

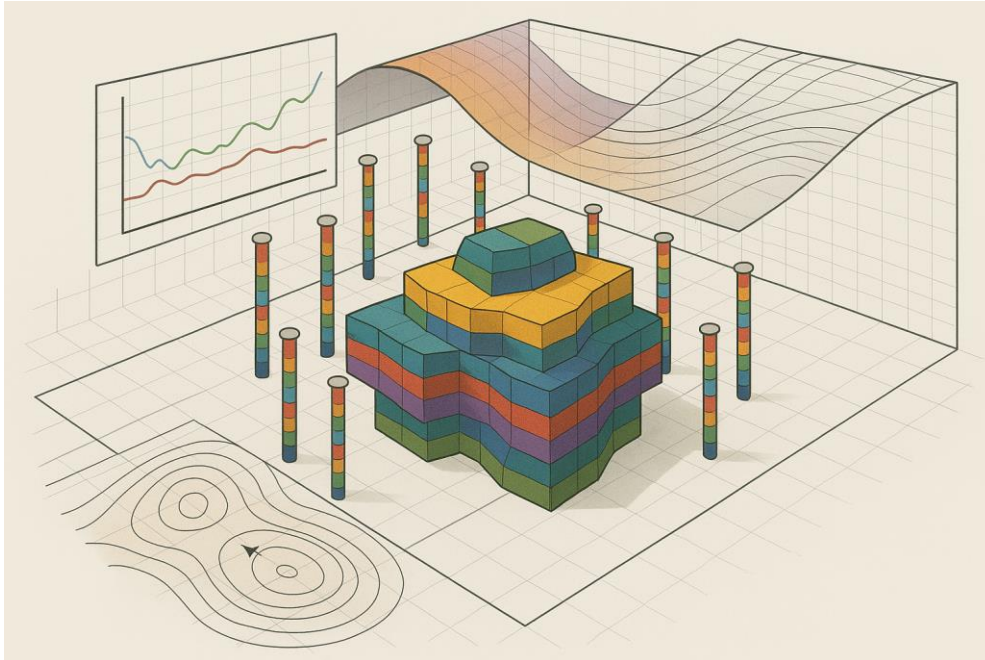


STEVE THORPE & CATHERINE CRIPPS (BGS)

Juggling the challenges of 3D modelling

Overview

- Geological modelling is a set of methodologies that help build a conceptual understanding of the ground

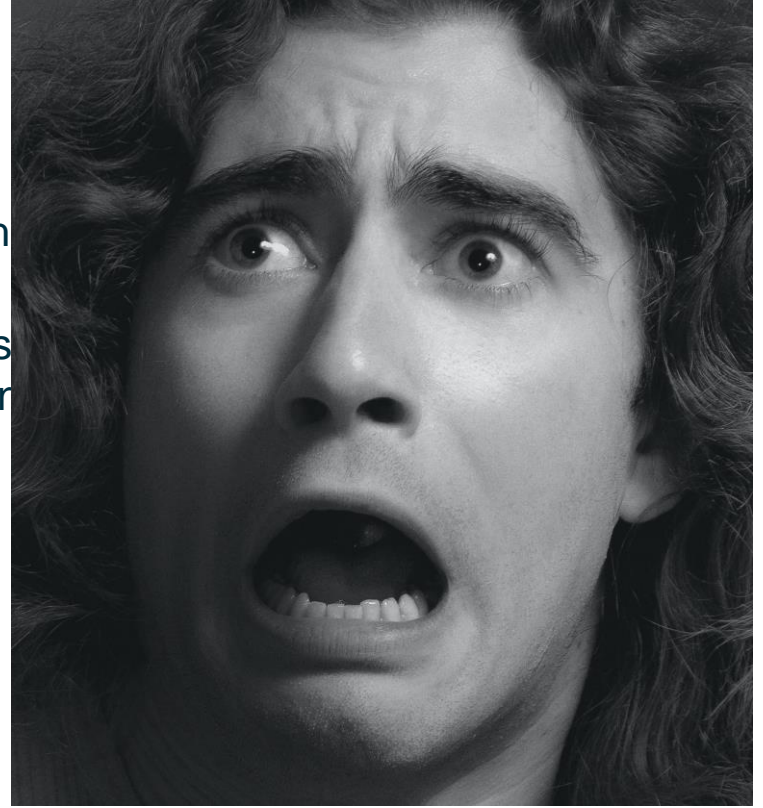


Overview

- Geological modelling is a set of methodologies that help build a conceptual understanding of the ground
- As modellers we are often thrust into the role of synthesising different datasets of varying quality, different methodologies, leveraging software whilst trying to rationalise the needs of a corporate strategy

