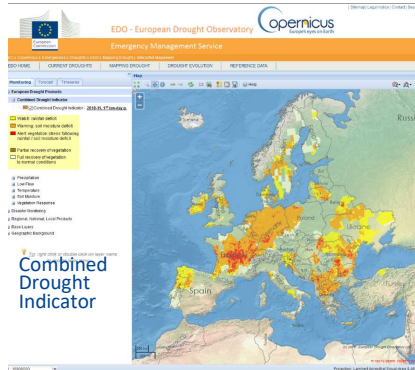
- Why? *Droughts are ...*
 - increasing in frequency and severity in many parts of the world, including parts of Europe.
 - a transboundary problem.
 - a global hazard with significant economic, societal and environmental impacts (3 to 6 billion Euros/year in Europe).
- What?
 - European and global **early warning, monitoring and forecasting of droughts and their likely impacts**, based on satellite data, hydro-meteorological modelling and in-situ observations.
 - Research in **indicators, risk assessment methodologies, past trends, future projections, impacts** in different sectors, online tools, ...



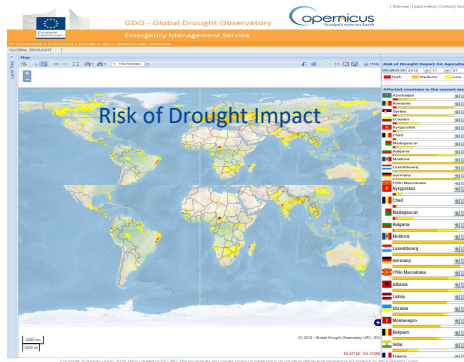


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European & Global Components



<http://edo.jrc.ec.europa.eu>



<http://edo.jrc.ec.europa.eu/gdo>

European Drought Observatory (EDO)

- Developed in collaboration with DG ENV and WS&D Expert Group (WFD) 2008-2012. Now in continuous further development.
- Based on a combination of hazard and impact-related indicators

Global Drought Observatory (GDO)

- Developed with DG ECHO – ERCC since 2016
- Includes dynamic assessment of the risk of impact for different sectors (based on hazard, exposure, vulnerability)

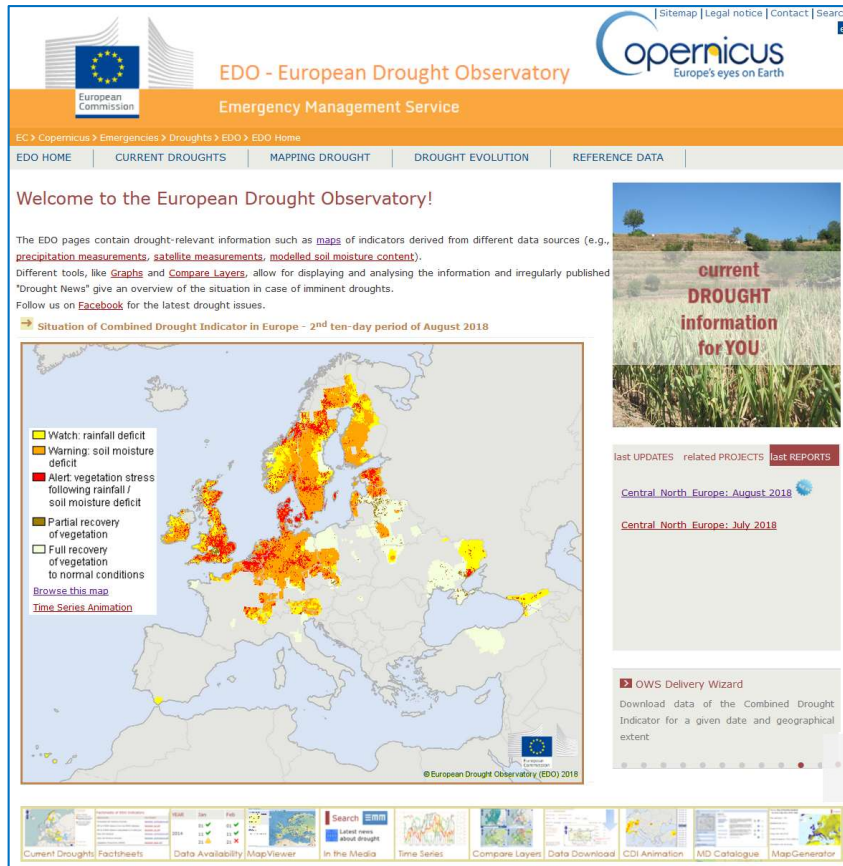
since 2018 part of Copernicus EMS





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The European Drought Observatory (EDO)



