

EPN Densification: Meta-data Management and Web Pages

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EPN Central Bureau

Visibility of EPN densification

- Stimulate contributions from broad community
- Guarantee proper acknowledgement of all contributions :
 - station operation
 - meta-data maintenance
 - data analysis
 - combination

Dedicated web pages

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EUREF PERMANENT NETWORK

DENSIFICATION

ROB
GNSS RESEARCH GROUP

EUREF

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ORGANISATION > **ABOUT**

The primary goal of the EPN Densification is to realize a continental-scale (European), homogeneous, high quality position and velocity product in an homogeneous reference frame, for a very dense network of GNSS stations, and this with comparable quality from Greenland to Crete, from Svalbard to Gran Canaria.

Consequently, the EPN Densification is a joint venture of agencies and institutions from European countries which operate and/or analyse the data from dense national GNSS networks (in addition to their EPN stations) and are willing to submit the results of their data analysis (daily or weekly position SINEX files) routinely to EUREF.

To achieve its goal, the EPN Densification combines the national GNSS networks on the product level (daily or weekly position SINEX files) with [the multi-year positions & velocities of the EPN stations](#) and express them homogeneously in the ITRS/ETRS89 with the EPN as the backbone. Additionally, to support the station managers and guarantee the reliability of the combination, the station metadata (station naming, site logs) of the participating densification stations will maintained, cross-checked, harmonized and centrally managed by EUREF to avoid inconsistencies.

The EPN Densification products shall be used - in close cooperation with the [EUREF Deformation Models Working Group](#) - to support the ETRS89 realization not only over the stable part of Europe, but also over tectonically deforming areas like the Mediterranean region. The velocity product will be usefull for general and specific tectonic studies, supporting the better understanding of the processes at deforming regions.

The EPN Densification will exploit the huge potential lying in these active GNSS networks both for geodesy and earth sciences. All the activities of the EPN densification require efficient cooperation between the data suppliers (e.g. NMCAs) and the geophysical community. Beside the well built structure and communication channels of the EPN, a close cooperation with other communities such as EPOS is foreseen.

http://epncb.oma.be/_densification

Data Analysis

- **Densification Analysis Centers**

Process an EPN densification solution and submit weekly SNX solutions to the Chair of EPN Densification WG (A. Kenyeres)

- **Meta-data : XXXX_DEN.AC**

- Include at least **4-CHAR ID's of stations included in the densification network**

- To be provided by each densification analysis center.

- Initial forms provided by A. Kenyeres

- In process of having them validated by the ACs.

EPN ANALYSIS CENTRE

Agency acronym : IGE
Networks processed : IBE: Spain
Institution : Instituto Geografico Nacional

Example of XXX_DEN.OC

⋮

Software Used : Bernese GPS Software Version 5.0 for EPN Dens
: Bernese GPS Software Version 5.2 for EPN

Stat. Included in Analysis :

4-ID start stop network

3CAN 1512 now IBE
ABAN 1549 now IBE
ACIN 1756 now IBE
ACNS 1469 now IBE
ACOR 1400 now IBE
ACRE 1502 1620 IBE
AGDE 1565 now IBE
AGRD 1425 now IBE
AGUE 1538 now IBE
AGUI 1578 now IBE
AICI 1780 now IBE
AJAC 1400 now IBE
AJAL 1426 now IBE
ALAC 1400 now IBE
ALAJ 1635 now IBE
ALBA 1437 now IBE
ALCO 1400 now IBE
ALCZ 1491 now IBE
ALDA 1495 now IBE

EPN stations

IGS stations

Non-EPN/IGS stations

EPN CB FTP server

<ftp://epncb.oma.be/pub/center/analysis/> :

XXX_EPN.AC



Routine AC

YYY_DEN.AC



Densification AC

Information presently collected

 BUL_DEN.AC

 CAT_DEN.AC

 COE_EPN.AC

 CZE_DEN.AC

 DEO_EPN.AC

 EST_DEN.AC

 GGI_DEN.AC

 GKU_DEN.AC

 GOP_EPN.AC

 IGE_DEN.AC

 IGE_EPN.AC

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The Analysis Centers listed below routinely submit daily or weekly SINEX position solutions for a national or regional network of GNSS stations to EUREF (More specifically to A. Kenyeres). EUREF is not distributing these solutions. These analysed GNSS networks contain, in addition to a few EPN stations, mainly non-EPN stations.