Overview

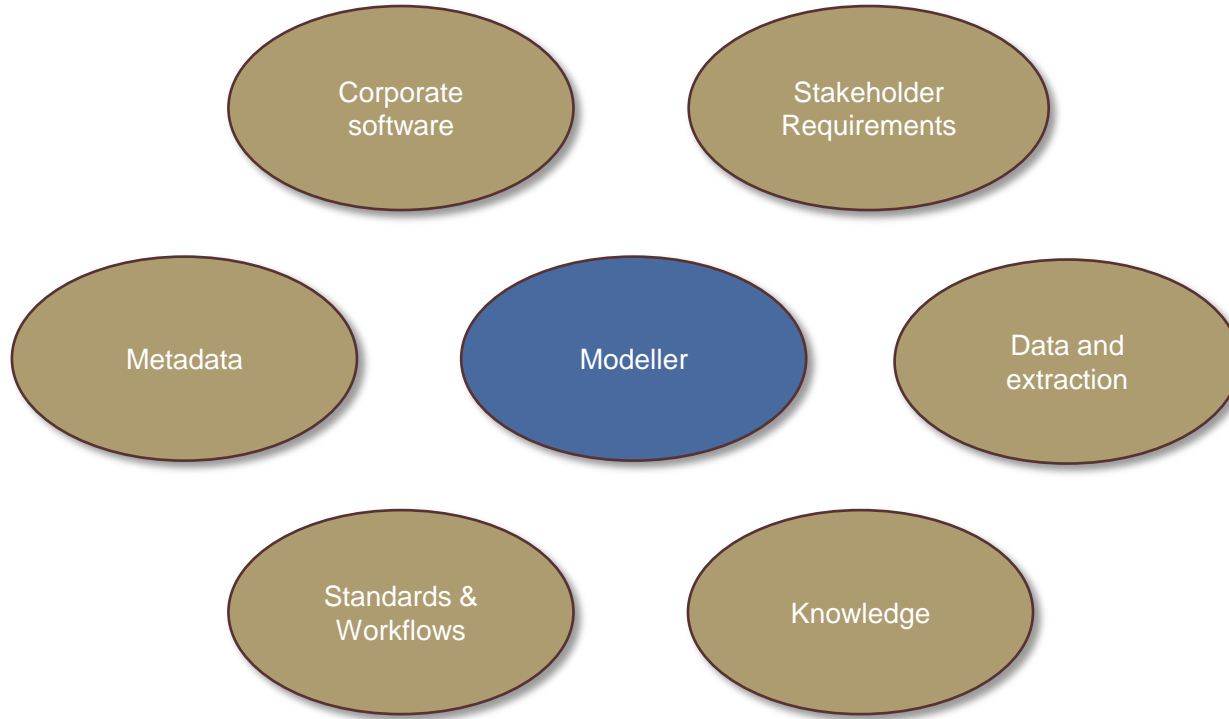
- Geological modelling is a set of methodologies that enhance understanding of the ground
- As modellers we are often thrust into the role of synthesising varying quality, different methodologies, leveraging and rationalise the needs of a corporate strategy
- Argghhhh! I didn't sign up for all this headache!



Overview

- Geological modelling is a set of methodologies that help build a conceptual understanding of the ground
- As modellers we are often thrust into the role of synthesising different datasets of varying quality, different methodologies, leveraging software whilst trying to rationalise the needs of a corporate strategy
- Argghhhh! I didn't sign up for all this headache!
- As a geological modeller of almost 20 years it didn't occur to me that I was so good at my job
- Let me take you through all the challenges of 3D modelling from my (and the British Geological Survey's) perspective

The “Wheel of Modelling Inputs”



The “Wheel of Modelling Inputs”



Each endpoint has requirements and challenges

Stakeholder Requirements

- Stakeholders should be the catalyst for everything we do
- Often have very different requirements – important to know and understand these
- Internal versus external
- Knowing when to talk to them is key
- Can affect what you do – input data, data formats, delivery mechanisms
- Learning how to convert what they tell you into pieces of information you can use to shape your products/models/solutions
- BGS is on this learning journey - we still don't talk enough



