



2nd TERENO - OZCAR Conference

Bonn | Germany | 25-28 SEPTEMBER 2023

The International Soil Moisture Network (ISMN):

A permanent service for delivering long-term, in-situ soil moisture data

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contact: ismn@bafg.de



source: pixabay.com



source: www.esa.int



2009
ISMN is
established
at TU Wien

2017
GTN-H Panel
Meeting

2018
Start of
negotiations
with the
German
Government



2021/2022
ISMN Migration

- Jan: Financial clearance
- Nov 2021 - May 2022: Recruitment of staff
- Feb 2021 - June 2022 technical transfer from software stack and data to new host
- Jul – Dec 2022: Parallel operations
- Legal Clearance

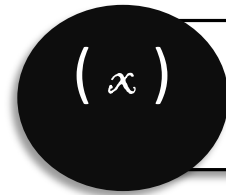
2023 ISMN in
production at
ICWRGC/BfG

- Application for auspices of WMO und FAO
- Set up of a advisory board
- Increase data acquisition activities
- Improve robustness and maturity of the service

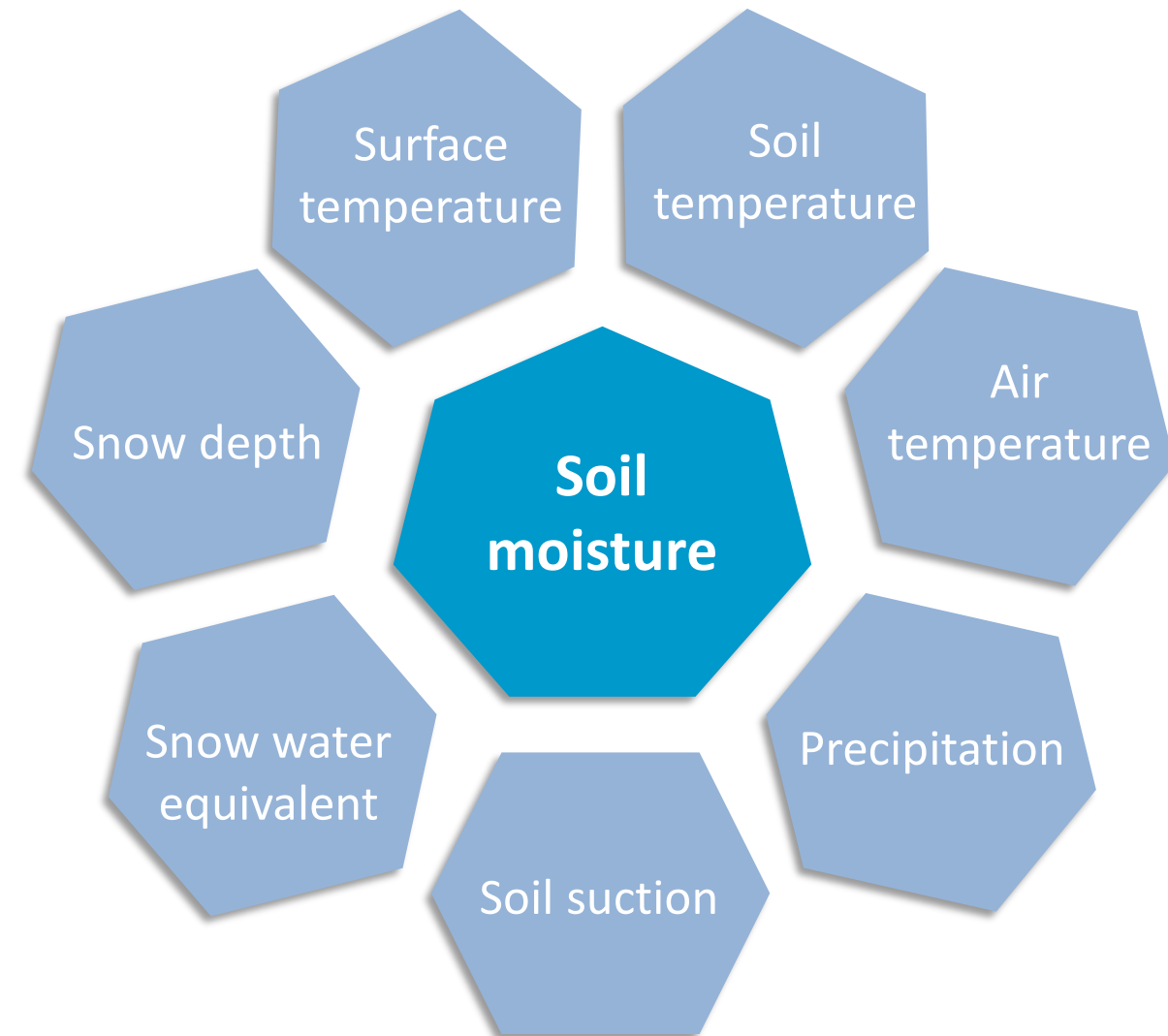




In situ data + metadata



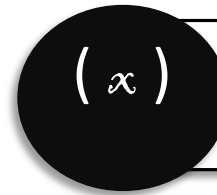
Soil moisture + 7 additional variables
integrated in the DB



