CEMS Meteorological Data Collection Centre

Emergency Management

KISTERS: Christoph Schweim, Damien Pichon

DWD: Kira Rehfeldt, Zora Schirmeister, Jakub Walawender, Markus Ziese

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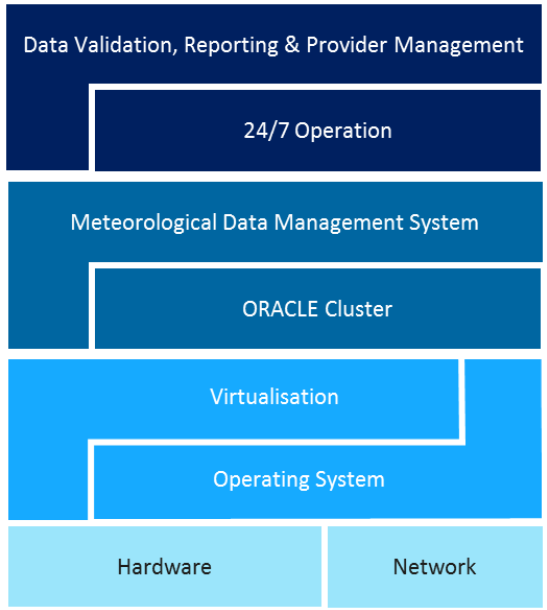
Operated by KISTERS and DWD

KISTERS

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

DWD




Christoph


Kira


Zora


Markus


Damien


Jakub

… and many more in the background …

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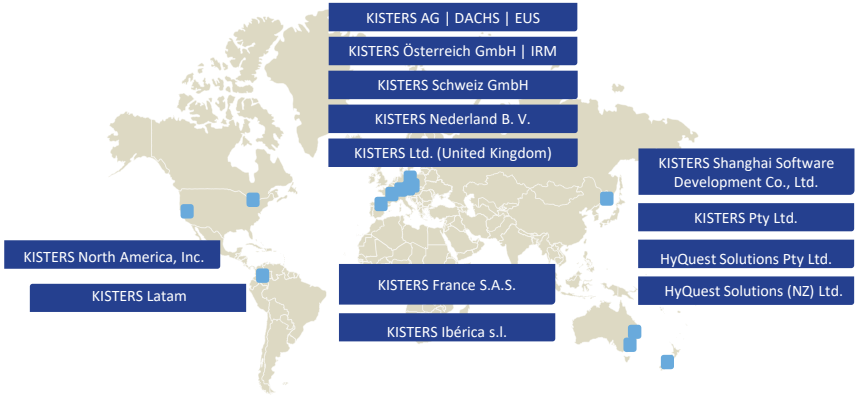
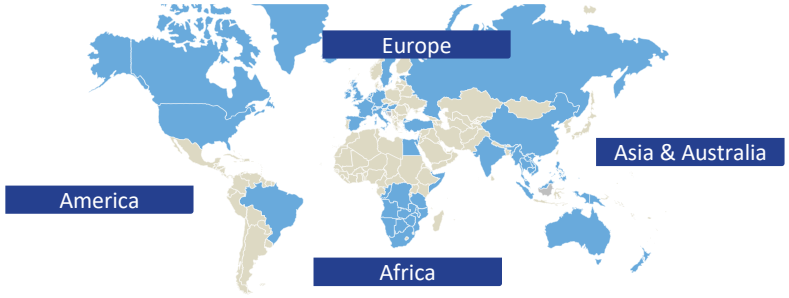
KISTERS at a glance