Data and Extraction



- Most GeoSurveys have multitude of datasets that feed into the modelling process
- BGS relies on people able to extract data using GIS, FME, database queries
- Data quality is key – important to understand how to work with varying quality standards
- BGS has invested heavily in ensuring most of the major modelling/mapping datasets are held centrally, but new data constantly evolving
- Ongoing projects aimed at improving our data extraction processes to reduce the burden on staff and ensure standardisation of approach

Knowledge

- Modellers need to know everything!
- Modelling techniques, best practice, technical insights, geological background
- It's a lot to keep in our heads and it's also difficult to teach quickly
- BGS is slowly learning that a geologist might be the best person to create the model
- Projects need plenty of time for discussing issues and complexities in geology and modelling practice especially when new people join the organisation

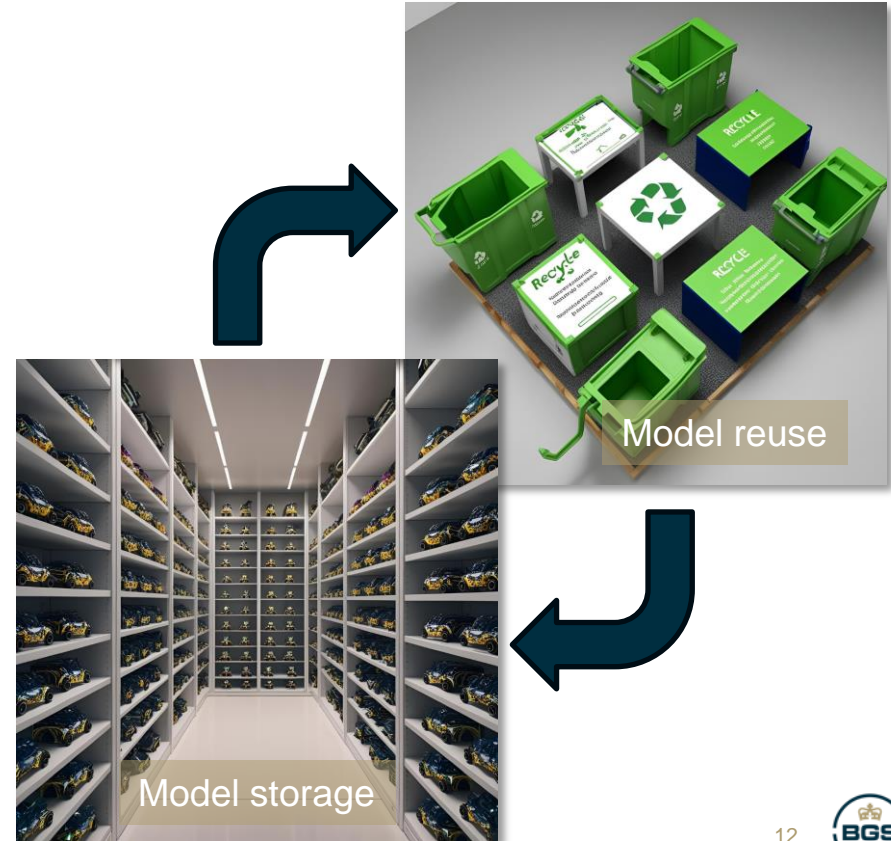


Standards & Workflows

- In any organisation there are workflows/rules that must be followed
- QA, Sign-off, peer review – all appear to slow down the modelling process, often because they are not costed into a project
- Workflows are a challenge but also allow standardisation of outputs
- Processes, data flows, bureaucracy – all require time and effort to ensure they are followed
- Standards help ensure consistency and transparency of input and output data – helps with stakeholder conversations
- BGS has developed some standards - QA of models
 - Standard metadata documentation
 - Technical checking documents for different types of model

Metadata

- Possibly the most underrated (and underfunded) part of any modelling system
- Metadata is crucial for future storage and reuse of models
- Without knowing how, when, why and who the model was created, its use is restricted
- Uncertainty can't be judged without adequate metadata defining purpose and modelling methodology



