National Oceanography Centre

Permanent Service for Mean Sea Level

90 years of the Permanent Service for Mean Sea Level (PSMSL)

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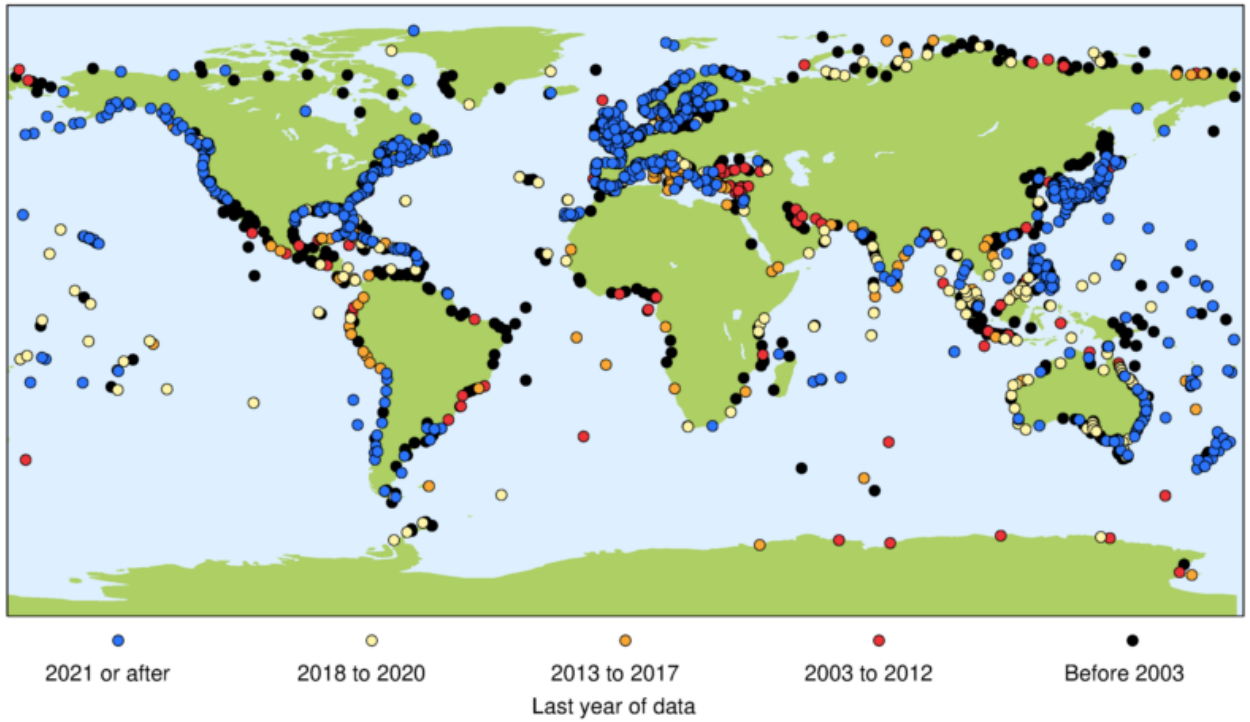
GGOS Days, 20-22 September 2023

WHO ARE THE PSMSL?



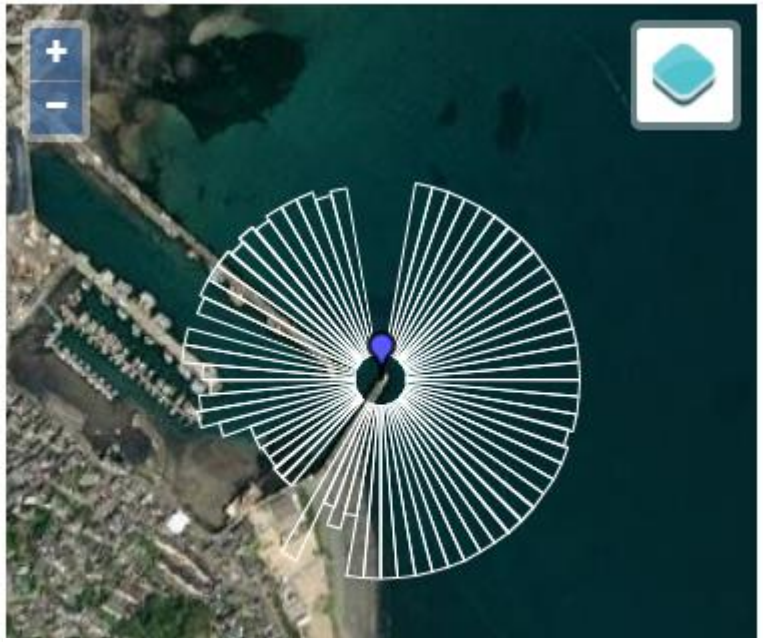
Year of most recent data received by PSMSL

