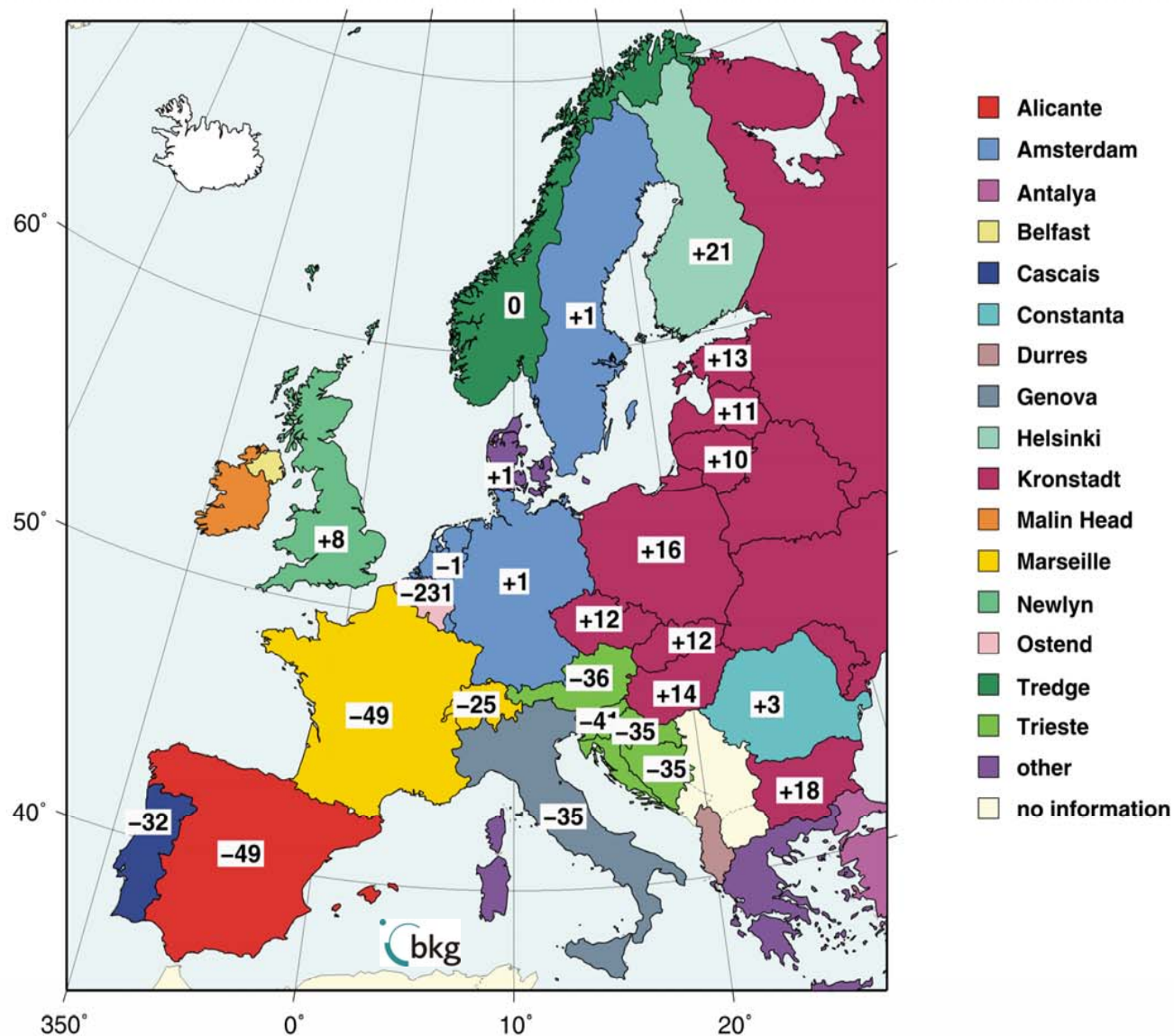


Approximated transformation parameters (only translation) from national height systems to EVRF2000 in cm