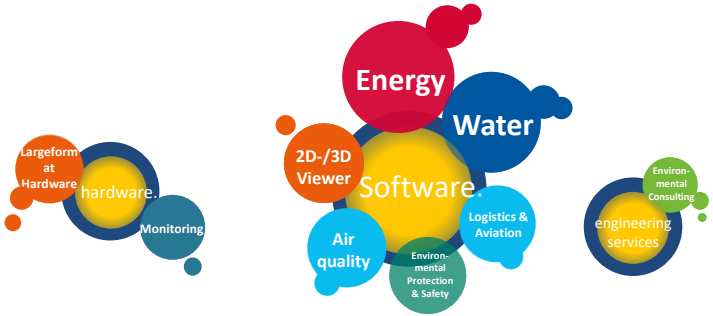
The KISTERS Group



A strong customer base



Markets & software products



Corporate figures

Key figures	2020
Number of permanent employees	> 600
Number of subsidiaries	16
Revenue in million euros	80

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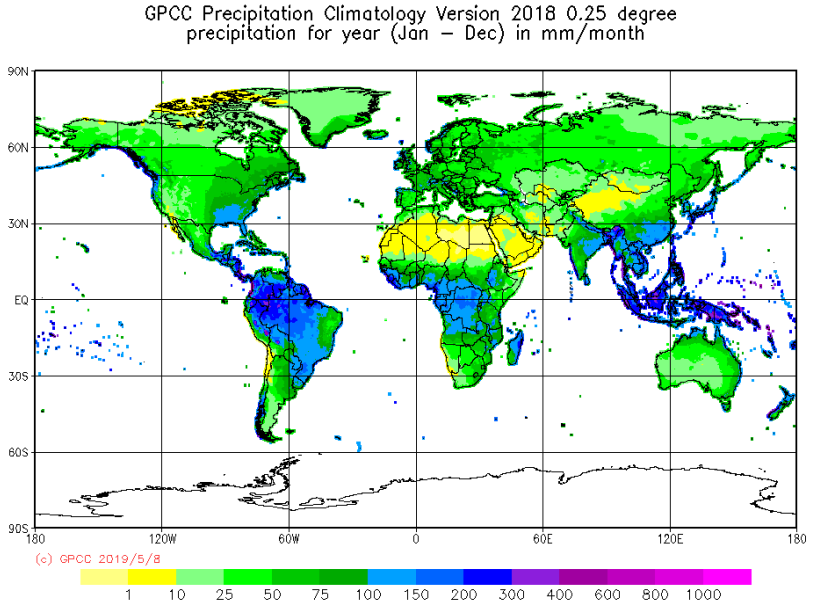
Global Precipitation Climatology Centre (GPCC)

Established by the World Meteorological Organization WMO in 1989

GPCC Product	Spatial Resolution	Time Coverage
First Guess Monthly	*1.0°*	*2004 - present*
First Guess Daily	*1.0°*	*2009 - present*
Monitoring Version 6	*1.0°, 2.5°*	*1982 - present*
Full Data Monthly Version 2018	*0.25° , 0.5°, 1.0°, 2.5°*	*1891 - 2016*
Full Data Daily Version 2018	*1.0°*	*1982 - 2016*
HOAPS/GPCC global daily precipitation Version 2	*0.5°, 1.0°, 2.5°*	*1988 - 2015*
HOMPRA Europe Version 1	*0.5°, 1.0°, 2.5°*	*1951 - 2005*
Precipitation Climatology Version 2018	*0.25°, 0.5°, 1.0°, 2.5°*	*1951/2000*
Interpolation Test Dataset	*1.0°*	*1988*
Drought Index Version 1	*1.0°*	*2013 - present*
Drought Index Version 1.1	*1.0°*	*1952 - 2013*
GPCC Visualizer		
GPCC Home		



gpcc.dwd.de

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Current active data providers

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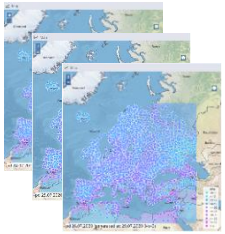
Some numbers

- > 63,000 stations in data base
- > 7,000,000 data record to process each day
- > 1300 GB disc space of data base

