

EUVN_DA: ESTABLISHMENT OF A EUROPEAN CONTINENTAL GPS/LEVELING NETWORK

EUVN_DA WORKING GROUP:

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WHAT IS EUVN_DA?

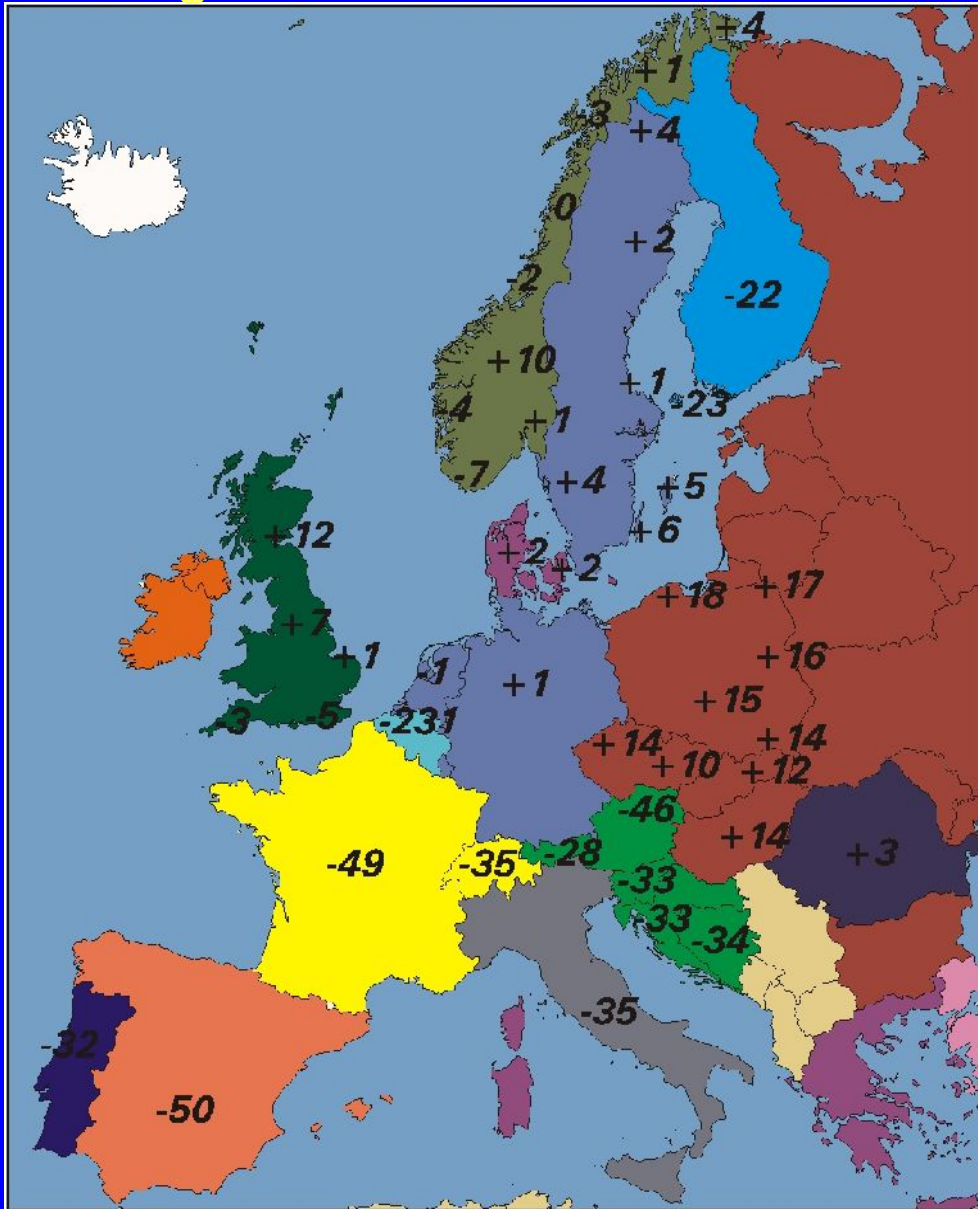
Densification Action of EUVN

- Joint effort of the European Mapping Agencies to establish a homogeneous, dense continental GPS/leveling reference network
 - strict data quality standards, cm-accuracy expected
 - initiated by EUREF in 2003, EGGP (European Gravity and Geoid Project) is a cooperation partner
- mutual interest:** control data for geoid and GPS/leveling
- contribution to the accurate continental height reference surface consistent with ETRS89 and EVRS.

PREDECESSOR: EUVN

European Unified Vertical Network

height datum offsets wrt NAP



Targets:

