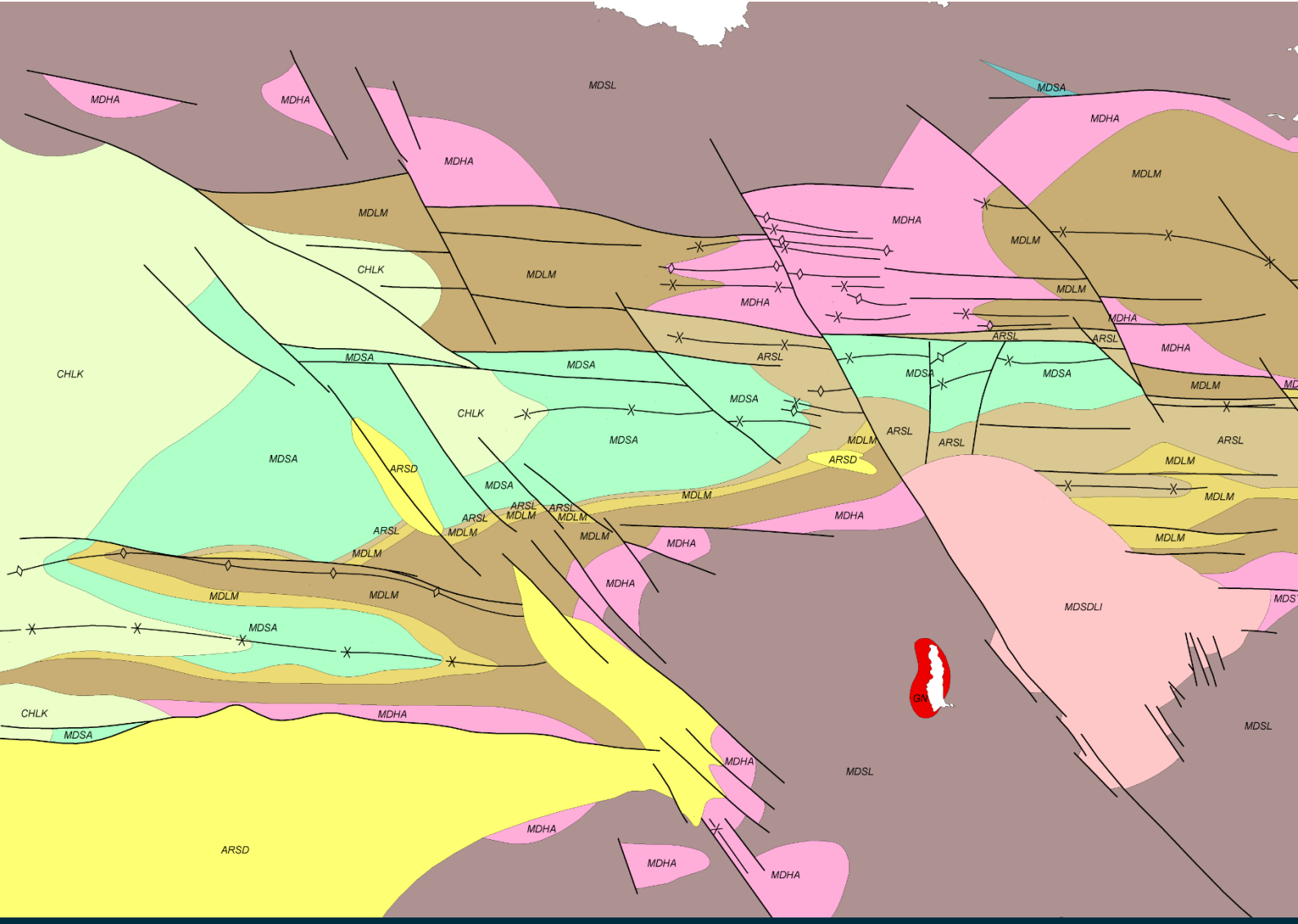

BGS INFORMATICS

User Guide: BGS Offshore Bedrock 250k

Open report OR/21/009

British Geological Survey

BRITISH GEOLOGICAL SURVEY

BGS INFORMATICS

OPEN REPORT OR/21/009

User Guide: BGS Offshore Bedrock 250k Dataset

British Geological Survey

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Keywords

Bedrock, Geospatial, Stratigraphy, Lithology, Continental shelf, Structural geology.

Front cover

Example of the BGS Offshore Bedrock 250k dataset, from the Bristol Channel.

Bibliographical reference

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Keyworth, Nottingham British Geological Survey 2021

BRITISH GEOLOGICAL SURVEY

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The British Geological Survey carries out the geological survey of Great Britain and Northern Ireland (the latter as an agency service for the government of Northern Ireland), and of the surrounding continental shelf, as well as basic research projects. It also undertakes programmes of technical aid in geology in developing countries.

The British Geological Survey is a component body of UK Research and Innovation.

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Foreword

The British Geological Survey (BGS) is a world-leading geological survey, focusing on public-good science for government, and research to understand earth and environmental processes.

We are the UK's premier provider of objective and authoritative geoscientific data, information and knowledge to help society to:

- use its natural resources responsibly
- manage environmental change
- be resilient to environmental hazards

We provide expert services and impartial advice in all areas of geoscience. As a public sector organisation, we are responsible for advising the UK Government on all aspects of geoscience as well as providing impartial geological advice to industry, academia and the public. Our client base is drawn from the public and private sectors both in the UK and internationally.

The BGS is a component body of the Natural Environment Research Council (NERC), part of UK Research and Innovation (UKRI).

