

Multi-source seamless maps and composite data products serving multiple end users - Seabed geology in the southern North Sea

Lars Kint, Vera Van Lancker, Fabien Paquet, Heather Stewart, Sytze van Heteren, Kristine Asch

EMODnet Geology provides free access to marine geological data in Europe. Composite data products, at various scales, have been created by 39 cooperating geological surveys and scientific institutes, ensuring the traceability of the original data and initial approaches. Use of international standards, including INSPIRE-compliant vocabularies, and uniform methodologies was crucial to maximise the likelihood of harmonised data products. Although huge progress has been made in unified mapping of seabed geology, challenges remain in cross-border and land-sea areas. A plethora of data sources leads to (1) data overload and data conflicts in certain regions, while data scarcity and data gaps persist in others; (2) diversity of scales and varying degrees of detail; and (3) different glossaries and hierarchies fitting the original mapping purposes. Simple harmonisation towards a common denominator can be done for seamless mapping, though this often results in loss of information. For the southern part of the North Sea, partners from Belgium, France, the Netherlands and the UK are looking into solutions to overcome those discrepancies. By sharing, comparing and revising existing geological data, descriptions and classification schemes could be improved. Agreements are sought to resolve terminological and hierarchical issues concerning the applicability of standard vocabularies, reducing mismatches. It enabled the construction of full-coverage maps at aggregated levels and partial-coverage maps when showing more detail. Blanks and knowledge gaps are highlighted for future targeted efforts and data acquisition. When complete, EMODnet maps of specific geological features provide the flexibility to serve multiple end users, from regional authorities to pan-European strategists.

Multi-source seamless maps and composite data products serving multiple end users - Seabed geology in the southern North Sea

Lars Kint^{1*}, Vera Van Lancker¹, Fabien Paquet², Heather Stewart³, Sytze van Heteren⁴, Kristine Asch⁵



¹Royal Belgian Institute of Natural Sciences (RBINS) - Operational Directorate Natural Environment (OD Nature),
²Bureau de Recherches Géologiques et Minières (BRGM) - Service géologique national, ³British Geological Survey (BGS),
⁴TNO - Geological Survey of the Netherlands, ⁵Federal Institute for Geosciences and Natural Resources (BGR),
 *lkint@naturalsciences.be



ARTEFACTS IN COMPOSITE STANDARDISED MAPS

As part of EMODnet Geology, information on geological age (stratigraphy), sediment material (lithology) and bedforms (geomorphology) of the European marine seafloor and subsurface are compiled and converted following INSPIRE geological data specifications. The process of data collection and standardisation into an increasingly detailed format is currently rather limited and inflexible. For many end users, such composite maps are therefore difficult to understand. This preliminary case study of the southern North Sea and English Channel already shows progress in (1) **cross-border harmonisation**, (2) **mapping at different scales**, (3) providing geological information at various **hierarchical levels**, and (4) making **appropriate use of standardised terms**.

WAYS TO ACHIEVE HARMONISED END PRODUCTS

- ✓ The addition of public and private (industry) data from onshore to nearshore, and adjacent offshore reduces border artefacts in land-sea areas and between neighbouring maritime zones.
- ✓ Consensus between neighbouring countries when supplied data products with variable scaling are being merged.
- ✓ Agreement on a hierarchy of terms in producing maps showing features at uniform levels of legend granularity. A map may be full coverage at one hierarchical level and have only partial coverage at increasing granularity.
- ✓ Coordinated use of standardised glossaries so that mapping is not only on an equal hierarchical scale, but is also given an equivalent status and value.