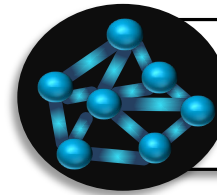
<https://ismn.earth>



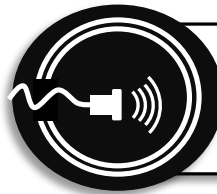
In situ data + metadata



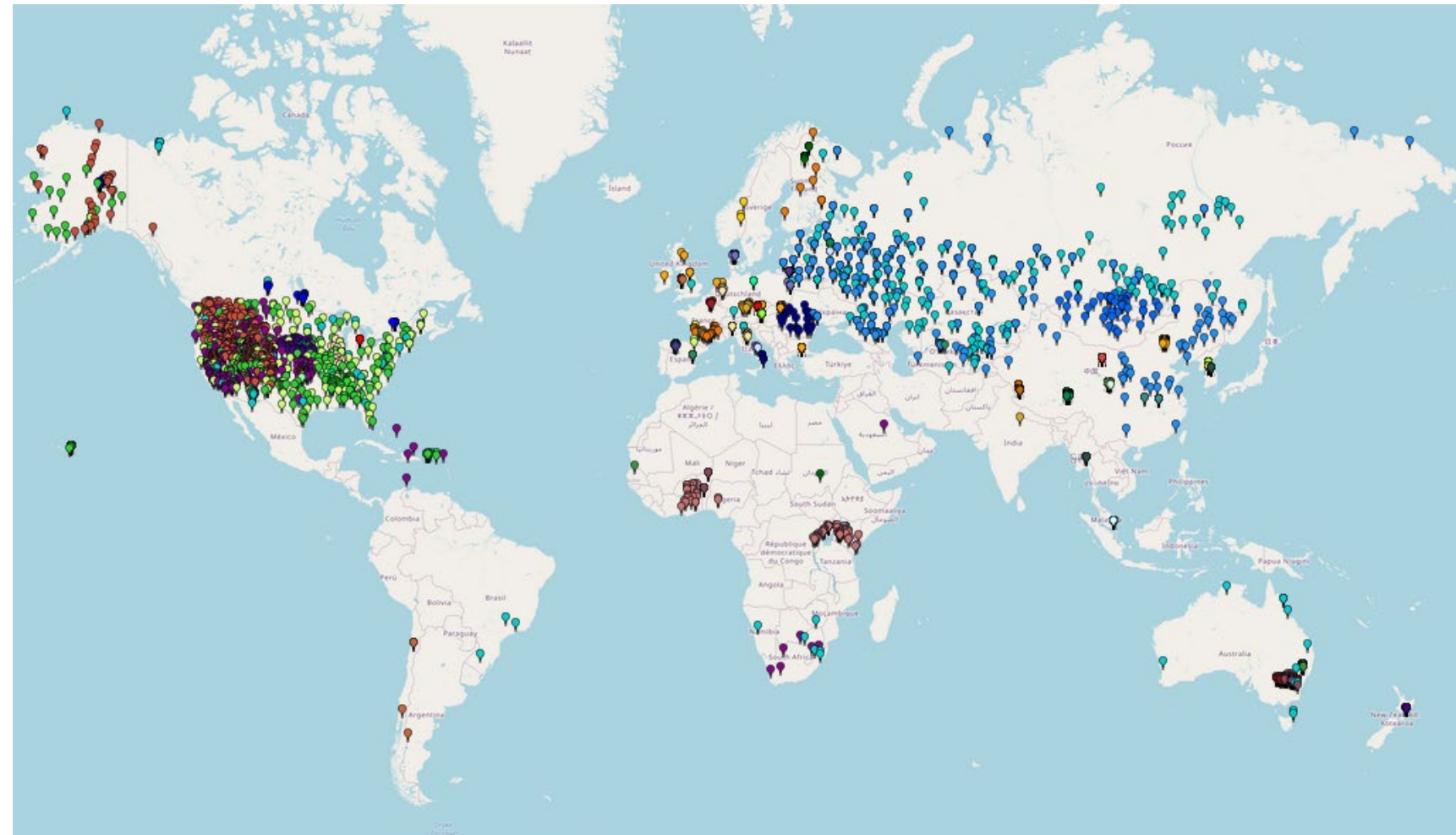
Soil moisture + 7 additional variables
integrated in the DB



77 networks participate
(June 2023)



>3,000 stations with > 11,000
timeseries integrated (June 2023)



Distribution of the soil moisture stations



In situ data + metadata

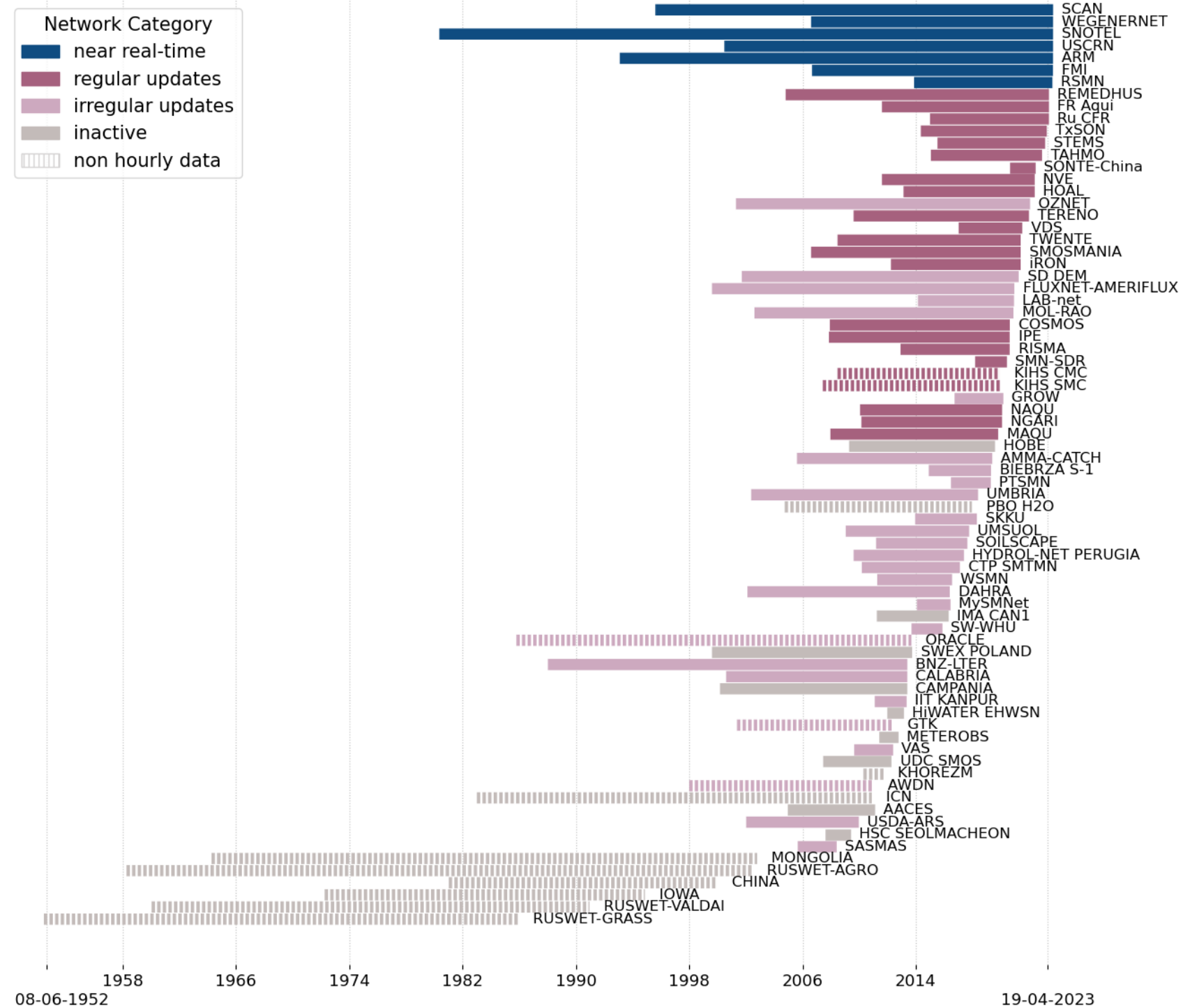
Soil moisture + 7 additional variables integrated in the DB

77 networks participate (June 2023)