DATA PRODUCTS

The BGS produces a wide range of data products that align with government policy and stakeholder needs. These include baseline geological data, engineering properties and geohazards datasets. These products are developed using in-house scientific and digital expertise and are based on the outputs of our research programmes and substantial national data holdings.

Our products are supported by stakeholder focus groups, identification of gaps in current knowledge and policy assessments. They help to improve understanding and communication of the impact of geo-environmental properties and hazards in Great Britain, thereby improving society's resilience and enabling people, businesses, and the government to make better-informed decisions.

Acknowledgements

The BGS Offshore Bedrock 250k dataset depicts the distribution of the different types of bedrock on the UK Continental Shelf. A large number of individuals in BGS have contributed to data acquisition, interpretation, mapping and publication of the first offshore bedrock paper maps (known as solid geology) during the BGS Offshore Mapping Programme (1970s-1980s) supported by the then Department of Energy. Their work was crucial for the creation of this dataset.

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Summary

The BGS Offshore Bedrock 250k dataset is a digital geological map portraying the bedrock geology of the UK Exclusive Economic Zone (EEZ) at a scale of 1:250 000. This comprehensive product provides a digital compilation of the original paper maps published by BGS at the same scale with additional re-interpretation from regional geological studies.

The composition, age and deformational history of the rocks underlying the seabed are important for a range of stakeholders, including marine habitat mappers, marine spatial planners and offshore industries (in particular, the cable, pipeline and dredging industries).

This information is arranged in two GIS layers:

- Bedrock Lithostratigraphy and
- Bedrock Structural geology.

The polygons within the Bedrock Lithostratigraphy layer show the spatial distribution of the principal lithostratigraphical units (formations and groups). The structural geology layer comprises polylines which show the location and extent of known structural features such as faults and folds.

The BGS Offshore Bedrock 250k dataset covers most of the UK EEZ and some of the adjacent waters. This small-scale mapping was derived from geophysical data (e.g. airgun, boomer, sparker, sidescan sonar, magnetometer, gravity meter) and data obtained from commercial wells and BGS shallow boreholes. The variations in data density will be reflected in the detail of the mapping.

This dataset can be used in conjunction with other small scale offshore geological datasets:

- BGS Seabed Sediments dataset (BGS, 2021a)
- BGS Seabed Hard Substrate dataset

This user guide provides the information required to enable the reader to understand and use this BGS data product.

1 Introduction

1.1 WHAT THE DATA SHOW

The BGS Offshore Bedrock 250k dataset portrays the bedrock underlying the seabed of the UK Exclusive Economic Zone (EEZ) and is part of the British Geological Survey collection of offshore digital maps at that scale.

The bedrock underlying the seabed comprises numerous rock types formed at different periods of geological time. These rocks have different physical properties, such as grain size, mineral composition, texture, colour and layering, depending on the processes that formed them or that may have affected them since their formation. This digital map delineates the principal lithostratigraphical units (formations and groups), describing the nature (lithology) and age (stratigraphy) of the bedrock. Structural features, such as faults and folds, observed at the rockhead are also provided by the mapping. An example of the data can be seen in Figure 1.