Parameter description	Used for
Cloud cover	
Dew point temperature	
Evaporation	
Precipitation	EFAS, EFFIS, EDO
Relative Air humidity	EFFIS
Solar radiation	EFAS
Sunshine duration	
Air temperature	EFAS, EFFIS, EDO
Water vapor pressure	EFAS
Wind direction	
Wind speed	EFAS

System Overview – Dataflow and Processing



Data provider

241,000

sensors *measuring cloud cover, dew point temperature, evaporation, relative air humidity, solar radiation, precipitation, sunshine duration, air temperature, water vapour pressure, wind speed and wind direction*

real time
24/7

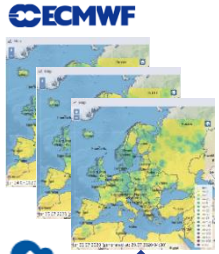
KISTERS

8

interpolated maps

at a spatial resolution of 5 km by 5 km
daily: precipitation, min/max temperature, solar radiation, wind speed and water vapour pressure
6-hourly: mean temperature, precipitation

ECMWF



Final gridded data products

4 parameter

point lists for EFFIS

2 parameter

point lists for EDO

Automatic Import format consistency checks

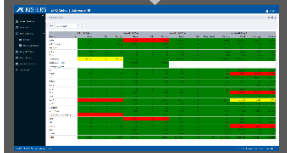
Temporal consistency checks

Cross validations

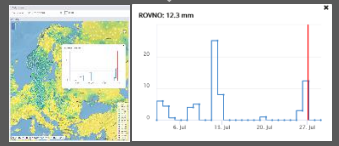
Spatial Temporal consistency checks e.g. cloud cover

Check against background statistics

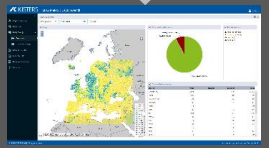
Calculation and dissemination of gridded data products



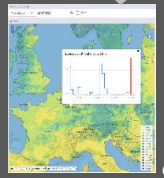
Overview failed imports
Non delivered data



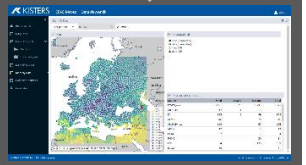
List validation results
Quality Flags & Error Correction



Visualization of questionable data with background information



Quality Flags & Error Correction



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Getting the Real-Time Data

- Data arrives at METEO through:
  - Upload to sftp-server at METEO
  - Download the data from (s)ftp-server operated by data provider
  - Fetching data via API-requests
- Fetching cycle between once a day to every five minutes
- Files are converted into uniform file format for import
- Data are instantaneous imported into data bank
- Import triggers the Quality Control (QC)

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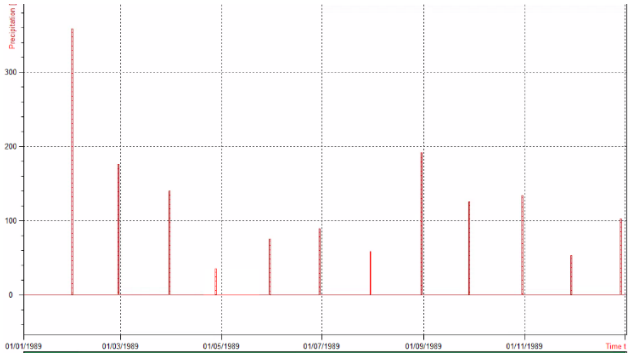
METEOs Quality Control (QC)