Realization of EVRS 2007

- **United European Leveling Network (UELN, REUN)** of Western Europe UELN55, NAP, geopotential numbers, networks 1.0 - UELN 73/86
- **Uniform Precise Leveling Network (EPNN)** of Eastern Europe: gauge Kronstadt, normal heights, networks 1.0. - EPNN 76 (HN 76), Map of the Recent Vertical Crustal Movements of Eastern Europe
- **On Request of CERCO:** EUREF- Symposium 1994 in Warsaw, establishing of an unified vertical datum for Europe at the 1-dm level
- First realization: **UELN95/98 as EVRF2000**
- 9th **EC GI-GIS** conference June 24-26 2003, La Coruna:
 - Need for harmonization of vertical reference of spatial coordinates

The EVRS definition fulfils the following four conventions:

1. The vertical datum is defined as the equipotential surface for which the Earth gravity field potential is constant:

$$W_0 = W_{0E} = \text{const.}$$

And is in the level of the Normals Amsterdam Peil (NAP).

2. The unit of length of the EVRS is the meter (SI). The unit of time is second (SI).

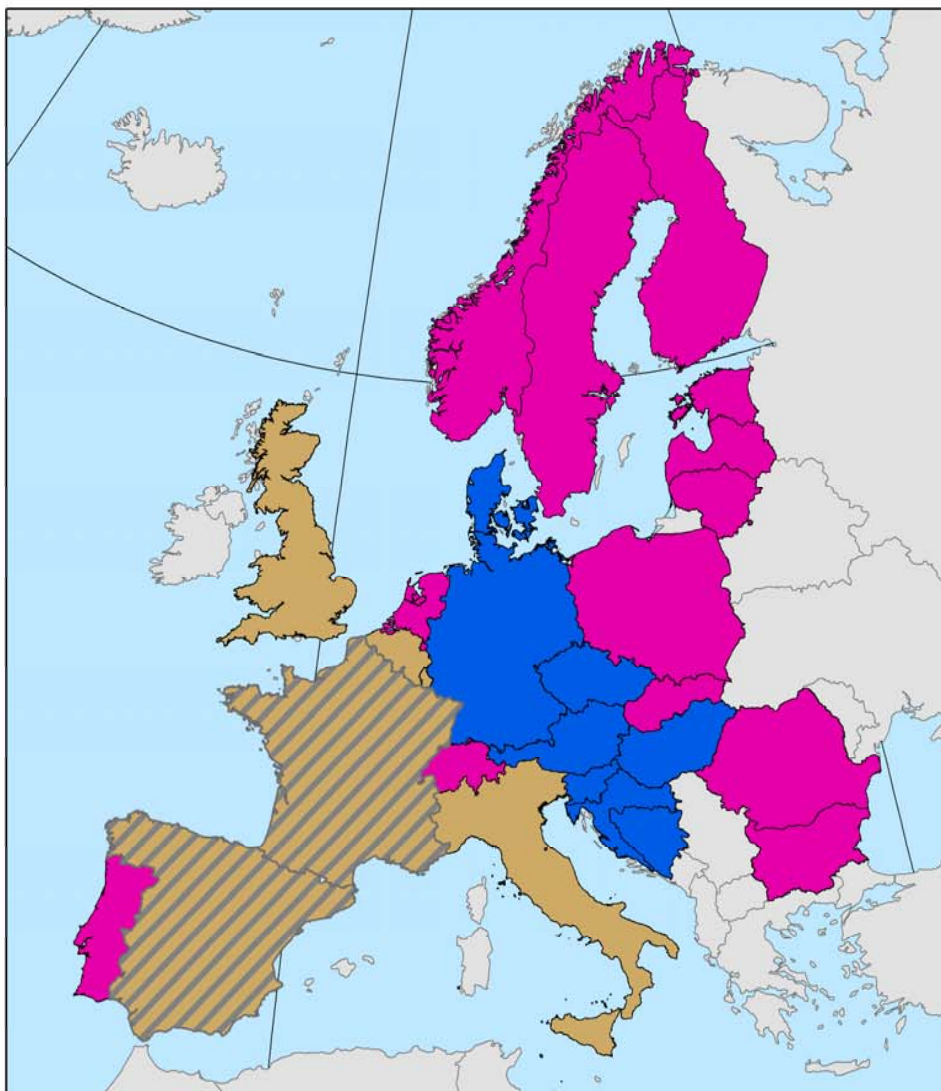
3. The height components are potential differences ΔW_P , also designated as **geopotential number c_P** :