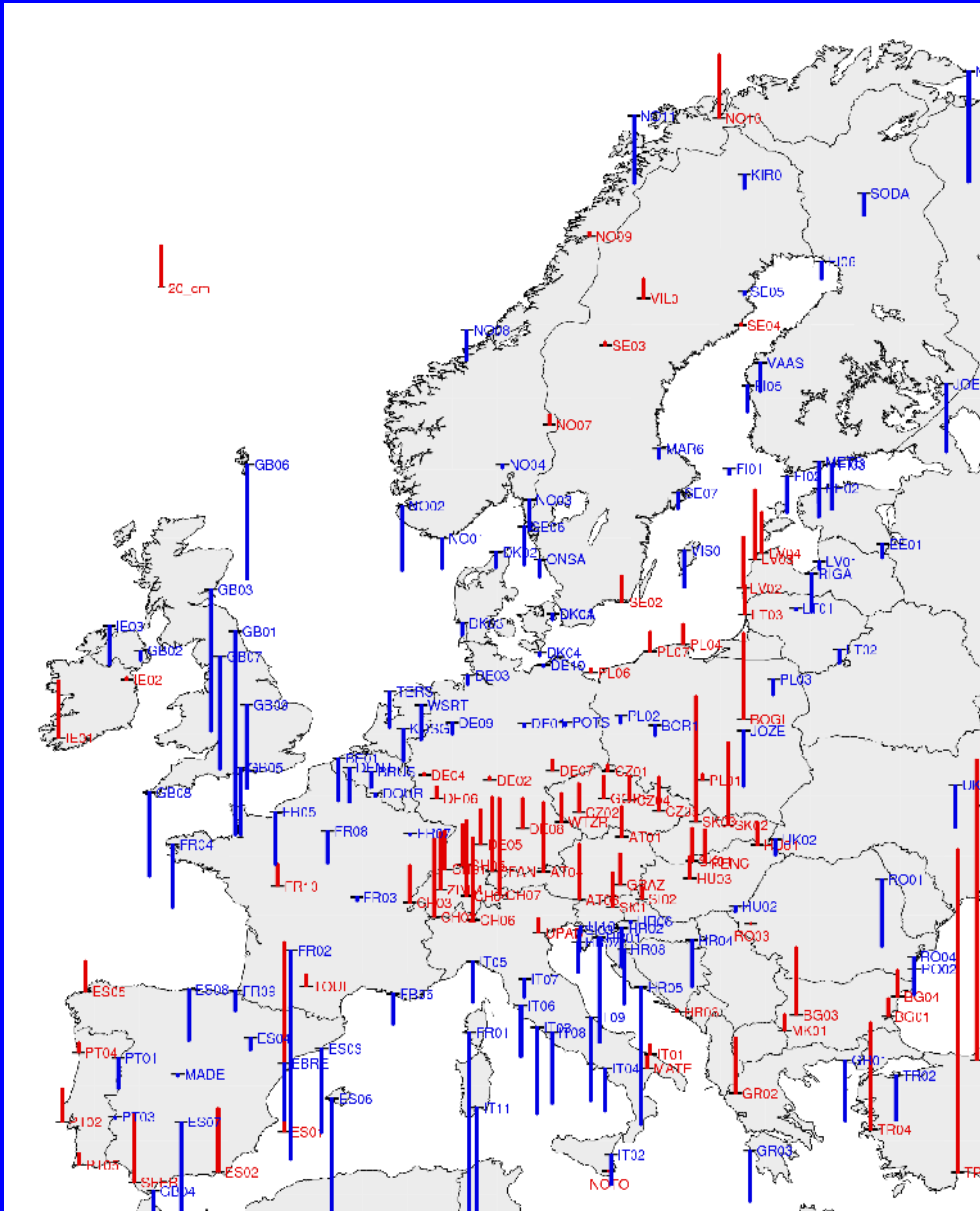
- vertical datum unification
- tide gauge connection

The network:

- **196 benchmarks**
(UELN nodal points, permanent stations, tide gauges)
- **GPS campaign in 1997 (ETRF96)**
connected to UELN