EDO:

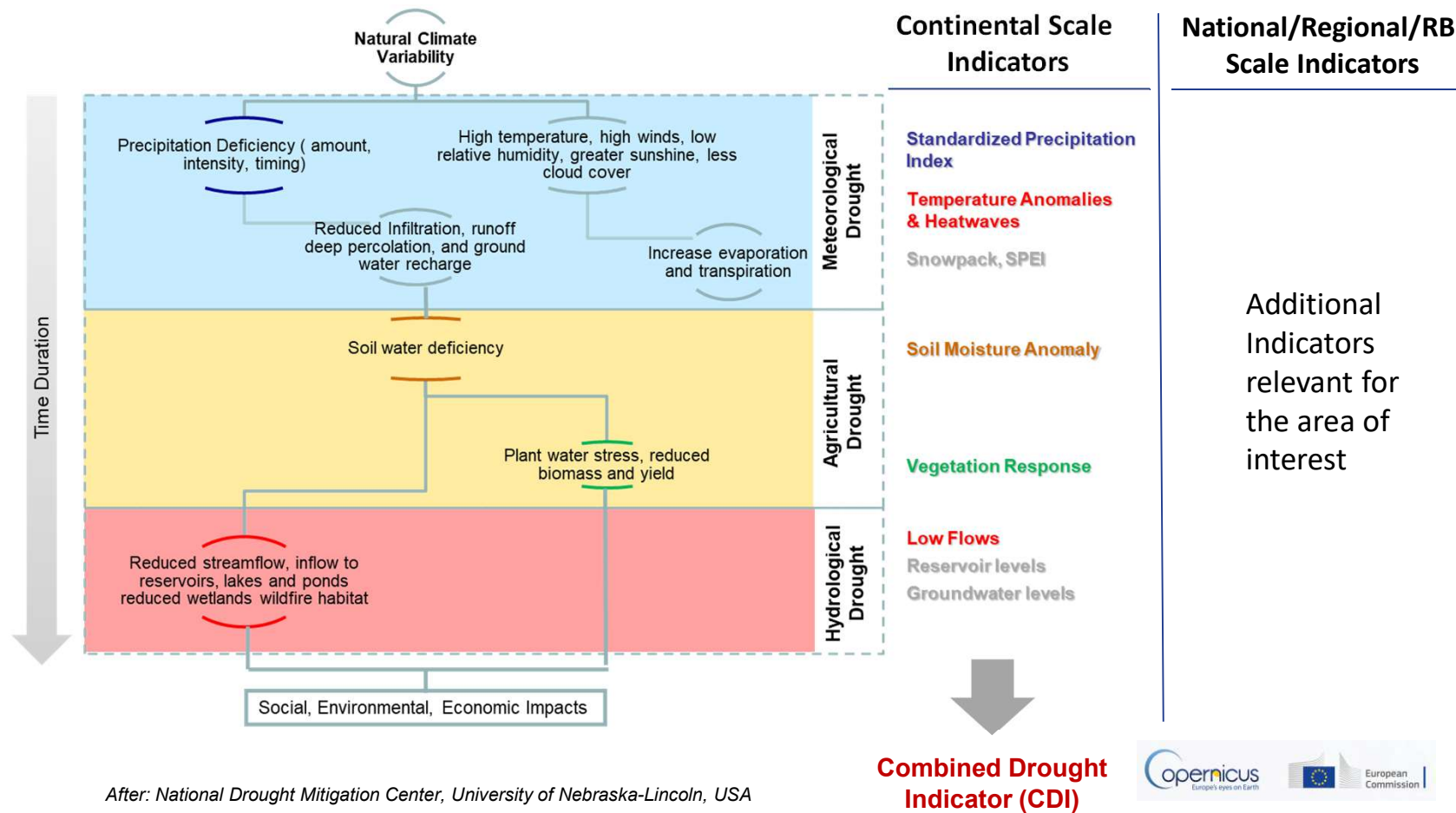
- Internet-based portal
- Mapping, forecasting, analysis tools
- Multiple scales, distributed architecture
- Multiple indicators, including combined indicators targeted to decision makers
- Analytical Reports