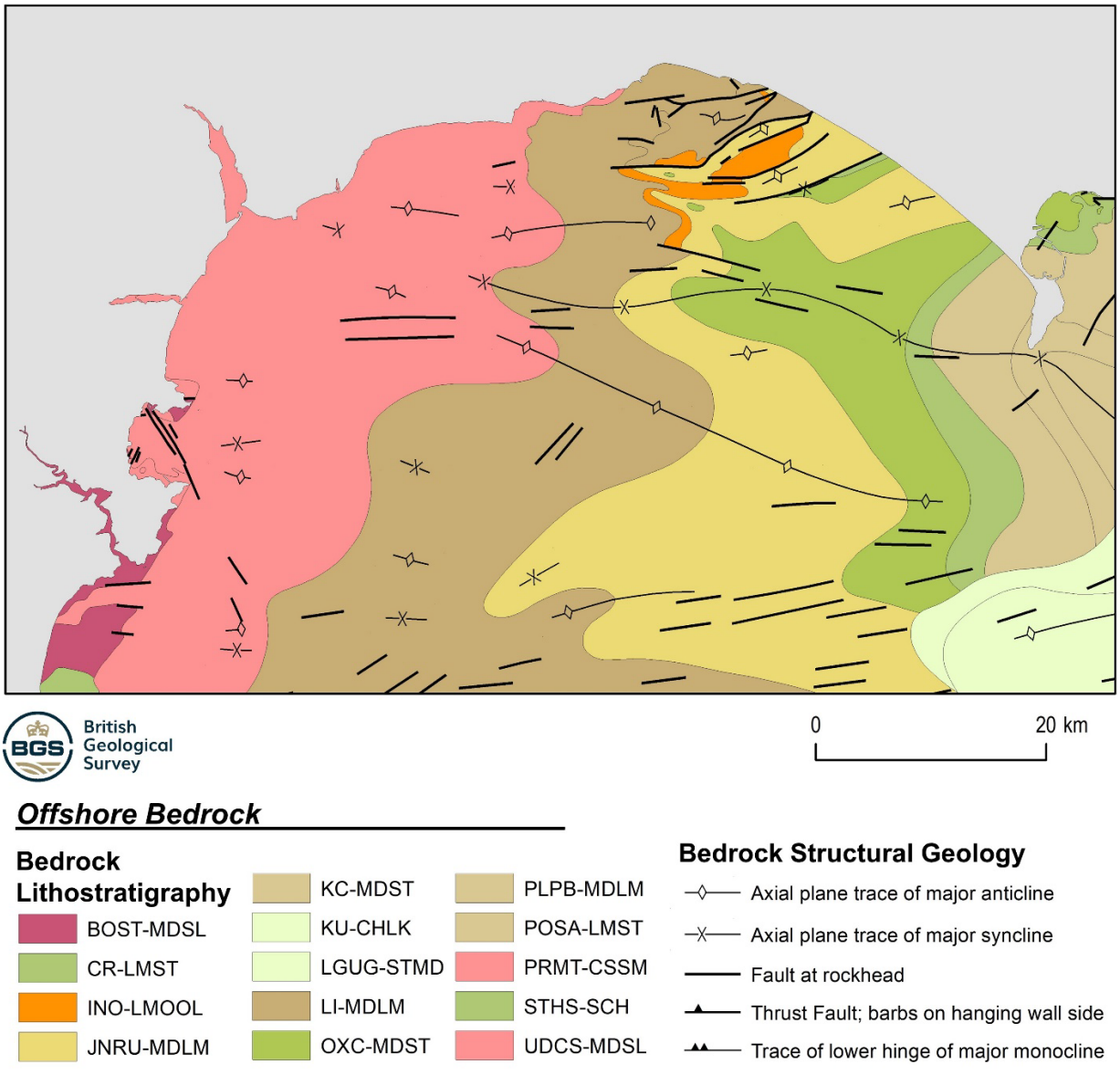

Figure 1 - Example of the BGS Offshore Bedrock 250k dataset [Contains OS data © Crown copyright and database rights 2020’].

1.2 BACKGROUND TO THE DATASET

The BGS Offshore Bedrock 250k dataset results from digitising existing printed bedrock geology 1:250 000 map series (or 'solid geology' as the series was known). It includes additional re-interpretation from regional geological studies across the EEZ. The BGS Offshore 1:250 000 geological map series was published between 1977 and 2000, with a few special sheets up to 2009. The 'Solid Geology' maps were compiled on the basis of sub-seabed seismic information, supplemented by samples acquired from boreholes or shallow rock cores. Most of the data were collected as part of the BGS Offshore Mapping Programme of the 1970's – 1980's (funded by the then Department of Energy).

1.3 WHO MIGHT REQUIRE THE DATA?

The distribution of bedrock is important to a range of stakeholders connected to marine industries including fishing, shipping, aquaculture, renewable energy (wind, wave and tidal power), marine infrastructure, and aggregate industry. Presence and type of bedrock on the seabed is a particularly important characteristic in determining things like the distribution of different habitats, especially for those organisms living on the seabed and so is key to determining key of seabed habitat maps and supporting marine management. However, the bedrock map is primarily aimed at sectors currently seeking information to assist in foundation design for the growing network of offshore infrastructure to be found across most of the UK Exclusive Economic Zone (EEZ).

2 Case Study: assessing foundation conditions on the seabed

2.1 THE CHALLENGE

For over a decade now, there has been a growing drive to develop a new offshore renewable energy capability to help meet UK domestic energy demand and enhance energy security, whilst also progressing towards Net Zero targets. However, prior to the installation of any offshore infrastructure development, a detailed understanding of seabed geology is required. For instance, the bedrock lithology will have a strong impact on the bearing capacity of any offshore foundation that extends below the Quaternary / Bedrock interface. Plus, bedrock affected by jointing, fracturing and differential weathering can present higher variability in composition and strength. Therefore, bedrock geological variations may have an impact on the engineering design of offshore infrastructure and the cost of its installation.

2.2 WHAT WAS THE SOLUTION?

The Crown Estate (TCE), responsible for leasing sites for several offshore activities, led a project to assess seabed development opportunities across the UK Continental Shelf (UKCS) - Seabed Characterisation project. The primary goal of the project was to gather evidence that characterises the geological conditions that would impact the installation of several types of foundations. Allowing TCE to better manage competing demands for space across a breadth of offshore sectors and potentially unlock opportunities for sustainable development. As part of this project, the BGS produced a suite of digital geological map layers, which show a range of geological factors (such as Bedrock Summary Lithologies) and how they vary geographically across the UKCS, and the constraints that these factors may place on engineering infrastructure.

2.3 WHAT WERE THE OUTCOMES?

BGS has extensive databases of Bedrock lithology with over 12000 separate codes for the onshore and 313 codes covering the offshore area. In order to reduce these to a more manageable classification, various classes based on lithological groups and age of rock were trialled and considered to be a good indicator for strength in that younger rocks tend to be less

cemented and hence weaker. After several iterations to create classes to accommodate bedrock lithologies mapped within DiGRock250k Version 3, a classification was established, which groups the bedrock lithologies (rock types) into classes based on similar engineering geology characteristics.