PREDECESSOR: EUVN

European Unified Vertical Network

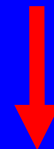


Comparison with EGG97

- outliers, trends, high scatter
- sparse network

EGG97 and EUVN are not feasible to

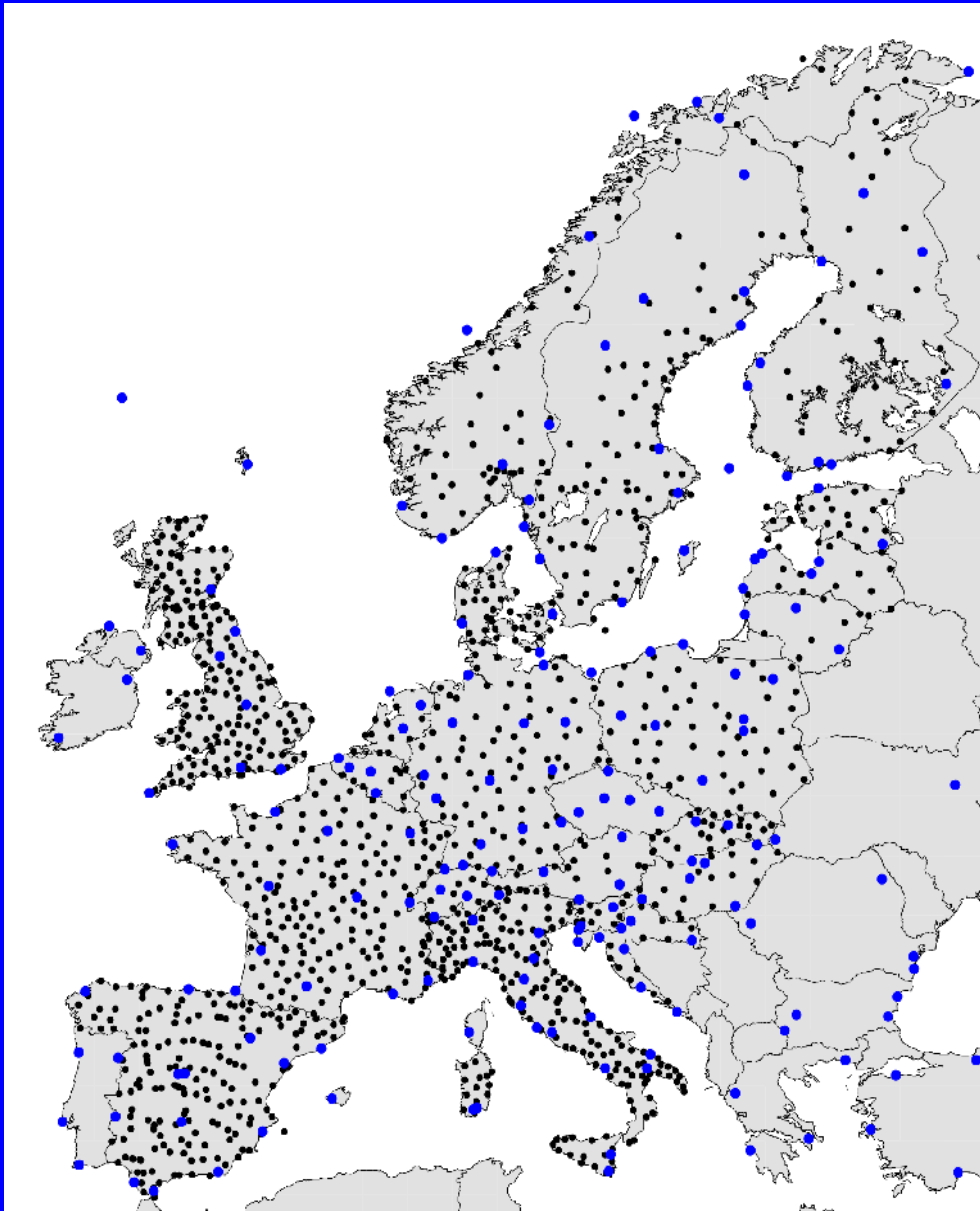
- separate data and reduction shortages
- precisely model the observed differences and create a combined height reference surface



new EGG and densified GPS/leveling network is needed

EUVN_DA

CONTINENTAL HOMOGENEOUS GPS/LEVELING DATABASE



- Collection of >1200 existing and new high quality GPS/leveling points
 - GPS:** 24h; scientific processing
 - leveling:** UELN & gpu
- common reference frames
 - **leveling:** UELN/EVRS2000
 - **GPS:** ETRS89/GRS80
- common reference epoch ?
 - epoch of observation (UK, Spain!)**
 - Nordic countries: 2000.0**
 - land uplift modeling: NKG2005LU**
- project time frame: 2003-2007