<http://edo.jrc.ec.europa.eu>



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Indicator Scheme

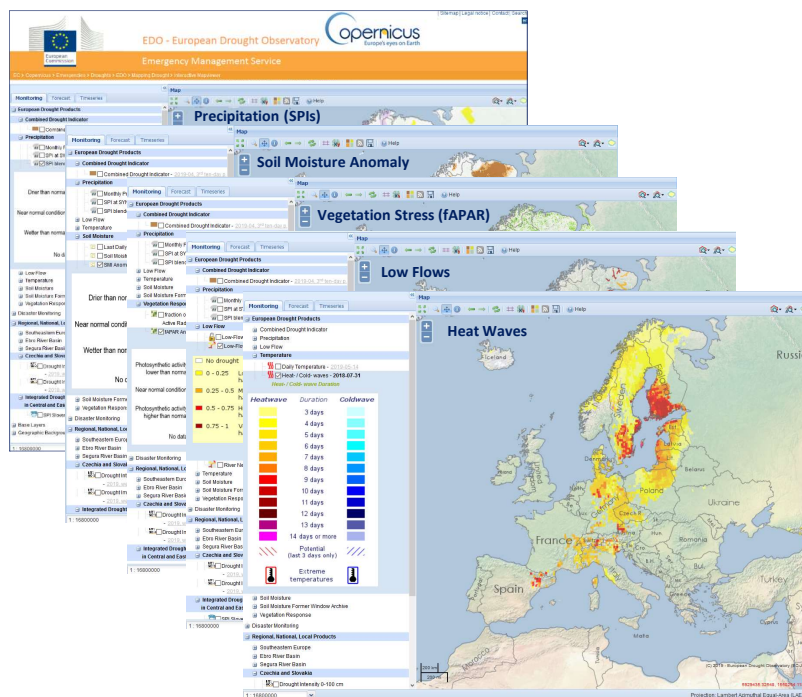




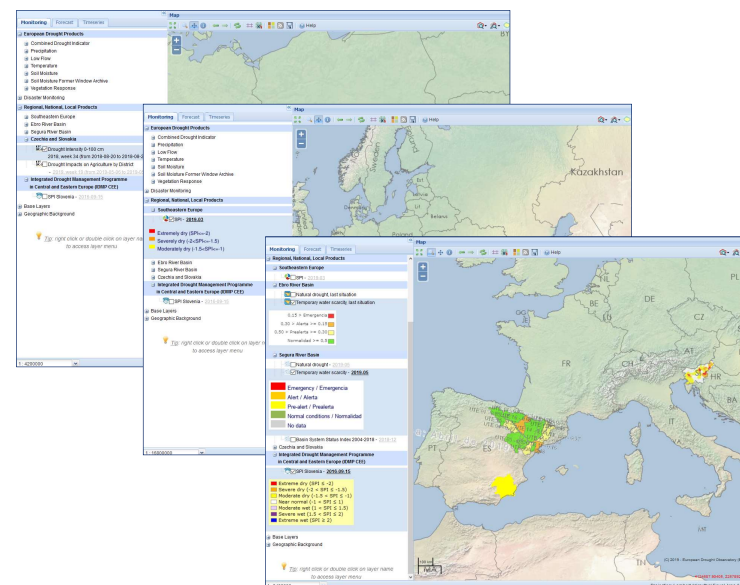
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Indicators and Scales

