Development of UELN

- Last UELN action reported to TWG: Integration of the Bulgarian 1st Order Levelling Network in October 2003
- In 2004 new data of Denmark and the Netherlands were available
- Data set of Denmark:
  - in principle the same epoch of measurements as in the last version
  - observations related between nodal points
  - without groups of nodal points with very short distances
  - old data set: 735 nodal points and 1036 measurements,

    s_0 = 0.6 mm/km
  - new data set: 66 points and 100 measurements,

    s_0= 0.85 mm/km.

- **Problem 1: Connection to Sweden**
  - **new connection across the bridge cannot be used because of the boundary points in Sweden are not available**
  - **old connection between Helsingør and Helsingborg belongs to a previous epoch → inconsistencies to the new Danish data.**

- **Problem 2: New epoch of The Netherlands, changes of heights after new epoch between about –200 mm and + 20 mm**

- **Problem 3: New data set of The Nrtherlands is not related to reference point of UELN 000A2530**

Conclusions:

(1) For a readjustment of UELN the new levelling data of the Nordic Countries has to be provided.

(2) New definition of the UELN datum is necessary.

Results of two test computations:

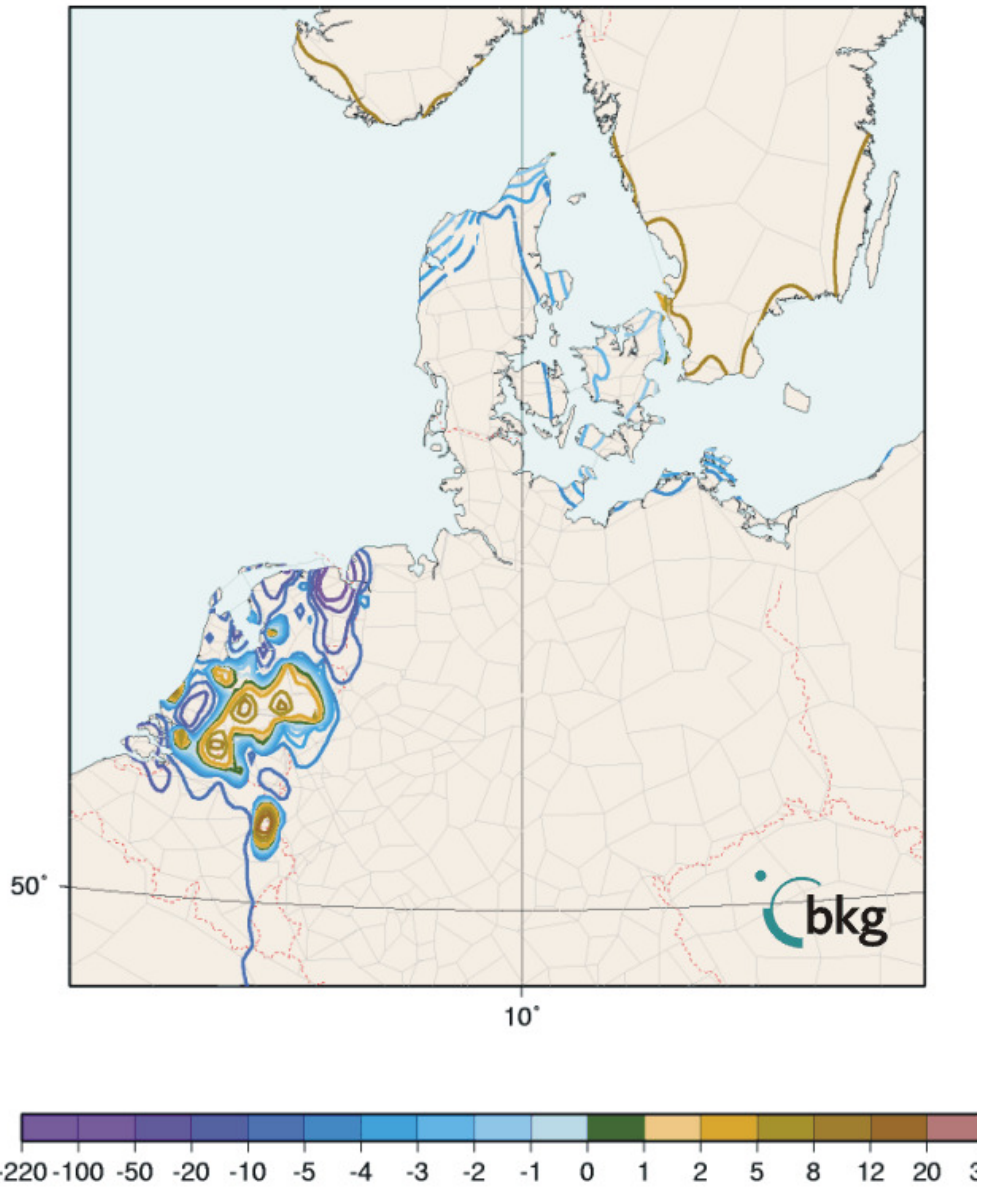
a) **Substitution of the reference point of UELN 000A2530 by point 000A1112. This point has a minimal height change during the last 40 years. The height of the last adjustment UELN95/98 was fixed.**

b) **Free adjustment of new UELN without Scandinavia with 23 datum points all over Europe with the same height as in the adjustment UELN95/98. (Condition equation: Sum of residuals in the 23 national datum points is zero)**

Preliminary results:

- **Variant a): The height changes in the Dutch network is distributed over the whole UELN and changes heights of about –7 mm also in Bulgaria.**
- **Variant b): Height changes over whole UELN is about 1 to 2 mm or less, the standard deviation is less than 1 mm.**

UELN with new data of DK and NL
Differences to the heights of the last adjustment version in kgal·mm
Version with reference point 000A1112 in NL



UELN with new data of DK and NL
Differences to the heights of the last adjustment version in kgal·mm
Version with 23 Datum points