

## Survey on 3D modelling activities at Geological Survey Organisations across Europe

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Following an initiative developed at the 2<sup>nd</sup> European meeting on 3D geological modelling in Edinburgh, Scotland, in November 2014, a survey on 3D modelling activities at Geological Survey Organisations across Europe was carried out during December 2014 and January 2015. An invitation was sent to 27 national surveys, to 16 German State surveys, and to organisations in 2 Belgian states, to participate in the online survey via a link to a questionnaire on SurveyMonkey. The questions were prepared by the Geological Survey of Austria (S. Pfleiderer), the online survey by the British Geological Survey (H. Kessler). In total, 36 replies were obtained (pink countries in Fig. 1).

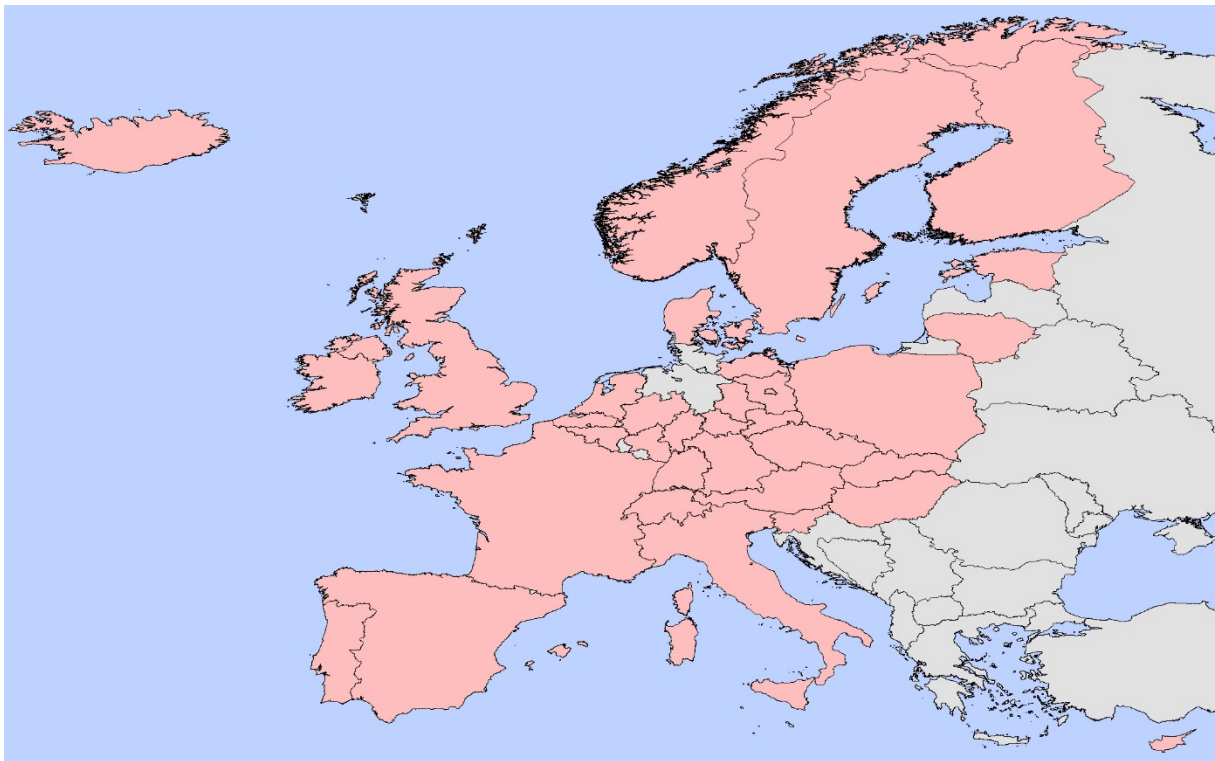


Fig. 1: Countries / states participating in the survey on 3D modelling activities across Europe

### *Questions asked in the questionnaire:*

Please specify the areal percentage of your country / state / province covered by 3D geological models. Please distinguish between:

**Regional scale models** (or bedrock models) are usually based on deep boreholes and seismic data, typically extend > 1 km into depth and comprise only a few mayor units.

