# Geopotential Deutsche Nordsee

# The Quaternary base of the German North Sea; first results of the project Geopotential of the German North Sea (GPDN) module–A2

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**Introduction:**

The quaternary succession of the German North Sea has rarely been studied as a whole during the past decades. So far only one publication of BRÜCKNER-RÖHLING et al. (2005) presented a map (Fig.1) of the depth the Quaternary deposits reaching down to 850m deposits, however without any stratigraphic subdivisions or onshore connection. While other authors deal with more local structures like glacial tunnel valleys (LUTZ et al., 2009) or the local correlation of wells like SCHWARZ (1996a,b), just to name a few.

Within the module-A2 of the project Geopotential Deutsche Nordsee (GPDN) we collect, review, classify and reinterpret if necessary the data that have been accumulated within the campaigns of the BGR (seismic surveys (Fig.2), vibrocores, datings), the BSH (subbottom profiles, vibrocores) and from the offshore activities of the oil companies (deeper seismic and well information). From these data we are going to create a 3D model of this sedimentary succession. We started with the interpretation on a set of seismic lines (Fig.3) providing a good cover of the area because we lack of sufficient deep and stratigraphically analysed boreholes (Fig.4). We here present as a first result a revised and enhanced map of the base of Quaternary deposits in the German North Sea (Fig.5).

The presented new surface shows some deviations from the established surface (Fig.6a). The differences in depth below sea bottom relatively to the old surface range from app. +100m to almost -400m (Fig.6b). The actual base of the Quaternary is lower increasing the total thickness of the deposits to more than 1000m in the NW part. This first surface already shows a good corellation with some stratigraphically analyzed borholes (Fig.7).

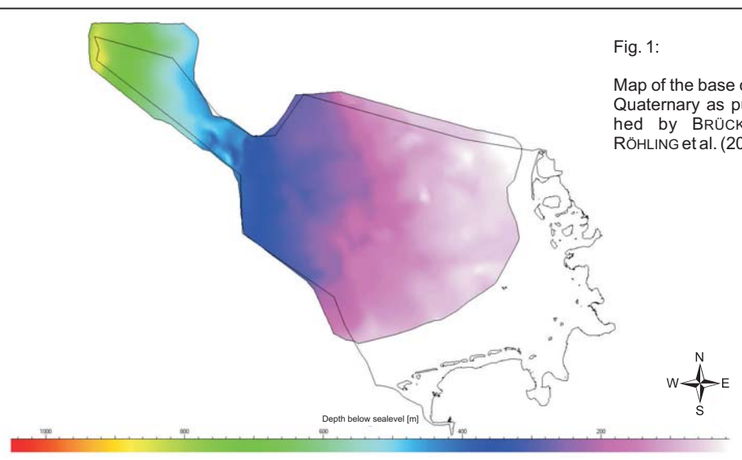


Fig. 1:

Map of the base of the Quaternary as published by BRÜCKNER-RÖHLING et al. (2005).


Fig. 2:

Map of BGR seismic survey lines of the German North Sea mainly from 1990 until 2007.

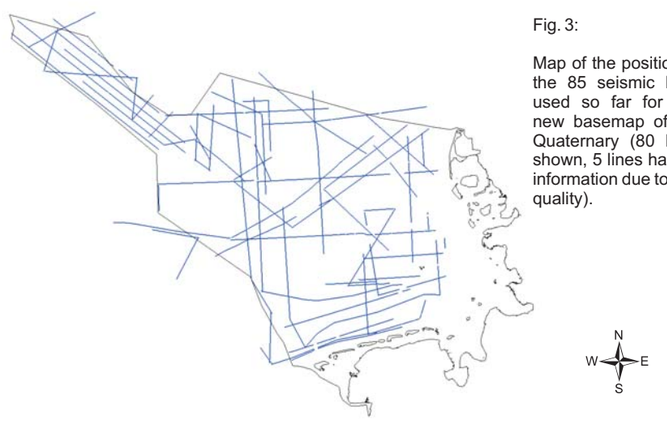


Fig. 3:

Map of the position of the 85 seismic lines used so far for this new basemap of the Quaternary (80 lines shown, 5 lines had no information due to bad quality).

