Deutscher Wetterdienst
Wetter und Klima aus einer Hand

Data and drought monitoring activities at the Deutscher Wetterdienst (DWD)

Kira Rehfeldt[1], Andreas Becker[1], Markus Ziese[1]

[1] Global Precipitation Climatology Centre, DWD

European Drought Observatory (EDO) User and Expert Meeting at the European Commission's Joint Research Centre (JRC) in Ispra (VA), Italy

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Structure

1) Drought monitoring at DWD – current status
2) Global Precipitation Climatology Centre Drought Index
3) Global Drought Monitoring
4) Global Drought “Climatology”
5) Global Drought Prediction
6) Summary and Outlook
7) Cooperation with Copernicus Emergency Management Services

1) Drought monitoring at DWD – current status

- National monitoring: support for agrometeorological advisory
  - SPI, STI based on national observation network

- Standardized Precipitation Index (SPI)
  - Based on precipitation anomalies
- Standardized Temperature Index (STI)
  - Based on temperature anomalies

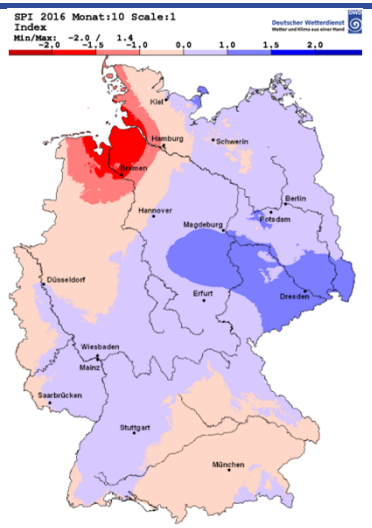
1) Drought monitoring at DWD – current status

- SCI, SPEI used for Flash Droughts since last year

- Standardized Combination Index (SCI)
  - Based on difference between SPI and STI (SCI ~ SPI - STI)
- Standardized Precipitation Evapotranspiration Index (SPEI)
  - Based on difference between precipitation and potential evapo(transpi)ration

- Flash Droughts
  - Soil moisture < 40% usable field capacity
  - STI > 1 (pentads, daily moving time window)
  - Potential evaporation > long term mean

- Monthly calculation of SPI, STI, SPEI and SCI
- Several aggregation intervals:
  - 1, 3, 6 and 12 months
- Flash drought monitoring in research status
- Example of October 2016, 1 month aggregated



SPI

STI

SPEI

SCI

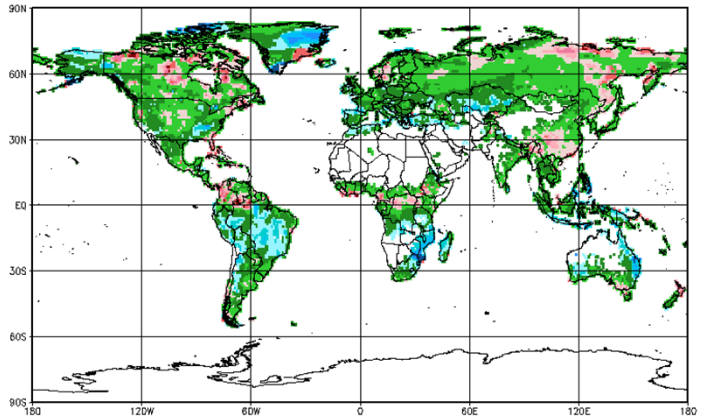
1) Drought monitoring at DWD – current status

- Global Monitoring: support climate science and relief organizations
  - Global Precipitation Climatology Centre Drought Index (GPCC-DI) based on gridded precipitation and gridded monthly mean temperature data; no homogenized input data
- Global Drought “Climatology”: support climate science
  - Retrospective calculation of GPCC-DI back to 1952
- Global Drought Prediction: support relief organizations
  - GPCC-DI calculation based on seasonal forecasts