For each Analysis Center, the list of analysed subnetworks is given (in dark blue) and each subnetwork is followed by the station included in the subnetwork solution. The stations in green are EPN stations, while those in orange are the EPN densification stations for which all meta-data (see [Station log submission](#)) have been submitted to the EPN CB. For the stations in grey no meta-data (station log) is available from the EPN CB and they are therefore still "Proposed densification stations".

CAT (ICGC: INSTITUT CARTOGRAFIC I GEOLOGIC DE CATALUNYA, SPAIN)**CAT**

ABAN	ACIN	AGDE	AGDS	AGEN	AICI	AIRM	ALAC	ALCA	ALCO	ALCZ	ALDA	ALHA	ALIA	ALOR
ALSA	AMUR	APB1	ARIB	ARUF	AUCH	AVEL	AYOR	BARY	BCLN	BEA2	BELL	BERG	BEUD	BIAZ
BINE	BONA	BORR	BRJA	BRZR	CABO	CALM	CAPT	CARA	CARC	CASS	CATY	CAUS	CIEZ	CORZ
CRAL	CREU	CRNA	CRVC	CSOS	CSTN	DENI	EBRE	EIVI	EJEA	ELCI	ELGE	ESCO	ESTE	FJCP
FORM	FRAG	GARR	GERN	GIRO	GRAS	GRAU	IBIZ	IEJA	IGEL	JACA	JORD	JUM2	JUMI	LACA
LANT	LAZK	LEIT	LGAR	LLEI	LLIV	LORC	LOSA	LRCA	LROC	MALL	MARE	MAZA	MEDI	MENC
MEQU	MORA	MSGT	MTDM	MTP2	MULA	MUNI	MUR2	MURC	MZAN	NARB	NOT1	ORON	PAMP	PARD
PASA	PAYR	PENI	PERP	PEYR	PIMI	PLAN	PZNA	QNTQ	RABT	REUS	RIO1	RONC	SABI	SALI
SANG	SANR	SARR	SBAR	SCOA	SFER	SINE	SLVT	SONA	SOPU	SOR2	SRNA	STSV	TAFI	TERU
TLIA	TLMF	TLSE	TLSG	TORR	TRAM	TUDE	UNME	UPNA	UTIE	VALE	VCIA	VILL	VITO	VROB
YEBE	ZARA	ZGZA	ZUER											

Regional analysis center



IGE (INSTITUTO GEOGRAFICO NACIONAL, SPAIN)