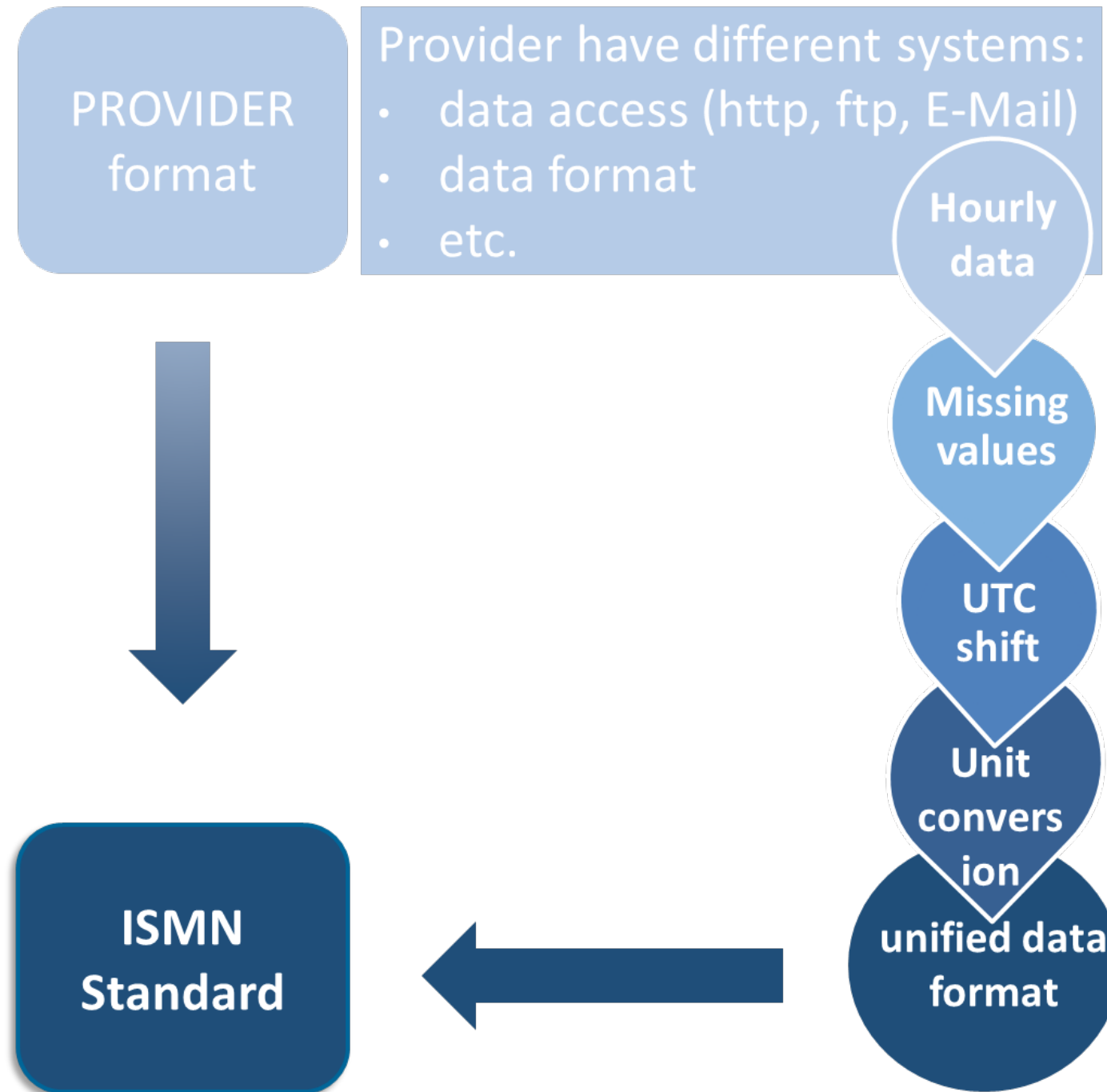
>3,000 stations with > 11,000 timeseries integrated (June 2023)

Time series available from 1952 up to near real time (see graph)

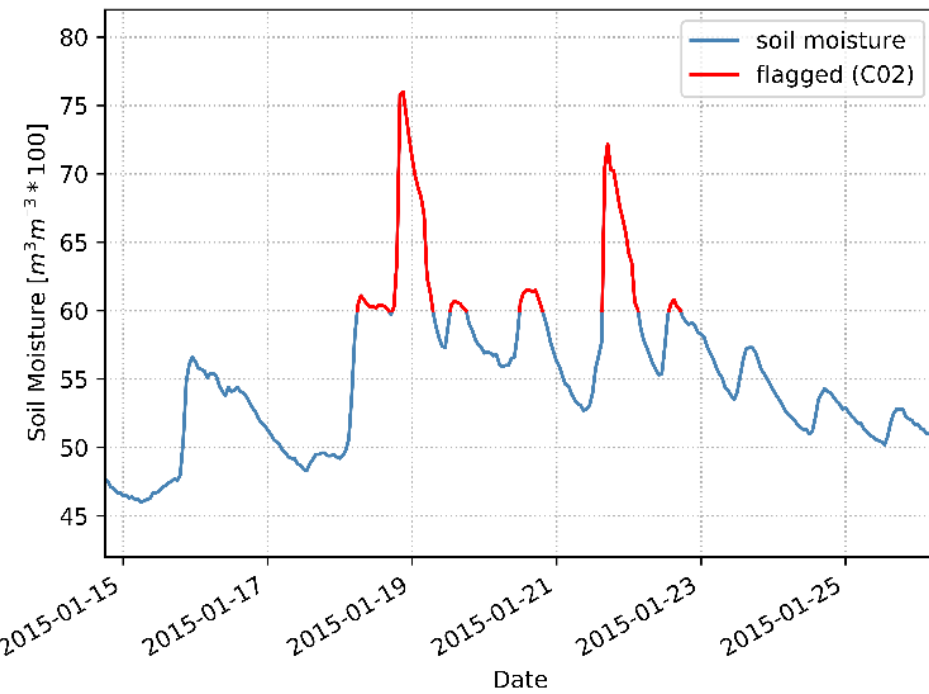
Daily update of 7 NRT networks → ~1,000 stations (June 2023)



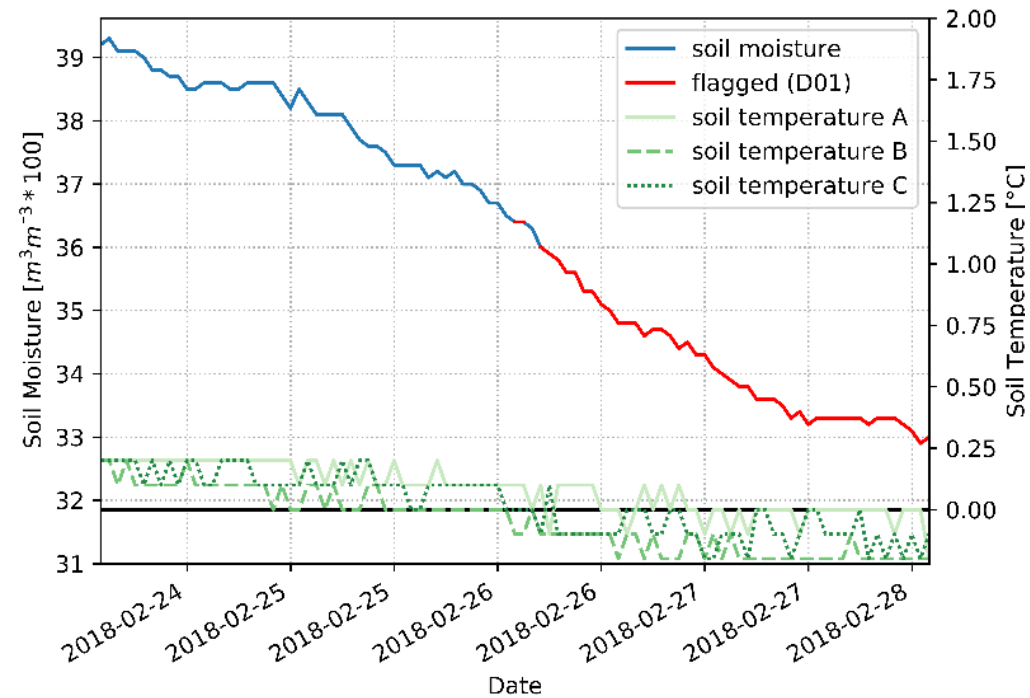
Dorigo et al., 2021 et al: The International Soil Moisture Network: serving Earth system science for over a decade, HESS



