

IDMP

INTEGRATED DROUGHT
MANAGEMENT PROGRAMME

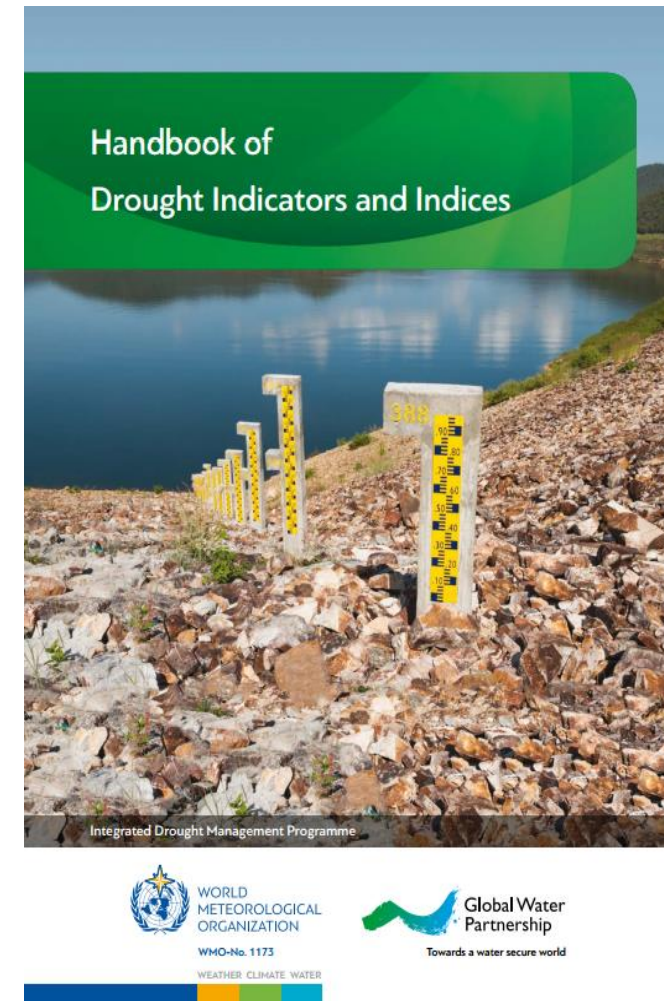
Updating the IDMP Handbook of Drought Indicators and Indices

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WMO
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Handbook of Drought Indicators and Indices

- Handbook is a resource to cover most commonly used drought indicators/indices
 - A starting point to describe and characterize the most common indicators and indices and their applications
 - Does not recommend a "best" set of indicators and indices, given research requirements for appropriate application in location in question.
 - Five themes: Meteorology, Soil Moisture, Hydrology, Remotely Sensed, Combined and Modelled
- Will be sending request to Partners to update list of indicators and indices**



Selected Drought Indices

<i>Meteorology</i>	<i>Page</i>	<i>Ease of use</i>	<i>Input parameters</i>	<i>Additional information</i>
Aridity Anomaly Index (AAI)	11	Green	P, T, PET, ET	Operationally available for India
Deciles	11	Green	P	Easy to calculate; examples from Australia are useful
Keetch–Byram Drought Index (KBDI)	12	Green	P, T	Calculations are based upon the climate of the area of interest
Percent of Normal Precipitation	12	Green	P	Simple calculations
Standardized Precipitation Index (SPI)	13	Green	P	Highlighted by the World Meteorological Organization as a starting point for meteorological drought monitoring
Weighted Anomaly Standardized Precipitation (WASP)	15	Green	P, T	Uses gridded data for monitoring drought in tropical regions
Aridity Index (AI)	15	Yellow	P, T	Can also be used in climate classifications
China Z Index (CZI)	16	Yellow	P	Intended to improve upon SPI data
Crop Moisture Index (CMI)	16	Yellow	P, T	Weekly values are required
Drought Area Index (DAI)	17	Yellow	P	Gives an indication of monsoon season performance
Drought Reconnaissance Index (DRI)	18	Yellow	P, T	Monthly temperature and precipitation are required
Effective Drought Index (EDI)	18	Yellow	P	Program available through direct contact with originator