**Local scale models** are based on shallow boreholes, typically extend > 100 m into depth and give a more detailed view of the subsurface which can be used for groundwater studies, tunnelling projects etc.

\*1. What is the coverage of your country by 3D geological models at the **regional scale**?

- 0 – 20 %
- 21 – 40 %
- 41 – 60 %
- 61 – 80 %
- 81 – 100%

\*2. What is the coverage of your country by 3D geological models at the **local scale**?

- 0 – 20 %
- 21 – 40 %
- 41 – 60 %
- 61 – 80 %
- 81 – 100%

\*3. When did your organisation start 3D geological modelling?

- Before 1980
- 1980 – 1990
- 1991 – 2000
- 2001 – 2010
- Later than 2010

Modelling the subsurface is a process which includes field mapping (which always means thinking in 3D!), 2D-map creation, construction of geologic sections, compilation / processing / interpretation of subsurface data such as boreholes, seismic sections or structural maps, formatting and import of subsurface information into your modelling software, and finally modelling *per se*.

We would like to limit the following question of this survey to those steps in the process which involve interpretation and modelling of subsurface data. This means: **exclude** anything you already did before geological modelling was introduced at your organisation (year X of question 3), e.g. field mapping, geological map creation, programming / filling / maintaining borehole databases, but **include** steps such as borehole validation / selection for model input, geological profile construction, seismic processing, data formatting / import into your modelling software, and modelling itself. Keeping this in mind,

\*4. How many person-years were spent to obtain your 3D geological models?

- < 5 person-years
- 5 – 10 person-years
- 11 – 15 person-years
- 16 – 20 person-years
- 21 – 25 person-years
- > 25 person-years

\*5. What is the rough annual budget allocated to 3D modelling for the year 2014?

- < 50,000 Euro
- 50,000 – 100,000 Euro
- 101,000 – 200,000 Euro
- 201,000 – 500,000 Euro
- 501,000 – 1,000,000 Euro
- > 1,000,000 Euro

\*6. What percentage of this annual budget comes from government sources?

- 0 – 20 %
- 21 – 40 %
- 41 – 60 %
- 61 – 80 %
- 81 – 100%

Please provide a rough estimate of the costs involved in IT infrastructure (software licences / programming / dissemination) for your 3D geological models.

\*7 What annual costs went into modelling software licences in the year 2014?

- < 5,000 Euro
- 5,000 – 10,000 Euro
- > 10,000 Euro

\*8 What annual costs went into programming modelling software and storage in the year 2014?

- < 5,000 Euro
- 5,000 – 10,000 Euro
- > 10,000 Euro

\*9 If you provide your 3D geological models for download / viewing on your homepage, what total costs went into homepage set-up / programming since you started?

- < 10,000 Euro
- 10,000 – 50,000 Euro
- 51,000 – 100,000 Euro
- > 100,000 Euro

\*10 What modelling software are you using (multiple answers possible)?