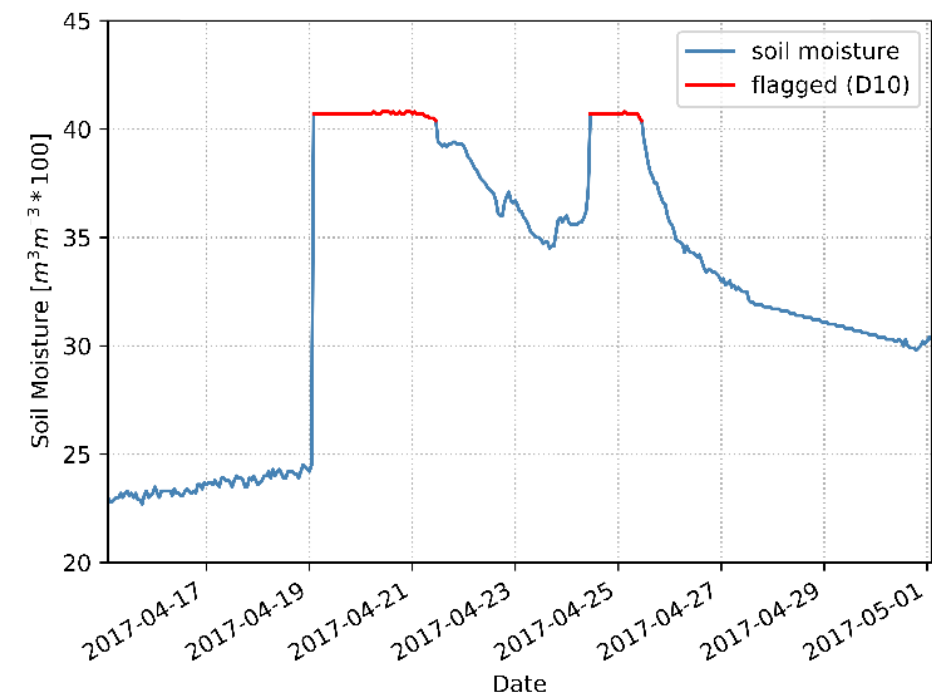
1) Geophysical Dynamic Range thresholds for all variables



2) Geophysical Consistency check plausibility with other variables, i.e. soil temperature and precipitation



3) Spectrum– Based Approach detection of spikes and plateaus



- Keeping flags from provider
- quality flag added to each data point

user: Tunde

Networks

Africa Americas Asia Europe Oceania

Time range

from to

1950 2023

Area

Latitude

Longitude

Draw a rectangle with SHIFT + mouse click

Sensor

All Variables

Soil Moisture

Soil Temperature

Air Temperature

Precipitation

Snow Depth

Snow Water Equivalent

Surface Temperature

Soil Suction

Depth

cm cm

Station environment

All climates

Tropical

Arid

Temperate

Cold

Water

Polar

All landcovers

Crop land

Tree cover

Grassland

Lichens and mosses

Sparse vegetation

Urban areas

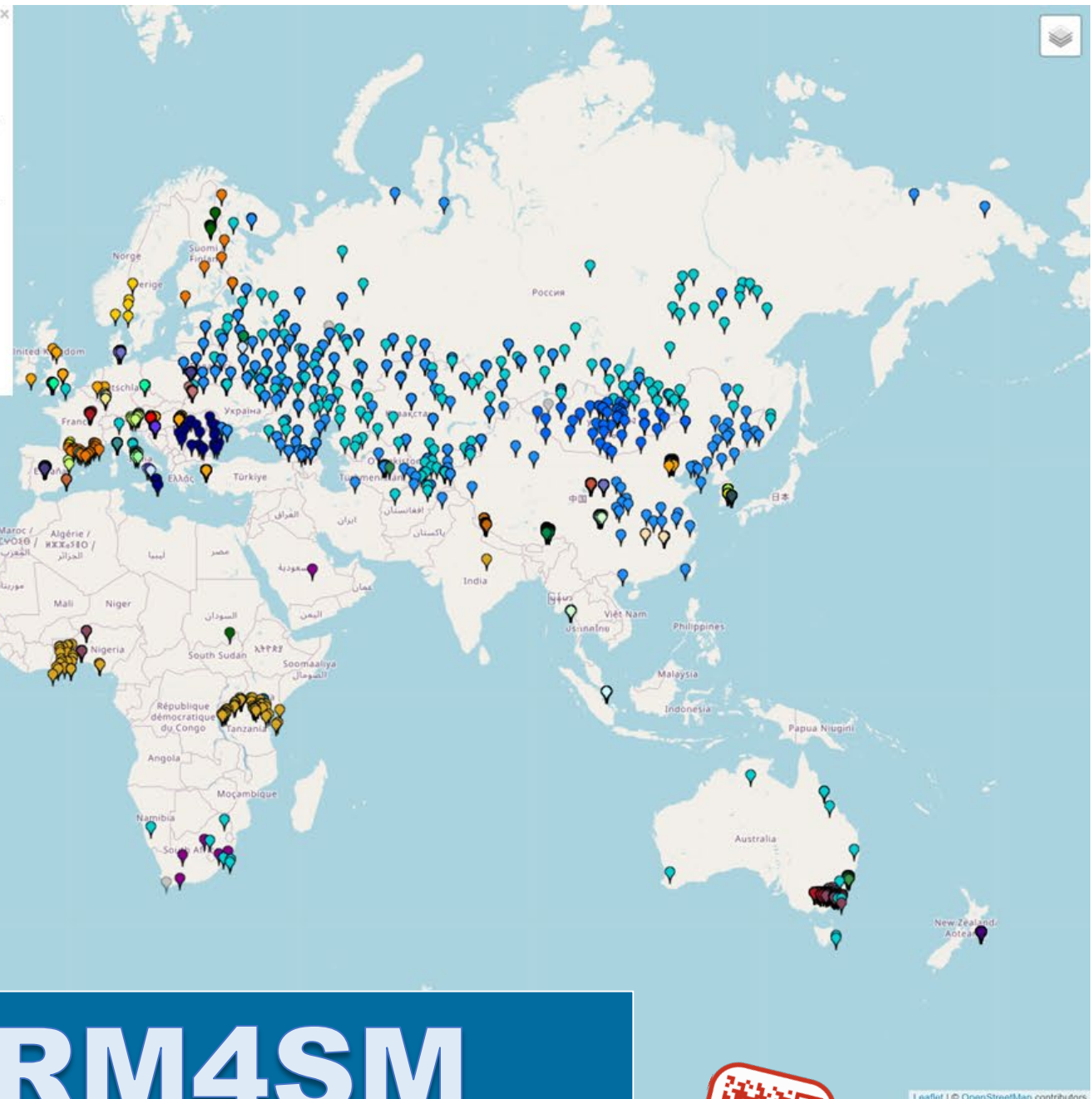
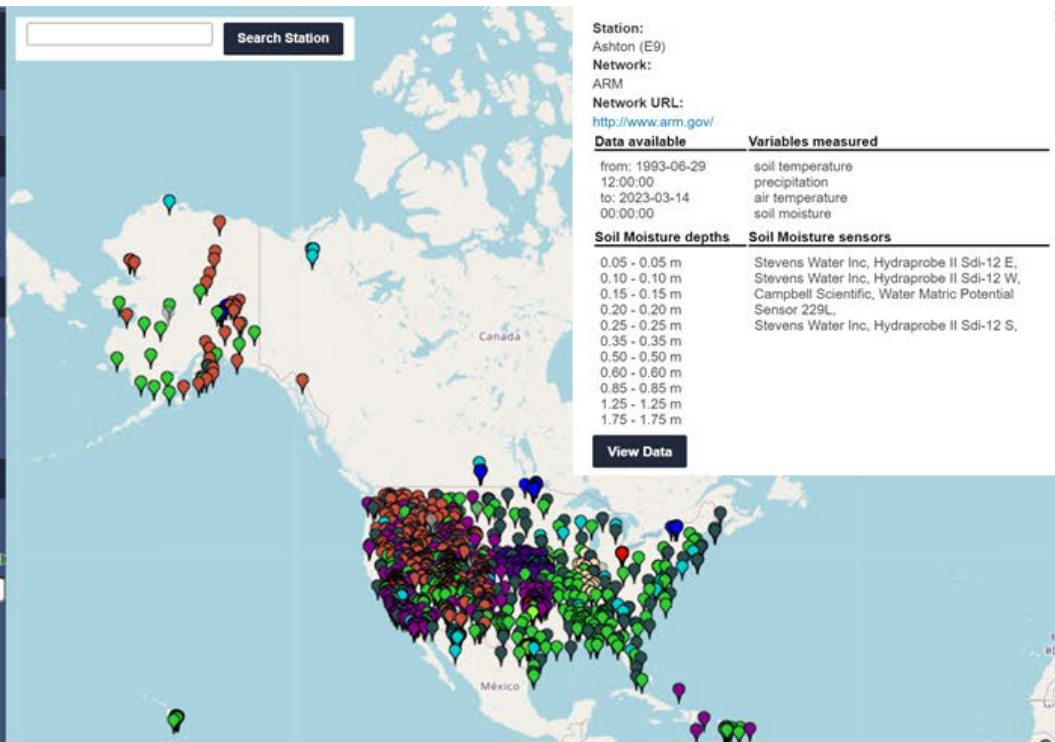
Bare areas