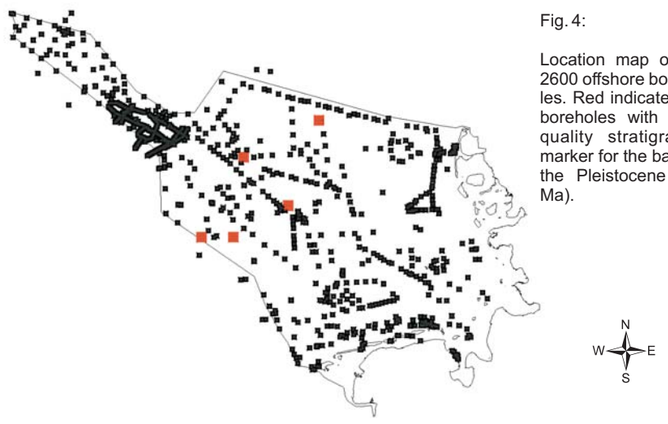

Fig. 4:

Location map of the 2600 offshore boreholes. Red indicates the boreholes with good quality stratigraphic marker for the base of the Pleistocene (2,6 Ma).

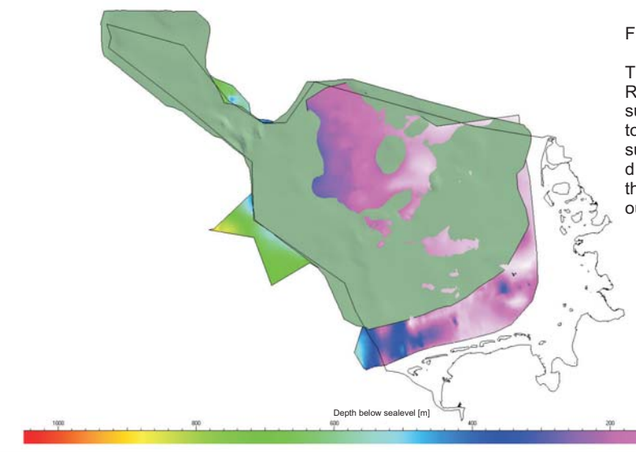


Fig. 6a:

The BRÜCKNER-RÖHLING et al. (2005) surface (single colour) together with the new surface visualizing the difference between the old surface and our new surface.

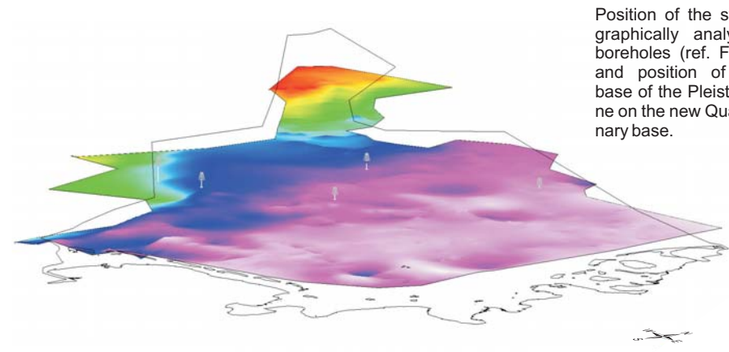

Fig. 7:

Position of the stratigraphically analyzed boreholes (ref. Fig.4) and position of the base of the Pleistocene on the new Quaternary base.