- Gocad
- Skua
- Move
- Geomodeller
- GSI3D
- Other            please specify

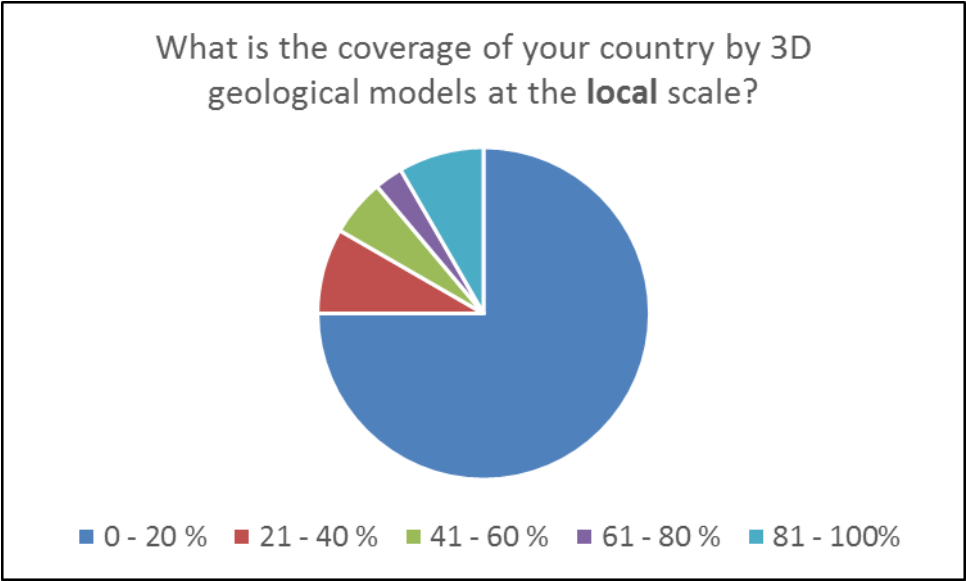
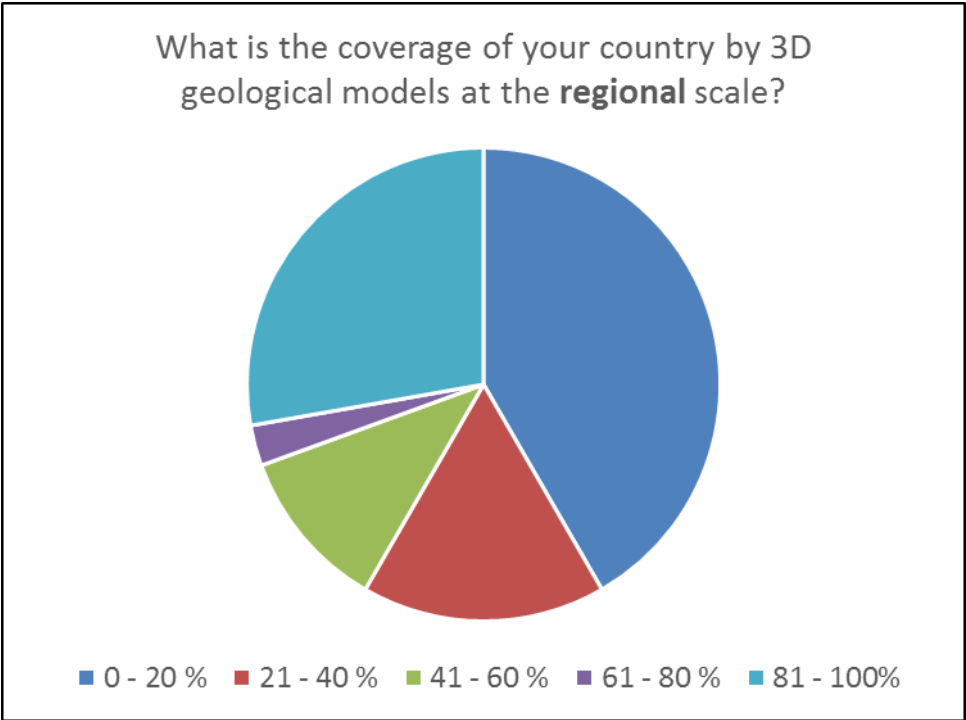
\*11 Is there a legal mandate for 3D modelling / mapping / cartography in your country?

