Building the national geological model of Great Britain

Holger Kessler, Steve Mathers, Benjamin Wood

and many more staff at the BGS

9th Swiss Geoscience Meeting

November 2011
ETH Zürich
Because the subsurface and its use is complex
The vision: Environmental Modelling Platform

Linking Data, Knowledge, concepts with numerical process models (including socio economic)

Quantitative Understanding  →  Socio- Economic, ecological, optimisation and other models

Scenario Planning  →  Predictions Forecasts

Process Model

Quantitative Conceptual Model

Geological Model

Data and Information Base

POLICY and Decision Making
Geological Survey Evolution

• National Survey to support industry – since 1835

• Systematic coverage (at 50K scale) achieved - by 1990

• Conversion of data and processes from analogue to digital -1990s

• From maps to models to suit environmental needs - since 2000

• Simulation and prediction of earth processes to enable decision making to deal with environmental challenges - 2010+
Geological Modelling in 1835
Geological Modelling in 2011

Map and DTM + Boreholes → Cross-sections

Exploded model, synthetic sections, etc. → Geological Block model → Fence diagram

Completed geological models in the UK

Many models of differing scales and quality and often built for different purposes
Soil horizon modelling at Shelford near Nottingham
Artificial Ground modelling in Manchester
Geological framework model of Greater London

2400 km²

© NERC All rights reserved
The National Fence Diagram

• Fits the 625K published mapsheet

• Use for national and regional assessments for Groundwater, Radwaste storage, Geothermal, CCS…

• Geoscience Education (free download intended)
Ireland joined up with Scotland
Gradual incorporation of all models into the National Geological Model
Calculated Volumes to Lower Cretaceous
From maps… ...to models… ...to forecasts

© NERC All rights reserved