Geological Map Database
A Practitioners Guide to delivering the Information

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GEOLOGICAL MAPPING

• Key strategic aims:
  • Deliver high quality detailed information on the solid and superficial geology
  • Provide increased information on Quaternary and other superficial deposits
  • Provide increase understanding of the three-dimensional structure and process

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WEALTH CREATION

• “The total value added of national output to which BGS contributes for 2001 lies in the range of £34 billion - £61 billion ($63 billion - $113 billion), representing around 5%-8% of total UK output (GVA). This is of course orders of magnitude greater than BGS’s annual turnover of approximately £40 million ($74 million).”

http://www.bgs.ac.uk/about/economicbenefits.html

THE MISSION

• To advance geoscientific knowledge of the UK landmass and continental shelf
• To provide comprehensive, objective, impartial and up-to-date geoscientific information
• To disseminate information in the community

http://www.bgs.ac.uk/about/strategic.html
1. BGS Geoscience Integrated Database System
2. Geoscience Spatial Framework
3. Geoscience large Object Store
4. National Geoscience Data Centre
During 1997 the BGS-geoIDS Scoping Study Report was prepared for the BGS Directorate.

The key findings were that:

- BGS has a wealth of data
- Islands of excellence but many problems
- Little interoperability between databases
- Few Corporate Standards for data or data management
- No up to date inventory of the datasets
- No application standards

DRIVERS

- to reduce staff effort in finding data;
- to make quality data available to staff and customers;
- to facilitate collaboration across BGS;
- to improve access to the unique BGS information;
- to keep BGS at the fore-front of the development of digital geoscience systems;
- to inform management decisions; and
- to allow Corporate implementation of standards and establish best practice.
PRODUCTS

- Corporate Data Policy
- Data Management Plan(s)
- Metadata
  - Discovery Metadata
  - Technical Metadata
- GIS Data Index in ArcGIS and the web
- Corporate Data Model enhancement & documentation
- Data Standards & Best Practice
- Application Standards (Software Systems)
- Corporate Data Access Interface (IDA)

CONstrains

- Development and implementation must not interrupt the supply of existing products and services
- Impact of intrusion must be minimised
- Existing systems are valuable assets
  - database design
  - application architecture
  - user experience
  - user confidence
DATABASING MODELS – GLOS & GSF

GIS
- cartography
- visualisation
- process modelling
- property modelling

Geoscience Large Object Store
- Full model content
- Immediate re-use
- but:
- May not have full model
- Effort required to use
- but:
- Application independent
- Long-term security

Geoscience Spatial Framework
- Application specific
- Version dependent
- Limited life-time

NGDC - AIMS

- Manage all data/information in accordance with NERC and BGS Data Policies;
- Manage all BGS information in appropriate environments to ensure its long-term potential;
- Ensure that appropriate metadata are provided for datasets and records;
- Provide digital indexes to actively-used datasets;
- Create a system in which all records, in whatever format or media, can be found rapidly;
- Build users’ confidence by creating and maintaining validated and verified datasets to agreed standards; and
- Provide tools that enable geoscientists, both inside and outside BGS, to use BGS information with confidence.
NATIONAL GEOSCIENCE DATA CENTRE

• NGDC has five components:
  • National Geoscience Records Centre
  • National Geoscience Materials Collection
  • National Hydrocarbons Data Archive
  • NGDC Earth Science Academic Archive
  • NGDC Digital Data Management

NATIONAL GEOSCIENCE RECORDS CENTRE

• Numerous datasets:
  • Borehole logs
  • SI Reports
  • Shaft logs
  • Section
  • Maps
  • Plans
  • Mine plans
  • Field slips
  • Notebooks

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NATIONAL GEOSCIENCE RECORDS CENTRE

- Borehole Records
  - NGDC holds over 1,000,000 records of boreholes, shafts and wells
  - Digital index
  - Most have a lithological record
  - Collection dates back to 1790
  - Mine Industry Act 1926
  - Water Resources Act 1991

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NATIONAL GEOSCIENCE MATERIALS COLLECTION

- Borehole core
- Rock specimens
- Thin sections
- Rocks and sediment core sample photographs
- Biostratigraphical material