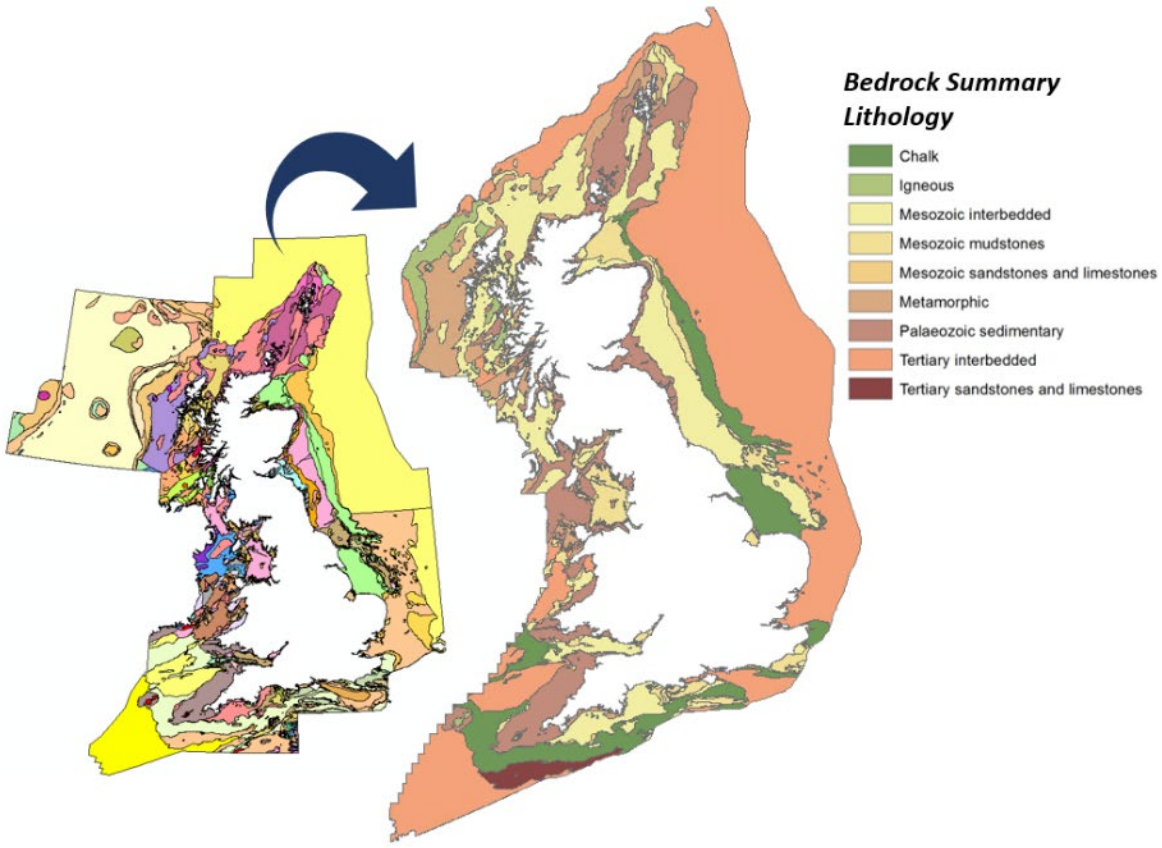

Figure 2 - Visual summary of the creation of the BGS/TCE Bedrock Summary Lithologies layer based on the BGS Offshore Bedrock 250k dataset, by establishing 9 groups of bedrock lithologies (rock types) based on similar engineering geology characteristics. UKEEZ boundary: © UK Hydrographic Office. United Kingdom, Overseas Territories and Crown Dependencies Limits and Boundaries Dataset, UK Hydrographic Office, Jan 19, 2023, licensed under the Open Government Licence https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/. UK Coastline: Ordnance Survey data © Crown Copyright and database rights 2021.

2.4 THE PRODUCTS USED

The primary BGS dataset used in this example was the BGS Offshore Bedrock 250k (BGS, 2021b; https://www.bgs.ac.uk/datasets/marine-bedrock-250k/).

3 Methodology

3.1 ORIGINAL SURVEY

The broad-scale mapping of the bedrock geology of the UK continental shelf, presented in the 'solid geology' 1:250 000 paper map series, was derived from geophysical data (e.g. airgun, boomer, sparker, sidescan sonar, magnetometer, gravity meter) and complemented by cores data obtain from commercial wells and BGS shallow boreholes. Most of this data was acquired in the 1970s and 1980s, during the BGS Offshore Mapping Programme. The locations of the seismic profiles and cores are available on the BGS Offshore GeoIndex (BGS, 2021c).

This mapping programme was principally at a reconnaissance level and, therefore, the individual data sources could be several kilometres apart. The interpretations are consequently the result of extrapolation between widely distributed information. To improve the interpretation of the bedrock geology wherever possible, the geologists were able to make use of information provided by the offshore industry, such as site investigation reports. Therefore, the variations in data density are reflected in the detail of the resultant geological map.

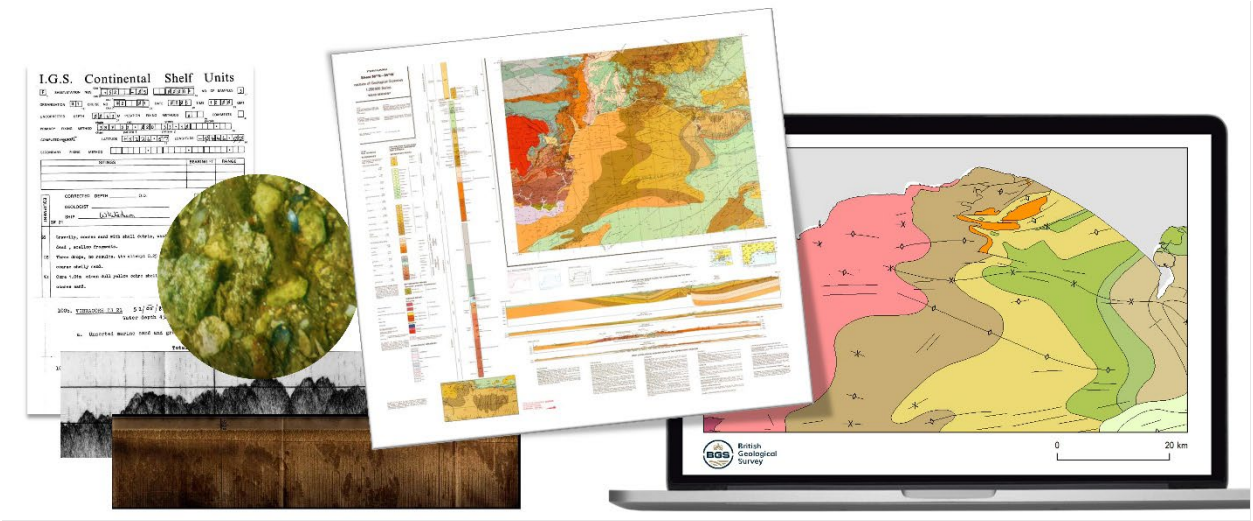

Figure 3 - Visual summary of the process of generation of the BGS Offshore Bedrock 250k dataset, from the data collected during the BGS Offshore Mapping Programme (left) to the published paper maps (centre) and the release of the geospatial product (right).

