



# FIG WORKING WEEK 2023

28 May - 1 June 2023 Orlando Florida USA

Protecting  
Our World,  
Conquering  
New Frontiers

Presented at the FIG Working Week 2023,  
28 May - 1 June 2023 in Orlando, Florida, USA

## EPOS-GNSS

### Improving the Access to GNSS data and Products from CORS Stations in Europe

Rui FERNANDES, Portugal

EPOS-GNSS members, Europe

<https://gnss-epos.eu/>



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## EPOS – European Plate Observing System



### European Plate Observing System

Infrastructure serving Solid Earth science

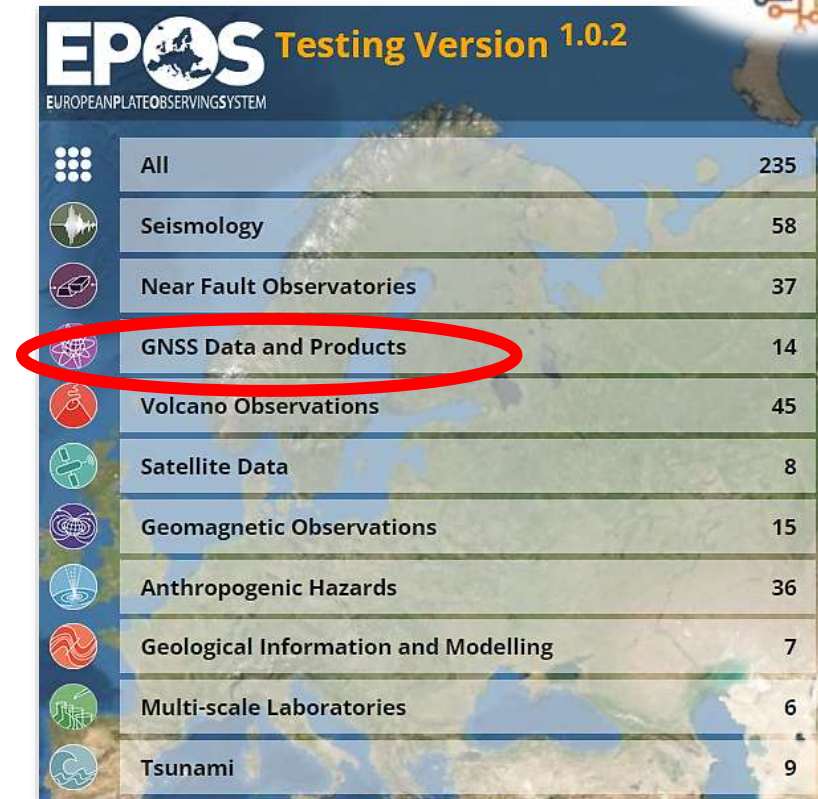
Multidisciplinary research platform to provide access to quality controlled data from diverse Earth science disciplines, together with tools for their use in analysis and modelling



## EPOS – European Plate Observing System



EPOS started the Operational Phase in 2023



Category	Count
All	235
Seismology	58
Near Fault Observatories	37
GNSS Data and Products	14
Volcano Observations	45
Satellite Data	8
Geomagnetic Observations	15
Anthropogenic Hazards	36
Geological Information and Modelling	7
Multi-scale Laboratories	6
Tsunami	9