2) Global Precipitation Climatology Centre Drought Index

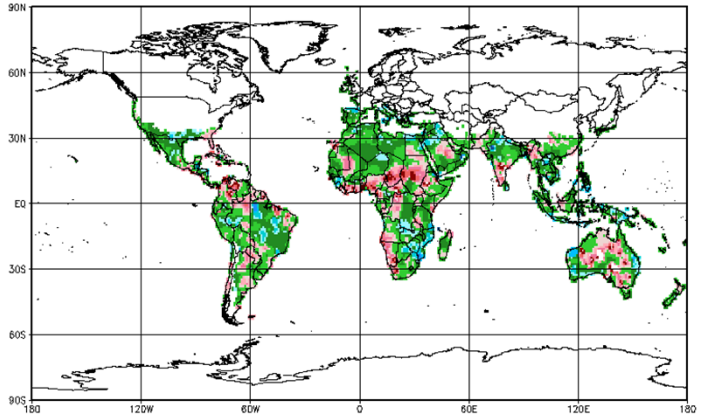
- GPCC-DI is combination of SPI and SPEI
  - SPI not applicable in arid regions
  - SPEI not applicable in cold regions, due to used Thornthwaite PET parameterization (~ 30°N and 50°S)
  - GPCC-DI uses mean of SPI and SPEI, otherwise the one which can be calculated
  - Nearly global coverage, except cold-dry regions like southern Andes, Himalayas or parts of Tibet
  - **Citation: Ziese, M., U. Schneider, A. Meyer-Christoffer, K. Schamm, J. Vido, P. Finger, P. Bissolli, S. Pietzsch and A. Becker (2014):** The GPCC Drought Index – a new, combined and gridded global drought index. *Earth Syst. Sci. Data*, 6, 285-295, DOI:10.5194/essd-6-285-2014