Selected Drought Indices

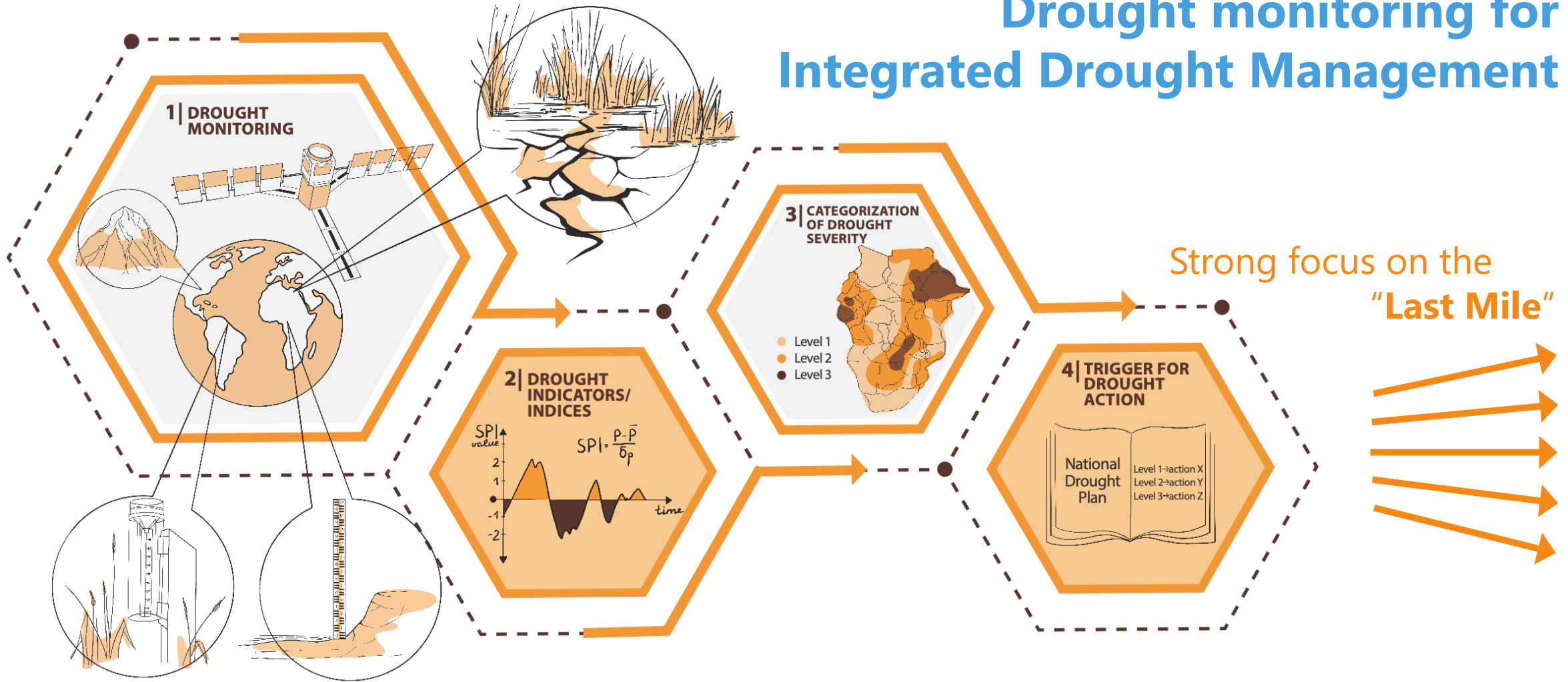
Standardized Anomaly Index (SAI)	22	Yellow	P	Point data used to describe regional conditions
Standardized Precipitation Evapotranspiration Index (SPEI)	23	Yellow	P, T	Serially complete data required; output similar to SPI but with a temperature component
Agricultural Reference Index for Drought (ARID)	24	Red	P, T, Mod	Produced in south-eastern United States of America and not tested widely outside the region
Crop-specific Drought Index (CSDI)	24	Red	P, T, Td, W, Rad, AWC, Mod, crop data	Quality data of many variables needed, making it challenging to use
Reclamation Drought Index (RDI)	25	Red	P, T, S, RD, SF	Similar to the Surface Water Supply Index, but contains a temperature component

<i>Soil moisture</i>	<i>Page</i>	<i>Ease of use</i>	<i>Input parameters</i>	<i>Additional information</i>
Soil Moisture Anomaly (SMA)	25	Yellow	P, T, AWC	Intended to improve upon the water balance of PDSI
Evapotranspiration Deficit Index (ETDI)	26	Red	Mod	Complex calculations with multiple inputs required
Soil Moisture Deficit Index (SMDI)	27	Red	Mod	Weekly calculations at different soil depths; complicated to calculate
Soil Water Storage (SWS)	27	Red	AWC, RD, ST, SWD	Owing to variations in both soil and crop types, interpolation over large areas is challenging

<i>Remote sensing</i>	<i>Page</i>	<i>Ease of use</i>	<i>Input parameters</i>	<i>Additional information</i>
Enhanced Vegetation Index (EVI)	32	Green	Sat	Does not separate drought stress from other stress
Evaporative Stress Index (ESI)	33	Green	Sat, PET	Does not have a long history as an operational product
Normalized Difference Vegetation Index (NDVI)	34	Green	Sat	Calculated for most locations
Temperature Condition Index (TCI)	34	Green	Sat	Usually found along with NDVI calculations
Vegetation Condition Index (VCI)	35	Green	Sat	Usually found along with NDVI calculations
Vegetation Drought Response Index (VegDRI)	35	Green	Sat, P, T, AWC, LC, ER	Takes into account many variables to separate drought stress from other vegetation stress
Vegetation Health Index (VHI)	36	Green	Sat	One of the first attempts to monitor drought using remotely sensed data
Water Requirement Satisfaction Index (WRSI and Geo-spatial WRSI)	36	Green	Sat, Mod, CC	Operational for many locations
Normalized Difference Water Index (NDWI) and Land Surface Water Index (LSWI)	37	Green	Sat	Produced operationally using Moderate Resolution Imaging Spectroradiometer data
Soil Adjusted Vegetation Index (SAVI)	38	Red	Sat	Not produced operationally

<i>Composite or modelled</i>	<i>Page</i>	<i>Ease of use</i>	<i>Input parameters</i>	<i>Additional information</i>
Combined Drought Indicator (CDI)	38	Green	Mod, P, Sat	Uses both surface and remotely sensed data

