

An Integrative Management Approach of Subsurface Data for Major Cities like Berlin

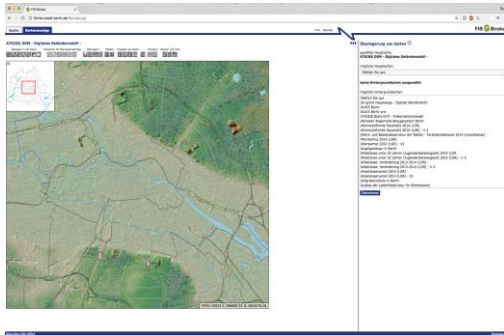
Matthias Schroeder, Alexander Limberg, Birgit Fritz-Taute, Dorit Kerschke, and Joachim Wächter

Senate Department for the Environment, Transport and Climate
Protection, Berlin

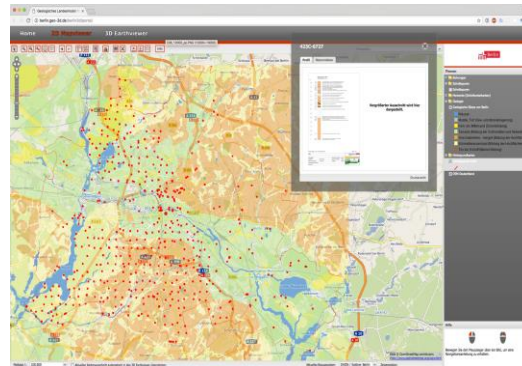
German Research Centre for Geosciences, Potsdam

Current Status of SDIs

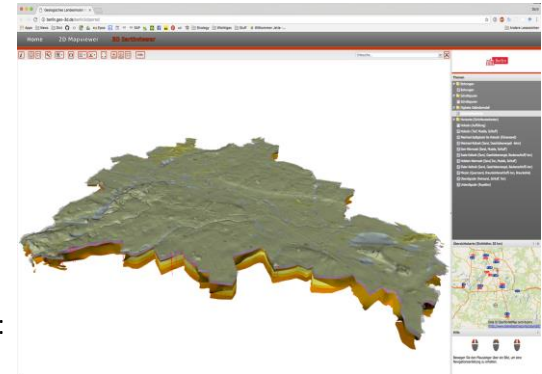
- Spatial Data Infrastructures in Germany growing at all levels (GDI-DE, and state SDIs)
- Since 2004, Berlin is addressing SDIs in a cross-administrative fashion
- According to the INSPIRE schedule -> metadata-, download-, transformation-, data-services, and web applications have been implemented



FIS-Broker: <http://fbinter.stadt-berlin.de/fb/index.jsp>



3D Subsurface Model Berlin:
<http://berlin.geo-3d.de/>



Assets Senate Department

Berlin State Geology



Geology

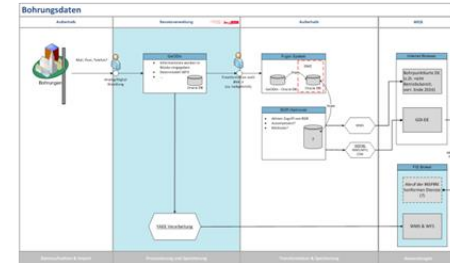
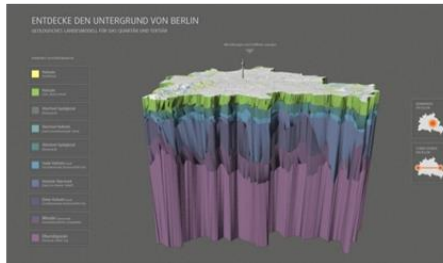
- 160.000 drilling wells
- Geological 3D- Model
- Diverse digital Maps and Webservices for Geothermal Potentiale map, Geological maps, etc.

Hydrogeology

- State Groundwater Monitoring Network
- Digital Groundwater Maps
- Groundwater Modelling


Geoinformation

- Geodata Management and Mapping
- Webmapping
- Workflow optimization
- Data Preparation for INSPIRE



E-Government

- SDI development accompanied by e-government process (e.g. Berlin Smart City initiative)
- Recently implementation of the e-gov act “E-Government-Gesetz Berlin”

Amtliche Abkürzung: EGovG Bln	Quelle: 
Ausfertigungsdatum: 30.05.2016	Fundstelle: GVBl. 2016, 282
Gültig ab: 10.06.2016	Gliederungs-Nr: 206-2
Dokumenttyp: Gesetz	

**Gesetz zur Förderung des E-Government
(E-Government-Gesetz Berlin - EGovG Bln)
Vom 30. Mai 2016 *)**

- E-gov fosters public participation in the administrative processes and improves the access to data and information
- E-gov has already modified and improved many planning processes: untouched topic -> subsurface management

Subsurface Management-Vision in a Nutshell

- Progressive urbanization exerts pressure on space and resources.
- Subsurface data are necessary for long-term planning of world's cities.
- Understanding subsurface beneath our cities is a key focus for modern geological surveys.
- We need better management concepts to measure the environmental impact of urban footprint.