IBE



3CAN	ABAN	ACIN	ACNS	ACOR	ACRE	AGDE	AGRD	AGUE	AGUI	AICI	AJAC	AJAL	ALAC	ALAJ
ALBA	ALCO	ALCZ	ALDA	ALDE	ALGC	ALHA	ALHE	ALIA	ALME	ALMO	ALMR	ALOR	ALSA	AMAR
AMUR	ANDU	ANTI	ARAC	ARDU	ARGU	ARIB	ARJU	ARSP	ASTO	AUCH	AVEL	AVIO	AVIL	AVIS
AVLS	AXPV	AYOR	AZAR	BADH	BADJ	BAIO	BAIX	BAND	BANU	BARV	BARY	BCLN	BEA2	BECE
BEJA	BELF	BELL	BENA	BERG	BIAZ	BINE	BONA	BORB	BORR	BOTI	BRGN	BRIZ	BRJA	BRST
BRZR	BUNO	BUOS	BURG	CAAL	CABA	CABO	CABR	CACE	CAEN	CAGL	CAGZ	CALH	CALM	CANT
CARA	CARC	CARG	CARN	CAS0	CASC	CASO	CASS	CATU	CATY	CAZA	CBRA	CCEX	CDRD	CEBR
CERV	CEU1	CHAP	CIEZ	CNAR	COBA	COR2	CORC	CORI	CORU	CORZ	CRAL	CRDB	CREU	CRNA
CRT2	CRTG	CRVC	CSOS	CSTB	CSTN	CUE2	CUEN	DARE	DENI	EBRE	EDVD	EIVI	EJEA	ELCI
ELGE	ERBZ	ERGM	ERGO	ERLC	ERLV	ERLX	EROT	EROX	ERPO	ERSA	ERUF	ERUG	ESC2	ESCO
ESTE	EURO	FAJA	FCOA	FJCP	FLRS	FONS	FORM	FRAG	FRON	FUER	FUNC	FURN	FVFI	GAIA
GARI	GARR	GDRM	GERN	GIRO	GIOR	GMS	GOPE	GRAE	GRAN	GRAS	GRAU	GRN1	GROY	GUA0
GUAR	GUIJ	HENA	HERR	CARA	CARC	CARG	CARN	CAS0						
IGEL	IGMI	IGNE	IGP0	CERV	CEU1	CHAP	CIEZ	CNAR						
LDB2	LEBR	LEGA	LEIR	CRT2	CRTG	CRVC	CSOS	CSTB						
LPAL	LRCA	LROC	LROZ	ELGE	ERBZ	ERGM	ERGO	ERLC						
MATA	MATE	MAZA	MZO	ESTE	EURO	FAJA	FCOA	FJCP						
MILO	MIMZ	MIRA	MLGA	GARI	GARR	GDRM	GERN	GIRO						
MULA	MUNI	MUR2	MURC	GUAR	GUIJ	HENA	HERR	HERS						
OSUN	PAIA	PALA	PALC	IGEL	IGMI	IGNE	IGP0	ILLE						
PENM	PERP	PEYR	PIMI	LDB2	LEBR	LEGA	LEIR	LEIT						
REUS	RIAN	RIAZ	RIBD	LPAL	LRCA	LROC	LROZ	LTVI						
SALA	SALD	SALI	SALS	MATA	MATE	MAZA	MAZO	MDOR						
SINE	SMAN	SMNE	SNDT	MILO	MIMZ	MIRA	MLGA	MOCZ						
STEI	STVD	TABU	TAFI											
TN01	TN02	TN03	TN04											
UJAE	UNEX	UNME	UPNA											
VICA	VIGO	VIL2	VILA											
ZGZA	ZIMM	ZMRA	ZOUF											

National analysis center

Stations

- EPN or IGS stations (green)
- Densification stations
 - Site log available from EPN CB → orange
 - No site log (yet) available from EPN CB → grey



Royal
Observatory
of Belgium



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EUREF PERMANENT NETWORK DENSIFICATION

ROB *****
GNSS RESEARCH GROUP *****

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Link to EPN CB site log submission

NETWORK & DATA > STATION LOG SUBMISSION

THIS ON-LINE STATION LOG SUBMISSION ALLOWS TO:

- Create a new station log conform the IGS/EPN [station log format](#)
- Upload, update, validate and save a station log on your local disk
- Upload, validate and save a station log in the EPN data base (only for EPN operational centres)

LOGIN

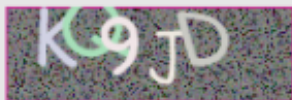
Operational centre :

IGE (Spain)

Password:

[Request \(or forgot ?\) password](#)

Security code:



Select station from IGE OC form:

(send updated IGE.OC to EPN CB for mis

☐ Upload the log from EPN CB (blank

☐ Upload station log from disk

(select a station)

(select a station)

ACOR
ALAC
ALBA
ALME
ALMO (densification)
ARDU (densification)
BCLN (densification)
BORR
CACE
CANT
CARG (densification)
CEU1
COBA
CUEN (densification)
FRAG (densification)
FUER (densification)
GIRO (densification)
HUEL
IBIZ (densification)

Frequently asked questions

Javascript has to be enabled in the options of your browser.

NOT REGISTERED ?

(Operational Centre=guest, password=guest). This
it does not allow to upload a station log to

the left: select your
te and push the

**Extension of EPN Station log submission
to allow submission of non-EPN stations
included in the EPN densification
Fine tuning in progress based on first
site log submissions!**

base.
It is strongly
upload the station
will guarantee that no im
during the upload.

to
This
e lost

Operational Centre

- EPN stations
 - data upload to EUREF
 - meta-data submission & maintenance to EUREF
- Densification stations:
 - Meta-data submission & maintenance to EUREF
 - Also possible for third party stations!