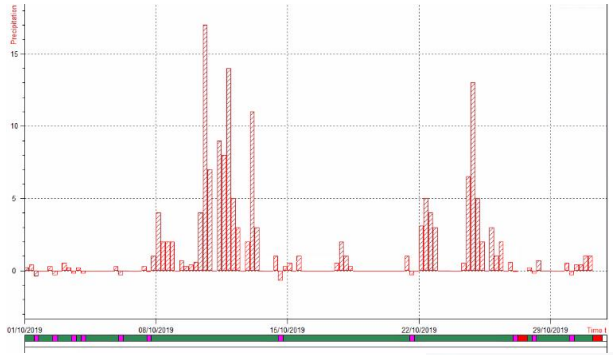
- Triggered by import into data bank
- METEO perform automatic checks, no manual edits or flagging
- Performed checks (depending on parameter):
  - Upper & lower threshold (constant or time dependent)
  - Difference to previous value (rate of change)
  - Temporal consistency (detection of expected but not received data)
  - Cross-validation
- Worst quality wins

METEOs Quality Control (QC)

- Validation against thresholds
  - Specific thresholds, e.g. lower for minimum temperature than for maximum temperature
  - For precipitation depending on aggregation period
  - Disadvantage: not all errors were detected
    - Example: monthly total provided as ‘daily total’ at the last day of the month, if its lower than the daily threshold



Monthly total as “daily total”



Negative totals due to disaggregation

METEOs Post-Processing

- All data are further processed:
  - Calculation of mean, minimum and maximum values over specified intervals
  - Accumulate over different periods
  - Extract data at specific timestamps
  - Disaggregate data to get high temporal resolution (e.g. precipitation: 6-hourly total as difference of 12-hourly and included 6-hourly total)
- Post-processed data gets the worst quality of the processed data
- Post-processed data are input for gridding

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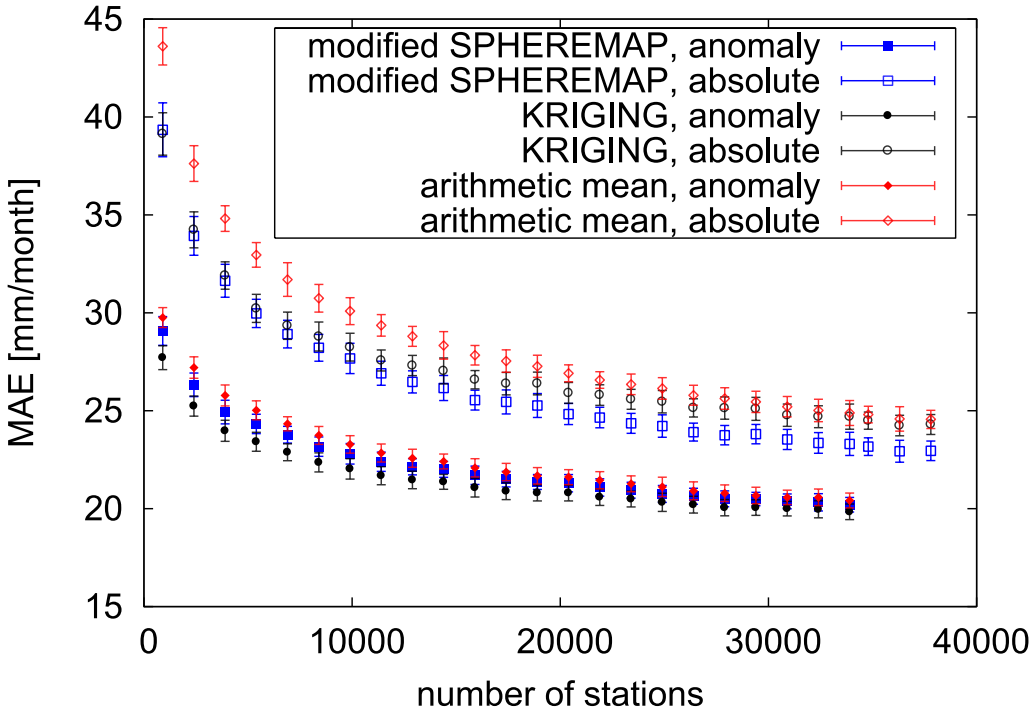
METEOs Gridding