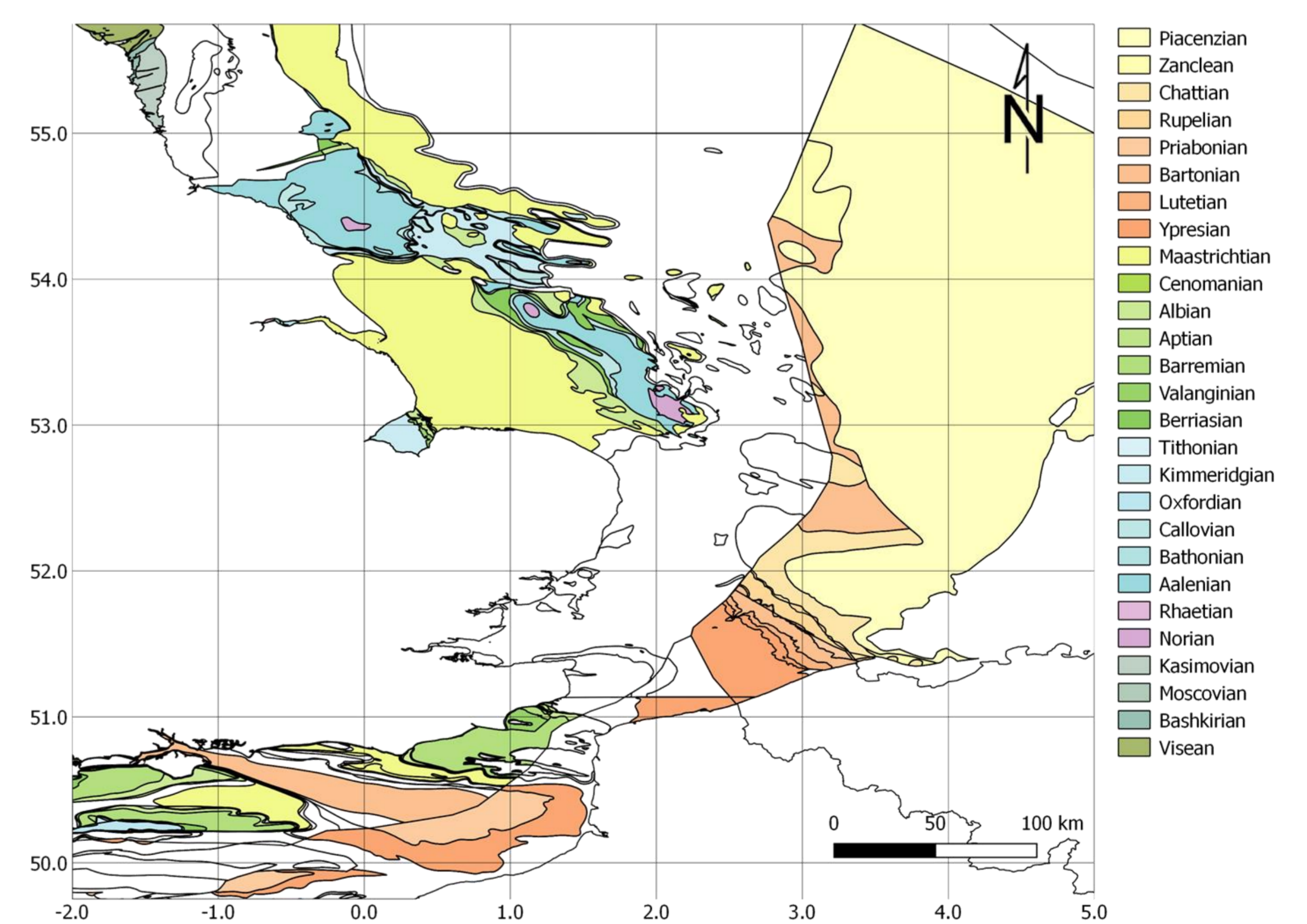
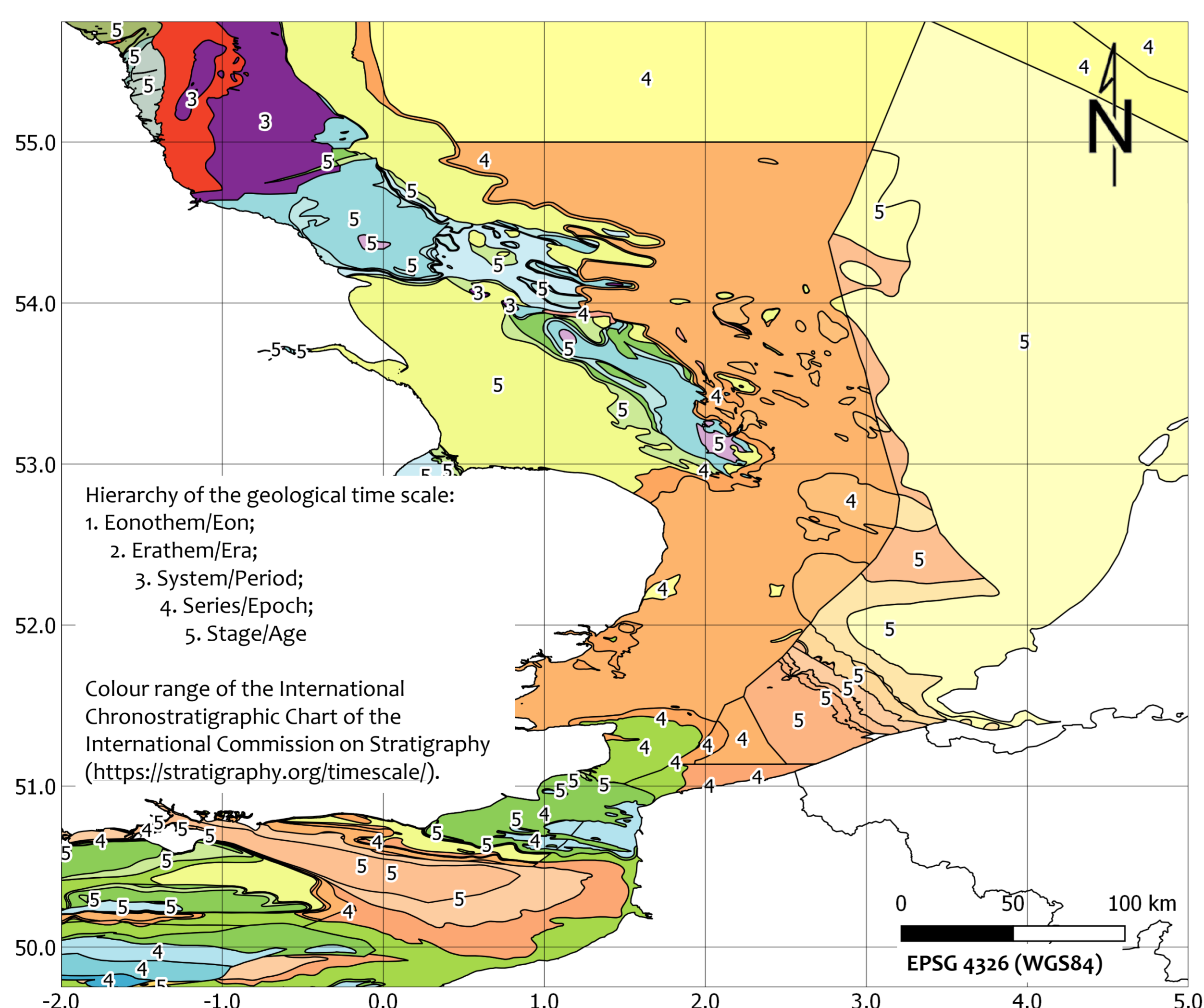
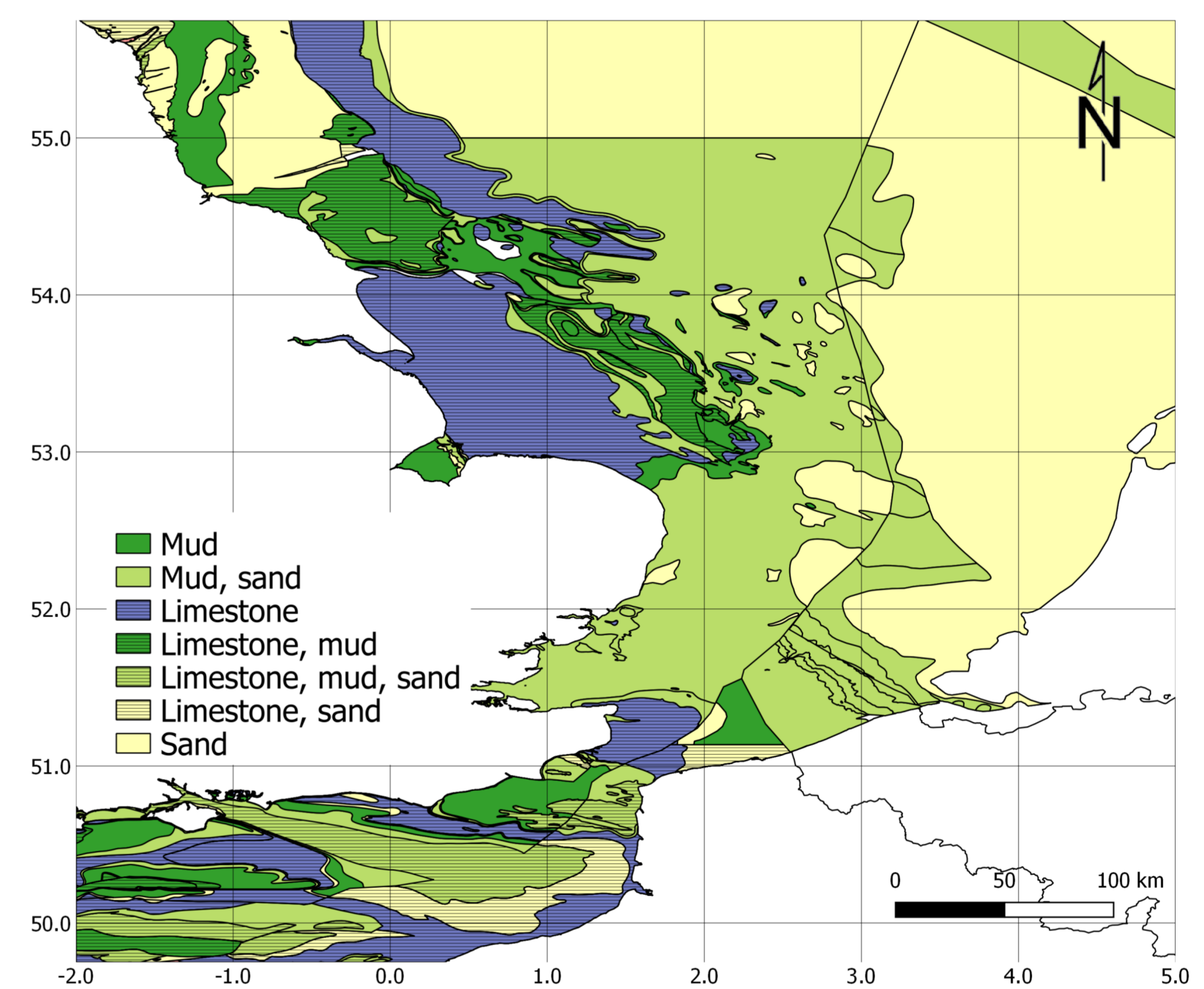
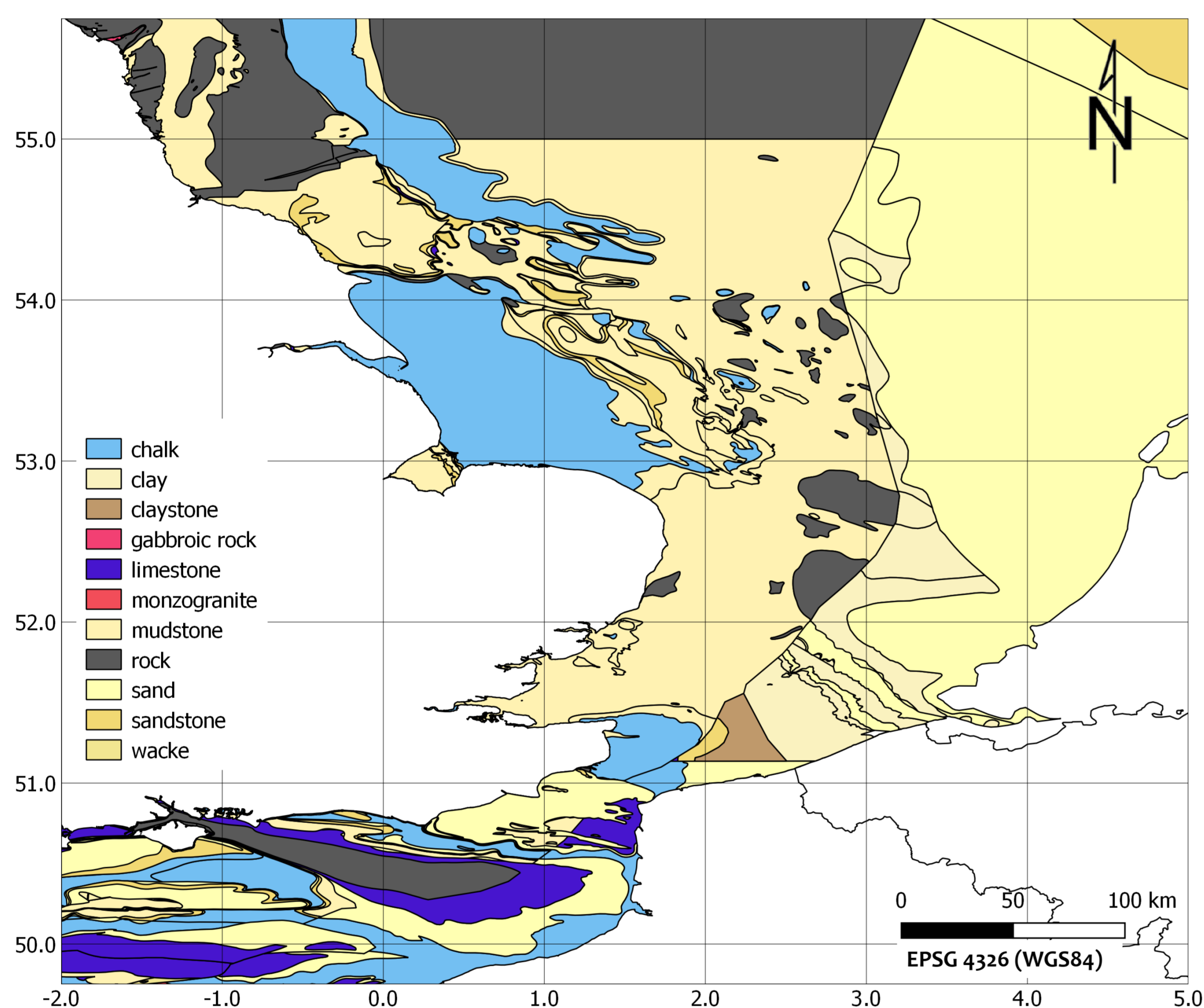


Figure 1. The current composite Pre-Quaternary map of lithology (top left) and geological age (bottom left) in the southern North Sea and English Channel with following mapping artefacts: (1) shifting border crossings, (2) overlapping data products, (3) differential hierarchical levels, and (4) non-coordinated use of standardised vocabularies. From this, simplified sediment (top right) and age (bottom right) maps can be derived by structuring the geological information according to its hierarchy, status and value. Eventually, fully harmonised maps with multiple scales are planned in future initiatives.