Example – OC form IGE

EUREF OPERATIONAL CENTRE

Agency acronym : IGE

Institution : Instituto Geografico Nacional de España

Mail Address : General Ibañez de Ibero, 3
: 28003 MADRID

Country : Spain

SITES OPERATED : ACOR ALAC ALBA ALME BORR CACE CANT CEU1 COBA HUEL IZAN
: LEON LPAL MALA MALL MELI RIO1 RIOJ SALA SONS TERU VALE
: VIGO YEBE ZARA
: ALMO ARDU BCLN CARG CARV CUEN FRAG FUER GIRO GUDI IGNE
: IBIZ JACA LUGO MOFR MOLI MOTA PENI SNTG TALR TARI TN01
: TN02 TN03 TN04 TN05 TN06 TN07 VICA YEB1 ZFRA

*Includes now also
densification
stations*











***DOES NOT MEAN** that the densification station is
operated by that Agency!
ONLY that Agency commits (in agreement with station
operator) to submit and maintain station meta data (site
log) to the EPN CB*

Densification site logs

Index of <ftp://epncb.oma.be/pub/station/>

 Up to higher level directory












Name

-  [coord](#)
-  [densification](#)
-  [general](#)
-  [log](#)
-  [new](#)
-  [old](#)
-  [real_time](#)
-  [skl](#)
-  [tie](#)
-  [xml](#)

Index of <ftp://epncb.oma.be/pub/station/densification/log/>

 Up to higher level directory

Name

-  [avel_20150429.log](#)
-  [bdln_20150522.log](#)
-  [beud_20150429.log](#)
-  [case_20150429.log](#)
-  [garr_20150429.log](#)
-  [giro_20150522.log](#)
-  [llel_20150429.log](#)
-  [mare_20150429.log](#)
-  [plan_20150429.log](#)
-  [reus_20150429.log](#)
-  [sbar_20150429.log](#)
- [sona_20150429.log](#)
- [sorg_20150429.log](#)

Site logs from densification stations can now be uploaded and maintained similar to EPN stations

In progress

- Gradually contacting involved agencies to
 - Collect Operational Center forms
 - Some initial forms provided by A. Kenyeres
 - In process of having them validated by the OCs.
 - Collect site logs for densification stations
- Done for all stations included in last densification solution of A. Kenyeres

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NETWORK > OPERATIONAL CENTRES

The Operational Centres listed below are maintaining the meta-data (station log) of the EPN densification stations at the EPN CB.

For each Operational Centre, the full list of stations included in their Operational Centre form is given. The stations in green are EPN (or IGS) stations, which are mostly operated by the Agency itself. The densification stations are indicated in orange (with station log available from EPN CB) and grey (no station log at EPN CB). These densification stations are not necessarily operated by the Agency acting as their Operational Centre, but their Station Operators agree that the Agency acting as Operational Centre maintains its station meta-data at the EPN CB.

ICGC (INSTITUT CARTOGRAFIC I GEOLOGIC DE CATALUNYA, SPAIN)

ICGC operational centre form



AVEL	BELL	BEUD	CASE	CREU	EBRE	ESCO	GARR	LLEI	LLIV	MARE	PLAN	REUS	SBAR	SONA
SORG														

IGE (INSTITUTO GEOGRAFICO NACIONAL DE ESPAÑA, SPAIN)

IGE operational centre form



ACOR	ALAC	ALBA	ALME	ALMO	ARDU	BCLN	BORR	CACE	CANT	CARG	CARV	CEU1	COBA	CUEN
FRAG	FUER	GIRO	GUDI	HUEL	IBIZ	IGNE	IZAN	JACA	LEON	LPAL	LUGO	MALA	MALL	MELI
MOFR	MOLI	MOTA	PENI	RIO1	RIOJ	SALA	SNIG	SONS	TALR	TARI	TERU	TN01	TN02	TN03
TN04	TN05	TN06	TN07	VALE	VICA	VIGO	YEB1	YEBE	ZARA	ZFRA				