- Only data with quality good or suspect are used for gridding
- Sort-out of duplicate stations before each gridding (switched on with next calibration)
- Gridding by means of a modified SPHEREMAP scheme (4 – 10 station per grid point)
- Calculate for each grid an uncertainty estimation, depending on data availability and variance between input data
- Gridded parameters:
  - Precipitation (6-hourly and daily)
  - Air temperature (6-hourly mean, daily minimum and maximum)
  - Wind speed
  - Solar radiation
  - Water vapor pressure

- Reliability of grids increases with increasing station availability



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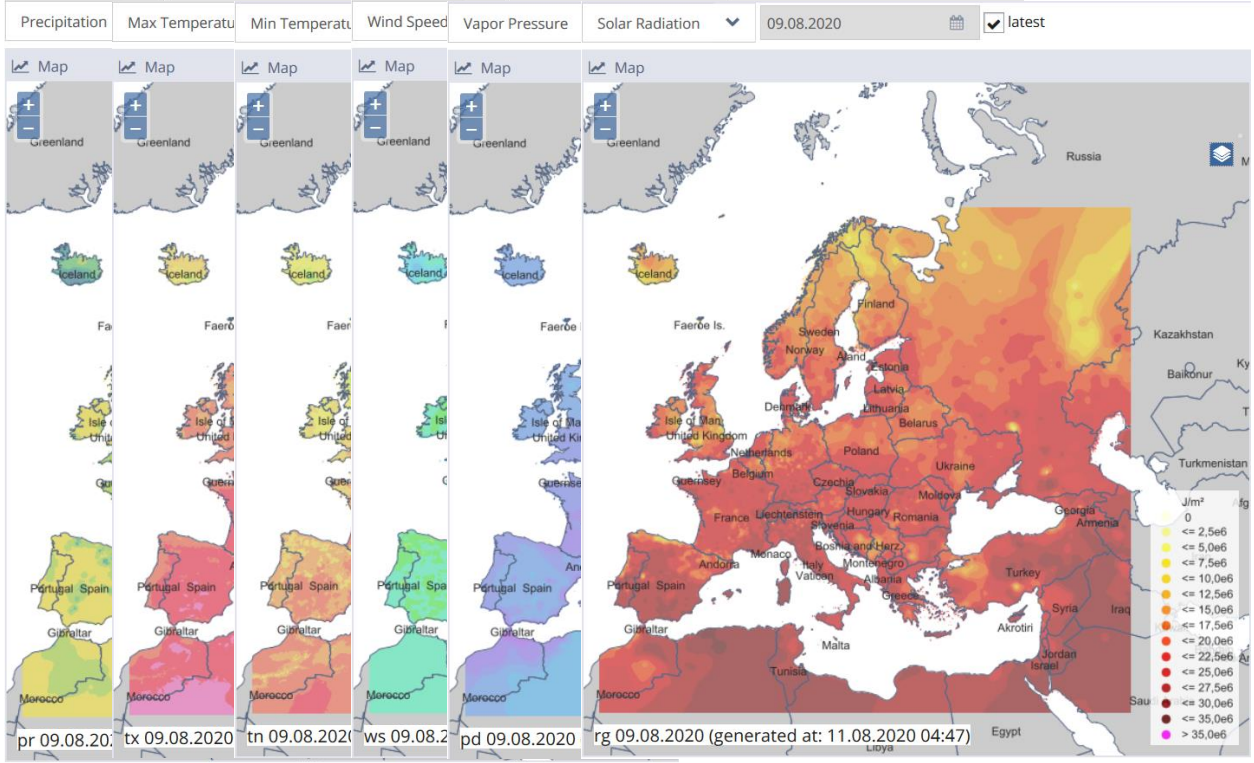
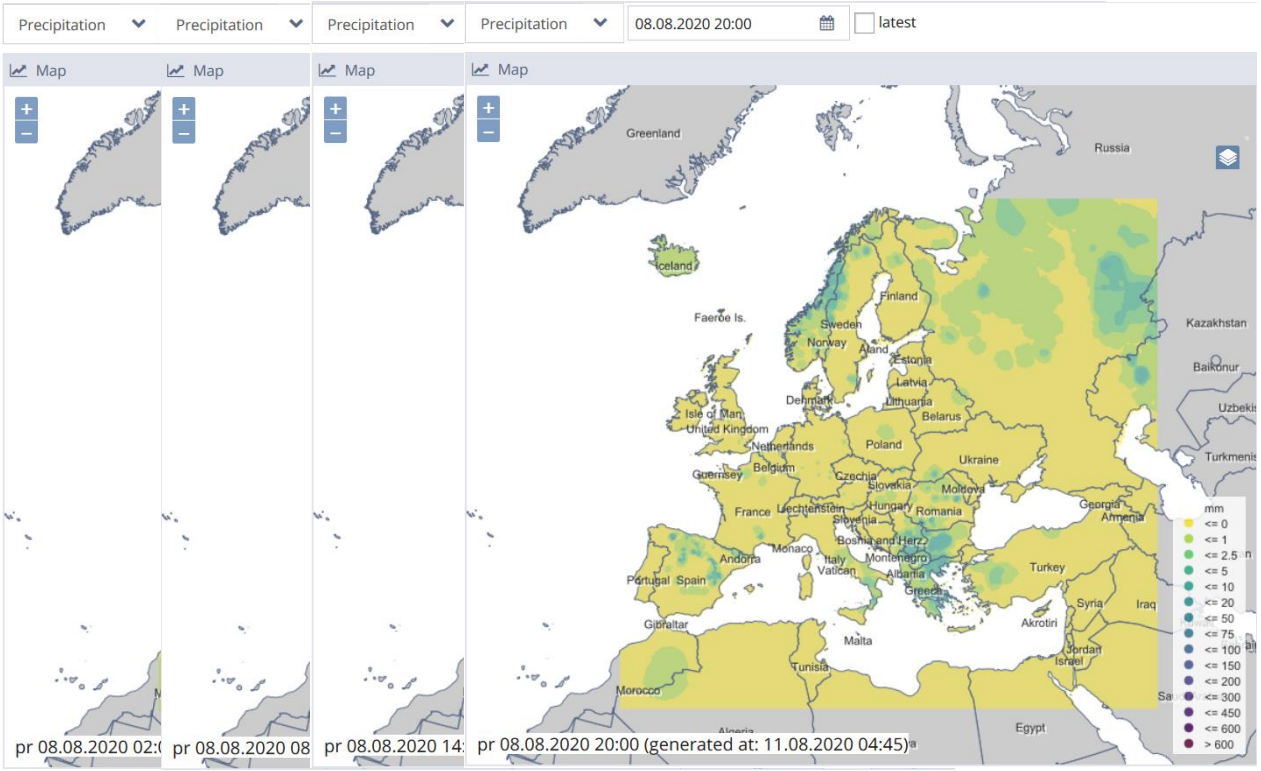
Interpolated grids for LISFLOOD model