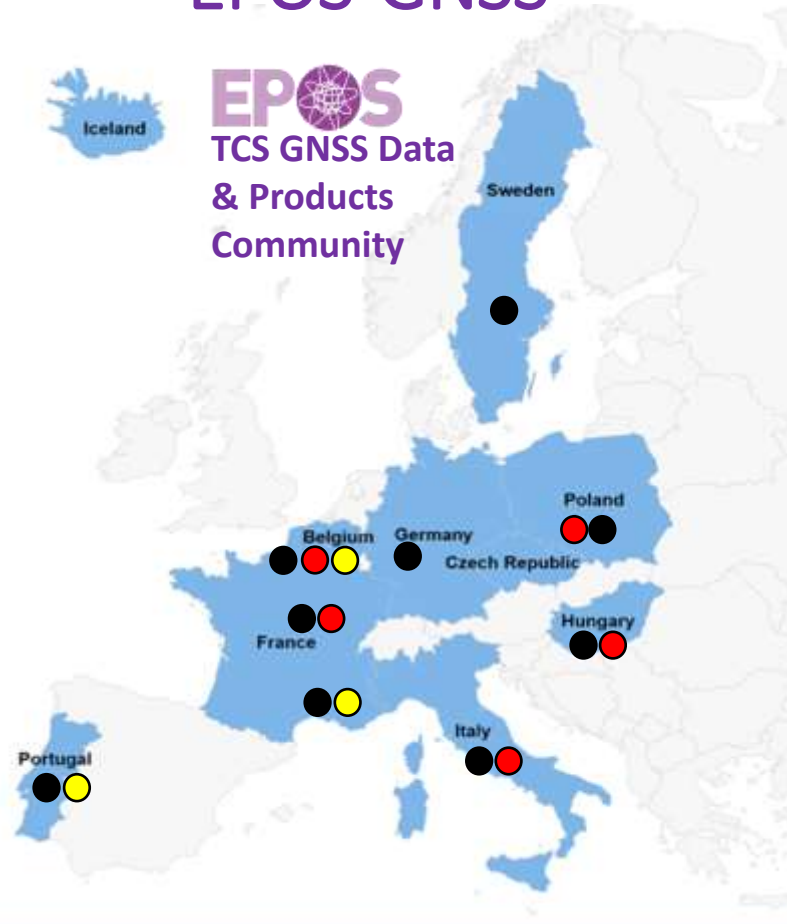
<https://www.ics-c.epos-eu.org/>

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## EPOS-GNSS



## GNSS EPOS Service Providers

### List of core stakeholders:

- BKG** Bundesamt für Kartographie und Geodäsie, DE
- CNRS-UGA** Université Grenoble Alpes, FR
- CNRS-OCA** Observatoire Cote d'Azur, FR
- INGV** Istituto Nazionale di Geofisica e Vulcanologia, IT
- LM** Lantmäteriet, SW
- ROB** Royal Observatory of Belgium, BE
- SGO** Space Geodetic Observatory, HU
- UBI/C4G** Univ. Beira Interior, PT
- WUT** Warsaw University of Technology, PL

- 5 Analysis Center's
- 3 Portals (M<sup>3</sup>G, Data, Products)
- 11 Service Providers

- + Data Providers (National Research Infrastructures)
- EUREF (Data, Data Products & Services)



## EPOS Thematic Core Service "GNSS Data & Products"

*Added value of GNSS Data & Products for the GNSS community*

Sustainability within EPOS:

**Countries that join EPOS-ERIC commit to maintain their GNSS infrastructure integrated in EPOS (stations, operation).**

**Pan-European Service Providers needed the commitment of their countries to sustain them on long-term (EPOS-ERIC operation).**

Provision of software tools (GLASS):