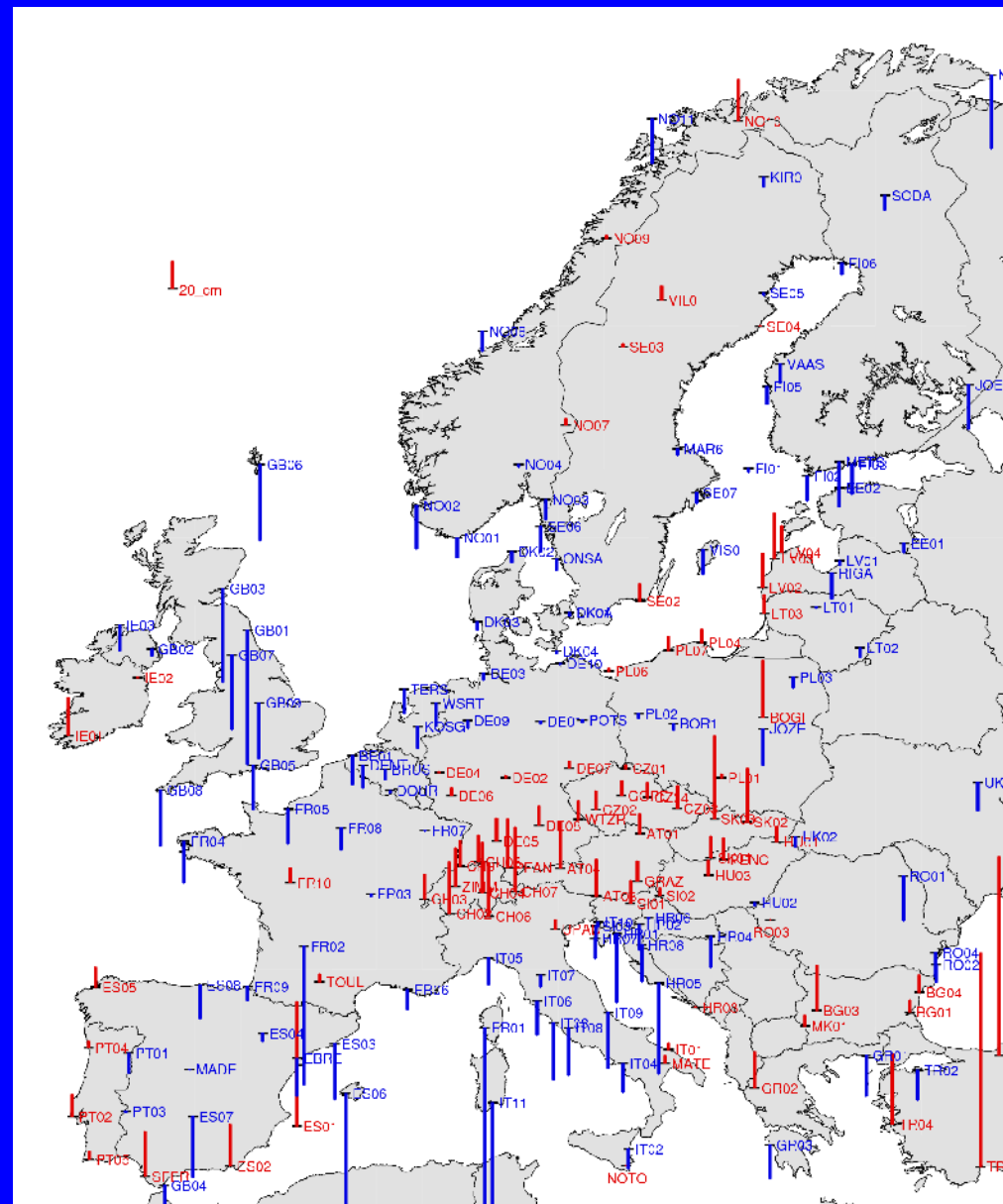
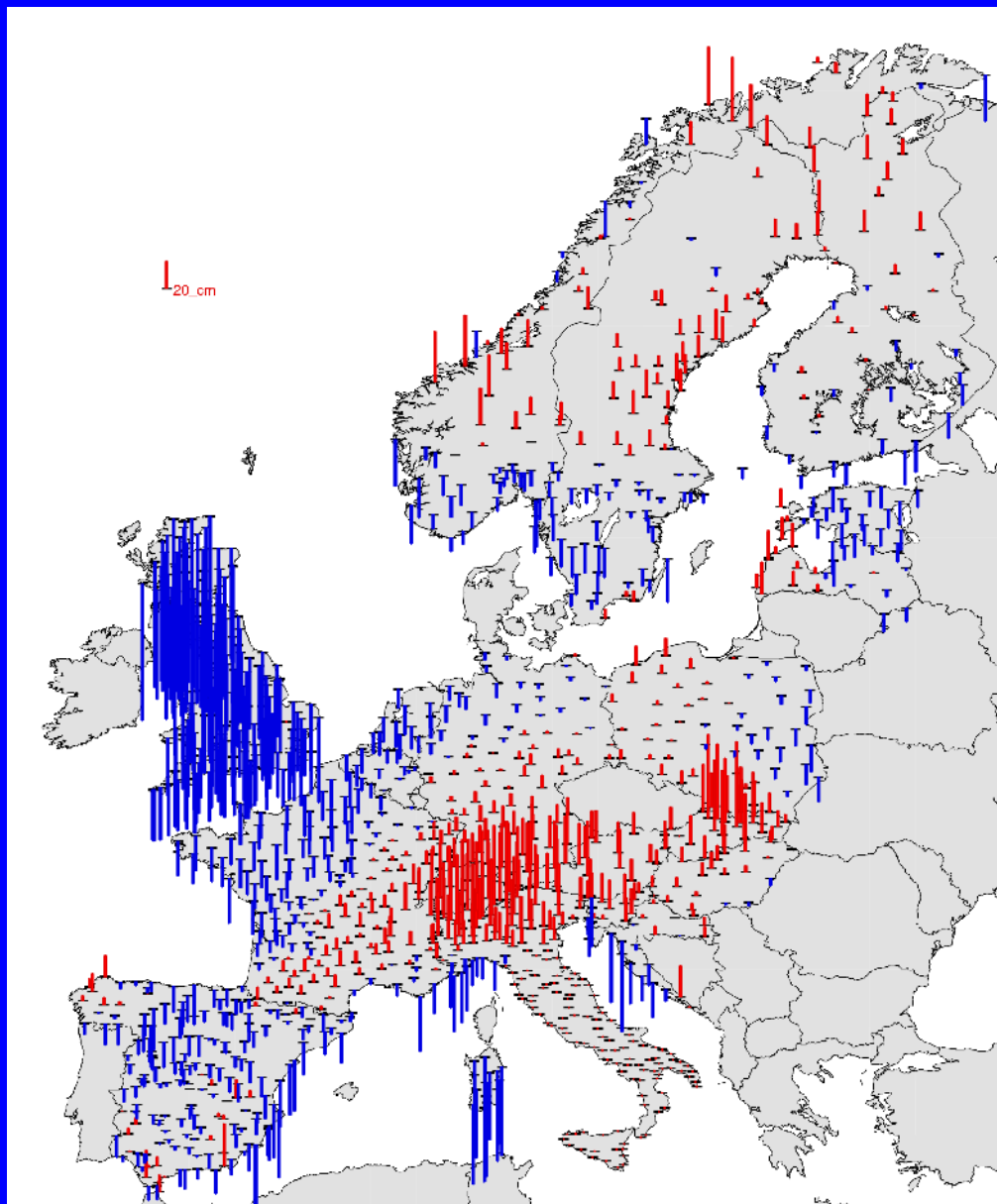
EUVN_DA – EGGyy comparison statistics