Water bodies

Permanent snow and ice

10925 Soil Moisture time series selected

Complete archive (created:17-03-2023)



FRM4SM

Fiducial Reference Measurement for Soil Moisture



<https://ismn.earth>

Download

You are about to download the following data:

Networks:

AACES, CALABRIA, COSI^{x, y, z}

Variables:

Soil Moisture,

Climates:

Tropical, Arid, Temperate, Cold, Water, Polar

Landcovers:

Crop land, Tree cover, Grassland, Lichens and mosses, Sparse vegetation, Urban areas, Bare areas, Water bodies, Permanent snow and ice

Time range:

from 2022/04/21 until 2023/04/21

Number of Soil Moisture timeseries selected:

0

Choose Format:

- Variables stored in separate files (Header+values) (zipped) ([View Specifications](#))
- Variables stored in separate files (CEOP formatted) (zipped) ([View Specifications](#))

Gap filling:

- Fill data gaps with NaN values (to always have 24 data points per day)

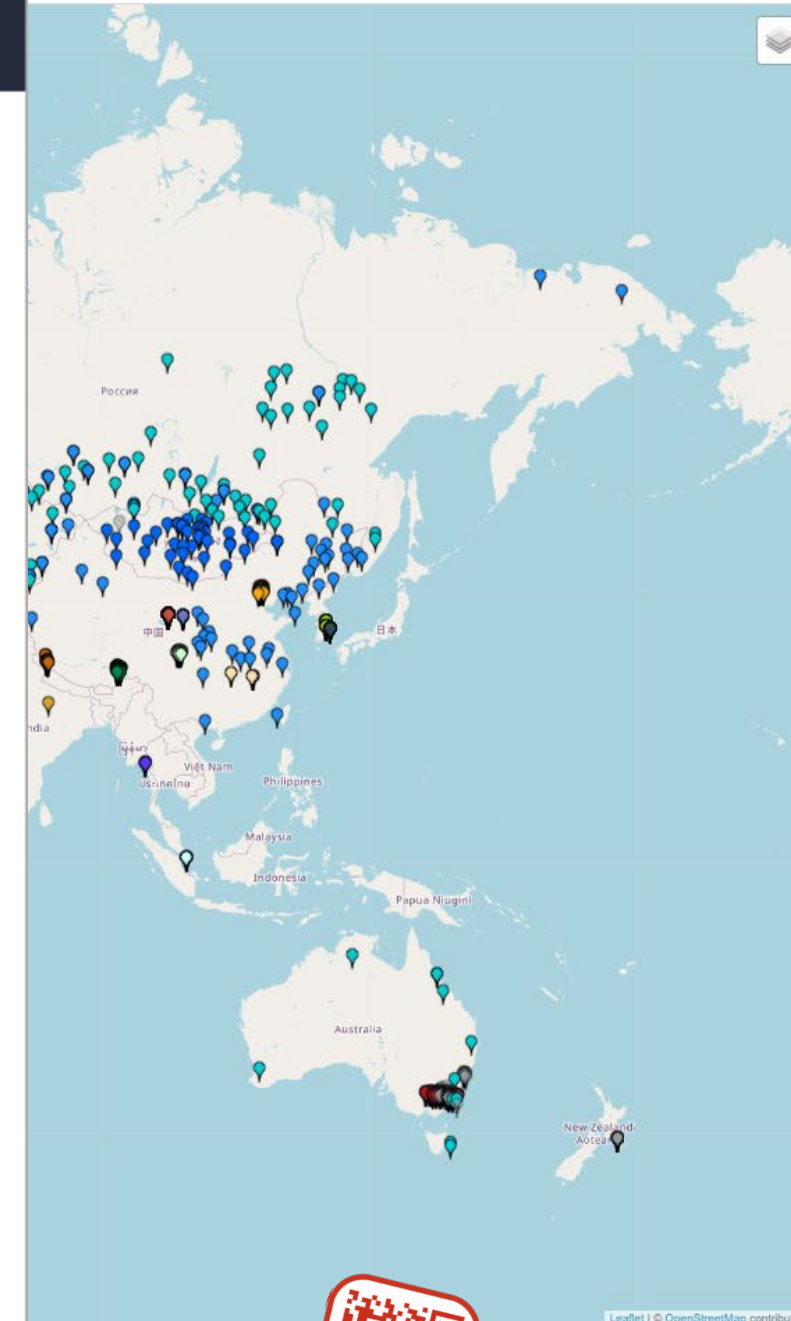
Quality flags:

- Only download observations tagged as "Good" by the [ISMN QC](#)

Large data requests may require hours of processing time. If your request is not ready within 30 seconds you will receive an email with a download-link. The data can be downloaded within 20 days.