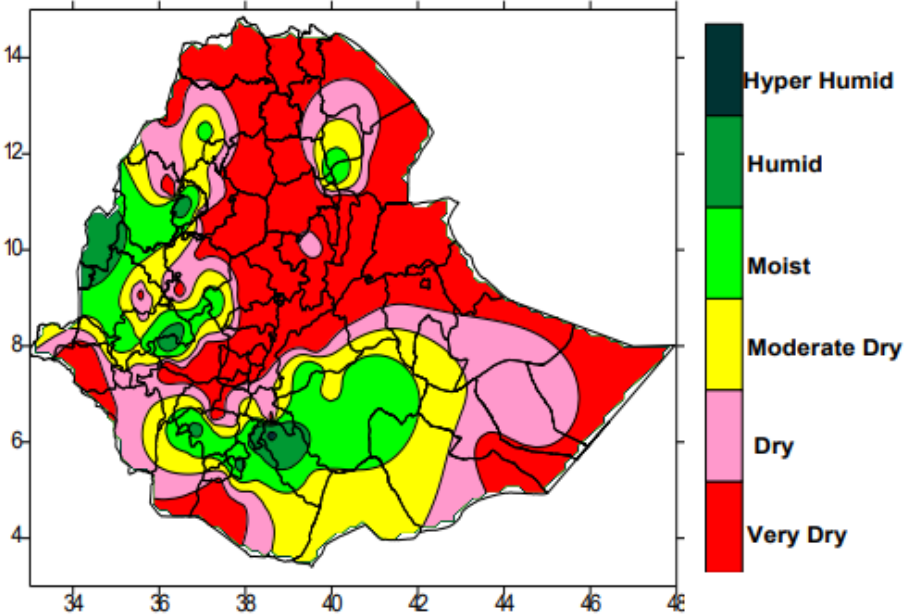
Drought monitoring for Integrated Drought Management



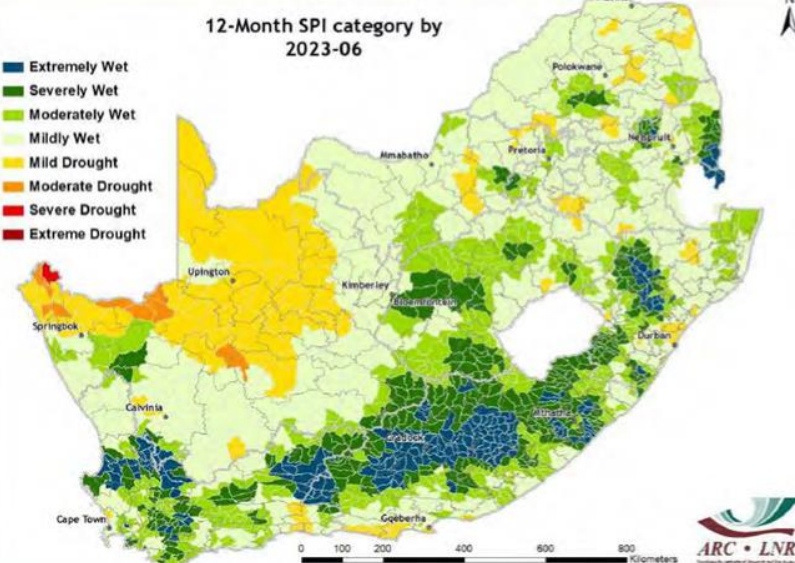
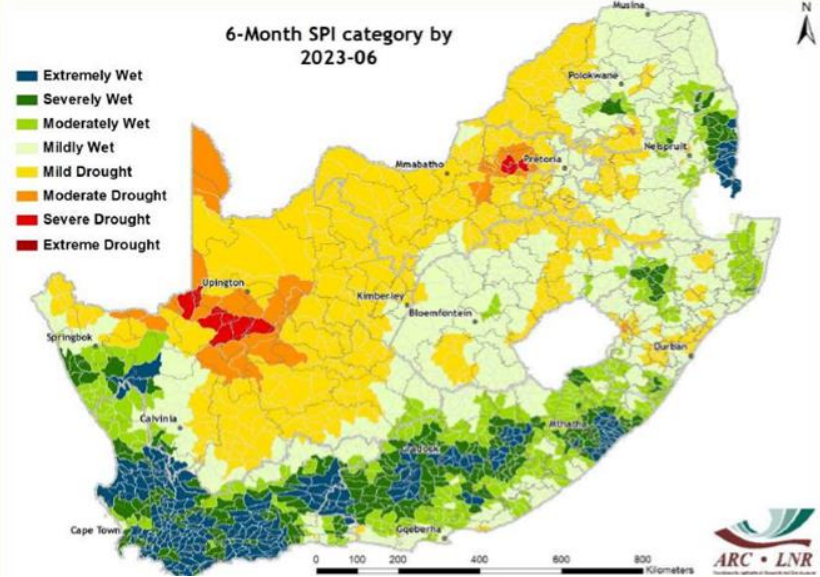
The design and implementation of technical solutions is based on **stakeholder engagement** at all steps and using an inclusive **whole-of-society approach**

South Africa SPI on August 2023

Ethiopia Moisture status (01-11 October 2023)