3.1 DIGITAL CAPTURE

The BGS Offshore Bedrock 250k digital map data was created by digitising the linework presented in the printed Solid Geology 1:250 000 map series. However, the content may differ from the information shown on some of the original paper maps. During compilation, the digital data was modified in some areas 1) to improve nomenclature, 2) to correct identified errors on printed maps and, 3) to include additional or revised geological interpretations that have been created since the publication of the printed maps.

4 Technical Information

4.1 SCALE

This dataset is produced for use at a 1:250 000 scale. This scale data should not be relied on for local or site-specific geology, or navigation. The British Geological Survey should be contacted if more detailed mapping is required as additional geological information may be available in BGS files, or we may be able to direct enquirers to other bodies or third parties.

4.2 COVERAGE

The BGS Offshore Bedrock 250k dataset covers the majority of the UK EEZ and some of the adjacent waters (Figure 4).

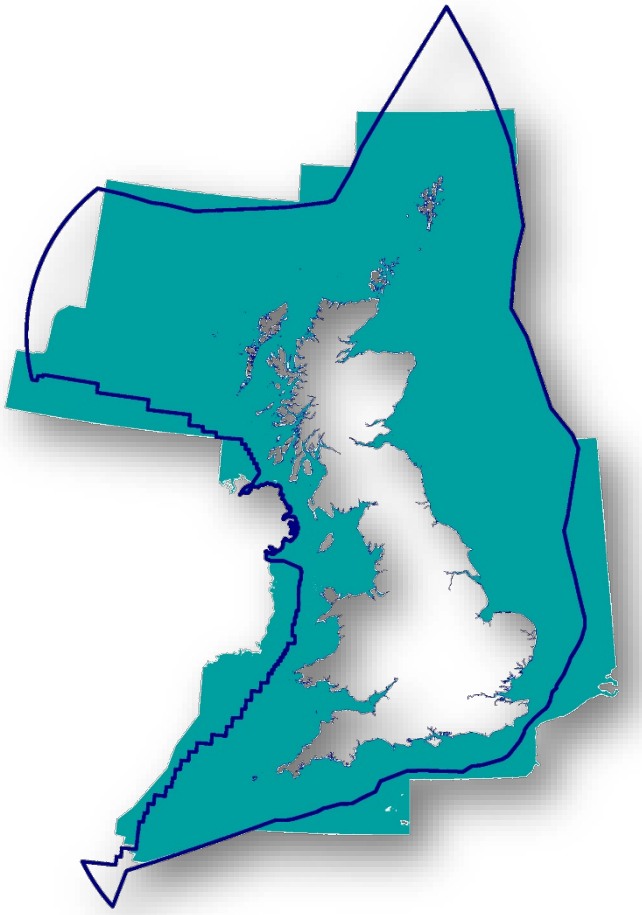

Figure 4 - Coverage of the BGS Offshore Bedrock 250k dataset. UKEEZ boundary: © UK Hydrographic Office. United Kingdom, Overseas Territories and Crown Dependencies Limits and Boundaries Dataset, UK Hydrographic Office, Jan 19, 2023, licensed under the Open Government Licence https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/. UK Coastline: Ordnance Survey data © Crown Copyright and database rights 2021.

4.3 ATTRIBUTE DESCRIPTION

The following tables describe the fields (columns) in the attribute tables associated with the two GIS layers that make up the BGS Offshore Bedrock 250k dataset – the *Bedrock*

Lithostratigraphy layer comprised of polygonal features (Table 1) and the *Bedrock Structural Geology* layer comprised of linear features (Table 2).

Table 1. Names and descriptions of the attribute table fields of the polygonal features on the Bedrock Lithostratigraphy layer of the BGS Offshore Bedrock 250k dataset.