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DATA ANALYSIS

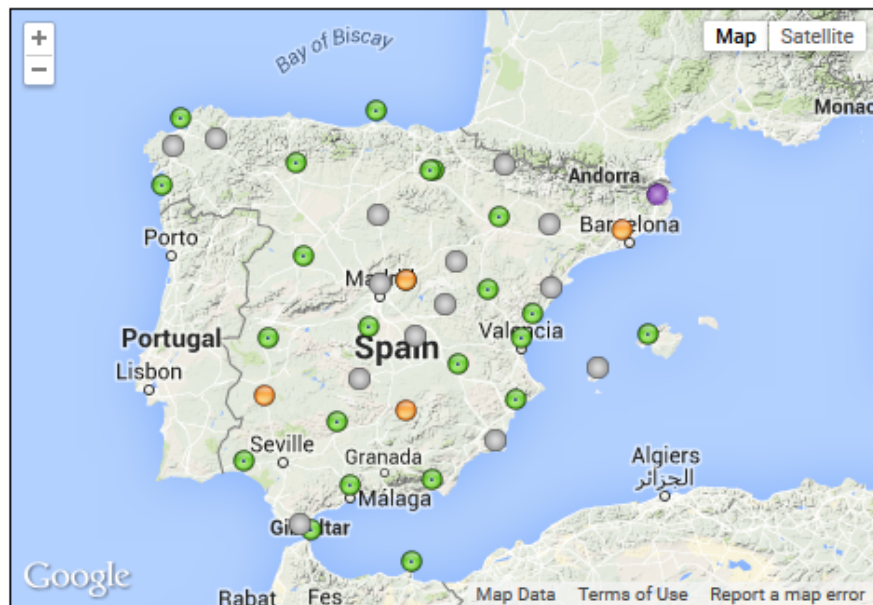
Analysis Centres

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NETWORK > STATION LIST > **GIRO (Sant Julia de Ramis, Spain)**

LOCATION



- GIRO (Sant Julia de Ramis, Spain)
- other EPN densification stations from the same operational centre
- proposed EPN densification stations from the same operational centre
- EPN stations from the same operational centre

LOG FILE

giro_20150522.log (current)

OPERATIONAL CENTRE

IGE : Instituto Geografico Nacional de España (Spain)

STATIONS IN OPERATIONAL CENTRE OF IGE

EPN DENSIFICATION STATIONS

BCLN, GIRO, TN01, TN02, TN03, VICA, YEB1, ZFRA

PROPOSED EPN DENSIFICATION STATIONS

ALMO, ARDU, CARG, CARV, CUEN, FRAG, FUER, GUDI, IBIZ, IGNE, JACA, LUGO, MOFR, MOLI, MOTA, PENI, SNTG, TALR, TARI, TN04, TN05, TN06, TN07

EPN STATIONS

ACOR, ALAC, ALBA, ALME, BORR, CACE, CANT, CEU1, COBA, HUEL, IZAN, LEON, LPAL, MALA, MALL, MELI, RIO1, RIOJ, SALA, SONS, TERU, VALE, VIGO, YEBE, ZARA

DATA ANALYSIS RESULTS SUBMITTED BY

CAT - ICGC: Institut Cartografic i Geologic de Catalunya, Spain ([more info](#))

IGE - Instituto Geografico Nacional, Spain ([more info](#))



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NETWORK > STATION LIST

Below the list of GNSS stations included in the last EPN densification solution. The stations in grey have not yet submitted a site log to EPN CB and are therefore still "Proposed densification stations". The stations in orange are the EPN densification stations for which all meta-data are available from the EPN CB.