- no
- yes            please specify

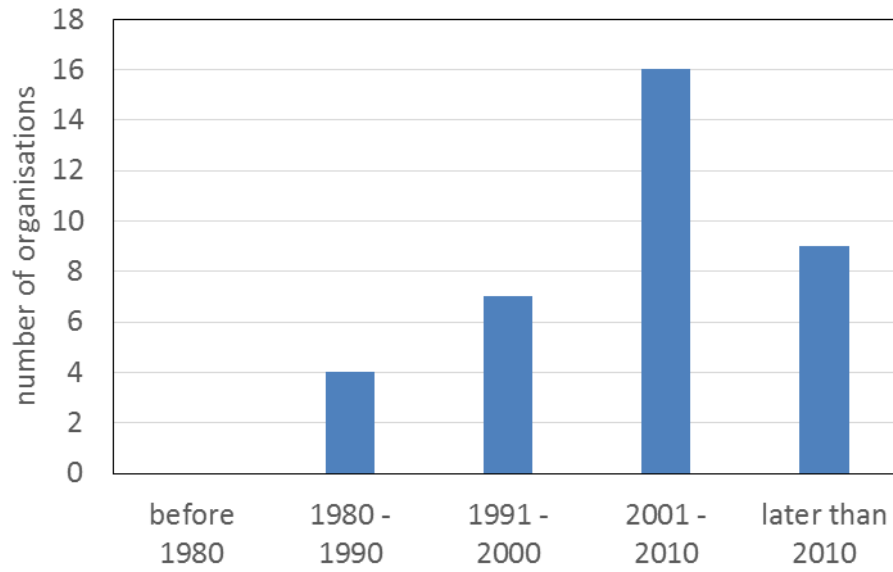
\*12 Are there legal requirements concerning 3D data model standards / specifications in your country?

- no
- yes            please specify

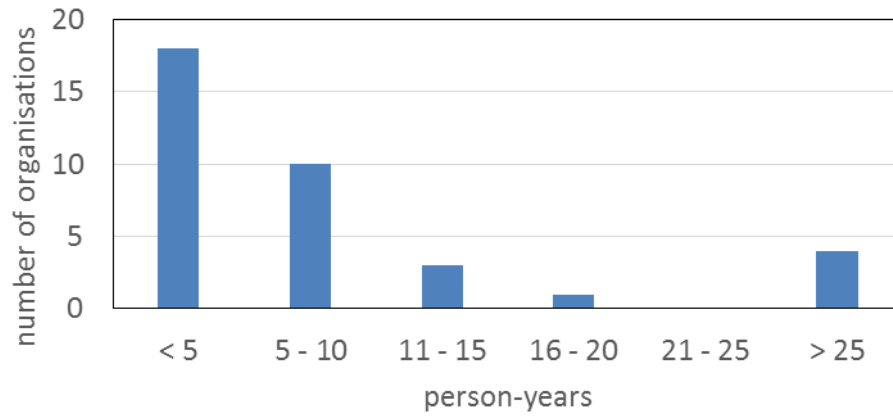
Graphical summary of results:



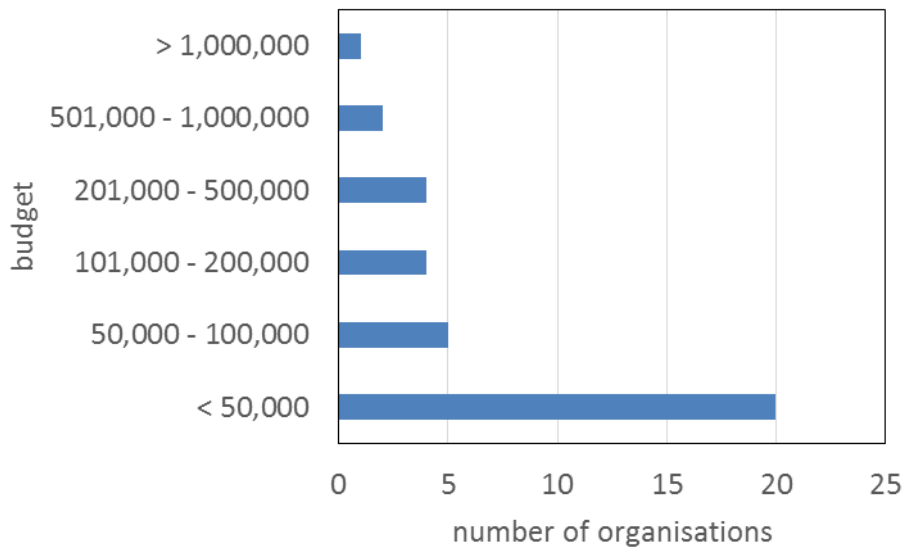
### When did your organisation start 3D geological modelling?