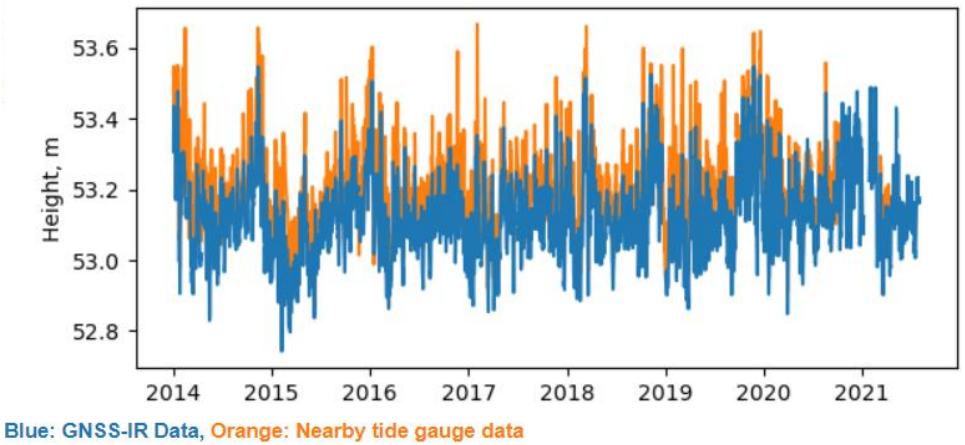
Year	2018	2019	2020	2021	2022
No. of stations	822	849	790	636	688
Station years	1412	3080	1361	1099	1325

Data added to the PSMSL databank

- Global Databank for Mean Sea Level data measured at tide gauges
- Acquire, quality control and make available mean sea level data
- Provide advice on collection, distribution, and use of sea level data, training and software

DATA PORTAL AT https://psmsl.org/data/gnssir





Blue: GNSS-IR Data, Orange: Nearby tide gauge data

Good site - reflectometry works well and data is available

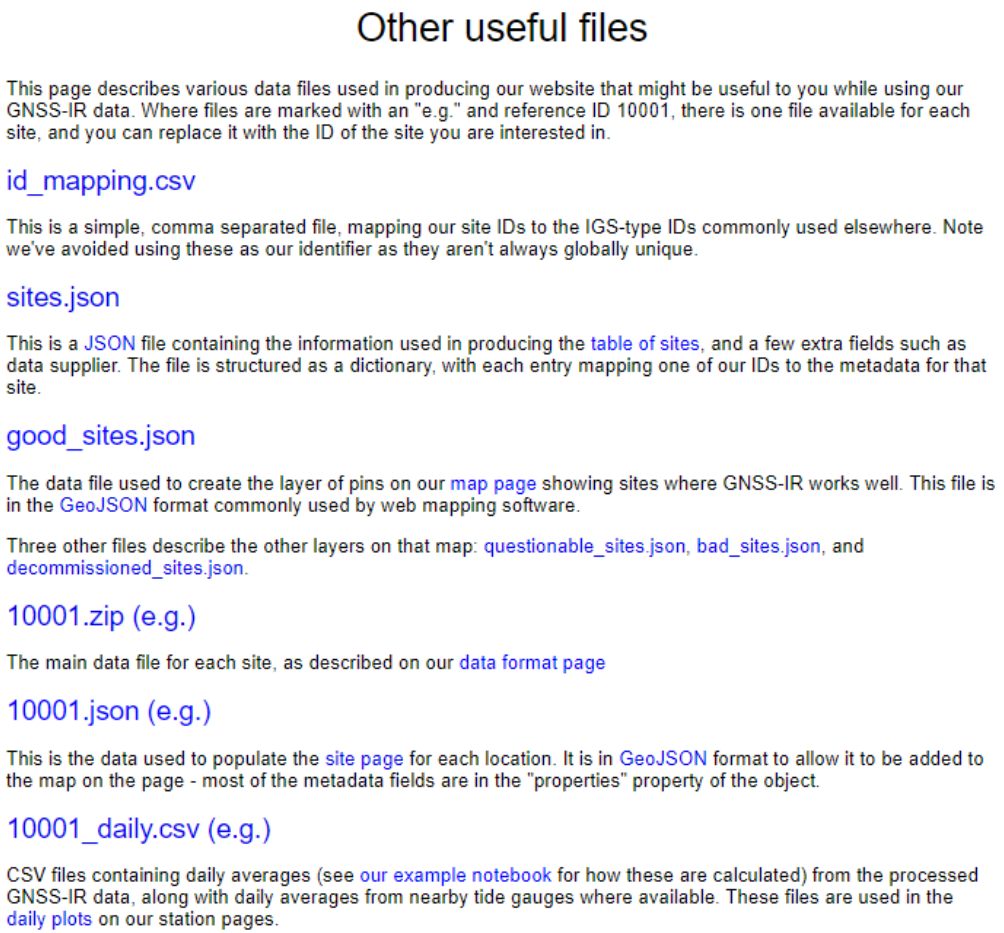
Decommissioned - reflectometry works well, data is available, but site is no longer operating