Field name	Description
LEX	Lexicon (or LEX) code. First part of the LEX_RCS label. Up to 5 characters (mostly letters). An abbreviation of the rock unit or deposit as listed in the BGS Lexicon of Named Rock Units: e.g. LI
LEX_D	Description of the Lexicon code above giving the name of the unit: e.g. LIAS GROUP is the full name of the unit coded as LI
LEX_RCS	The two-part code, LEX & RCS, used to label each polygon
RCS	A rock-classification code of up to 6 characters (mostly letters) forming the second part of the primary LEX_RCS attribute. E.g. LMA. The code can represent a single lithology or multiple lithology's (see RCS_X).
RCS_X	A variant of the RCS code (above) which individually lists the components of heterolithic units. Heterolithic units are represented by a string of rock-classification codes (each up to 6 characters) based on the hierarchical BGS Rock Classification Scheme (RCS), joined by + signs and with subordinate types denoted in square brackets. E.g. LMST + AROC + [SDST] (shown as RCS = LMA).
RCS_D	Description of the RCS code(s) above giving the lithology of the unit: e.g. MUDSTONE and LIMESTONE
RANK	Rank of the unit in the lithostratigraphical or lithodemic hierarchy: e.g. GROUP
MAX_TIME_D	Maximum or oldest age of the unit, to the most accurate time (or geochronological) division possible: e.g. ALBIAN
MIN_TIME_D	Minimum or youngest age of unit, to the most accurate time (or geochronological) division possible: e.g. APTIAN
MAX_TIME_Y	Maximum age, in years, of the oldest time division during which the geological unit was formed: e.g. 333800000
MIN_TIME_Y	Minimum age, in years, of the youngest time division during which the geological unit was formed: e.g. 320710000
MAX_INDEX	Maximum index. A number representing the maximum age (earliest or oldest time) of the unit: MAX_TIME_D field: e.g. 1322120
MIN_INDEX	Minimum index. A number representing the minimum age (latest or youngest time) of the unit: MIN_TIME_D field: e.g. 1321340
MAX_AGE	Maximum age. Name of the age of maximum geochronological time applicable: e.g. RYAZANIAN
MIN_AGE	Minimum age. Name of the age of minimum geochronological time applicable: e.g. BARREMIAN
MAX_EPOCH	Maximum epoch. Name of the epoch of maximum geochronological time applicable: e.g. CARADOC
MIN_ EPOCH	Minimum epoch. Name of the epoch of minimum geochronological time applicable: e.g. ASHGILL
MAX_SUBPER	Maximum sub-period. Name of the sub-period of maximum geochronological time applicable: e.g. DINANTIAN
MIN_SUBPER	Minimum sub-period. Name of the sub-period of minimum geochronological time applicable: e.g. SILESIAN
MAX_ PERIOD	Maximum period. Name of the period of maximum geochronological time applicable: e.g. CARBONIFEROUS

MIN_ PERIOD	Minimum period. Name of the period of minimum geochronological time applicable: e.g. PERMIAN
MAX_ERA	Maximum era. Name of the era of maximum geochronological time applicable: e.g. PALAEOZOIC
MIN_ERA	Minimum era. Name of the era of minimum geochronological time applicable: e.g. MESOZOIC
MAX_EON	Maximum eon. Name of the eon of maximum geochronological time applicable: e.g. PROTEROZOIC
MIN_EON	Minimum eon. Name of the eon of minimum geochronological time applicable: e.g. PHANEROZOIC
VERSION	Dataset name and version number
RELEASED	Date of dataset release
NOM_SCALE	Nominal scale of the published (or compiled) information used to prepare the digital data: e.g. 250000. Also gives an indication of scale-dependant accuracy
LEX_ROCK	A two-part code, LEX & ROCK, formerly used as the primary label for each polygon and for creating map keys or legends

Table 2. Names and descriptions of the attribute table fields of the linear features on the Bedrock Structural Geology layer of the BGS Offshore Bedrock 250k dataset.

Field name	Description
CATEGORY	Geological category, it can be FAULT or FOLD_AXIS
FEATURE	Geological feature, in abbreviated form, e.g. Fault_at_rockhead
FEATURE_D	Description of FEATURE above in full e.g. Fault at rockhead
VERSION	Dataset name and version number
RELEASED	Year of dataset release
NOM_SCALE	Nominal scale of the published (or compiled) information used to prepare the digital data: e.g. 250000. Also indicates scale-dependent accuracy

4.4 DATA FORMAT

The BGS Offshore Bedrock 250k dataset is available as a vector GIS dataset comprised of two GIS data layers: the Bedrock Lithostratigraphy layer (comprised of polygons) and the Bedrock Structural Geology layer (comprised of polylines). These are available in two GIS formats, including ESRI (.shp), and Geopackage (.gpkg). Other formats may be available but may incur additional processing costs. Please email BGS Enquiries (enquiries@bgs.ac.uk) to request further information.

4.5 DATASET HISTORY

In 2000, the BGS released the first version of the BGS Offshore Bedrock 250k dataset (named at the time DiGRock250k). This dataset was the result of digitising the existing printed bedrock geology 1:250 000 map series (or ‘solid geology’ as the series was known). This series, published between 1977 and 2000, comprises more than seventy maps, each map sheet covering an area of one degree of latitude by two degrees of longitude. Details of the printed map sheet names, numbers and publication dates are available from the BGS online catalogue, and the printed maps are still available via the BGS Bookshop. However, it should be noticed that the original printed maps used a chronostratigraphical classification, whereas the digital

dataset uses, as far as possible, a lithostratigraphical nomenclature, as defined in the BGS Lexicon of Named Rock Units.

The second version of this dataset was released in 2007 (known as DiGRock250k v.2). The principal objective of this revision and geological checking was to remove, as much as possible, join-up issues between the various 'sheet' areas, inherited from the sequentially published paper maps. In 2013, the dataset was put through a further comprehensive geological and GIS checking process to create the third and current version (then named DiGRock250k v.3). Two completely new map sheets were added to the latest published version of digital linework (Central and Northern Rockall, based on data acquired during industry co-funded projects such as the Rockall Consortium) and the St. George's Channel area was updated with the linework from a new map sheet published in 2009.

4.6 DISPLAYING THE DATA

It is recommended that the Bedrock Lithostratigraphy layer should be displayed based on the "LEX-RCS" field in the attribute table. This field provides an abbreviation of the rock unit as listed in the BGS Lexicon of Named Rock Units and the type of rock (lithology) as based on the hierarchical BGS Rock Classification Scheme. The Bedrock Structural Geology layer should be displayed based on "FEATURE_D". ESRI layer files are provided with the dataset.

5 Licencing the data

5.1 BGS LICENCE TERMS

The British Geological Survey does not sell its digital mapping data to external parties. Instead, BGS grants external parties a licence to use this data, subject to certain standard terms and conditions. In general, a licence fee will be payable based on the type and geographical extent of data, the number of users, and the duration (years) of a licence.