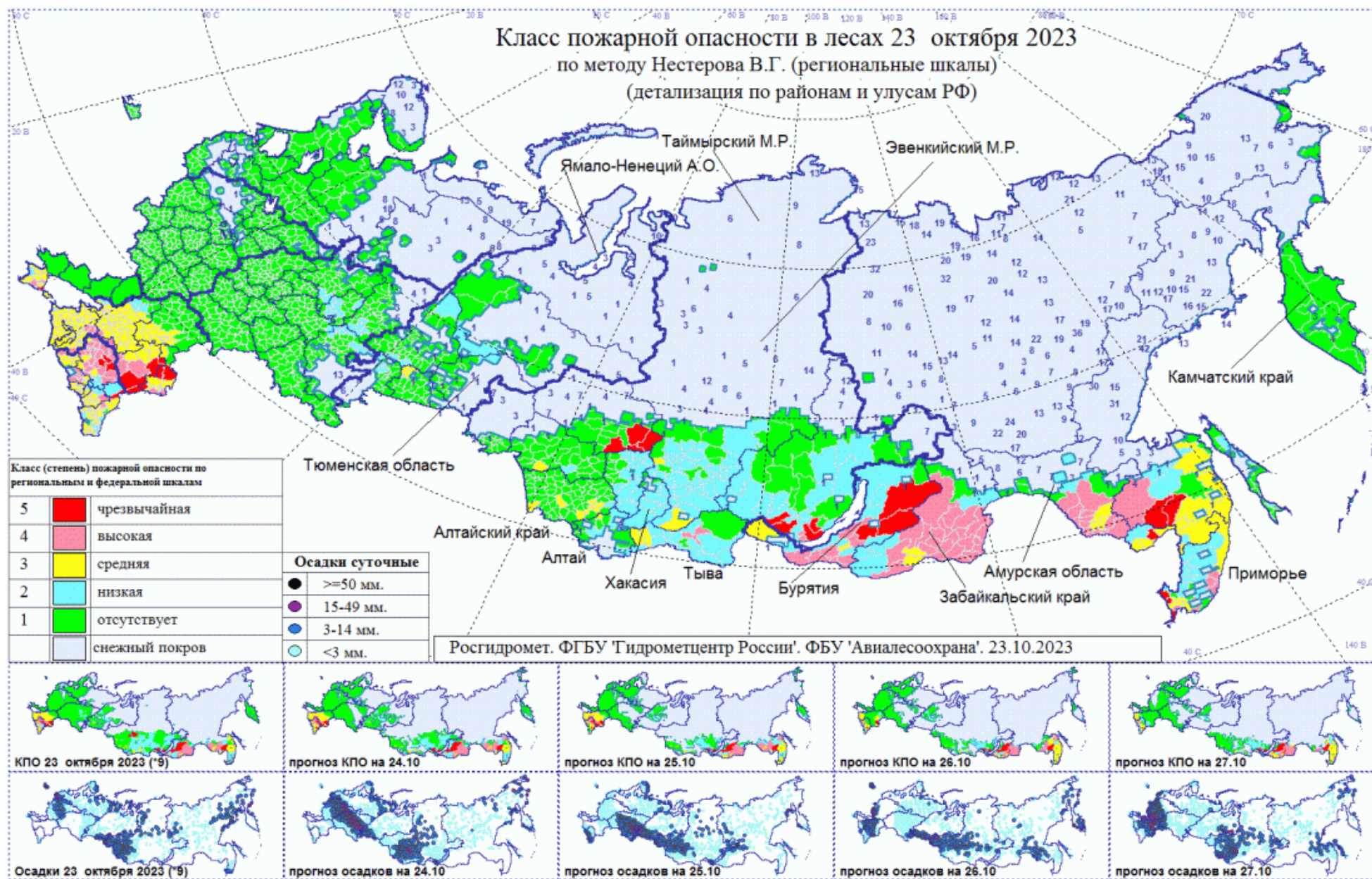


Source: National Meteorology Agency: Bulletins (ethiomet.gov.et)