Continental Maps



Regional, National, RB Maps



In preparation: PT
In discussion: IT

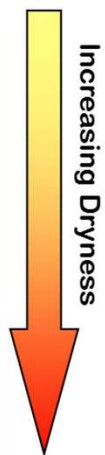
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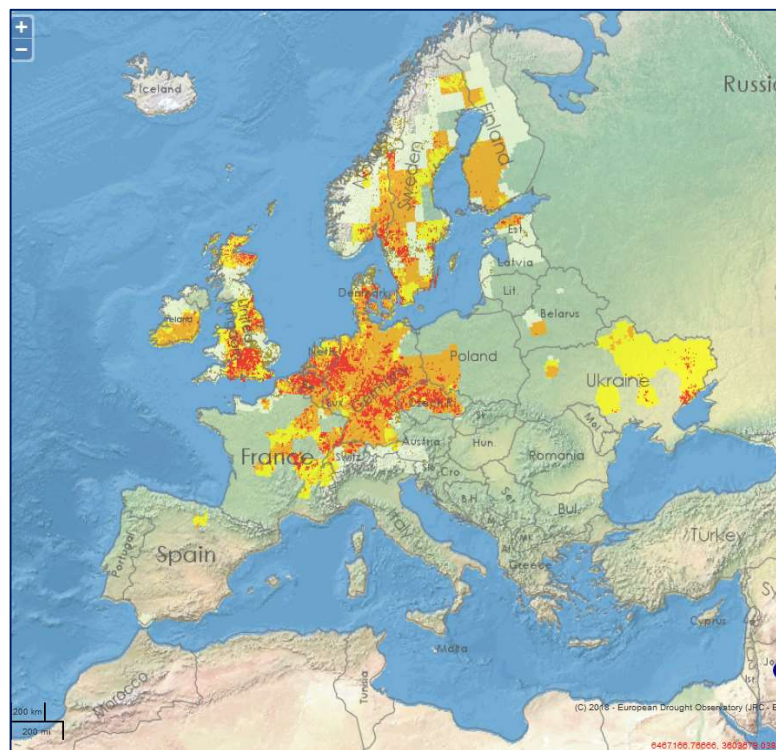
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Combined Drought Indicator (CDI)

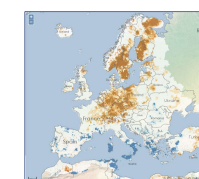
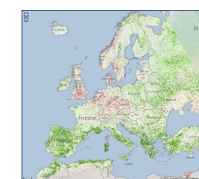
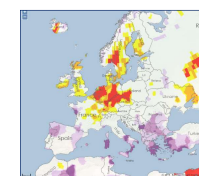
Impact	Level
Watch: rainfall deficit	1
	2
	3
Warning: soil moisture deficit	4
	5
	6
Alert: vegetation stress following rainfall/soil moisture deficit	7
	8
	9
	10



Impact	Level
Partial Recovery of Vegetation: normal condition of rainfall still vegetation stress	11
	12
Full Recovery of Vegetation: normal condition of rainfall normal condition of vegetation productivity	13
	14



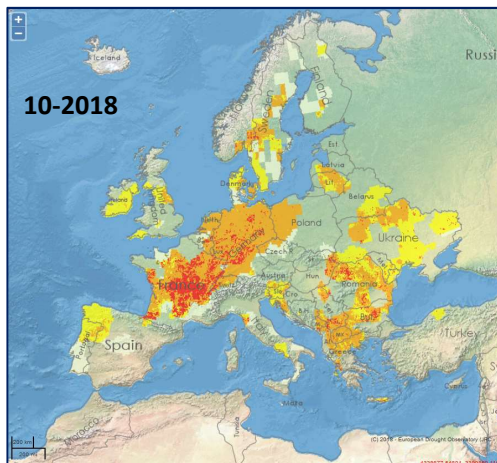
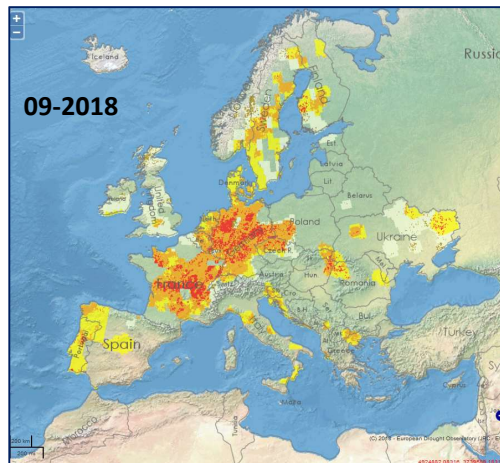
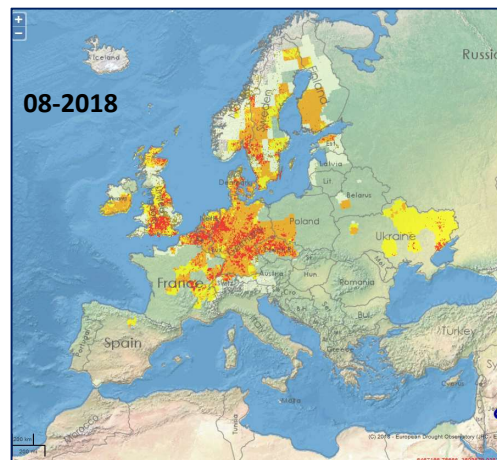
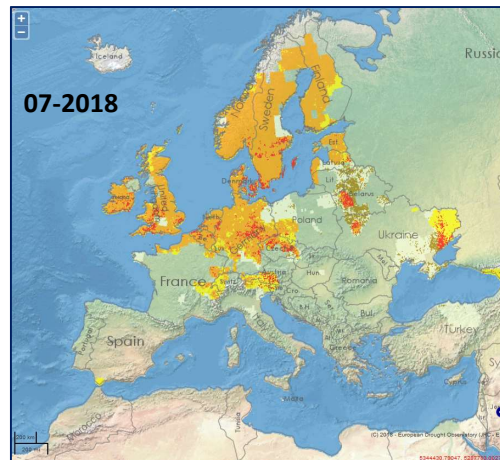
CDI, 21-31 August 2018