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Please use the following acknowledgements when using BGS Offshore Bedrock 250k:

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- Data collections
- Software

Please refer to OpenGeoscience, see www.bgs.ac.uk/Opengeoscience for more information and a full listing of datasets and services available under this service.

5.3 CONTACT INFORMATION

For all data and licensing enquiries please contact:
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NG12 5GG
Direct Tel: +44(0)115 936 3143
Email: digitaldata@bgs.ac.uk

6 Limitations

6.1 DATA CONTENT

BGS Offshore Bedrock 250k is a digital compilation of previously published maps and archive information. The mapping, description and classification of rocks are based upon the interpretations and evidence available at the time of the mapping, or the time of the modifications/correction. This dataset, therefore, represents data of different vintages and origins. This means that it may not always agree with more recently gathered observations (such as boreholes).

6.2 SCALE

The BGS Offshore Bedrock 250k digital map data is generalised and the geological interpretation should be used only as a guide to the geology at a local level, not as a site-specific geological plan based on detailed site investigations. Do not over-enlarge the data; for example, do not use 1:250 000 nominal scale data at 1:50 000 working scale.

6.3 ACCURACY/UNCERTAINTY

The mapping accuracy associated with this dataset is nominally +/-1 mm which equates to +/-250 m on the ground, at true scale. This is **only** a measure of how faithfully the lines have been captured from the original paper mapping, it is not a measure of the accuracy of the original geological survey.

The position of some features may be affected by imprecisions in the position of the oldest geophysical data and seabed samples, that underpin the geological interpretations presented in this digital product. The position of the oldest data was determined using terrestrial-based radio navigation systems (e.g. Decca Mainchain in the 1970s and 1980s). Their accuracy would vary

depending on several factors, e.g. the distance from the shore and time of the day but would normally be comparable to the map accuracy at 1:250 000 scale (+/- 250 metres).

All geological classifications are based on geological interpretation for which no explicit uncertainty is provided. This uncertainty will depend heavily on the nature of the rock and the relationship between the different features being mapped. For example, a sharp, planar boundary separating two contrasting lithologies, is likely to be more accurately mapped, with greater certainty that a diffuse or gradational boundary between two similar lithologies. The complexities of the boundaries and heterogeneity of the lithologies are further complicated by the evidence available at the time of the survey to enable a surveyor to resolve the map features.

6.4 DISCLAIMER

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7 Frequently asked questions

Q: What does this dataset show?

A: The distribution of different types of bedrock underlying the UK Continental Shelf at a scale of 1:250 000. These rocks were formed at different periods of geological time and have different physical properties, such as grain size, mineral composition, texture, colour and layering, depending on the processes that formed them or that may have affected them since their formation.

Q: What are the different colours on the map for?

A: Different colours show different lithostratigraphic units (formations and groups), describing the nature (lithology) and age (stratigraphy) of the bedrock.

Q: How accurate is this dataset?

A: The BGS Offshore Bedrock 250k is based on, and limited to, the interpretation of data in the possession of BGS at the time the dataset was created. This data was principally collected at a reconnaissance level and, therefore, the individual data sources could be several kilometres apart. Users must not consider this dataset at scales finer than 1:250 000.

Q: How often will this dataset be updated?

A: This dataset may go under future revision. When the BGS digital datasets are revised any upgrades will be automatically supplied to the licensee, at no additional cost.

Q: Where can I purchase paper maps?

A: Paper maps are available from our online shop. You can also view our catalogue of digital scans of paper maps in our maps portal (BGS, 2021d).

Q: Where can I get digital data?

A: This dataset is licenced from BGS, subject to certain standard terms and conditions. However, an increasing number are available for viewing or download. Many products also offer sample data downloads and user guides to help you decide if the data is suitable for you.

Q: In what formats can these data be provided?

A: This is available in a range of GIS formats, including ESRI (.shp) and Geo-package (.gpkg). More specialised formats may be available but may incur additional processing costs. Please email BGS Enquiries (enquiries@bgs.ac.uk) to request further information.

Q: I don’t have a GIS. Can I still view the data?

A: Yes! Our Offshore Map Viewer is a good place to start. It is an online data and GIS service that covers a very wide range of marine geoscience research. This dataset is also available to view as a Web Map Service (WMS).

Q: Can I use this dataset as part of a commercial application?

A: This dataset is licenced from BGS. If you have any doubts about whether your proposed use of the BGS data will be covered by a BGS digital licence, the BGS Intellectual Property Rights (IPR) section will be happy to discuss this with you and can be contacted through the following email address: iprdigital@bgs.ac.uk. BGS IPR will usually be able to provide reassurance that the licence will cover individual user requirements and/or to include additional 'special conditions' in the licence documentation, addressing specific requirements within BGS's permitted usage.

Q: I think the geology map might be wrong. What can I do?

A: We make every effort to ensure that our digital data reflects our best understanding of the geology of the UK continental shelf. Sometimes our interpretations need to be revised as new evidence (such as data from new boreholes) is obtained and simple errors sometimes get through our quality assurance procedures. We are currently working on a web service to improve notifications of errors that have been found and corrected; we hope to make this available soon. If you think you have spotted a problem with our datasets please let us know.