View ☒ all stations

☐ only proposed densification stations

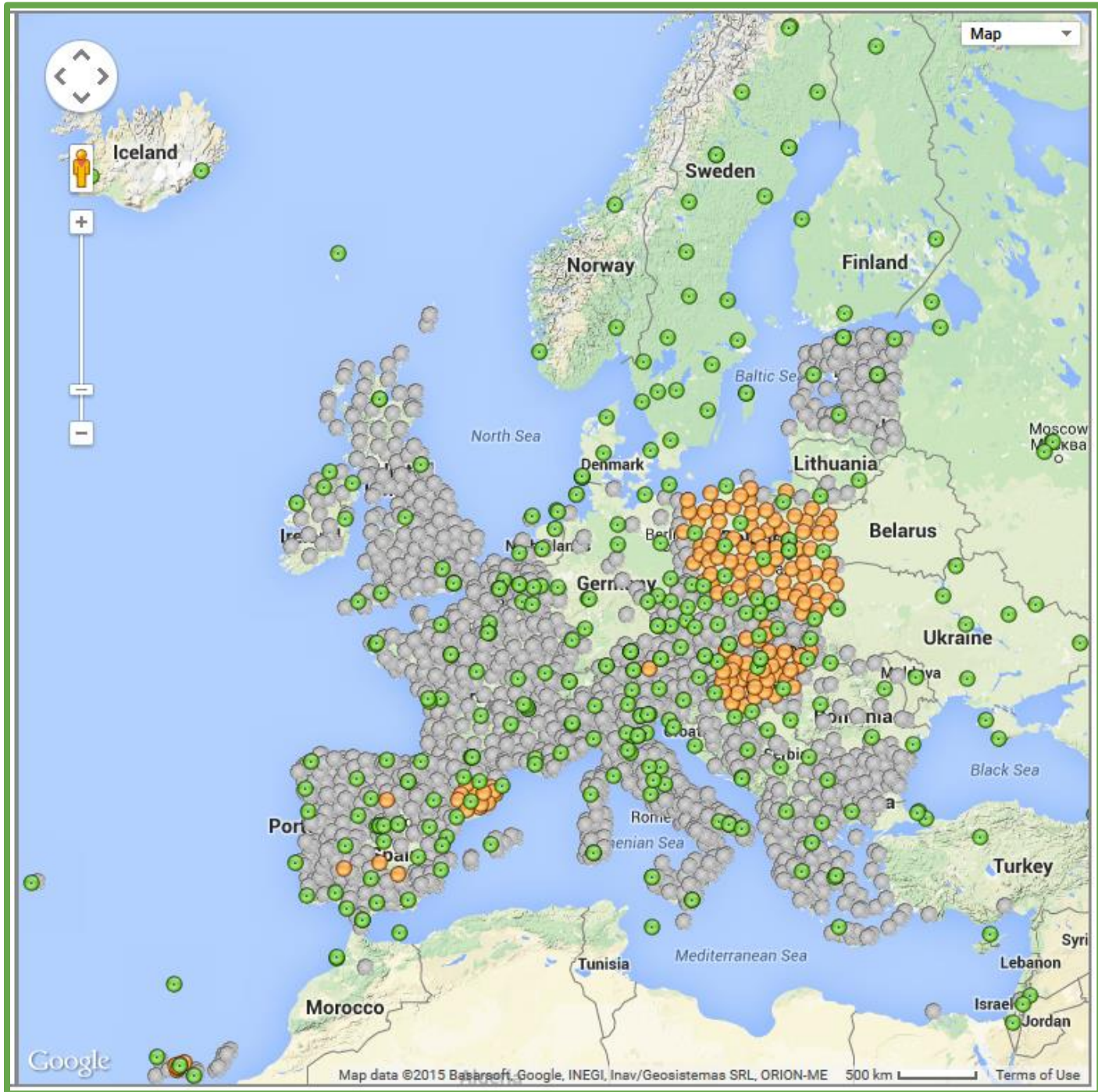
☐ only densification stations

ALBANIA (AL)

BAJR VLO2	BER2	DUR2	GRSH	KOR2	KUK2	LIBR	LUS2	PERM	PESH	RRE2	SARA	SHK2	TEP2	TIR2
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AUSTRIA (AT)

AMST	AT01	BLE1	BLE2	BLEI	BSL2	BSLE	DIEN	DLBG	DOER	FLDB	FLDK	FRST	GMN2	GMND
GMUE	GRA1	GRA2	GRAA	GRAB	GRAD	GRAI	GRAK	GRAL	GRAY	GRMS	GRMY	GUES	HKBL	HORN
HUTB	INBK	KIRS	KLA1	KLA2	KLAG	KOE1	KOE2	KOET	KOLM	KOP1	KOP2	KOPS	KRBG	KTZ1
KTZ2	KTZB	LAN1	LAN2	LANK	LECH	LHO2	LHO3	LHOF	LNZ2	MSTB	MUEN	NEUS	OBPD	OBWT
PAT2	PATK	POEL	RIED	ROHR	RTM2	RTMN	SECK	SI2L	SILA	SON1	SON2	SONN	STPO	TAM2
TAMS	TRE1	TRE2	TREI	VLCH	VLKM	WELS	WIEB	WIEN	WIEP	WING				



Summary of meta-data

- Densification Analysis Center XXX_DEN.AC
 - NEW form
- Operational Center Form YYYYYYY.OC
 - Extension of existing EPN form
- Site log
 - Same as for EPN/IGS stations

Step-wise Process!

Please check

[http://epncb.oma.be/ densification](http://epncb.oma.be/densification)

UNDER CONSTRUCTION

Information is still missing

Bugs, fine tuning of software...

Corrections and addition information are welcome
at EPN CB epncb@oma.be & A. Kenyeres