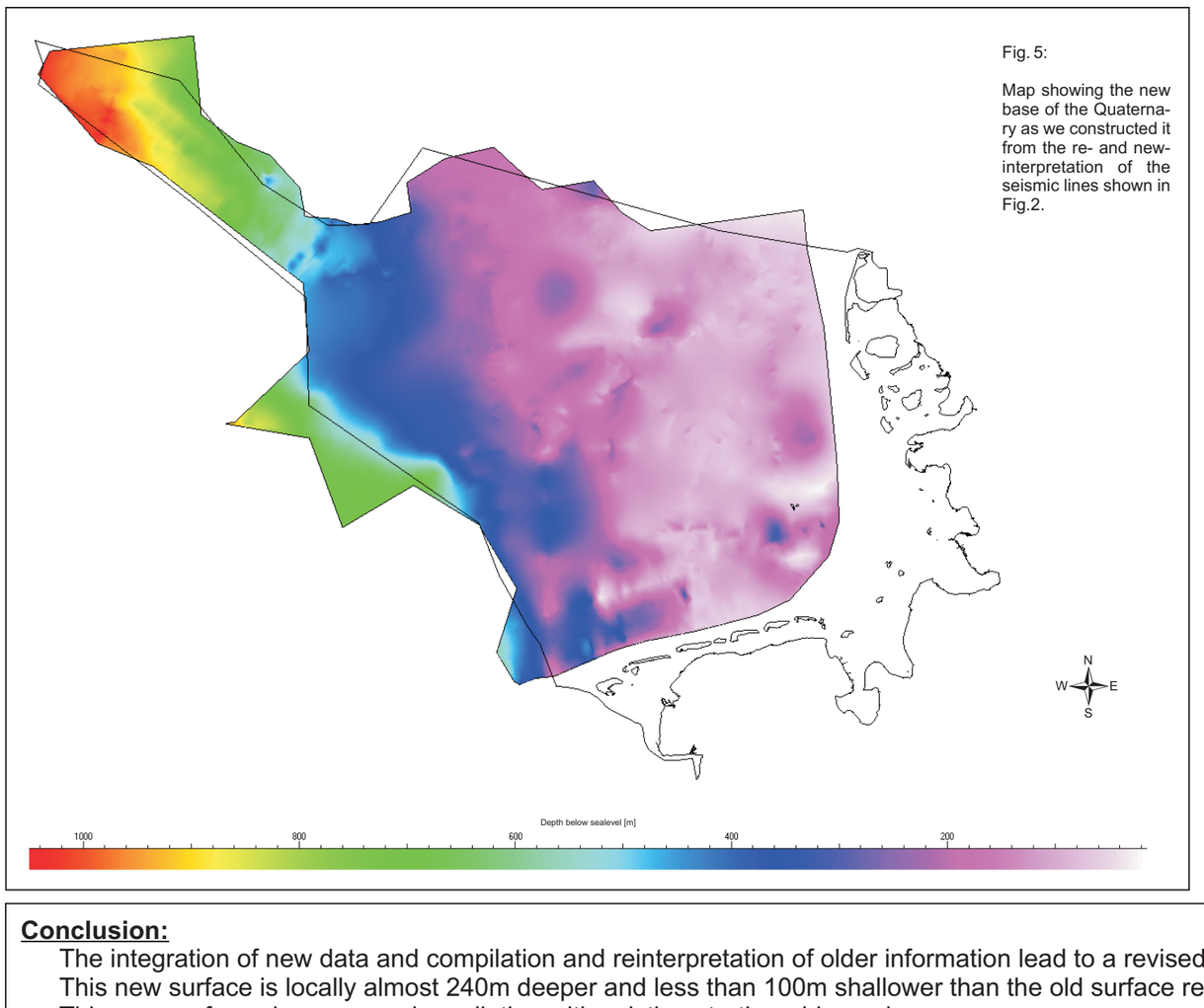


Fig. 5:

Map showing the new base of the Quaternary as we constructed it from the re- and new-interpretation of the seismic lines shown in Fig.2.