Download

Close



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user: Tunde

Networks

Africa Americas Asia Europe Oceania

Time range

from 1950/01/01 to 2023/03/14

1950 2023

Area

Latitude: -90 90

Longitude: -180 180

Draw Clear

Sensor

All Variables

Soil Moisture

Soil Temperature

Air Temperature

Precipitation

Snow Depth

Snow Water Equivalent

Surface Temperature

Soil Suction

Depth

cm 0 255

Station environment

All climates

Tropical

Arid

Temperate

Cold

Water

Polar

All landcovers

Crop land

Tree cover

Grassland

Lichens and mosses

Sparse vegetation

Urban areas

Bare areas

Water bodies

Permanent snow and ice

10925 Soil Moisture time series selected

Refresh

Reset All

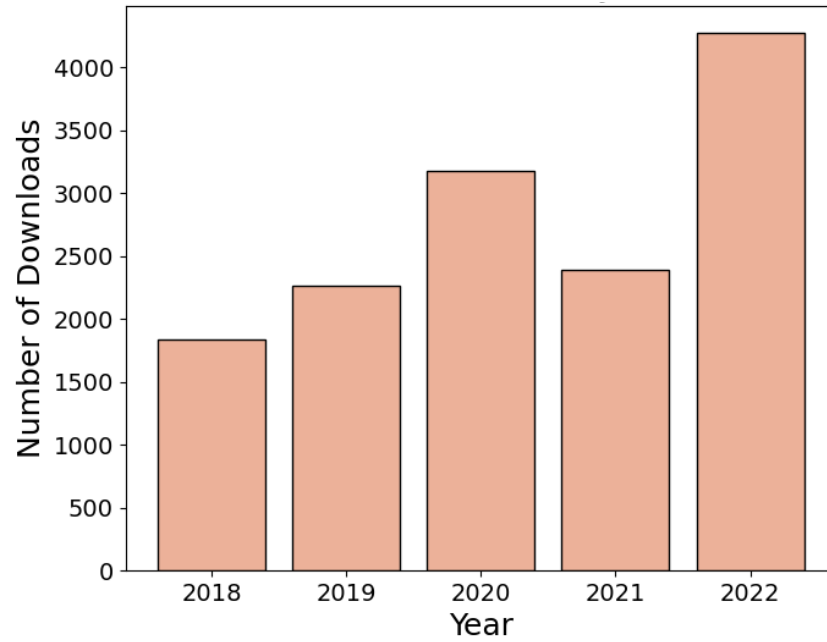
Hide Options

Download

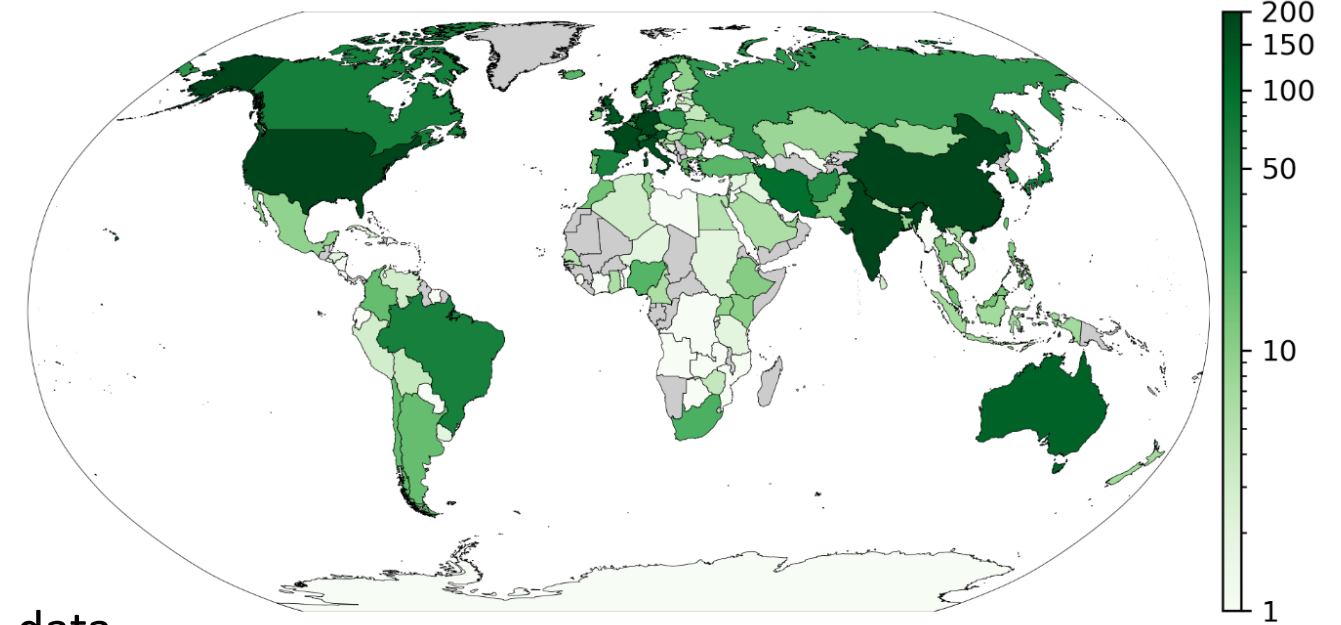
Your requests

Complete archive (created:17-03-2023)