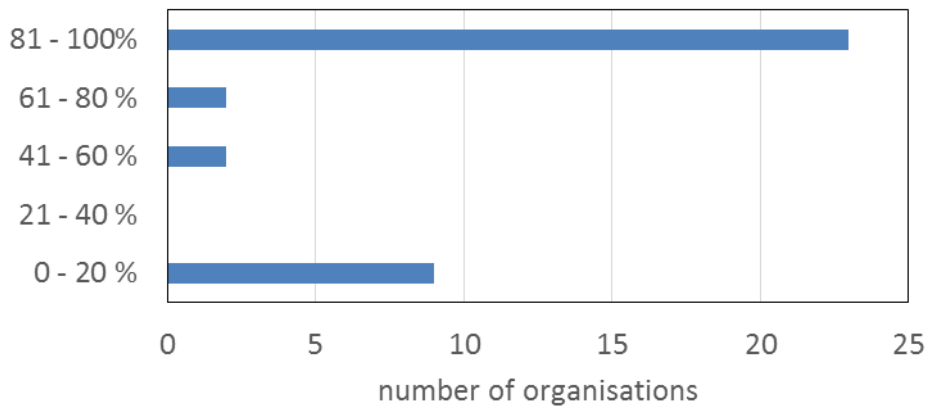
### How many person-years were spent to obtain your 3D geological models?



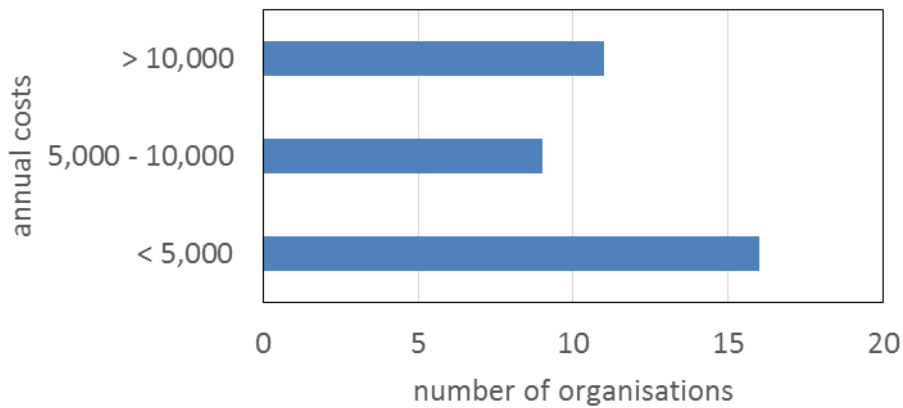
What is the rough annual budget allocated to 3D modelling for the year 2014 (in Euro)?



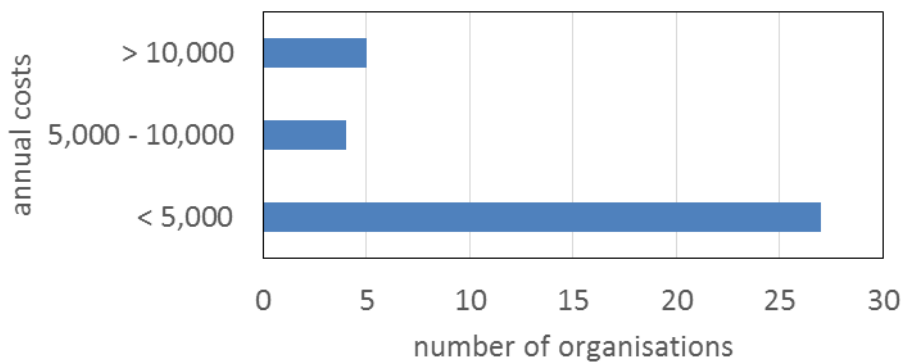
What percentage of this annual budget comes from government sources?



What annual costs went into modelling software licences in the year 2014 (in Euro)?



What annual costs went into programming modelling software and storage in the year 2014 (in Euro)?



If you provide your 3D geological models for download / viewing on your homepage, what total costs went into homepage set-up / programming since you started (in Euro)?