$$-\Delta W_P = c_P = W_{0E} - W_P.$$

The metric equivalent is the **normal height**.

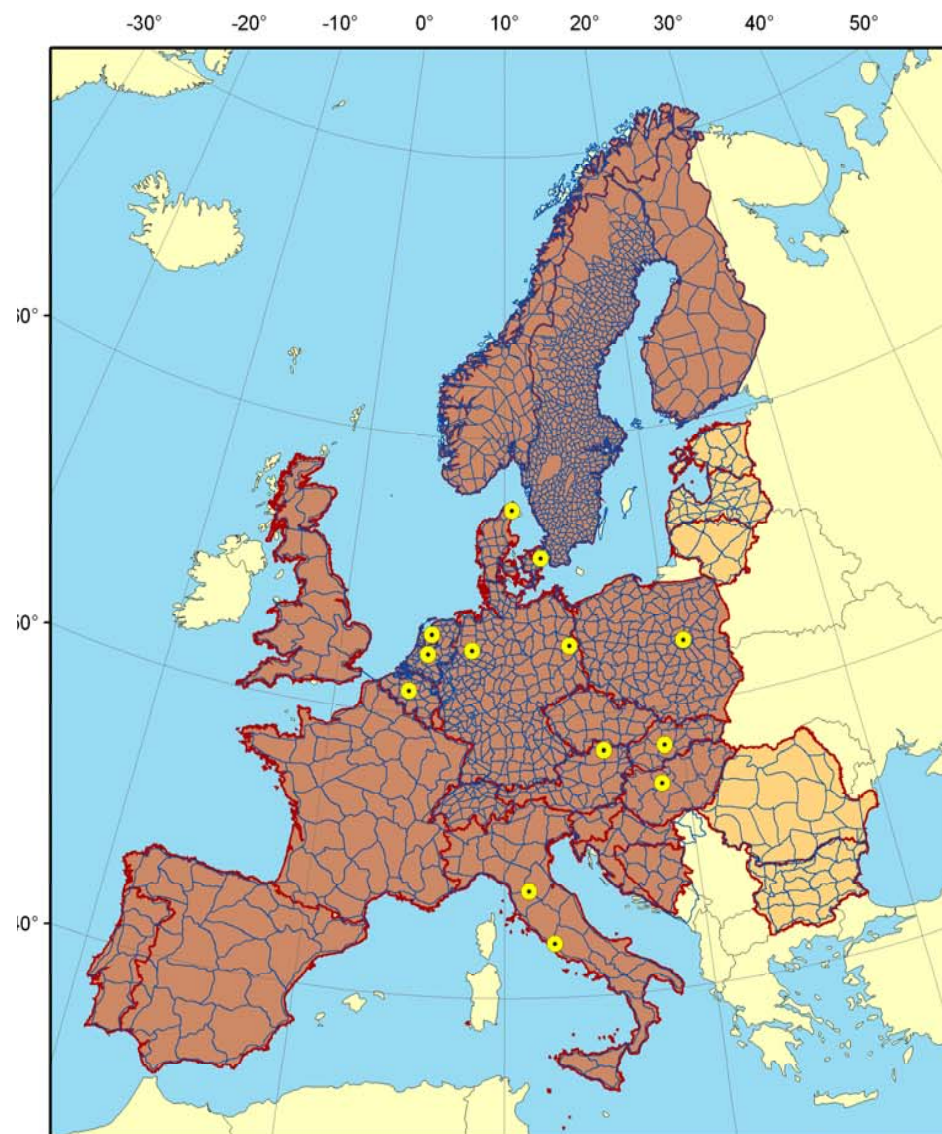
4. The EVRS is a **zero tidal system**.