Questionable - reflectometry works sometimes or the signal is very weak probably due to location

Bad - no data available at the site, either due to positioning of the sensor, lack of signal to noise ratio data, or data sampling is inadequate for the height of the sensor

OTHER USEFUL GNSS-IR PAGES

https://psmsl.org/data/gnssir/useful_files.php



Other useful files

This page describes various data files used in producing our website that might be useful to you while using our GNSS-IR data. Where files are marked with an "e.g." and reference ID 10001, there is one file available for each site, and you can replace it with the ID of the site you are interested in.

id_mapping.csv

This is a simple, comma separated file, mapping our site IDs to the IGS-type IDs commonly used elsewhere. Note we've avoided using these as our identifier as they aren't always globally unique.

sites.json

This is a JSON file containing the information used in producing the table of sites, and a few extra fields such as data supplier. The file is structured as a dictionary, with each entry mapping one of our IDs to the metadata for that site.

good_sites.json

The data file used to create the layer of pins on our map page showing sites where GNSS-IR works well. This file is in the GeoJSON format commonly used by web mapping software.

Three other files describe the other layers on that map: questionable_sites.json, bad_sites.json, and decommissioned_sites.json.

10001.zip (e.g.)

The main data file for each site, as described on our data format page

10001.json (e.g.)

This is the data used to populate the site page for each location. It is in GeoJSON format to allow it to be added to the map on the page - most of the metadata fields are in the "properties" property of the object.

10001_daily.csv (e.g.)

CSV files containing daily averages (see our example notebook for how these are calculated) from the processed GNSS-IR data, along with daily averages from nearby tide gauges where available. These files are used in the daily plots on our station pages.

- We are developing a mechanism to deliver NRT GNSS-IR data through ERDDAP
- In the future we hope to link to a persistent, uniquely defined identifier for each GNSS receiver to make identifying where data comes from easier
- Operators of GNSS sites near bodies of water can assist us by ensuring the signal-to-noise ratio is recorded in RINEX files (using RINEX version 3 or 4) and recording all constellations and frequencies possible. Please tell us about your site by emailing psmsl@noc.ac.uk - photographs and maps are very useful for establishing areas around the receiver likely to produce genuine reflections off the water

LINKING TIDE GAUGES TO GEOCENTRIC REFERENCE FRAMES

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Taken from https://psmsl.org/data/obtaining/rlr.diagrams/1.php

GNSS	Solution	Height	Velocity	Epoch	GNSS Start	GNSS End	Distance
BRST	ULR7a	44.094 ± 0.007	-0.22 ± 0.17	2020.0000	1998-10-31	2023-03-23	293
BRST	JPL14	44.078 ± 0.004	-1.12 ± 0.23	2020.0000	1998-10-31	2023-03-23	293
BRST	NGL14	44.073 ± 0.004	-1.09 ± 0.41	2020.0000	1998-10-31	2023-03-23	293
BRST	GT3	44.094 ± 0.006	-1.50 ± 0.30	2020.0000	1998-10-31	2023-03-23	293

GNSS solution used

Height of PSMSL RLR datum above ellipsoid (GRS80), in metres

Vertical movement of PSMSL RLR datum relative to ellipsoid, in mm/yr. Positive value: land rising

The date when the height is fitted

SONEL

Information provided by https://www.sonel.org/

See https://psmsl.org/data/obtaining/ellipsoidal_links.php

Automated weekly metadata exchange between psmsl.org (TG) and sonel.org (GNSS), so list will be updated as new linked are added

OTHER PSMSL NEWS

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- Still doing lots of work on data standards
  - DOI for the dataset to make finding citations easier
  - Proper data servers for our data (ERDDAP)
  - Persistent identifiers for tide gauges (?)
  - Standard names for relative sea level data (CF standard)
- Meetings in November in Liverpool
  - Sea Level Meeting to celebrate PSMSL's 90th anniversary (22-24 November)
  - IAPSO Best Practice Tidal Analysis Workshop (20-21 November)
  - Various committee meetings (IOC-GLOSS Steering Group, EuroGOOS TGTT)

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Thank you

NOC.AC.UK