		RMS [cm]			MAX-MIN range [cm]		
	# of pts	EGG97	EGG03C2	EGG06	EGG97	EGG03C2	EGG06
Austria	17	11	6	5	33	19	17
Croatia	20	20	17	7	80	74	29
France	168	12	8	8	70	42	48
Germany	75	10	4	4	46	15	15
Great Britain	189	19	13	11	74	59	56
Hungary	20	9	4	5	40	20	20
Netherland	15	6	4	2	20	13	7
Norway	63	17	10		81	53	
Poland	52	9	3	3	44	15	15
Slovakia	28	17	13	4	57	49	16
Slovenia	12	13	11	4	45	39	13
Spain	177	12	13		96	105	
Sweden	84	12	5		54	27	
Switzerland	20	10	6	5	31	23	16

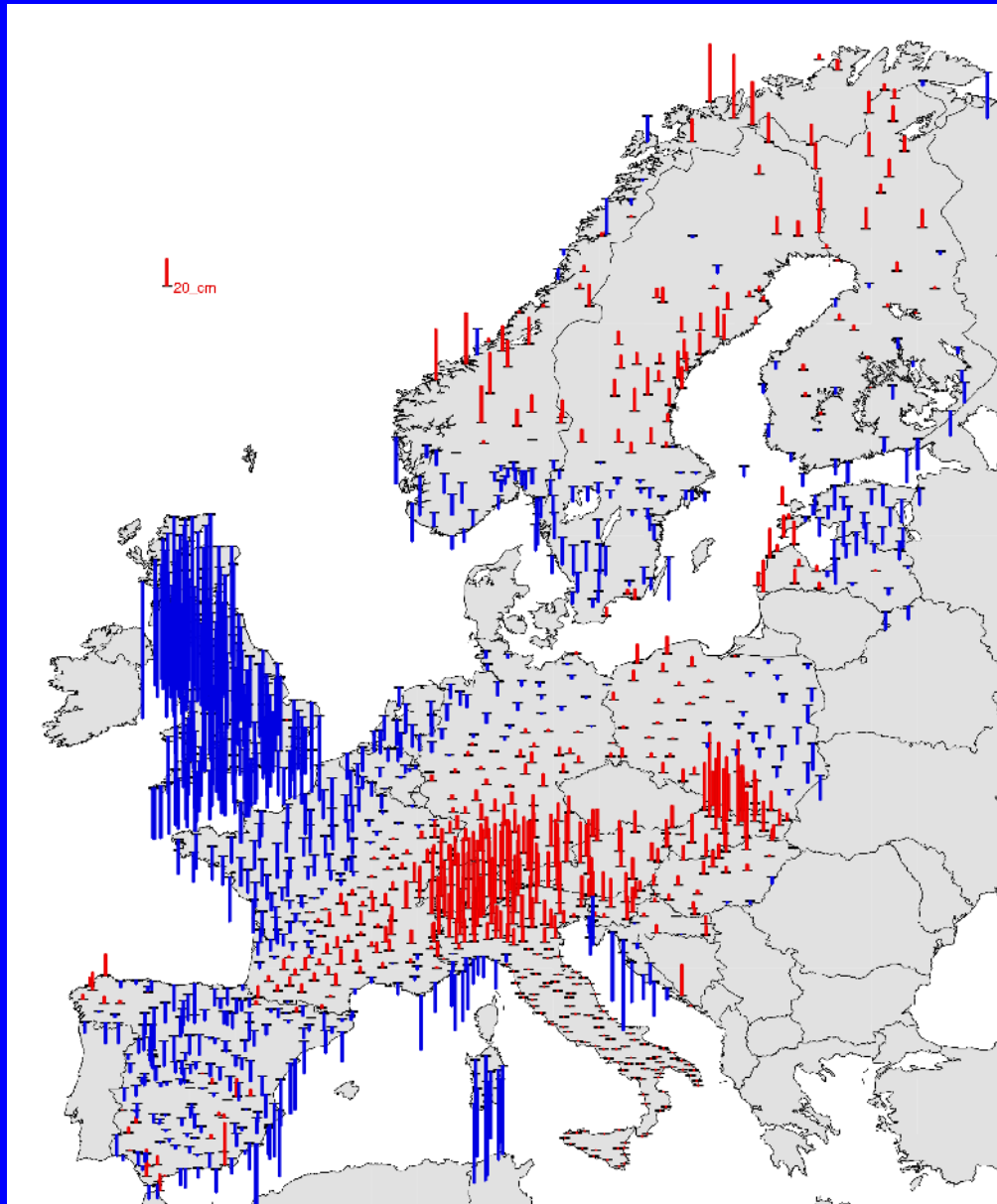
EGG032C2: EIGEN03C + marine data upgrade

EGG06: terrestrial data for C Europe upgraded

EUVN



EGG97 wrt EUVN_DA



clear LW trends

France, Scandinavia

GB: offset and strong tilt

UENL connection?

Alps and High Tatras

geoid or leveling?

Mediterranean coastline

?