**Standardized data quality check and visualization**

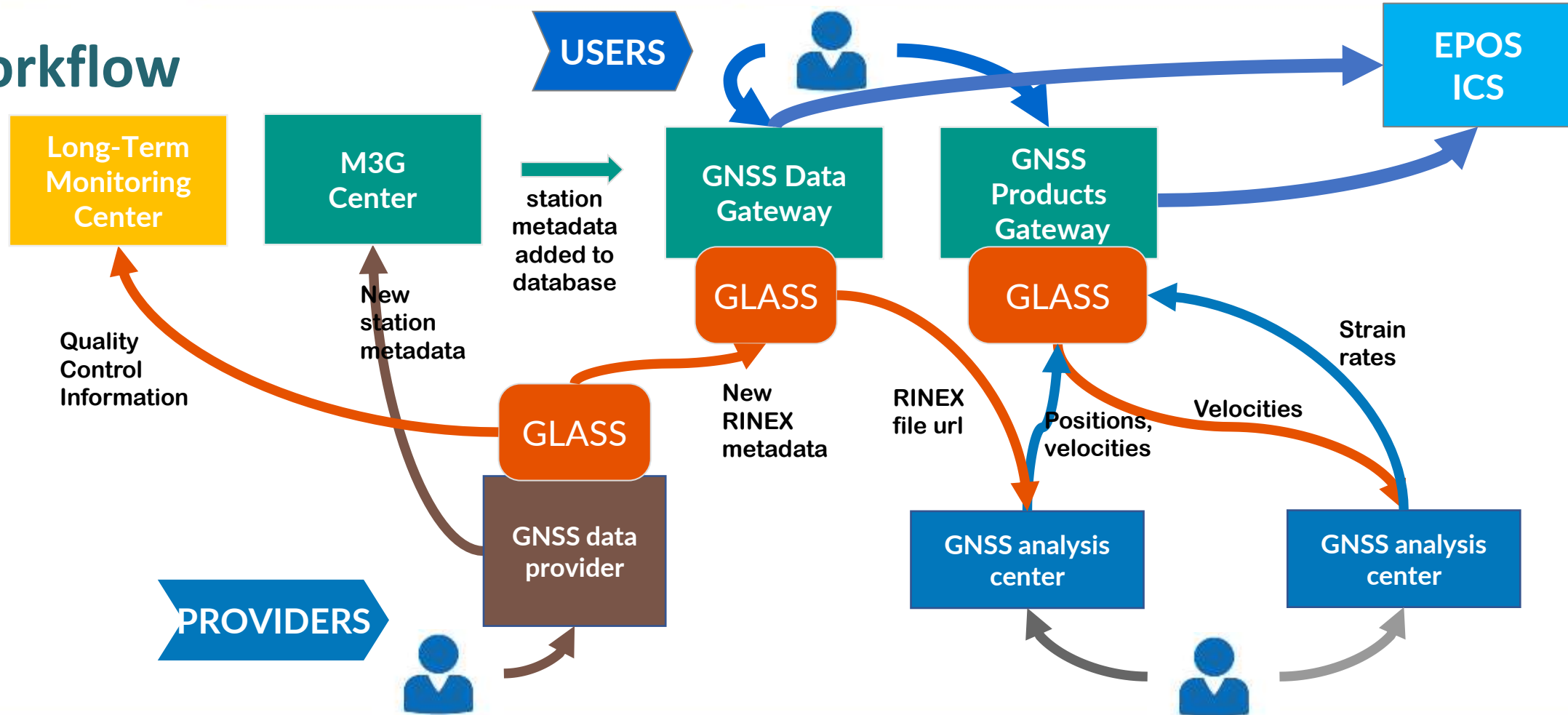
**Standardized exchange of metadata**

**Seamless data access**

**To be made globally available**



## GLASS Workflow





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## EPOS-GNSS Portals

M3G – Metadata Management

<https://gnss-metadata.eu/>

The screenshot shows the website <https://gnss-metadata.eu/>. The page features a "Welcome!" message and three main sections:

- Supported GNSS networks:** A list of three networks with play button icons: EUREF Permanent Network (EPN), EPN Densification Network, and European Plate Observing System (EPOS) Network.
- 2893 GNSS stations with metadata in M3G:** A map of Europe showing the locations of GNSS stations. The map includes a search bar, zoom controls, and a legend for EPN stations, EPN densification stations, and EPOS stations.
- Updates:** A list of recent updates, each with a station ID and a "New" status. The updates listed are: TOR000ESP, IST900CHL, IST800CHL, IST700CHL, IST600CHL, IST500CHL, IST400CHL, and IST300CHL, all dated "2 days ago".