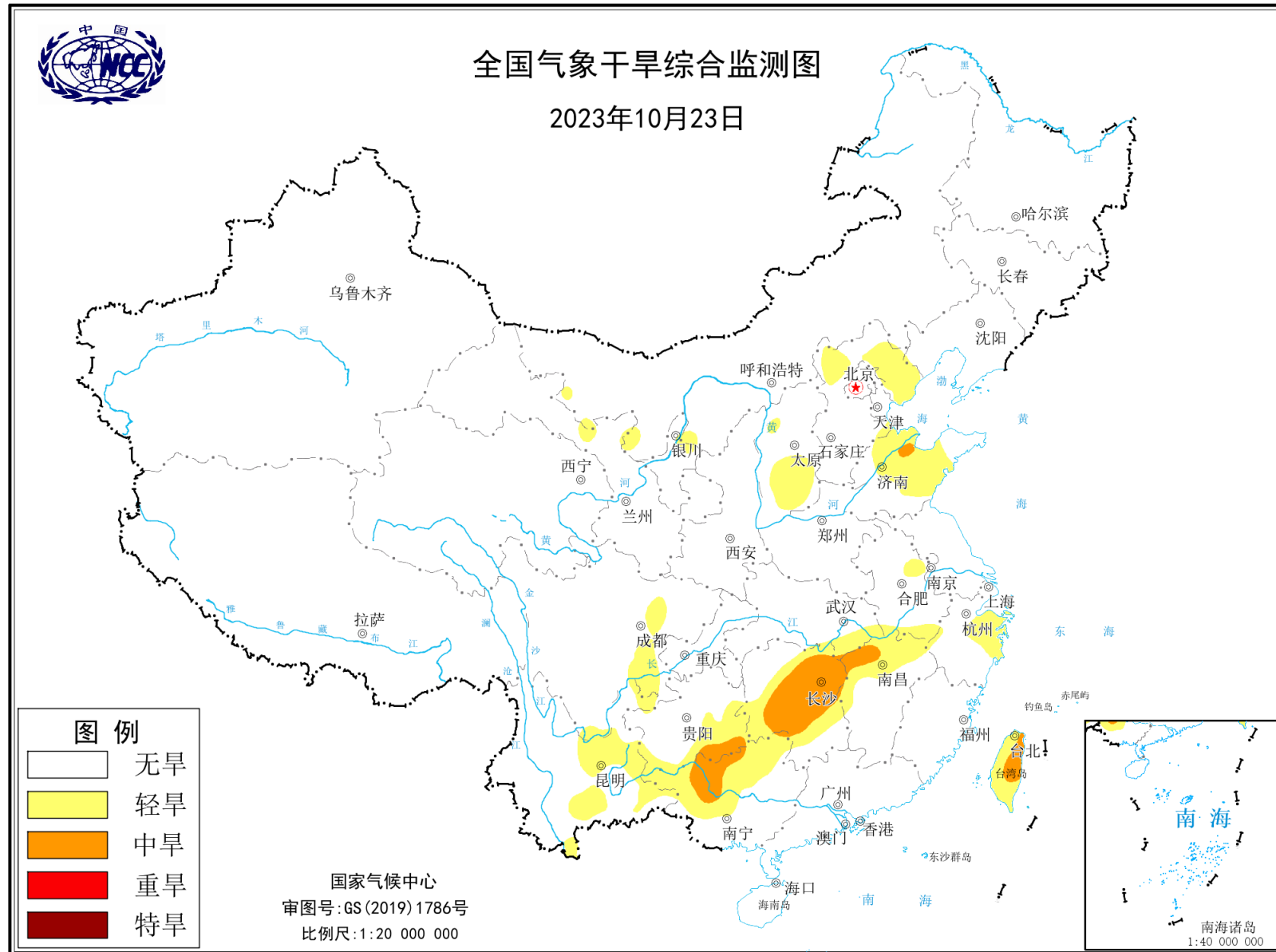


Source: Agricultural Research Council

Fire hazard in woodlands across the territory of Russia – 23 October 2023



China - October 2023



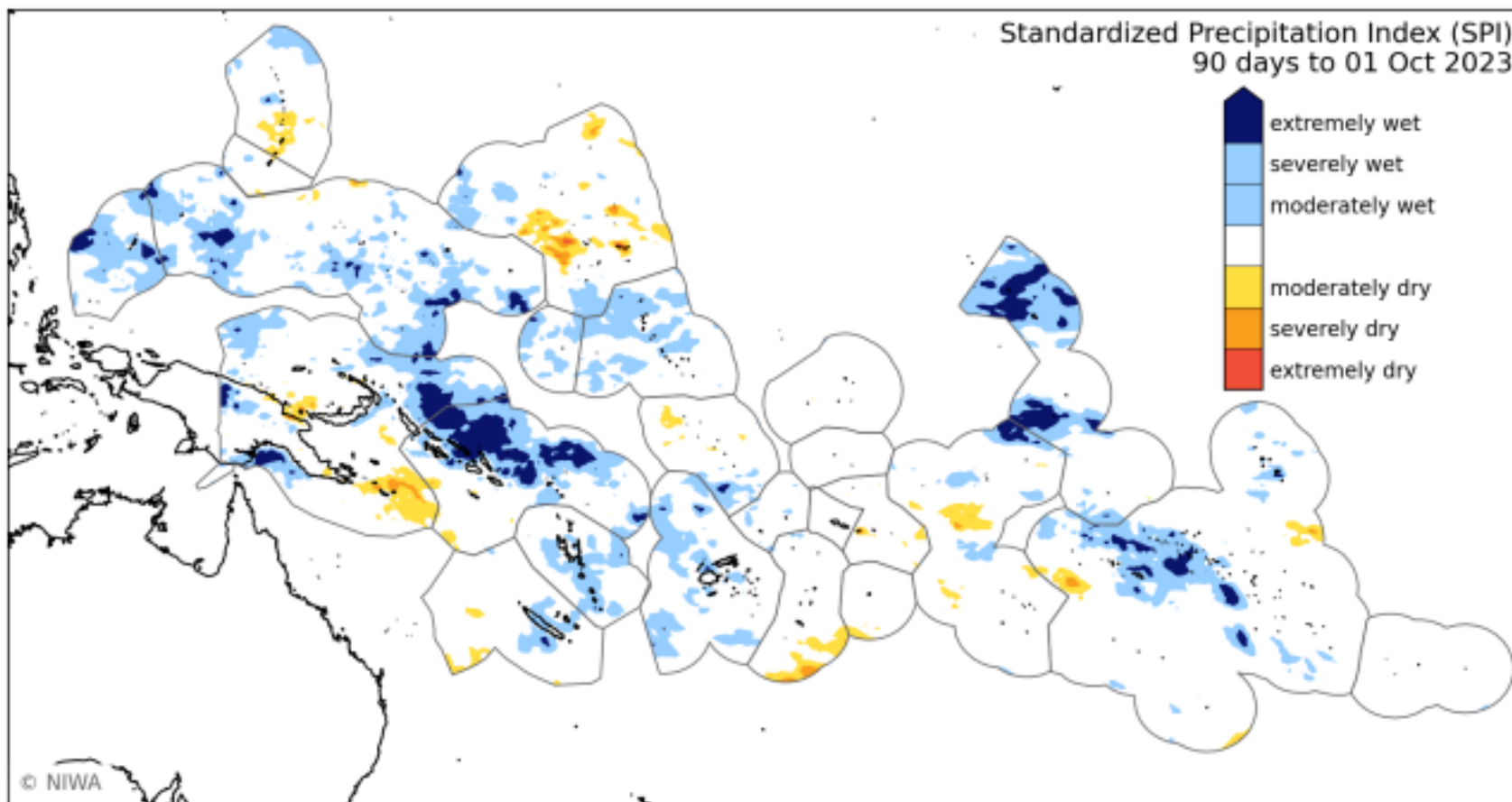
Source: National Climate Center of China