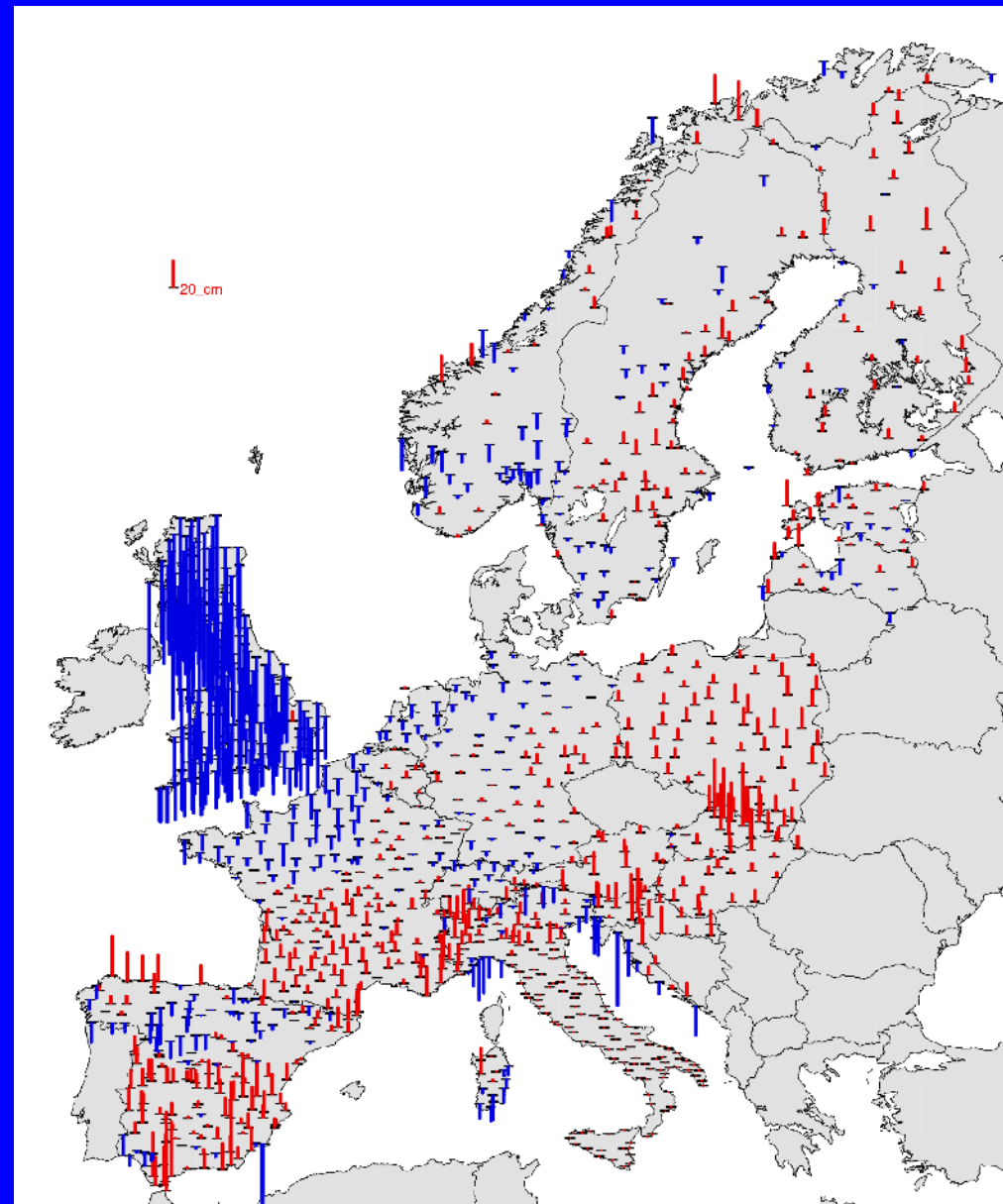
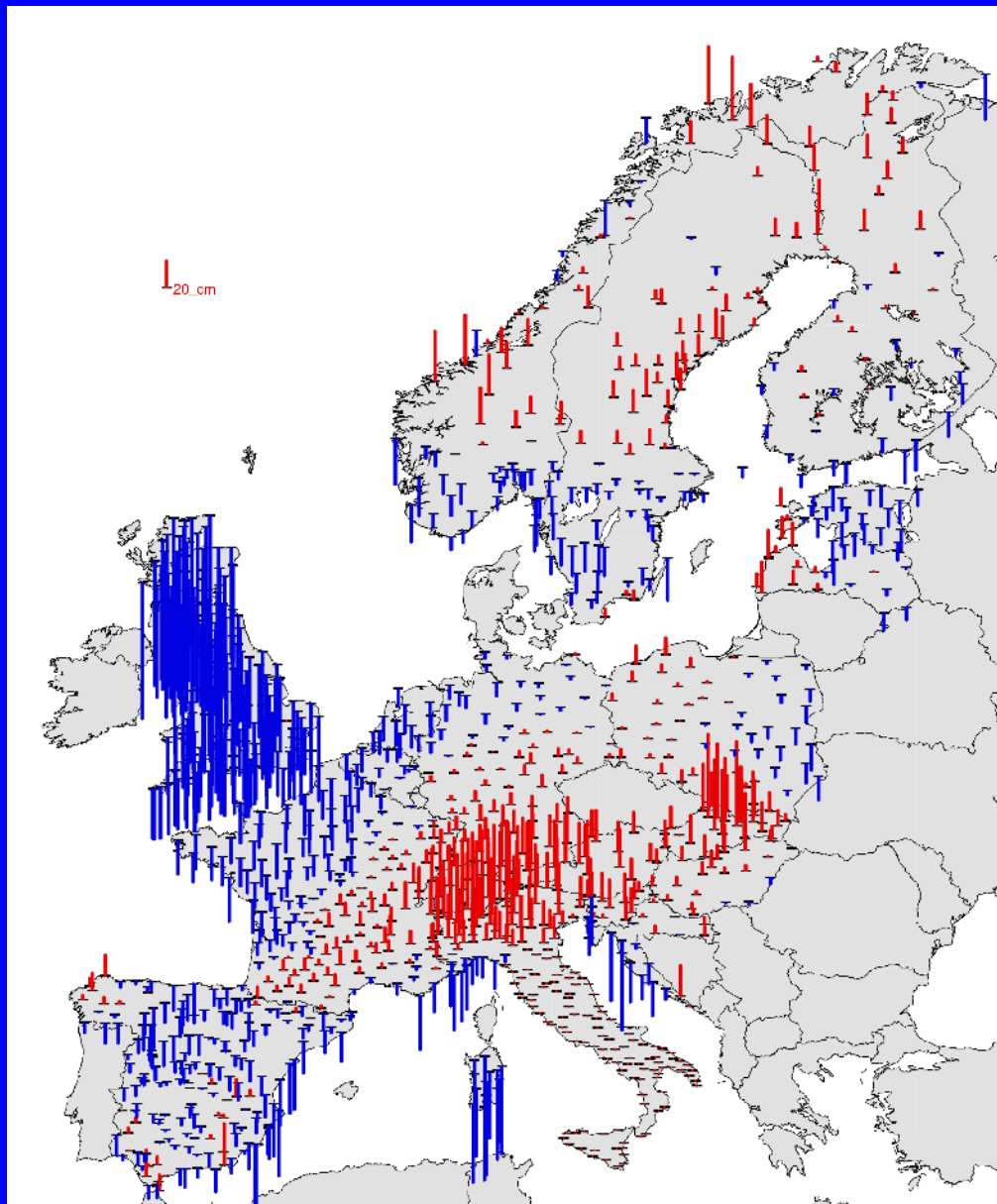
Spain: higher scatter