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## EPOS-GNSS Portals

Data Gateway

<http://gnssdata-epos.oca.eu/>

Marker	Site Name	Lat	Lon	Alt	Install Date	End Date	Country	State	City	Agency	Network
AAR00BEL	AARSCHOT	50.963	4.836	104.660	2002-10-04 00:00:00		Belgium	Vlaams-Brabant	Aarschot	Royal Observatory	FLEPOS
ABANDEBP	Abarilla	38.175	-1.054	307.620	2013-02-11 00:00:00		Spain	Región De Murcia	Parque De Bomber	Red Geodésica Act.	REGAM
ABEP0GBR	Aberporth	52.130	-4.571	167.510	2005-07-21 00:00:00		United Kingdom	Ceredigion	Aberporth	Ordnance Survey Lt.	OS Net
ABGX0GLP	Abri_geophysique	16.041	-61.659	1,254.510	2017-05-10 00:00:00		Guadeloupe	Guadeloupe (971)	Saint Claude	Guadeloupe Seism.	VOIC
ACAL0ESP	Los Alcazares	37.731	-0.961	67.090	2013-02-11 00:00:00		Spain	Región De Murcia	Parque De Bomber	Red Geodésica Act.	REGAM
ACER0ITA	Acerenza (PZ)	40.787	15.942	764.700	2007-07-11 00:00:00		Italy	Basilicata	Acerenza (Pz)	Istituto Nazionale di	IRING
ACH00ESP	Altamira	40.409	-1.437	1,177.850	2010-01-19 00:00:00		Spain	Tenife	Albarracín	Instituto Geográfico	IGN
ACH00ESP	Alicantes	41.700	-0.352	871.200	2006-02-14 00:00:00		Spain	Zamora	Alicantes	Instituto Tecnológico	IGN
ACOR0ESP	A Coruna	43.364	-8.399	66.960	1998-03-06 10:10:00		Spain	A Coruna	A Coruna	Instituto Geográfico	EPN
ADAB0GBR	Aberdaron	52.789	-4.741	148.300	2009-03-04 00:00:00		United Kingdom	Caernarfon	Aberdaron	Ordnance Survey Lt.	EPN & OS Net
ADCS0ROU	Adanciu	44.086	27.066	198.150	2019-05-14 00:00:00		Romania	Constanța	Adanciu	National Institute for	IGN
ADBJ0GLP	DESRIADE AIRPORT	16.297	-61.087	-40.330	2002-08-05 00:00:00		Guadeloupe	Guadeloupe (971)	Beaujeour, La Desi.	Guadeloupe Seism.	VOIC