Corporate Software

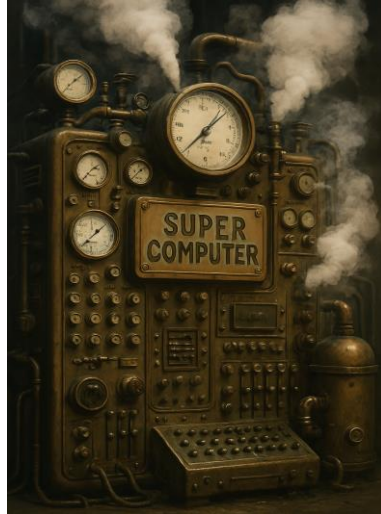
- Keeping up-to-date with technology
- Many software packages out there – each do things slightly differently
- Defining the corporate approach can be tricky – rarely does one software provide an answer
- Often pushing software boundaries
- Increasingly organisations are restricting open use of software not corporately approved
- Producing a foolproof workflow, utilising different software to achieve the end result is often tricky to communicate



What these Wheel challenges mean

- How these endpoints manifest themselves - RIRO
- Project risk – often under-appreciate the challenges
- Misunderstanding of data/processes - common phrases occur for example “You can just use XXX”, “You can make a model of XXX quickly can’t you?”
- Conceptual model is key – but it’s bigger than just this part

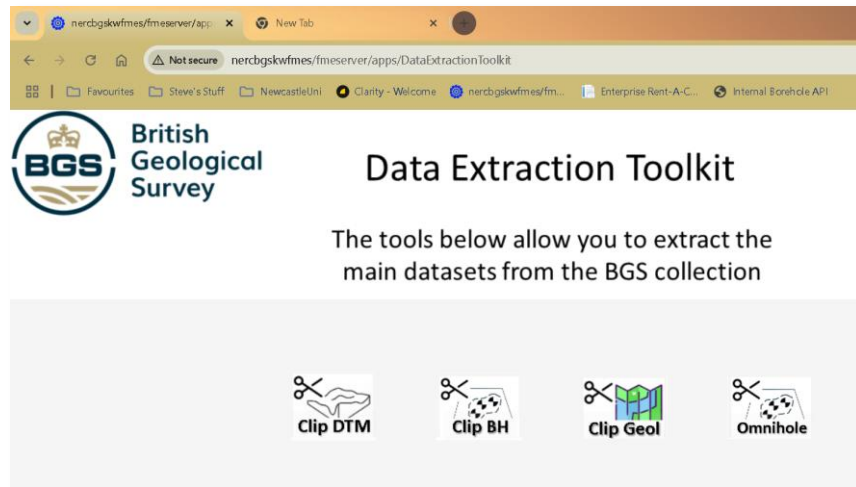
Rubbish In



Rubbish Out

BGS approaches to “fixing” some of this

- 👤 Ongoing best practice improvements
- 👤 New data extraction tools – outside GIS
- 👤 Defining modelling standards and QA
- 👤 Centralised storage
- 👤 3D model software investigations/
investment
- 👤 More time for “admin”



BGS approaches to “fixing” some of this

- 🐼 Ongoing best practice improvements
- 🐼 New data extraction tools – outside GIS
- 🐼 Defining modelling standards and QA
- 🐼 Centralised storage
- 🐼 3D model software investigations/ investment
- 🐼 More time for “admin”

The image shows two overlapping web-based interfaces from the British Geological Survey (BGS).