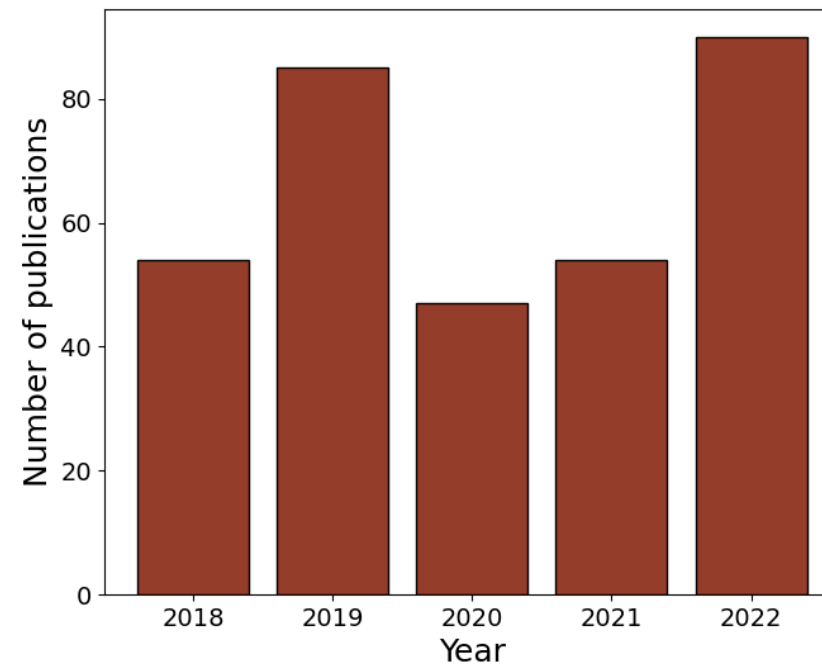
ISMN data download by users



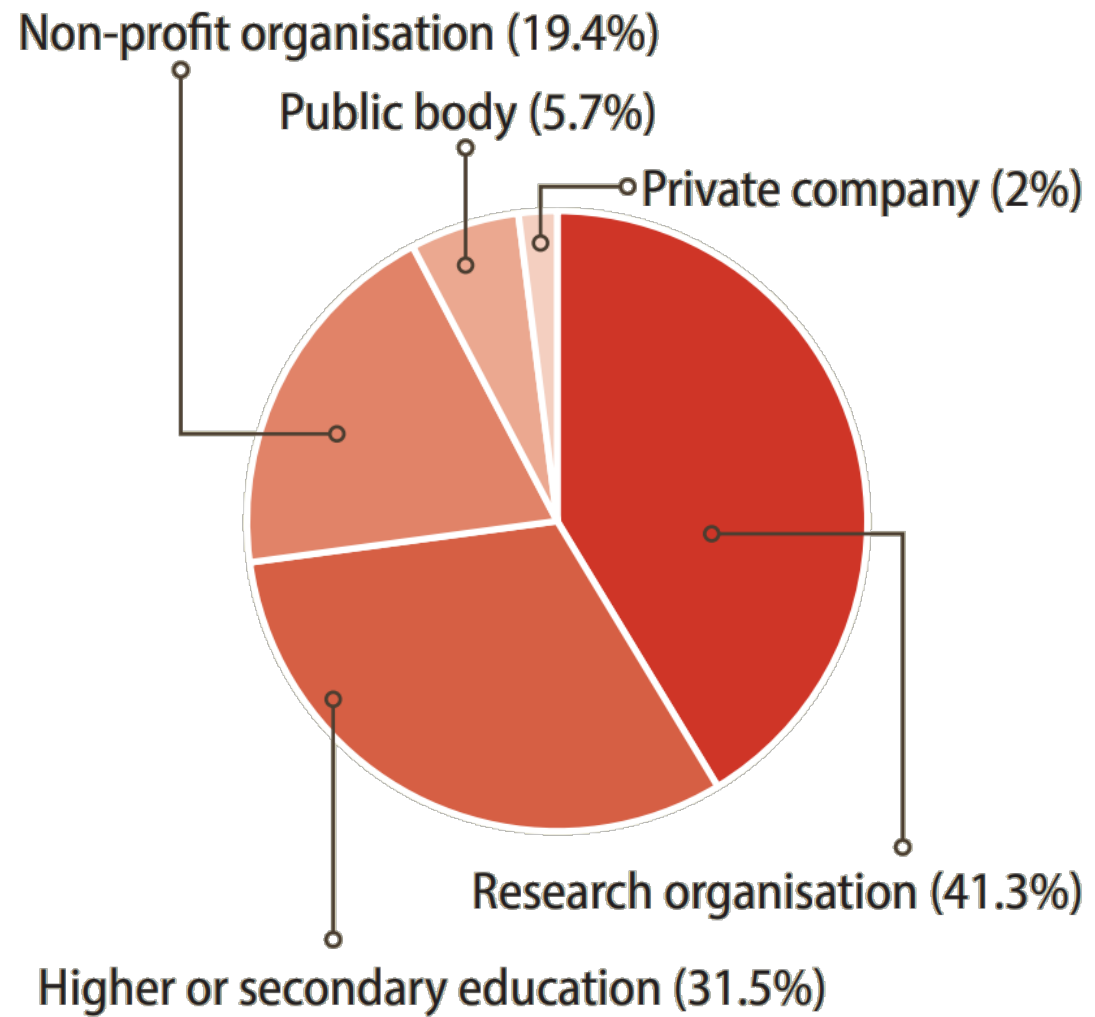
Number of ISMN users



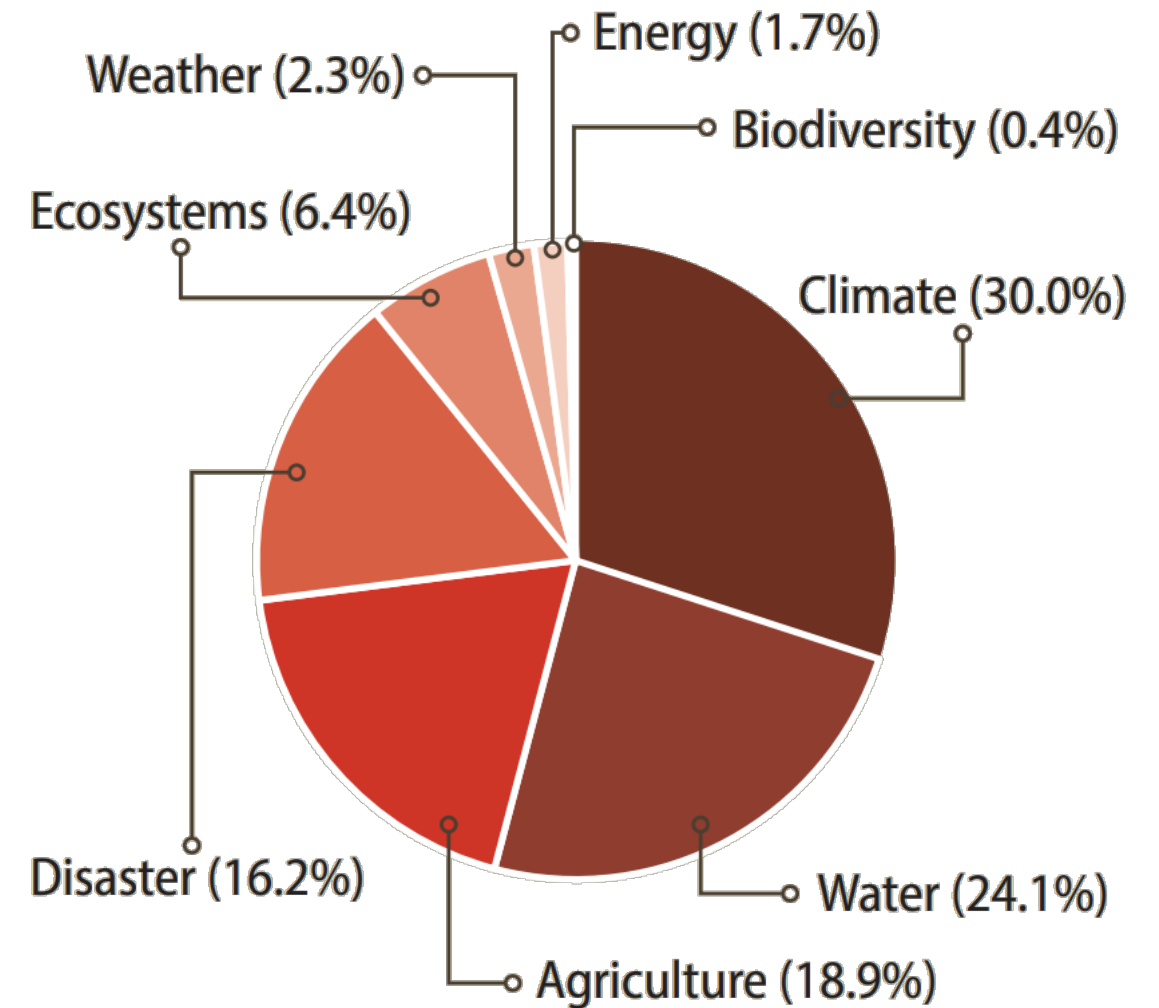
Publications using ISMN data



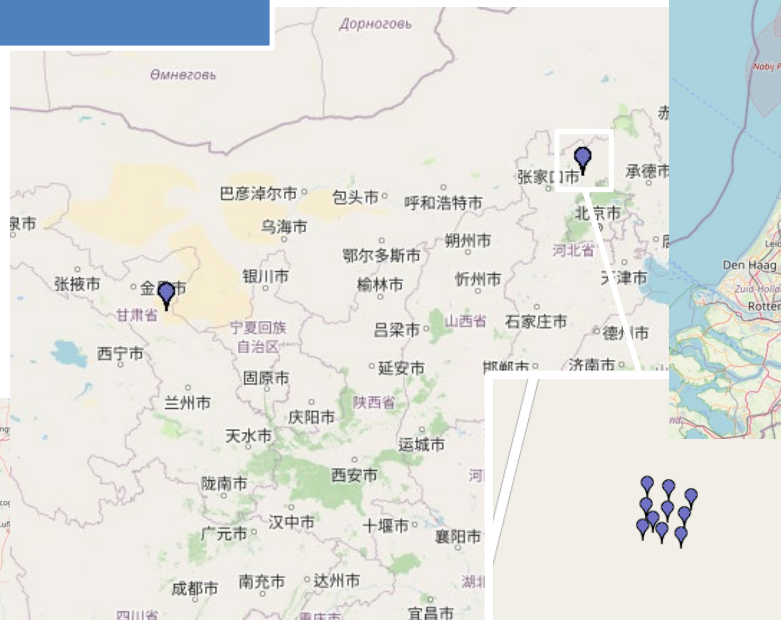
Organisations using ISMN data



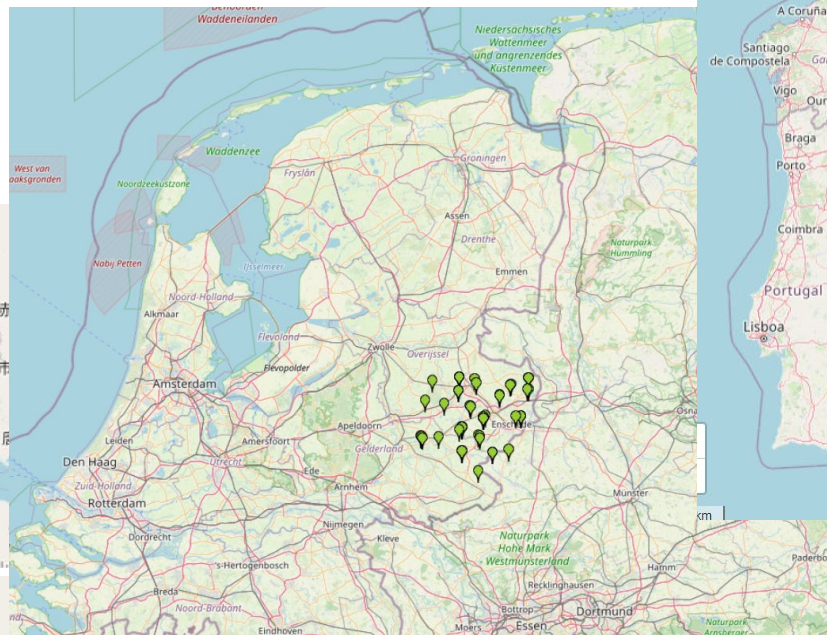
Application areas of ISMN data product



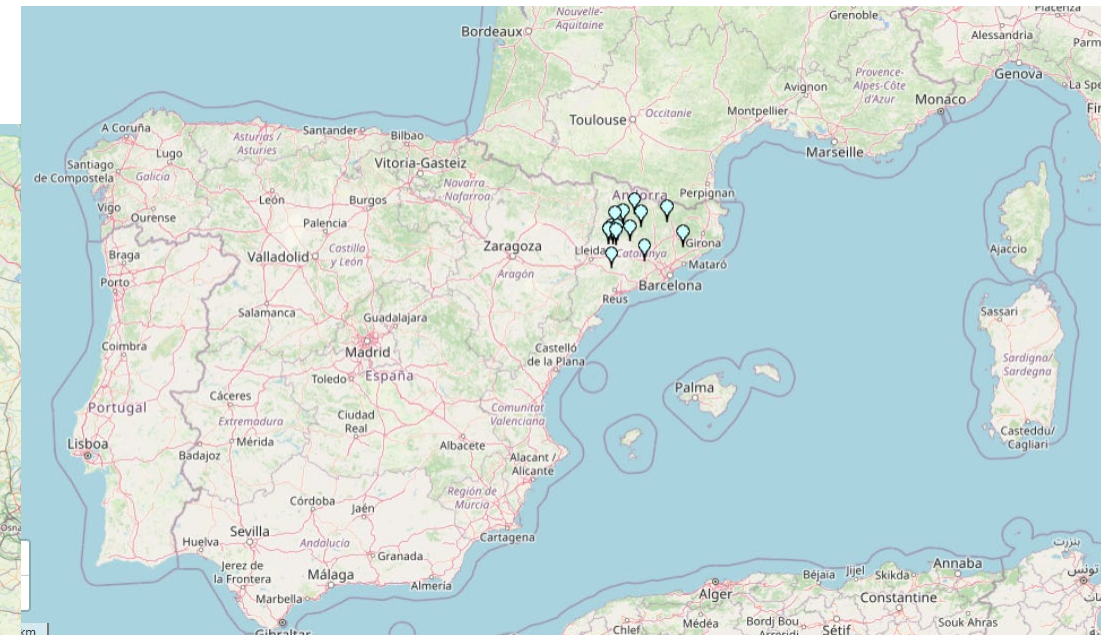