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## EPOS-GNSS Portals

Repositories

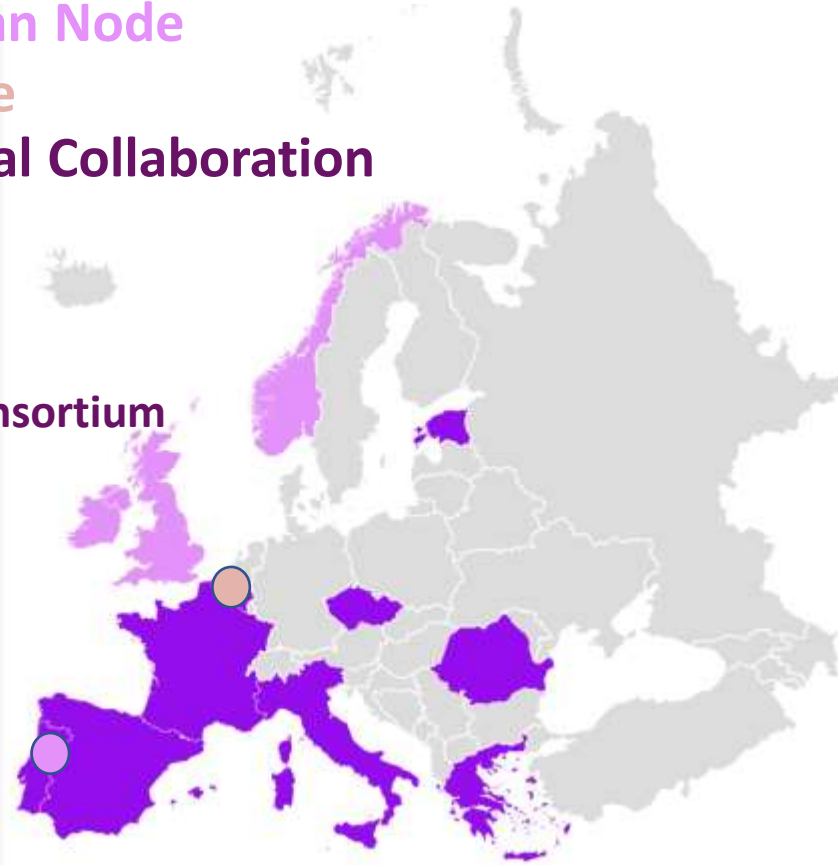
National Nodes

PanEuropean Node

EUREF Node

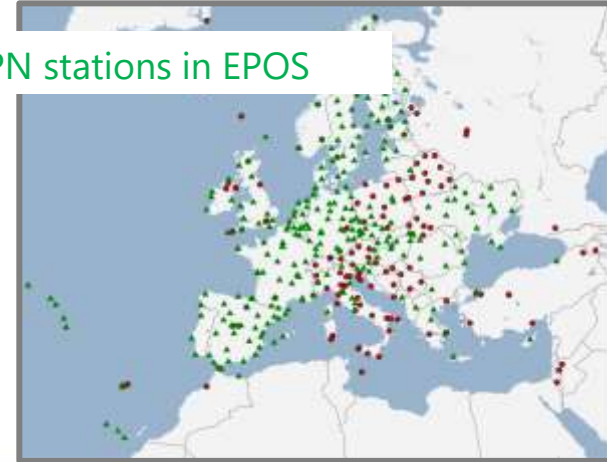
International Collaboration

EarthScope Consortium



EUREF Node

EPN stations in EPOS





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## EPOS-GNSS Portals

Products Portal

<https://gnssproducts.epos.ubi.pt/>

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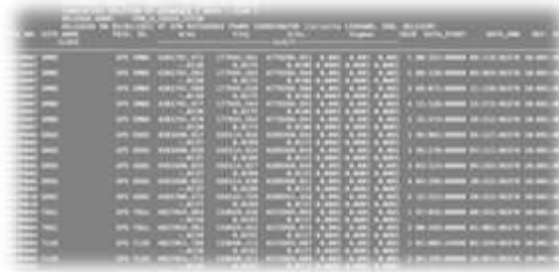
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Products Portal

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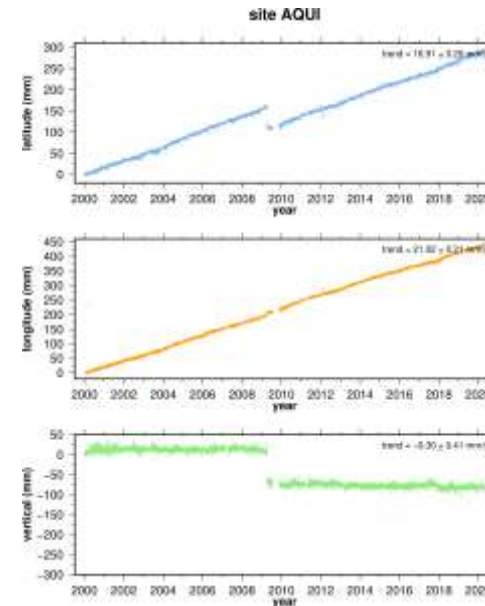
### Daily/Weekly Positions

In Sinex format



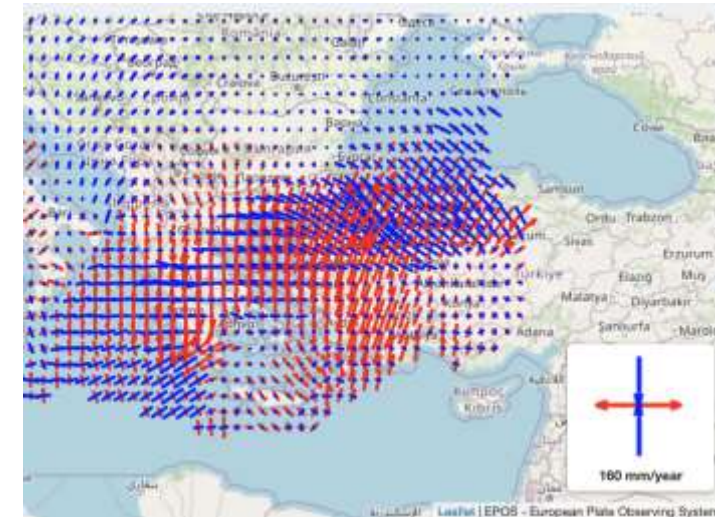
### Time-Series

In PBO format



### Strain-rate Maps

In dat format



### Velocities

In PBO format



## Conclusions

**EPOS Ambition: Provide data and information on ground motions based on permanent GNSS stations in Europe and plate boundary regions**

### Data Services

Centralized access to daily RINEX data through EPOS-GNSS Data Gateway 1600+ stations (xx EPN stations)  
Common EUREF-EPOS system (M<sup>3</sup>G) for collection of, and access to, station metadata :

### Product Services

Centralized access to GNSS products through EPOS-GNSS Product Portal  
EPOS-specific products  
EUREF products  
Common EUREF-EPOS products