SPI Regional situation summary (1 October 2023)

The Standardized Precipitation Index (SPI) thresholds for cumulative rainfall over the last 90 and 30 days are shown in the plots below.

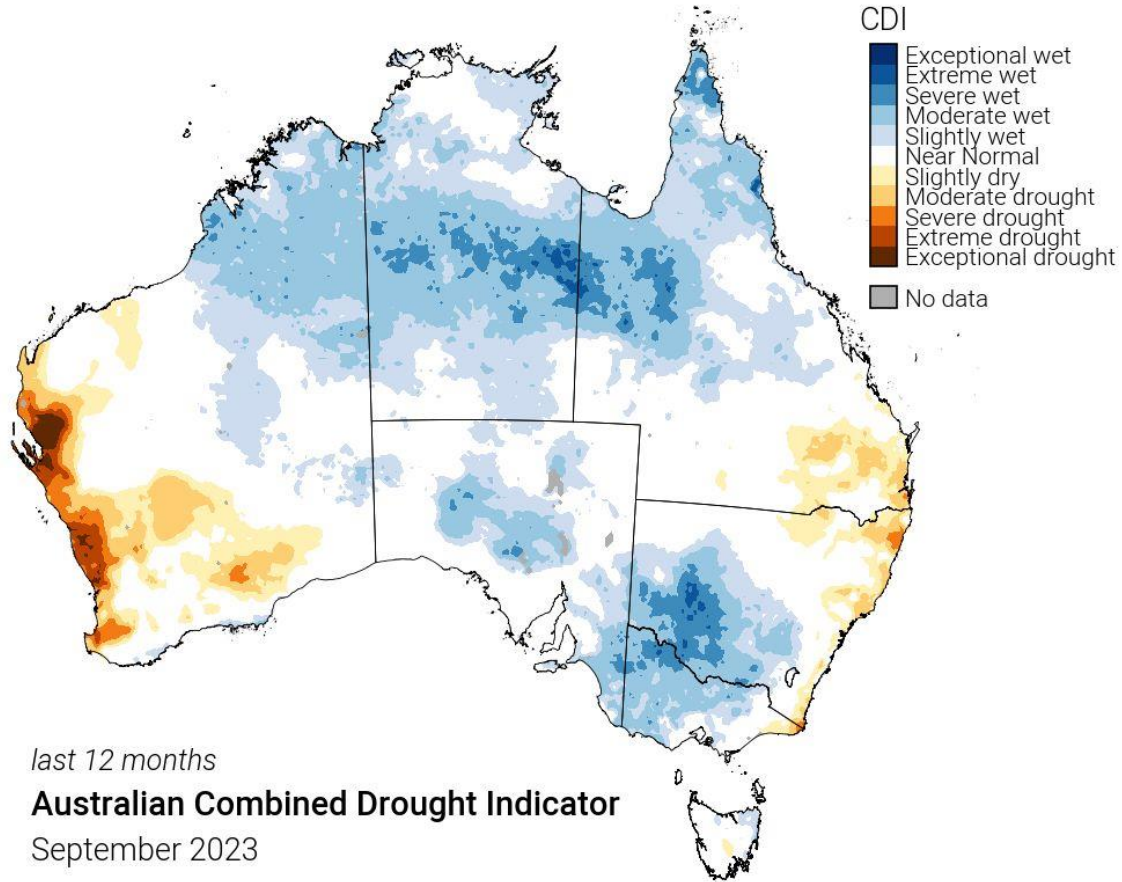
During July-September (top plot), extremely or severely dry conditions occurred in parts of Northern Marianas, the Marshall Islands, PNG, and American Samoa.

During September (bottom plot), extremely or severely dry conditions occurred in western FSM, parts of the Marshall Islands, the Solomon Islands, Wallis & Futuna, eastern Fiji, Tonga, and Niue.