8 Glossary

Term	Explanation
ArcGIS	Geographic information system (GIS) software for working with maps and geographic information maintained by the Environmental Systems Research Institute (ESRI).
Attribute	Named property of an entity. Descriptive information about features or elements of a database. For a database feature like a census tract, attributes might include many demographic facts including total population, average income, and age. In statistical parlance, an attribute is a variable, whereas the database feature represents an observation of the variable.
Bedrock	The main mass of rocks forming the earth was laid down prior to 2.588 million years ago. Present everywhere, whether exposed at the surface in rocky outcrops or concealed beneath superficial deposits, artificial ground or water. Formerly called solid.
Continental Shelf	The part of the ocean floor that is between the shoreline and the continental slope (or, when there is no noticeable continental slope, a depth of 200 m).
Chronostratigraphy	The classification (within a defined hierarchy) of rock successions based on relative age and time relationships.
Digitisation	The process of converting information into digital codes stored and processed by computers. In geographic applications, digitizing usually means tracing map features into a computer using a digitizing tablet, graphics tablet, mouse, or keyboard cursor.
Epoch	Geological unit of time during which a rock series is deposited. It is a subdivision of a geological period.
ESRI	Environmental Systems Research Institute (ESRI) is an international supplier of geographic information system (GIS) software, web GIS and geodatabase management applications.
Exclusive Economic Zone (EEZ)	An Exclusive Economic Zone is an area beyond and adjacent to the territorial sea, prescribed by the United Nations Convention on the Law of the Sea, over which a coastal state has special rights regarding the exploration and use of marine resources, including fishing, drilling, and other economic activities. The EEZ shall not extend beyond 200 nautical miles from the baselines of the territorial sea.
Formation	Part of the BGS rock-age ordering hierarchy. A formation is the fundamental rock unit for mapping purposes. Located within a defined hierarchical structure: Supergroup>Group>FORMATION>Member>Bed
Geospatial data	Data that has a geographical component to it. This means that the records in a dataset have locational information directly linked to them, such as geographic data in the form of coordinates, addresses, cities, or postcodes.
Geophysical data	Data that has been acquired by recording and analysing measurements of the Earth's physical properties, such as electrical, gravity, magnetic, radioactivity and seismic properties.
Group	Part of the BGS rock-age ordering hierarchy. Located within a defined hierarchical structure: Supergroup>GROUP>Formation>Member>Bed

Lexicon	Vocabulary defining rock names, the BGS Lexicon of Named Rock Units database provides BGS definitions of terms that appear on our maps and in our publications. https://www.bgs.ac.uk/lexicon/home.html
Lithodemic	Bodies of rock which do not conform to the Law of Superposition (i.e. in any undisturbed sequence of rocks deposited in layers, the youngest layer is on top and the oldest on the bottom) are described as lithodemic. They are generally composed of intrusive, highly deformed or metamorphic rocks, determined and delimited based on rock characteristics. Their boundaries may be sedimentary, intrusive, extrusive, tectonic or metamorphic. Their classification is by lithology (rock type) and form or mode of origin e.g. a LITHO-MORPHO-GENETIC grouping.
Lithological units	A rock identifiable by its general characteristics of appearance colour, texture and composition defined by the distinctive and dominant, easily mapped and recognizable petrographic or lithologic features that characterize it.
Lithology	Rocks may be defined in terms of their general characteristics of appearance: colour, texture and composition. Some lithologies may require a microscope or chemical analysis for the latter to be fully determined.
Lithostratigraphy	Age and lithology. Many rocks are deposited in layers or strata and the sequence of these strata can be correlated from place to place. These sequences of different rocks are used to establish the changing geological conditions or geological history of the area through time. The description, definition and naming of these layered or stratified rock sequences are termed lithostratigraphy (rock stratigraphy). Lithostratigraphy is fundamental to most geological studies. Rock units are described using their gross compositional or lithological characteristics and named according to their perceived rank (order) in a formal hierarchy. The main lithostratigraphic ranks in this hierarchy are Bed (lowest)>Member,>Formation>Subgroup>Group>Supergroup (highest). The units are usually named after a geographical locality, typically the place where exposures were first described.
Polygon	Polygons are a representation of areas. A polygon is defined as a closed line or perimeter completely enclosing a contiguous space and is made up of one or more links.
Scale	The relation between the dimensions of features on a map and the geographic objects they represent on the earth, commonly expressed as a fraction or a ratio. A map scale of 1/100,000 or 1:100,000 means that one unit of measure on the map equals 100,000 on the earth.
Shapefile	The shapefile format is a geospatial vector data format for geographic information system software. It is developed and regulated by Esri as a mostly open specification for data interoperability among Esri and other GIS software products.
Sedimentary	Rocks that originated from the broken up or dissolved and re-precipitated particles of other rocks. Examples include clay, mudstone, siltstone, shale, sandstone, limestone and conglomerate. Sedimentary rocks cover more than two-thirds of the Earth's surface. They are formed from the weathering and erosion products of rock material, which have been transported (usually by water or wind), redeposited and later consolidated.

Seismic Profile	Visual representation of data recorded with seismic methods that allow the description and geological interpretation of the seismic reflections originated at the sub-surface.
Stratigraphy	The branch of geology that is concerned with the study of rock layers and layering (stratification). It is primarily used in the study of sedimentary and layered volcanic rocks.
Structural Geology	The branch of geology that deals with the form, arrangement, and internal structure of the rocks. Especially, concerned with the description, representation and analysis of features that result from rock deformation, chiefly on a moderate to fine scale.
Superficial	The youngest geological deposits formed during the most recent period of geological time, the Quaternary. They date from about 2.6 million years ago to the present.
Vector	A representation of the spatial extent of geographic features using geometric elements (such as points, curves, and surfaces) in a coordinate space.
Rockhead	The point of contact between Bedrock and Quaternary units. The 'ground level' before the Quaternary deposits were laid down.

9 References

British Geological Survey holds most of the references listed below, and copies may be obtained via the library service subject to copyright legislation (contact libuser@bgs.ac.uk for details). The library catalogue is available at: https://envirolib.apps.nerc.ac.uk/olibcgi.

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