- Daily grids produced by CEMS-MDCC



Interpolated grids for LISFLOOD model

- 6-hourly precipitation grids produced by CEMS-MDCC



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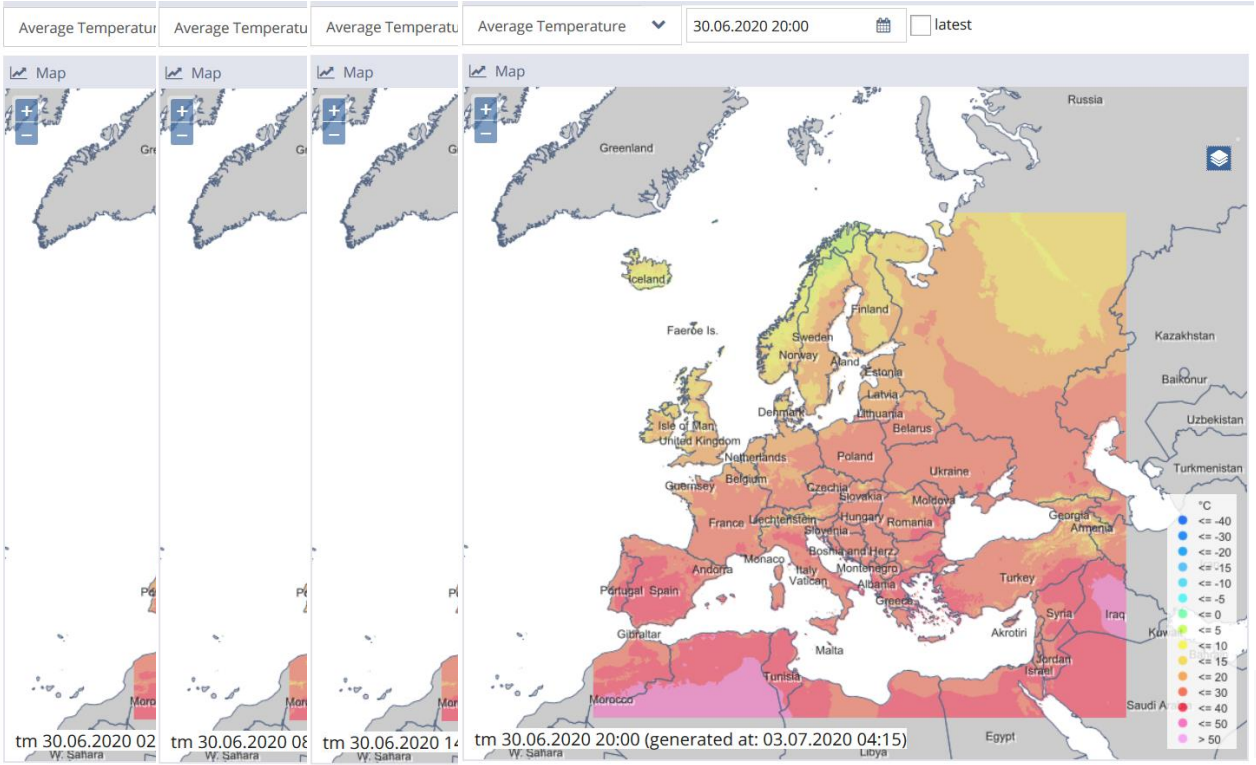
Interpolated grids for LISFLOOD model

- 6-hourly temperature grids produced by CEMS-MDCC



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Daily work – Experiences, issues, challenges

- **Experiences:**
  - Timely feedback from providers when there are problems with the data delivery
  - Variable response when we report suspicious station values
- **Issues:**
  - Missing data files
  - Strange data values
  - Wrong station metadata
- **Challenges:**
  - Optimise automatic quality checking algorithms
  - Find all problematic data values

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Technical details

- (S)FTP server on your side: we download data files from your (S)FTP server
- SFTP server at CEMS-MDCC: you deliver data files to our SFTP server
- Web data portal: we download data from your web server via URL or API
- Email: you send emails to us with data as attachment

- Data transfer as often as possible (at least once per day, but possibly more often or continuously)

Data use license

- Data is used in accordance with the license agreement between the European Environment Agency (EEA) and EUMETNET:
  - Meteorological and hydrological station data for use by the Copernicus services
  - Station data is only used for Copernicus services, not made available to the public
  - Only derived products may be publicly available
  - Details can be found in the license agreement
- Data license agreement for non-EUMETNET partner with similar conditions as for EUMETNET partners, each partner has to sign ‚it‘s own‘ license

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