old leveling

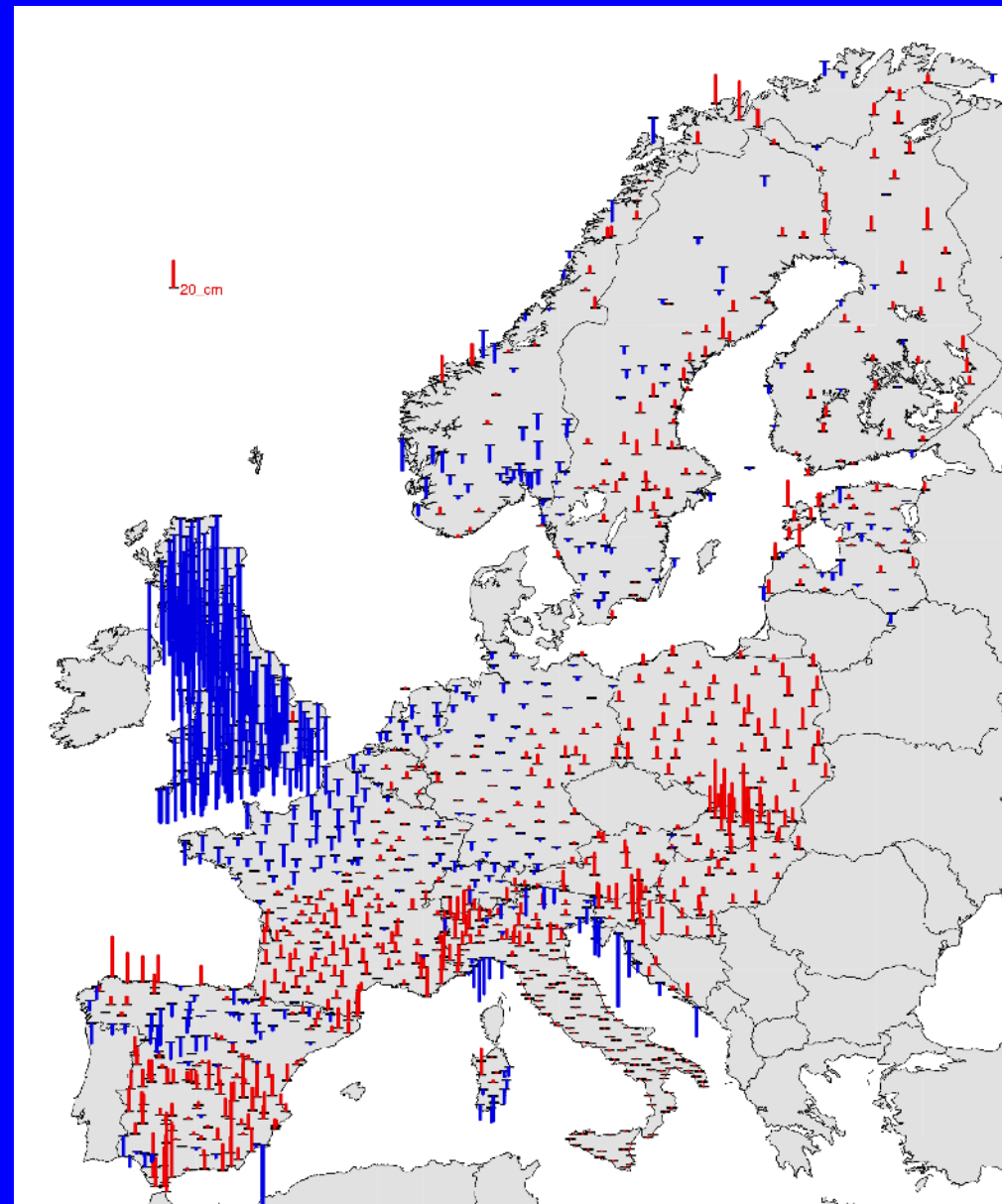
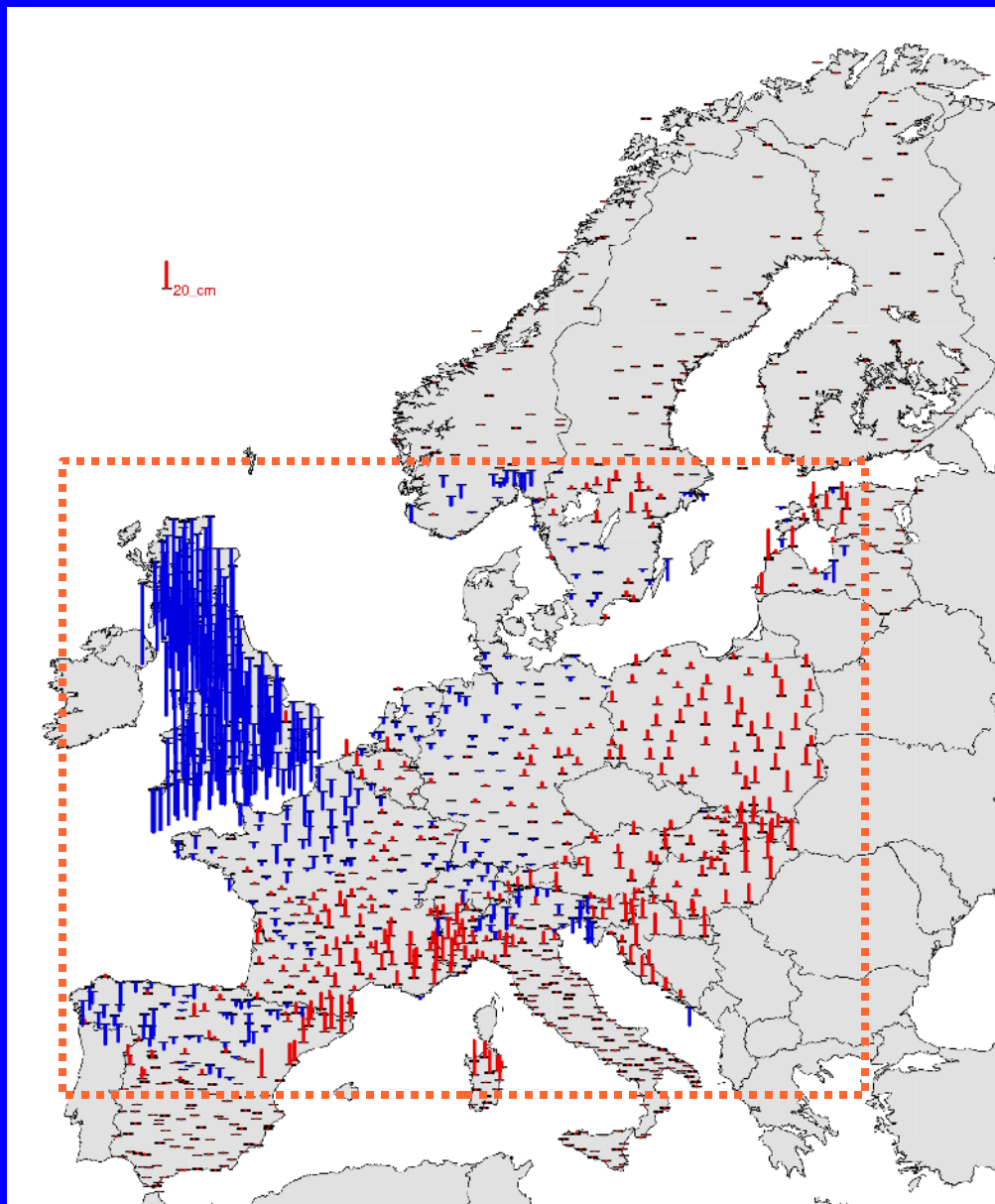
Sardinia: height datum?

(Italy: data not validated)

EUVN_DA wrt EGG97 EGG03C2



EUVN_DA wrt EGG06 EGG03C2



SUMMARY

- the build-up of a regional GPS/leveling database is in progress
- >1200 sites from 20 + 5 countries (missing: SE Europe)
- 50 – 100 km mean separation
- cm-accuracy ellipsoidal and levelled heights
- unified reference frames : ETRS89/UELN
- the presented preliminary tests show good agreement with the new EGG solutions (< 10 cm rms, +- 10 cm residual)
- further iteration and validation is needed to refine the current status

OUTLOOK

- the 1st version of EUVN_DA should be ready in 2007
- EUVN_DA is exclusively for scientific purposes
- the database should be capable for
 - studying leveling networks on national and continental level
 - validation of global geopotential models
 - analyzing the follow on EGG solutions
 - supporting the realization of an accurate continental height reference surface

SPECIAL THANKS TO THE DATA PROVIDERS

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• Great Britain	C.Fane	OS
• Hungary	G.Virág	FÖMI
• Italy	M.Pierozzi	IGM

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