Data contributions are very welcome. Please get in touch with us: ismn@bafg.de



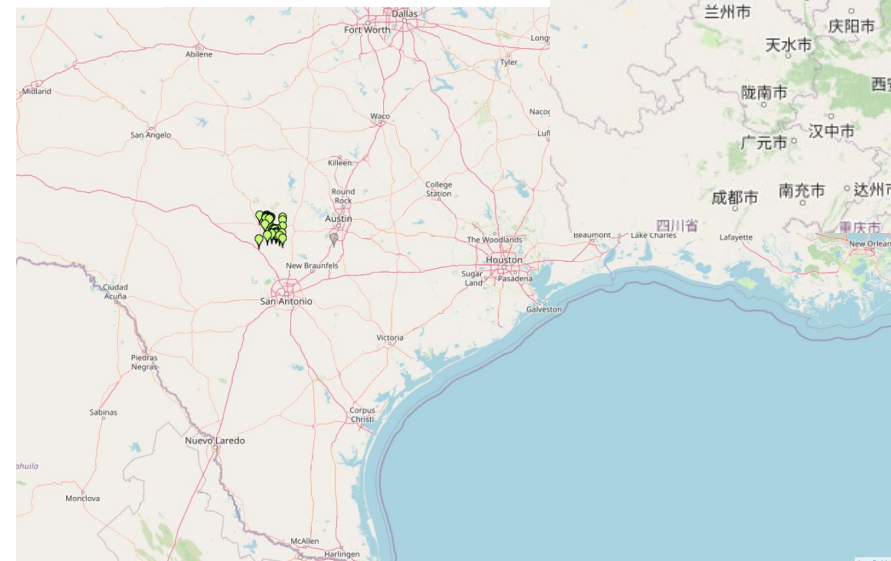
SONTE-China (China)
20 stations
2021 - 2022



TWENTE (Netherlands)
44 stations
2008 - 2021



XMS-CAT (Spain)
15 stations
2016-2023



TxSON (United States, Texas)
41 stations
2014 - 2022

! Please cite correctly



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HYDROlogical Status and Outlook System