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Drought Evolution Summer 2018



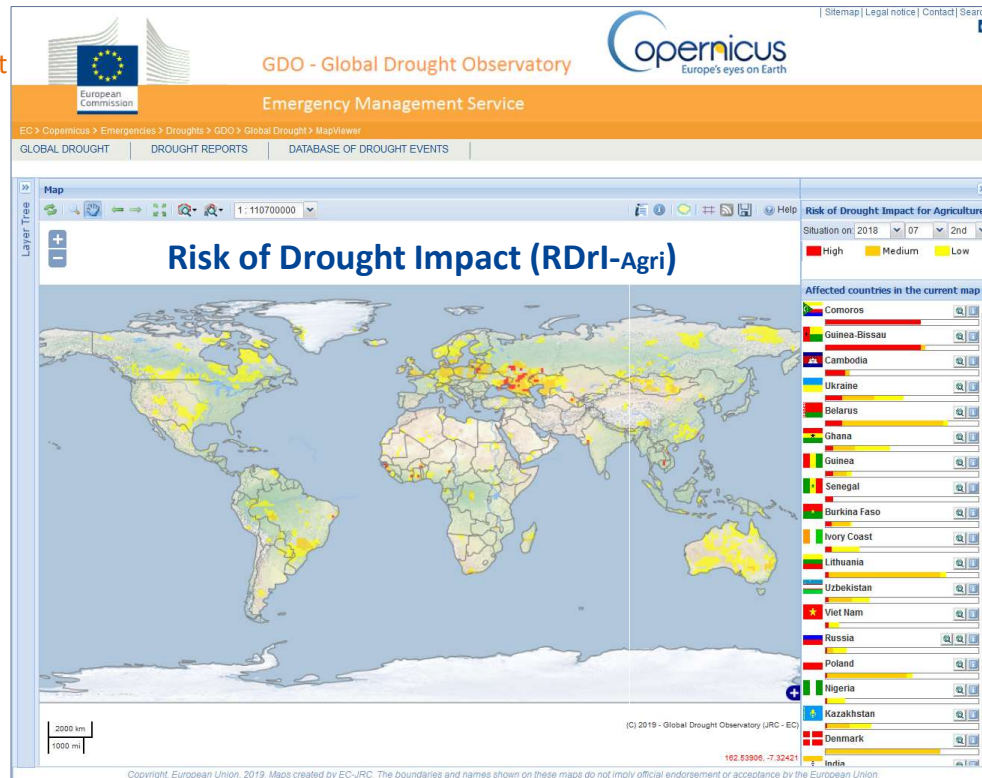
Combined Drought Indicator (CDI)

Maps show the last ten-day period of each month



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Global Drought Observatory (GDO)



<http://edo.jrc.ec.europa.eu/gdo>

Hierarchical list of
affected countries

The **risk of impact** is evaluated based on the **drought hazard**, **exposure** and the **vulnerability**.

Updated every 10 days.