In future we will need to manage the subsurface under modern cities.

www.bgs.ac.uk

Subsurface Data Management

CHALLENGES

- intensified usage of the subsurface is of increasing economic, societal and scientific interest
- it needs to consider conflicting types of use (e.g., tunnel construction and supply networks, groundwater protection)
- further increase of relevance due to unsolved/unaddressed questions (e.g., missing data, data acquisition, and tools)
- lack of appropriate digital administrative business processes

APPROACH

- integrated subsurface management as basis for sustainable use
 - comprehensive data base (e.g., exploration and monitoring wells)
 - high resolution 3D models
 - process modelling
 - monitoring with sensor networks
- development of new procedures for planning, approval and operation of facilities in close cooperation with involved stakeholders

New Digital Administrative Processes

Subsurface Management integrated processes for:

exploration
planning

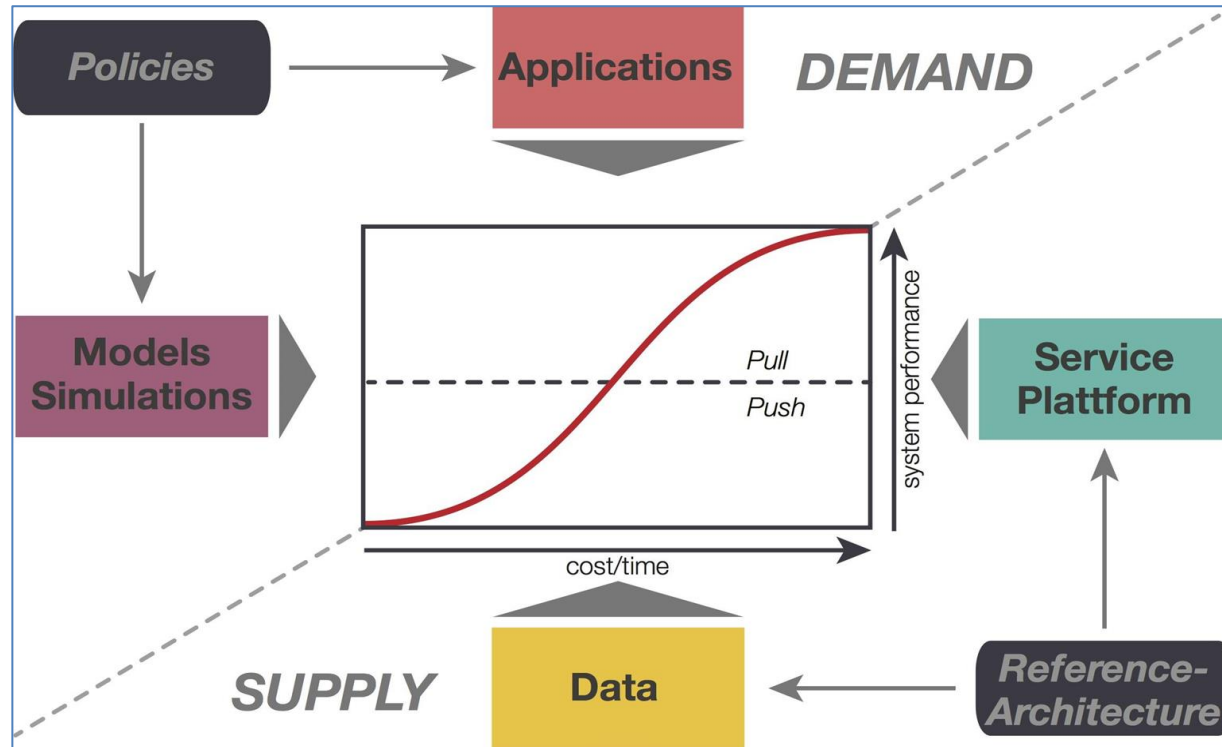
operation
monitoring

preservation



IT-infrastructure

The Approach



Groundwater Monitoring

What we have:

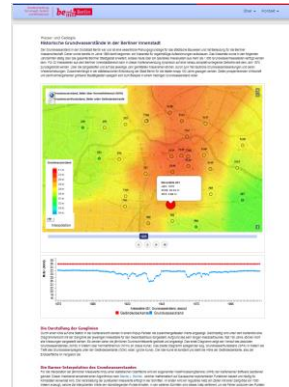
- over 1000 groundwater monitoring wells

Challenges:

- manual data import into database
- data is manually used for official groundwater contour plans
- data is manually exchanged with stakeholders, e.g. water companies

What we need:

- sensor integration to get automated data transmissions from all wells
- automated publishing of data
- automated data exchange with stakeholders
- automated reports for water and construction companies



Further Development of Geological Models

What we have:

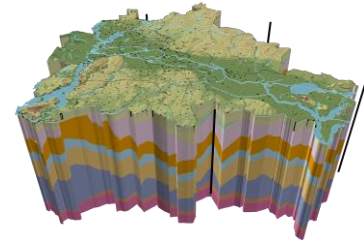
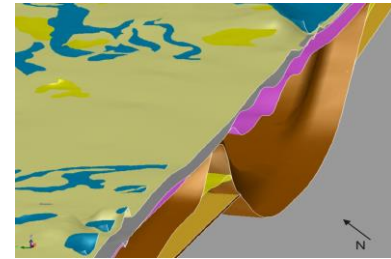
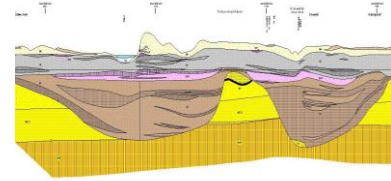
- round 160,000 boreholes
- > 1,000 are added each year

Challenges:

- manual data import into database
- data are used to construct geological maps, cross-sections, and 3D modelling

What we need:

- automated data import and update procedures
- semantically links between all data assets to simplify data product generation



Geothermal Exploitation

What we have:

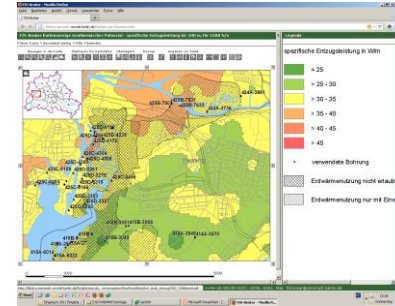
- > 13,000 wells with respective thermal conductivity potential
- data are used for planning and approval of geothermal systems

Challenges:

- only near-surface geothermal energy extraction in Berlin
- part of potable water is bank filtrate, results in strict conditions for plant operators

What we need:

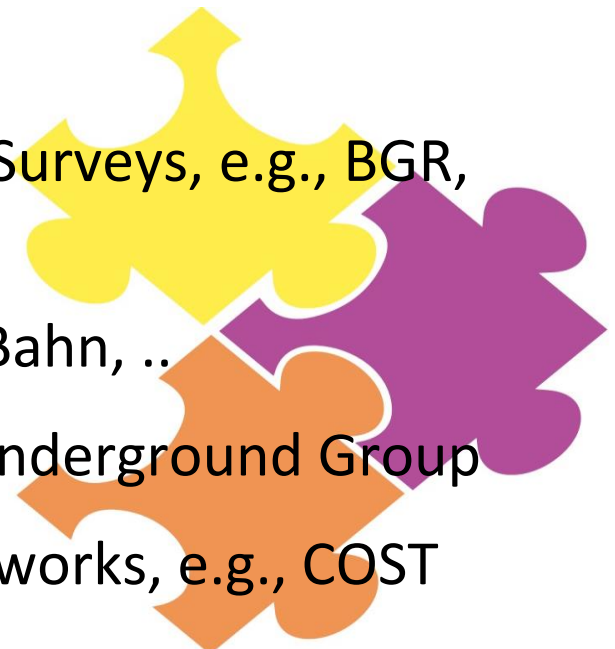
- modernized and semi-automated approval procedure for private and commercial geothermal systems



Collaboration

We seek collaborations with:

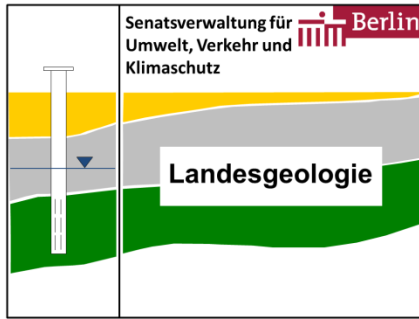
- National and International Geological Surveys, e.g., BGR, BGS, TNO, BRGM
- Industry stakeholders, e.g., Deutsche Bahn, ..
- Standardization consortia, e.g., OGC Underground Group
- Academic projects, initiatives, and networks, e.g., COST Action - Sub-Urban



Conclusions

- Berlin has successfully set up its SDI
- Time for pushing subsurface management
- Complex task in a complex context
- Based at identified scenarios initial applications could be realised
- We are in a starting phase and looking for partners.

Thanks for your attention



Senate of Berlin

Senate Department for the Environment, Transport and Climate Protection

Matthias Schroeder

Working Group State Geology

matthias.schroeder@senuvk.berlin.de