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NATIONAL GEO SCIENCE MATERIALS COLLECTION

• Borehole materials
  • 400,000m of core from over 3000 boreholes
  • 1,000,000 individual specimens in trays from over 5000 boreholes
  • 650,000 bottles and bags of washed cuttings from 1294 boreholes
  • Digital index being populated
  • Oldest borehole specimen is from 1825

SIGMA
- MIDAS
- GSD

Lithoframe
- GSDD
- 3D Modelling

BGS-geoIDS
- GSF
- GLOS

Internal Discovery
- Metadata

DiGMapGB GeoSure

NGDC

Internet
- Metadata
- Website
- GeolIndex
- GeoReport
- GeoRecord
- Extranet

1. Mobile Integrated Data Acquisition System
2. Geological Spatial Database

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TRADITIONAL TOOLS

- Pens
- Coloured pencils
- Paper maps
- Graph paper
- Tracing paper
- The photocopier
- Drawing and contouring boreholes by hand

MIDAS
Mobile Integrated Data Acquisition System

Mapface annotation tool
MIDAS
Mobile Integrated Data Acquisition System

GEOLOGICAL SPATIAL DATABASE (GSD)
1. Lithoframe – 3D litho-stratigraphic models
2. Geological Surveying & Investigation in 3D
LITHOFRAME

• LithoFrame is a new strategy to produce standard systematic models of the subsurface geology for Britain
  • LithoFrame - shows the most significant stratigraphic divisions and major faults
  • LithoFrame250 - will be prepared for stratigraphic groups
  • LithoFrame50 - will be modelled at the formation level
  • LithoFrame10 - will focus on well-characterised and relatively shallow superficial deposits

BUILDING LITHOFRAMES

Superficials - GSI3D

Bedrock - GOCAD
GSI3D USER INTERFACE

- Borehole window
- Map window
- 3D model window
- DTM (top surface of model)
- Section window

DiGMapGB CONSTRAINS THE MODEL

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Unravelling Glacial History

- Glacial Sand & Gravel
- Pro-glacial glaciolacustrine silt & clay
- Till & Esker
- Higher level glaciolacustrine silt & clay (14-17mOD)
- Fluvio-aeolian sand
- Modern Drainage

BEDROCK LITHOFRAME

- GSI3d cannot model faulted/folded bedrock
- GoCAD recommended
- The pluses
  - good 3d visualisation
  - extensive functionality
- The minuses
  - Complex, needs specialist operation
  - Interpretation and model construction are separate tasks
3D VISUALISATION SUITE

1. Geoscience Data Index
2. Intranet Data Access

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GDI

- Arc-GIS tool for discovering and exploring digital data
- Under development since 1988

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Ordnance Survey licence number 100017897/2006
3D DATA PORTAL

• providing modellers with access to 3D data
• based on well-proven GDI technology
• extensible range of data-types
• extensible range of output formats
PUBLIC METADATA

From the image, it appears to be a page from the British Geological Survey, which is a part of the Natural Environment Research Council (NERC). The page includes images of websites related to metadata. The text seems to be discussing the concept of metadata and its importance in geospatial information. The metadata is crucial for cataloging and managing data, ensuring that users can effectively access and understand the data they need. The text also mentions the need for standards in metadata management, which is essential for interoperability and data compatibility.
GeoReport

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GeoRecord

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GeoSure objectives

- National geospatial data sets that identify potential geo-hazards to the human environment
- Natural Ground Stability Hazards
  - Swell-shrink
  - Dissolution
  - Running sands
  - Compressible
  - Collapsible
  - Slope instability
  - Potential radon hazard
  - Models of thickness of superficial deposits

Dissolution hole collapse in Ripon
Natural ground stability hazards

Swell-shrink deposits

Heave damage, London

Natural ground stability hazards

Slope instability

Landslide, Nefyn, S. Wales
MANAGEMENT

Information Architecture Steering Committee

Database Technical Management Group

Application Technical Management Group

Dictionary Management Group

SAN Management Committee

KEY ROLES

• Data Architect

• Application Architect

• Records Manager (Vacant)

• Archives Manager (Vacant)

• Collections Manager

• Information Manager
QUESTIONS

• Web addresses
  • http://www.bgs.ac.uk
  • http://www.bgs.ac.uk/geoindex
  • http://www.thebgs.co.uk/shop/home.cfm
  • http://www.bgs.ac.uk/discoverymetadata/home.html

• E-mail address
  • Enquires@bgs.ac.uk