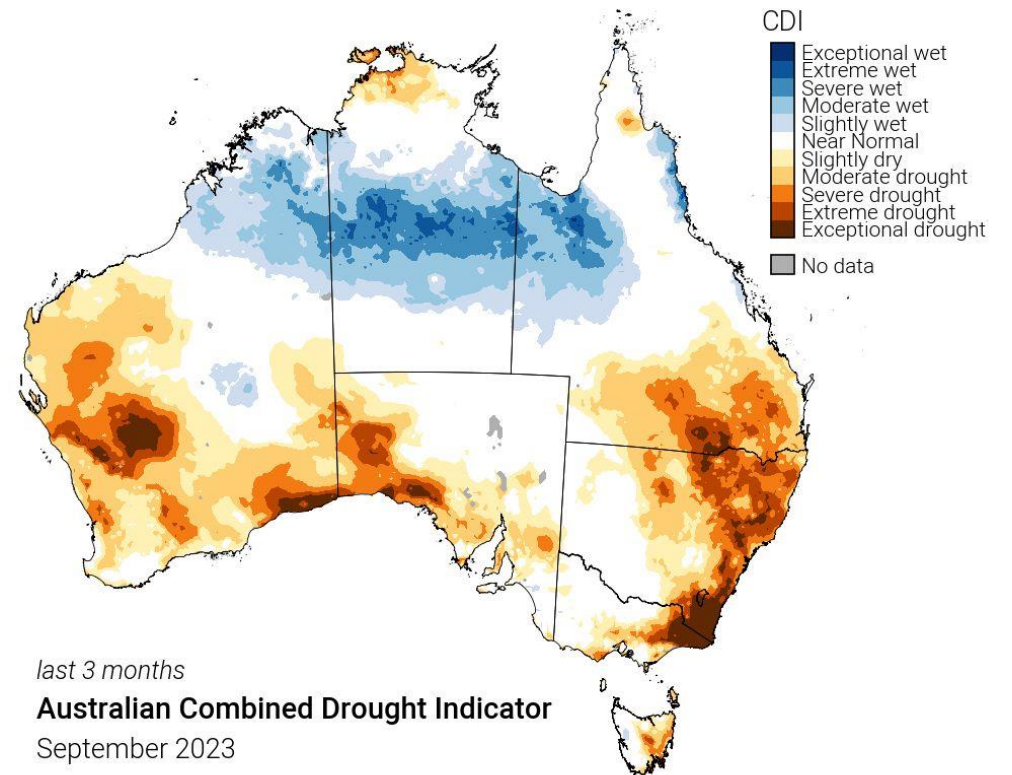


Australia - Monitor

Last 12 Months

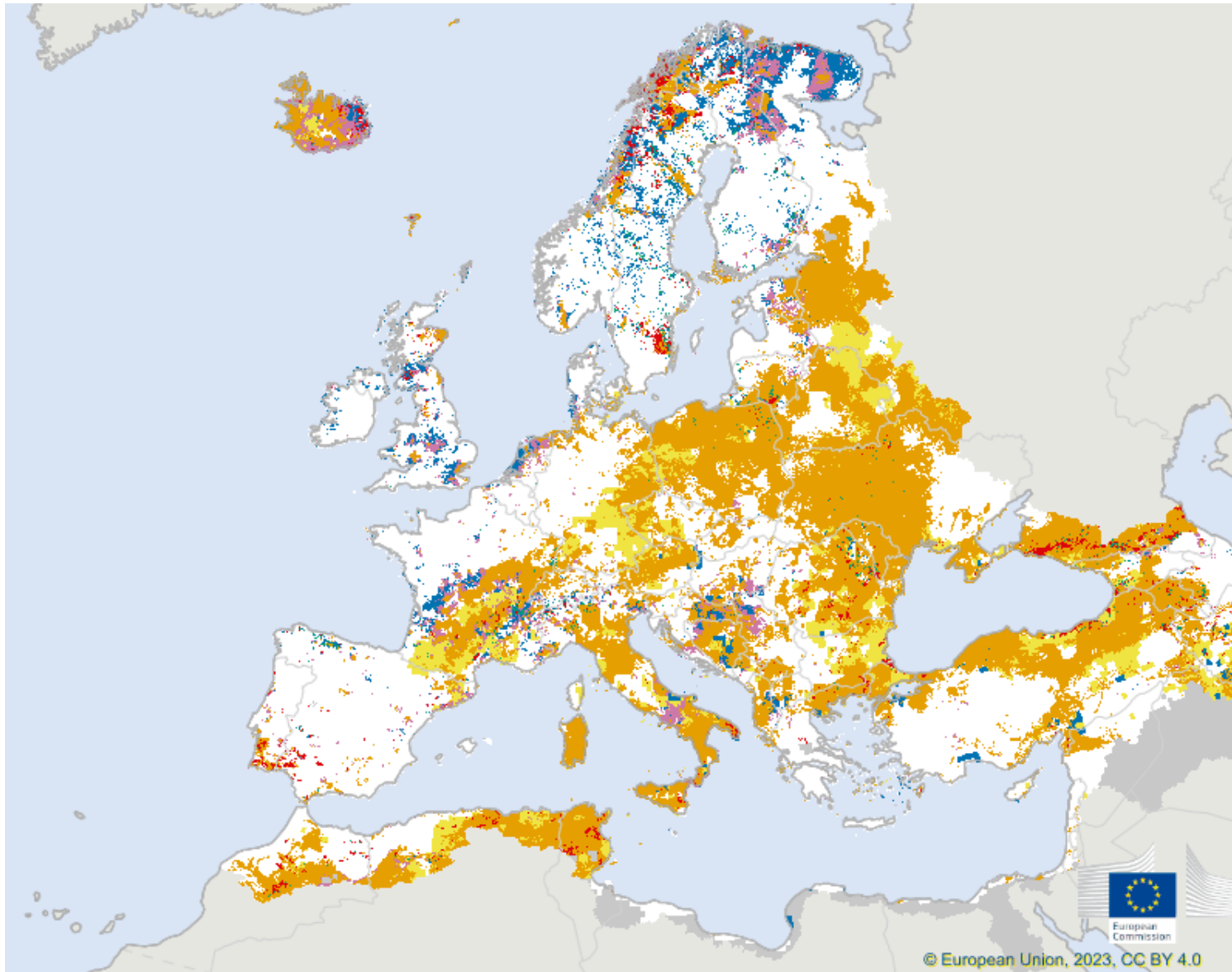


Last 3 Months



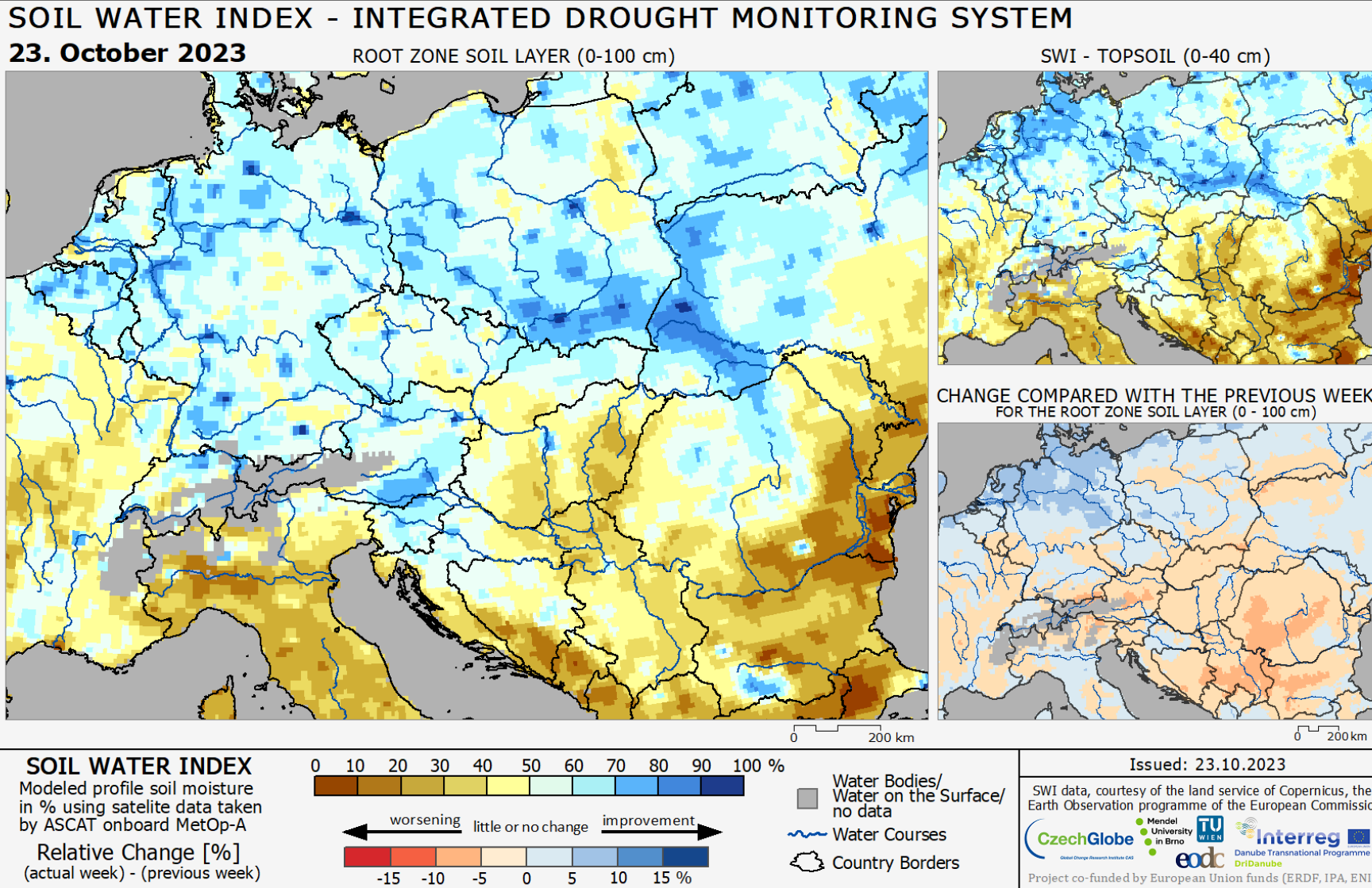
Source: Northern Australia Climate Program

Combined Drought Indicator in Europe – 3rd ten-day period of September 2023



Source: [European Drought Observatory](#)

Central Europe



Source: Integrated Drought Monitoring System – Central Europe

What indicators and indices would you like to add in the Handbook ?

Please scan the QR-code or go to www.menti.com and use this code:

XXXX

<https://www.menti.com/xxxxx>