2) Global Precipitation Climatology Centre Drought Index



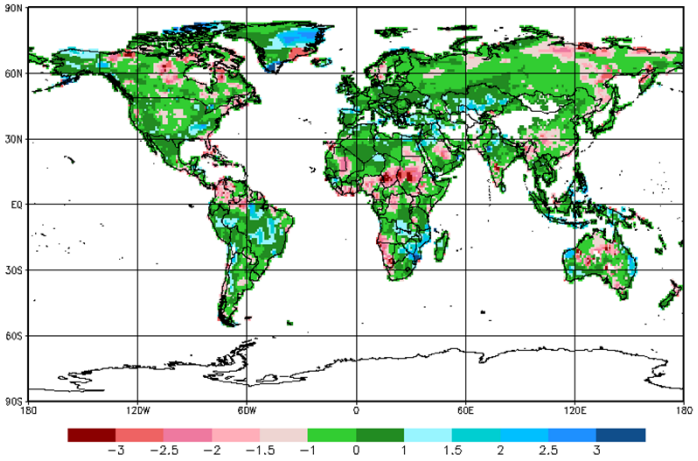
SPI-DWD

+



SPEI

=>

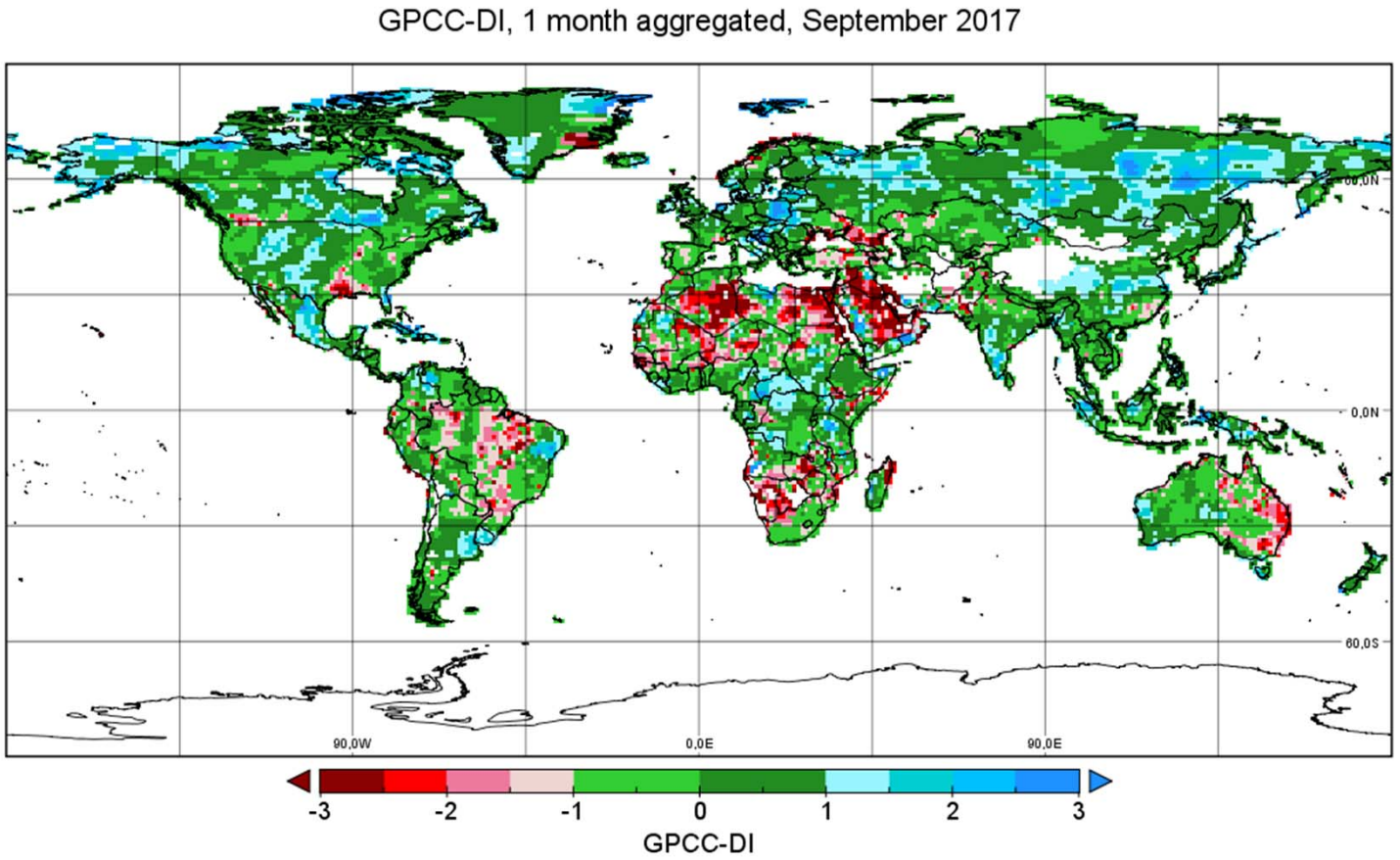


GPCC-DI

3) Global Drought Monitoring

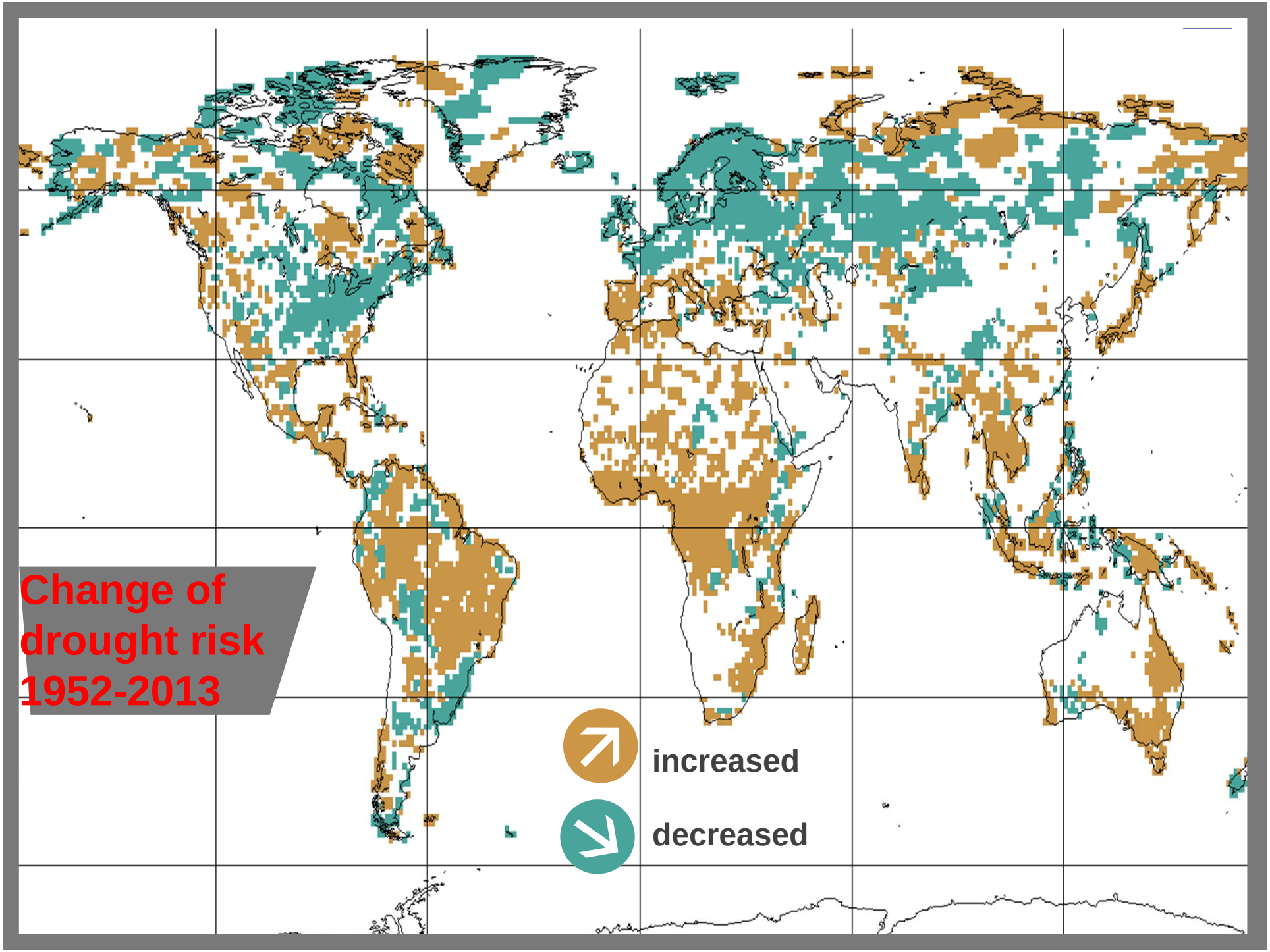
- GPCC-DI based on:
  - Precipitation analyses from GPCC (First Guess Monthly)
  - Temperature analyses from CPC
  - Spatial resolution: regular grid with 1°
  - Available 10 days after the end of each month
  - Multiple aggregation periods: 1, 3, 6, 9, 12, 24 and 48 months
  - Reference period for parameter 1961-1990
  - Operational calculation since 2013
- Utilized also for monitoring of WMO RA VI (Europe and Middle East) from WMO RCC-CM