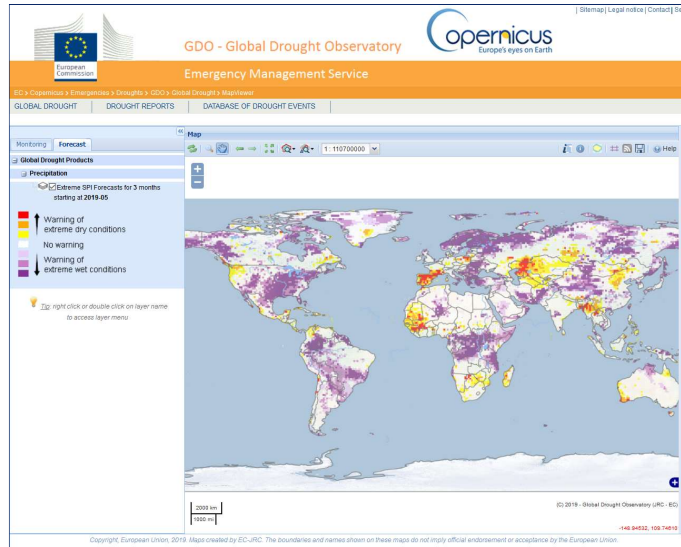


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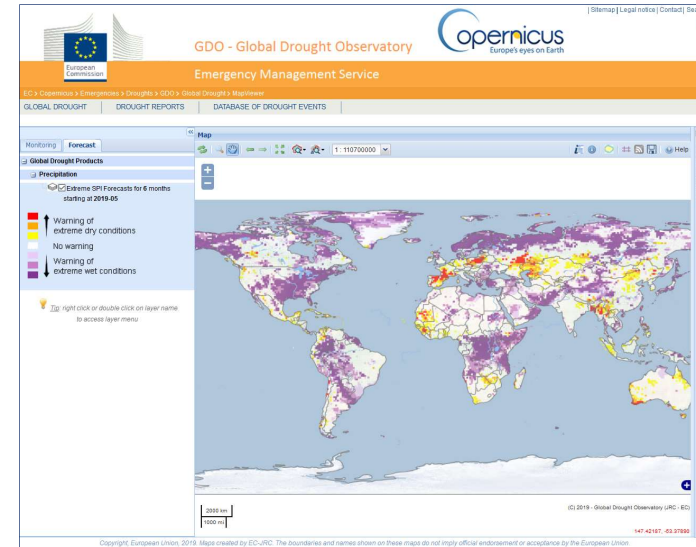
EDO: Forecasting

Early warning of extreme wet/dry conditions :

- From 1-month to 6-months lead time (i.e. SPI1, SPI3 and SPI6)
- Derived from Seasonal S5 model of ECMWF



Forecast for May to July 2019



Forecast for May to October 2019

Warning levels increase with the intensity (median) and the coherency (spread) of the ensemble forecast



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Analytical Reports

EDO Analytical Report

Drought in Central-Northern Europe – July 2018
EU Copernicus Drought Observatory (EDO) and EDC Analytical Team
10/07/2018



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EDO Analytical Report

Drought in Central-Northern Europe – August 2018
EU Copernicus Drought Observatory (EDO) and EDC Analytical Team
10/08/2018



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EDO Analytical Report

Drought in Central-Northern Europe – September 2018
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10/09/2018



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Drought in Afghanistan – 12 November 2018
EU Copernicus Drought Observatory (EDO) and EDC Analytical Team
12/11/2018



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Drought in Southern Pakistan – November 2018
EU Copernicus Drought Observatory (EDO) and EDC Analytical Team
09/11/2018



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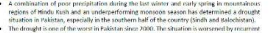


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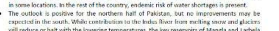


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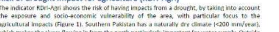


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GDO Analytical Report

Drought in India – December 2018
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12/12/2018



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GDO Analytical Report

Drought in Southern Africa – August 2018
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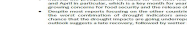


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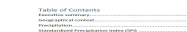


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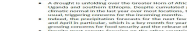


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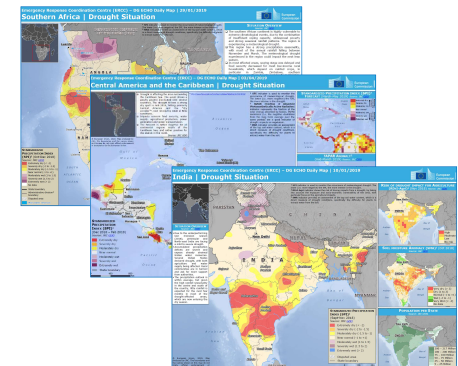
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In case of severe droughts
EDO & GDO produce
Analytical Reports on the
drought evolution and
related impacts ...

.... and **Daily Maps**
for ERCC





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T h a n k y o u

<http://edo.jrc.ec.europa.eu>
<http://edo.jrc.ec.europa.eu/gdo>

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