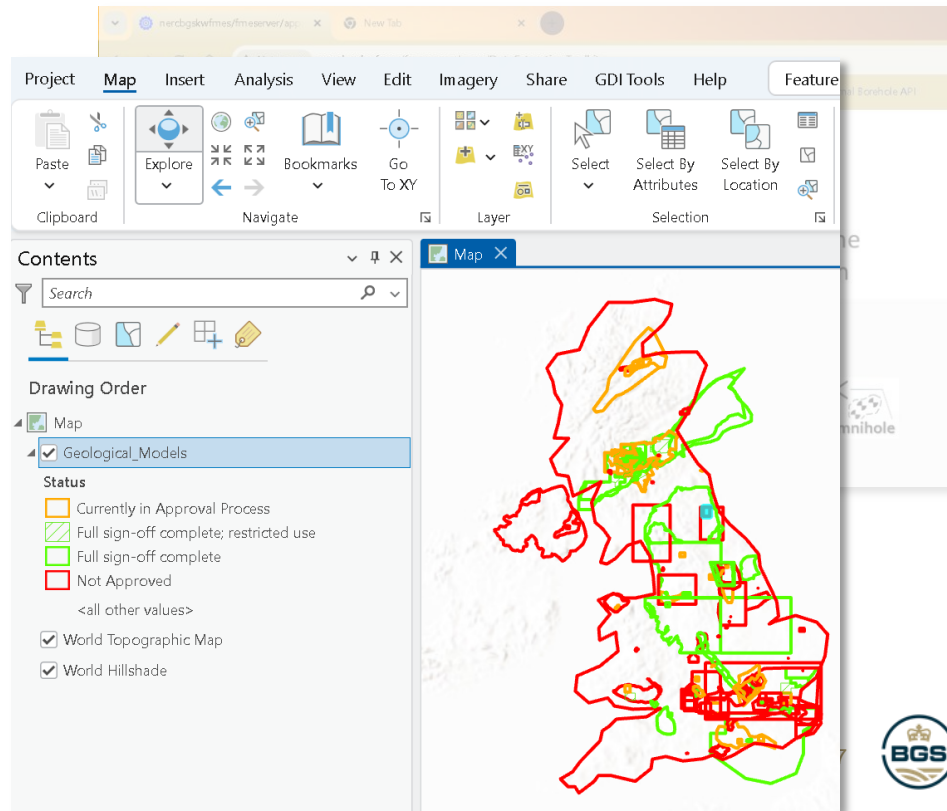
The foreground interface is the **Summary Metadata & Model Approval Form**. It is a structured form for recording model metadata. Key sections include:

- Model name**: A text field for the model name.
- Model file name including version**: A text field for the file name.
- Link to model folder**: A text field for the folder link.
- Link to model internal report**: A text field for the report link.
- Lead modeller (name or code)**: A text field for the modeller's name.
- Model resolution**: A dropdown menu.
- Scale of use**: A dropdown menu.
- Grid**: A dropdown menu.
- Datum used**: A dropdown menu.
- DEM - Capping surface**: A dropdown menu.
- Cell size used for calculation (in metres)**: A text field.
- Geology (select as they apply)**: A section with checkboxes for **Bedrock**, **Superficial**, **Artificial**, and **Mass Movement**.
- Extent**: A section with **BOTTOM LEFT COORDINATE** and **TOP RIGHT COORDINATE** text fields.
- Depth range (in metres)**: A text field.
- Purpose**: A dropdown menu.
- Intended Output (select as they apply)**: A section with checkboxes for **TINs-Grds**, **3D PDF**, **Viewer Model**, **Groundhog**, **Images on web**, and **Report**.
- Software(s) used including version**: A text field.
- Other Models fitted to, superseded or included**: A text field.
- IPR status**: A dropdown menu.
- Confidentiality status**: A dropdown menu.
- Dated signatures required**: A section with checkboxes for **1. Lead Modeller**, **2. TL/CG (or delegate)**, **3. IPR Manager (as required)**, **4. NCM QA Approval**, and **5. TL/NGM (or Science Director when referred)**.

The background interface is the **Data Extraction Toolkit**. It features the title "Extraction Toolkit" and a description: "Below allow you to extract the datasets from the BGS collection". It includes three icons: **Clip BH**, **Clip Geol**, and **Omnihole**.

BGS approaches to “fixing” some of this

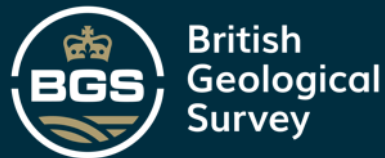
- 🐼 Ongoing best practice improvements
- 🐼 New data extraction tools – outside GIS
- 🐼 Defining modelling standards and QA
- 🐼 Centralised storage
- 🐼 3D model software investigations/ investment
- 🐼 More time for “admin”



Conclusions

- Each GeoSurvey will have its own challenges, and there needs to be communication amongst modellers in order to navigate.
- I've shown how BGS is approaching these challenges – hopefully some lessons can be learned
- Working with the Wheel – we need to learn how to balance expectations with own experience/knowledge and work with our team to fill any skills gaps





Thanks for your attention

Time for Questions

STHORPE@BGS.AC.UK

[HTTPS://WWW.LINKEDIN.COM/IN/STEVE-THORPE-04832B97/](https://www.linkedin.com/in/steve-thorpe-04832b97/)