3) Global Drought Monitoring



4) Global Drought “Climatology”

- Retrospective calculation of GPCC-DI from 1952 to 2013
  - Precipitation analyses from GPCC (Full Data Monthly, Version 7)
  - Temperature analyses from CPC
  - Multiple aggregation periods: 1, 3, 6, 12, 24 and 48 months
  - Reference period for parameter 1952-2013


Change of drought risk 1952-2013
increased
decreased

5) Global Drought Prediction

- DWD operates seasonal forecast system (GCFS) based on MPI-ESM
- GPCC-DI calculated using precipitation and evapotranspiration from ensemble mean
- Aggregation of forecast months 2 to 4, first month spin-off
- Parameter based on hindcasts 1982 to 2015

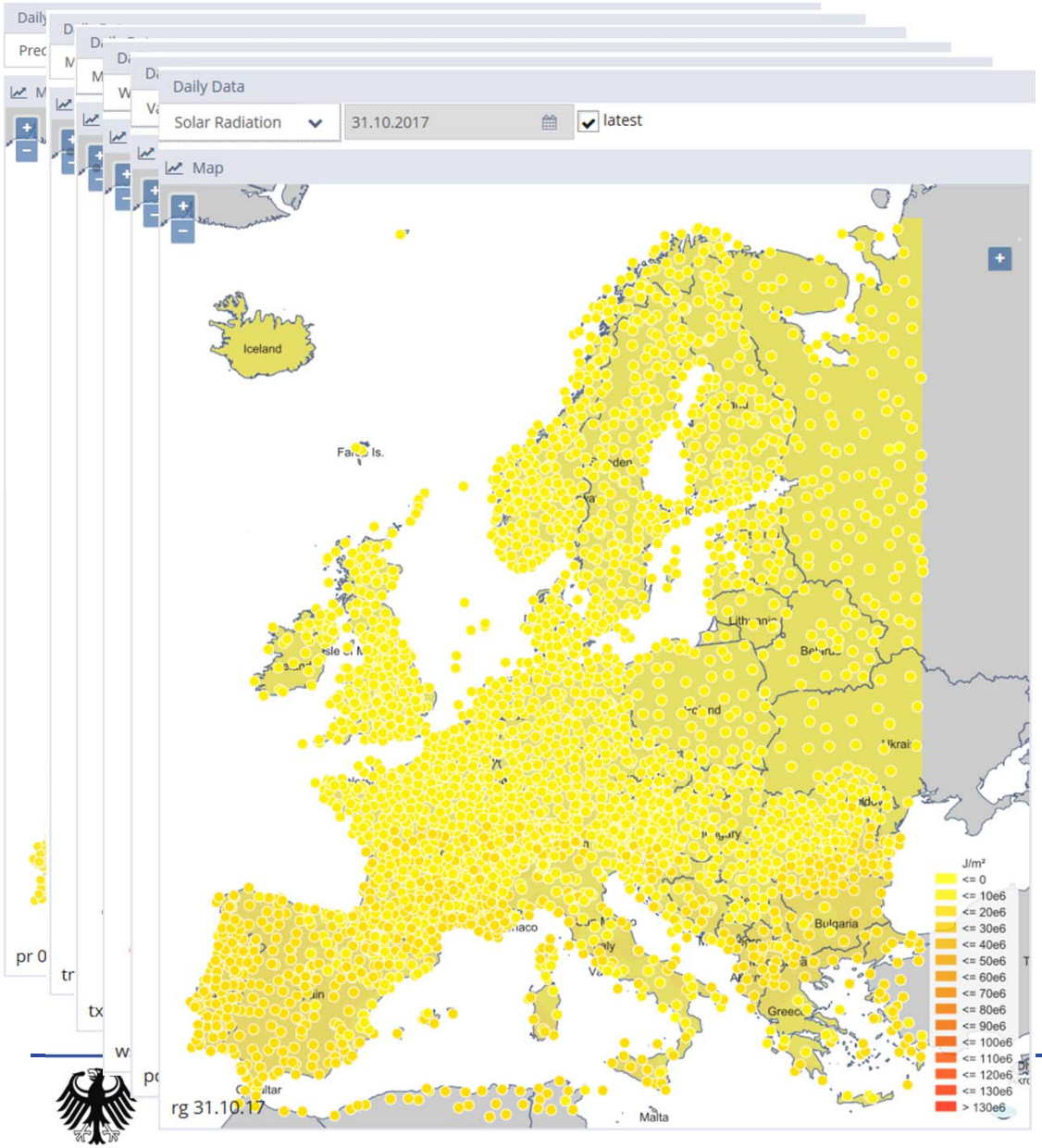
6) Summary and Outlook

- Drought monitoring for Germany based on SPI, STI, SPEI, SCI and flash droughts
- Global monitoring based on GPCC-DI:
  - Drought “Climatology” (retrospective calculation)
  - Drought Monitoring
  - Drought Prediction, based on seasonal forecasts

- Recalculation of GPCC-DI parameters for Climatology and Monitoring, as next version of Full Data Monthly released in Q1/Q2 2018
  - Recalculate and extent Climatology until 2016; Monitoring starting in 2017
  - Using same set of parameters for Climatology and Monitoring
- Move seasonal forecast from low resolution to high resolution in 2018 -> recalculation parameters

7) Cooperation with Copernicus EMS

- Copernicus Emergency Management Service (EFAS + EFFIS)
- European Flood Awareness System (EFAS) consists of four centres:
  - **EFAS Meteorological data collection Centre (MDCC)**
  - EFAS Hydrological data collection Centre (HDCC)
  - EFAS Computational Centre (COMP)
  - EFAS Dissemination Centre (DISS)
- first operational European system for monitoring and forecasting floods across Europe
- flood early warning information up to 10 days in advance
- European Forest Fire Information System (EFFIS):
  - supports the services in charge of the protection of forests against fires in the EU countries



- Parameters: precipitation, min. temperature, max. temperature, wind speed, solar radiation, vapor pressure
- Daily data and daily EFFIS data
- 13 data providers
- Delivery of gridded tmin and tmax maps to the JRC ftp for the European Drought Observatory

Source
AMDASynop
ARPASIM
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DWDSynop
IPMA
MARS
MeteoSwiss
METIE
NMI
SAIH
SHMU
ZAMG

You are able to share meteorological station data with us and need more information about the project, please contact us!

Kira.Rehfeldt@dwd.de Andreas.Becker@dwd.de Markus.Ziese@dwd.de

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Questions / Comments?