Status of UELN data August 2007



-  data part of UELN 73/86
-  data part of UELN 95/98
-  data provided after 1998
-  new data announced




EVRF2007 datum points



- **Realization of EVRF2000 datum:**
reference point *000A2530 in the Netherlands*
- **Realization of EVRF2007 datum**
 - several datum points distributed over the stable part of Europe
 - participating countries were asked to propose stable points
 - 13/19 points have been used

• Datum points of EVRF2007

Extension of UELN

-  up to 1998
-  as from 2003
-  UELN lines

Summary of the adjustment parameters

- Datum realization by 13 datum points
- Reduction to the zero tidal system
- Reduction of the measurements to the epoch 2000 using the whole NKG2005LU model

Parameter	EVRF2000	EVRF2007
Number of datum points:	1	13
Number of unknowns:	3063	7939
Number of measurements:	4263	10347
Number of condition equations:	0	1
Degrees of freedom:	1200	2409
A-posteriori standard deviation referred to 1 km levelling distance in kgal·mm:	1.10	1.11
Mean value of the standard deviation of the adjusted geopotential numbers ($\hat{=}$ heights), in kgal·mm:	19.64	16.05
Average redundancy:	0.281	0.233

- Resolution No.3 EUREF symposium June 2008 Brussels:
 - Adoption of EVRF2007 as new realization of the European Vertical Reference System
 - proposed to the EC for adoption as the vertical reference for pan-European geo-information
- At the EUREF symposium 2008 all of the countries agreed to exchange the data of the UELN nodal points between all participating countries
- Delivery of the final results is planned for October 2008

Measuring creates knowledge

Knowledge increases by distribution

Preliminary Delivery of the Results

Handing over to the participating countries at May 5th 2008:

- Draft: “*EVRF2007 as Realization of the European Vertical Reference System*”
- Draft: “*Conventions for the Definition and Realization of a European Vertical Reference System (EVRS)*”
- 2 files with adjustment results
 - a) point related data
 - b) measurement related data
- Because of missing agreement on data exchange only the national part of the results have been handed over to the respective country.

Final Delivery of the Results

- Splinter meeting at the EUREF symposium in Brussels about data exchange
- All participating countries except for Bosnia/Herzegovina agreed to exchange complete results (adjusted heights and coordinates)
- Final results without the points of Bosnia/Herzegovina will be delivered in the next weeks to all countries
- Bosnia and Herzegovina will get only there own adjusted points

Country	ID	written agreement	agreement in Brussels	remark	refusal
Austria	AT		X		
Bosnia/Herzegovina	BA	absent at the symposium, no answer to letters			
Belgium	BE		X		
Bulgaria	BG	X			
Switzerland	CH	X	X		
Czech Republic	CS		X		
Germany	DE		X		
Denmark	DK	X		only points	
Estonia	EE		X		
Spain	ES		X		
Finland	FI		X		
France	FR		X		
Great Britain	GB		X	only points	
Croatia	HR	X			
Hungary	HU		X		
Italy	IT	X			
Lithuania	LT	X	X		
Latvia	LV	X	X		
the Netherlands	NL		X		
Norway	NO	X			
Poland	PL		X		
Portugal	PT		X		
Romania	RO	X	X		
Sweden	SE	X	X		
Slovenia	SI	X			
Slowakia	SK	X			