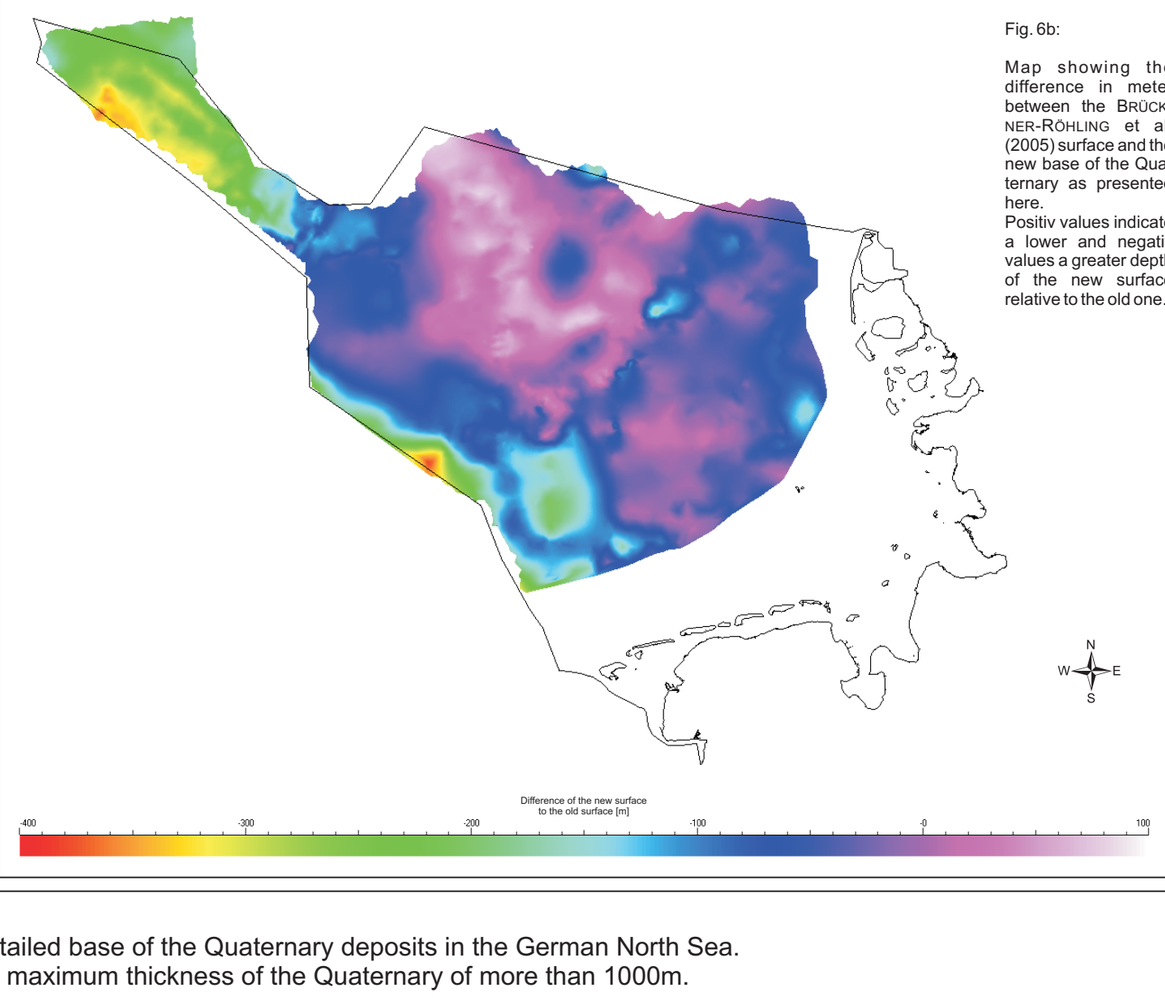


Fig. 6b:

Map showing the difference in meter between the BRÜCKNER-RÖHLING et al. (2005) surface and the new base of the Quaternary as presented here.

Positiv values indicate a lower and negativ values a greater depth of the new surface relative to the old one.

**Conclusion:**

The integration of new data and compilation and reinterpretation of older information lead to a revised more detailed base of the Quaternary deposits in the German North Sea.
This new surface is locally almost 240m deeper and less than 100m shallower than the old surface revealing a maximum thickness of the Quaternary of more than 1000m.
This new surface shows a good corellation with existing stratigraphic markers.

The further steps will be:

- Interpretation and integration of borehole data as far as possible and available.
- Integration of shallow seismic and subbottom lines especially in the areas close to the coast and/or with a thin Pleistocene succession.
- Reprocessing of seismic data for better data quality in the near surface areas if possible.
- Connecting this surface to the onshore areas (app. 8.5km to Sylt; app. 4km to Langeoog).
- Filling the holes in the seismic lines with additional data.

**Literature:**

Brückner-Röhling, S., Forsbach, H. & Kockel, F. (2005): The structural development of the German North Sea sector during the Tertiary and the Early Quaternary. Zeitschrift der Deutschen Gesellschaft für Geowissenschaften, 156: 341-356.

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