



This project is implemented through the CENTRAL EUROPE Programme co-financed by the ERDF.

<http://transenergy-eu.geologie.ac.at>

7th EUREGEO

Bologna, 15th June 2012

The CENTRAL EUROPE project

TRANSENERGY

—

Transboundary Geothermal Energy Resources
of Slovenia, Austria, Hungary and Slovakia

Gerhard Schubert, Geological Survey of Austria



The project's scope

The project TRANSENERGY is co-financed by the **CENTRAL EUROPE** programme (ERDF) in the **Area of Intervention 3.1, Developing a High Quality Environment by Managing and Protecting Natural Resources and Heritage.**

In the project area the main carrying medium of geothermal energy is the thermal water. Therefore the project addresses the **transboundary thermal water resources**. The aim of the project is not only the protection of this resources, but also the **stimulation of their sustainable utilisation** – based on a firm geoscientific expertise.

The project promotes the use of geothermal energy as a **renewable energy**.

The **target groups** are the legislative authorities, public administration, experts and potential thermal water users.

The project TRANSENERGY started in April 2010 and it will deliver its products until March 2013 by a **multilingual web portal** to the public.

Project team

MFGI - Geological and Geophysical Institute of Hungary

Annamária Nádor (project leader)

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György Tóth

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Jaromír Švasta

GeoZS - Geological Survey of Slovenia

Tadej Fuks

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Špela Kumelj

Andrej Lapanje

Nina Mali

Martin Podboj

Mitja Požar

Joerg Prestor

Dušan Rajver

Helena Rifelj

Nina Rman

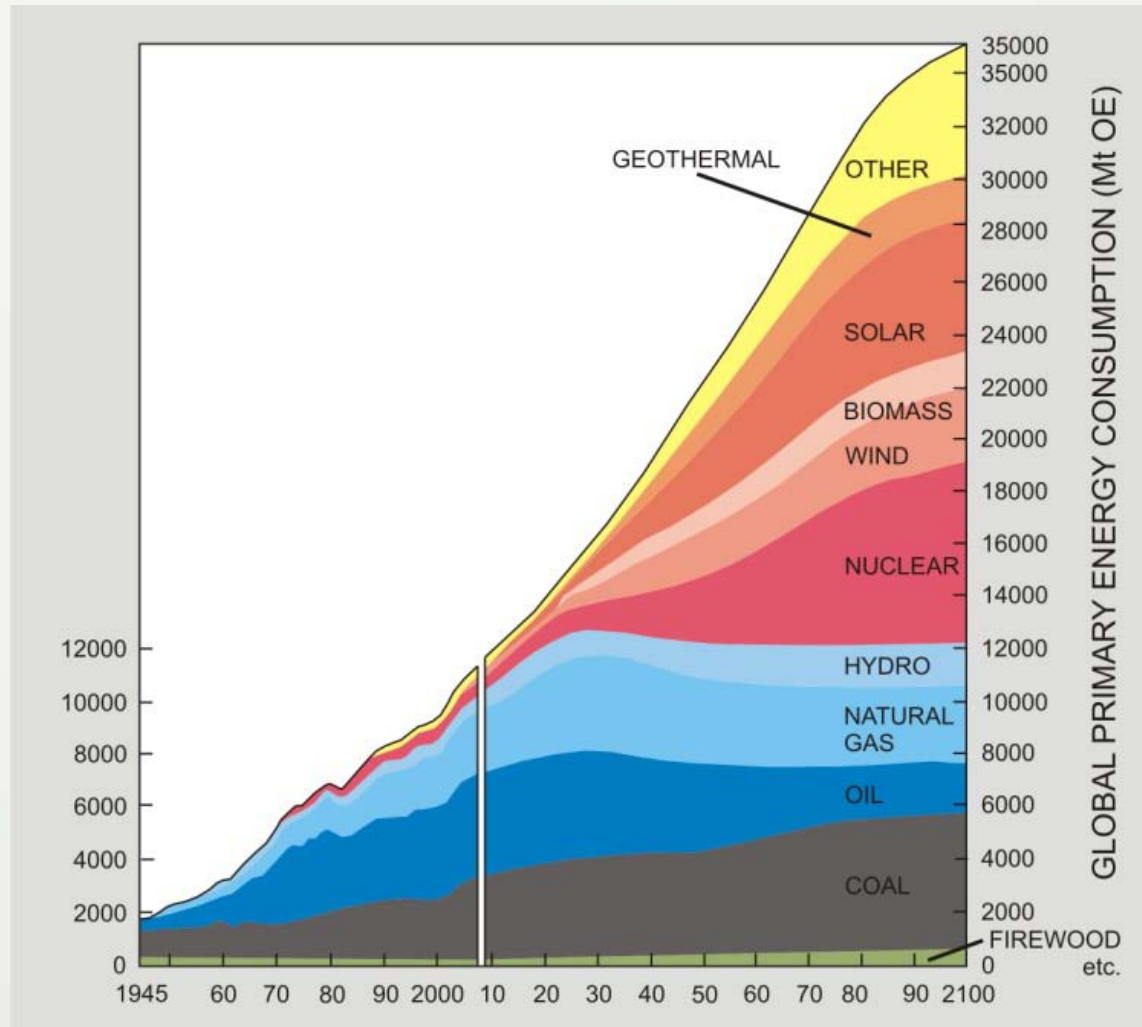
Barbara Simić

Jasna Šinigoj

Štefanija Štefanec

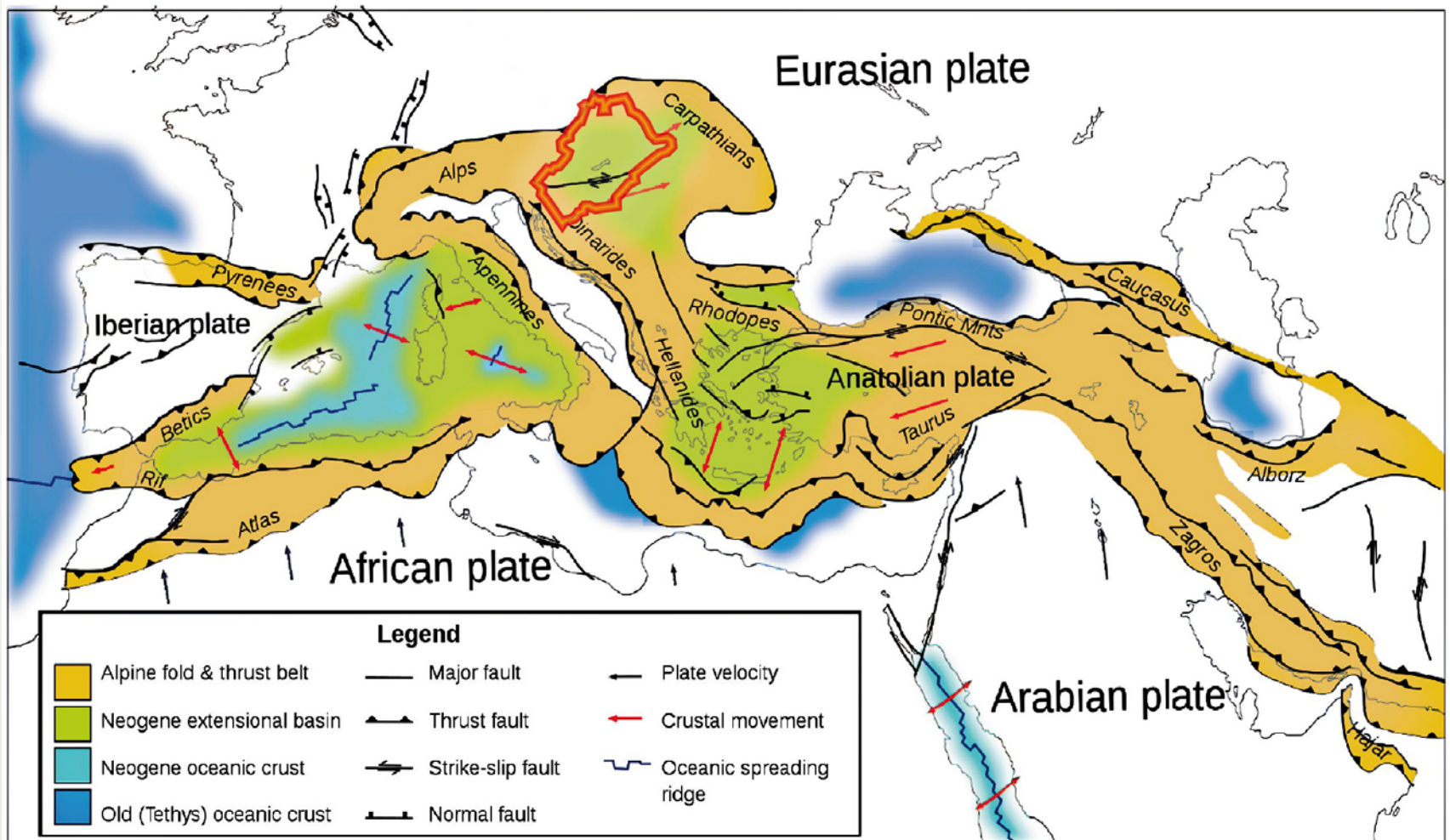
Mirka Trajanova

Energy spectrum 1945 to 2100



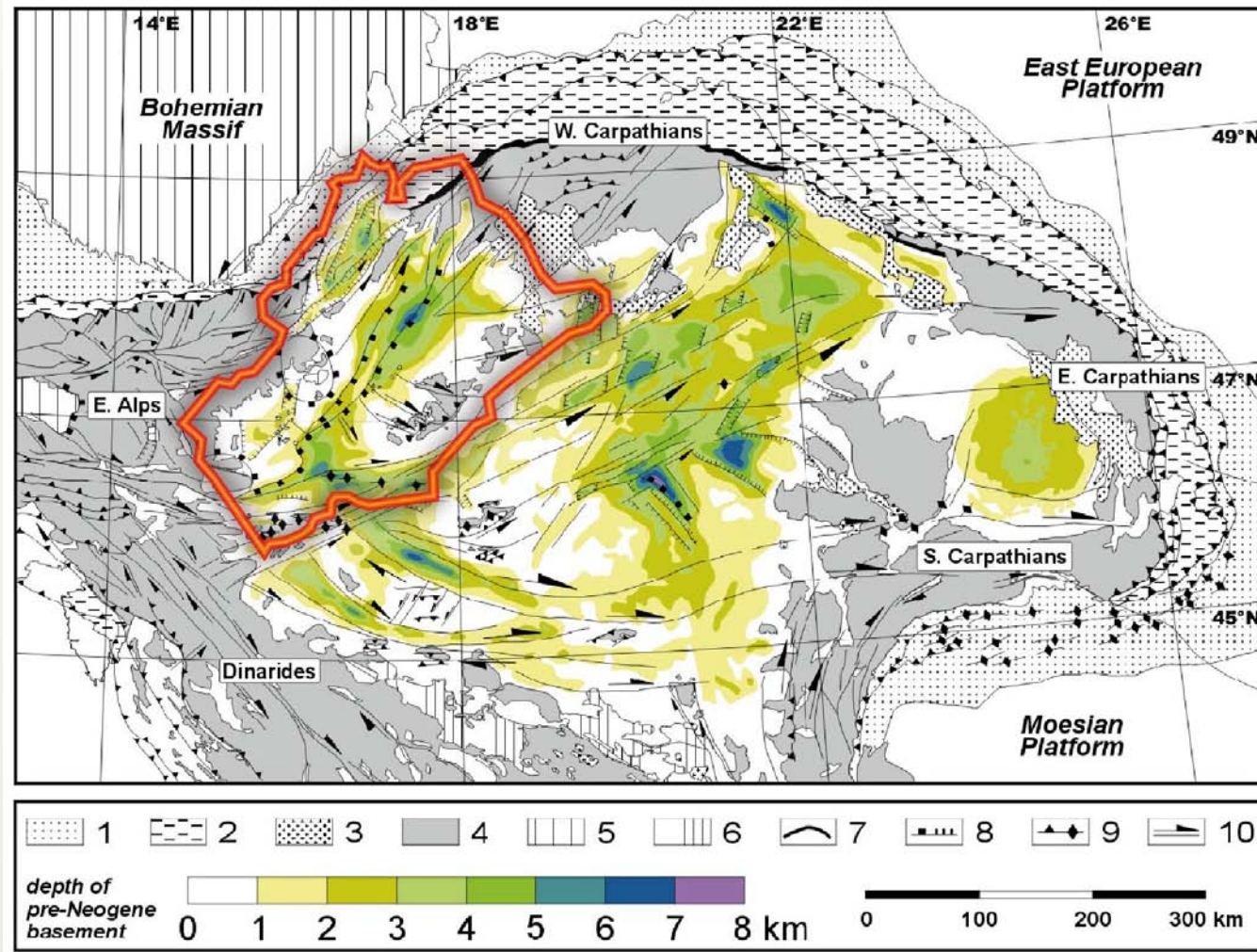
Schollnberger (2006)

Project region – tectonic scope



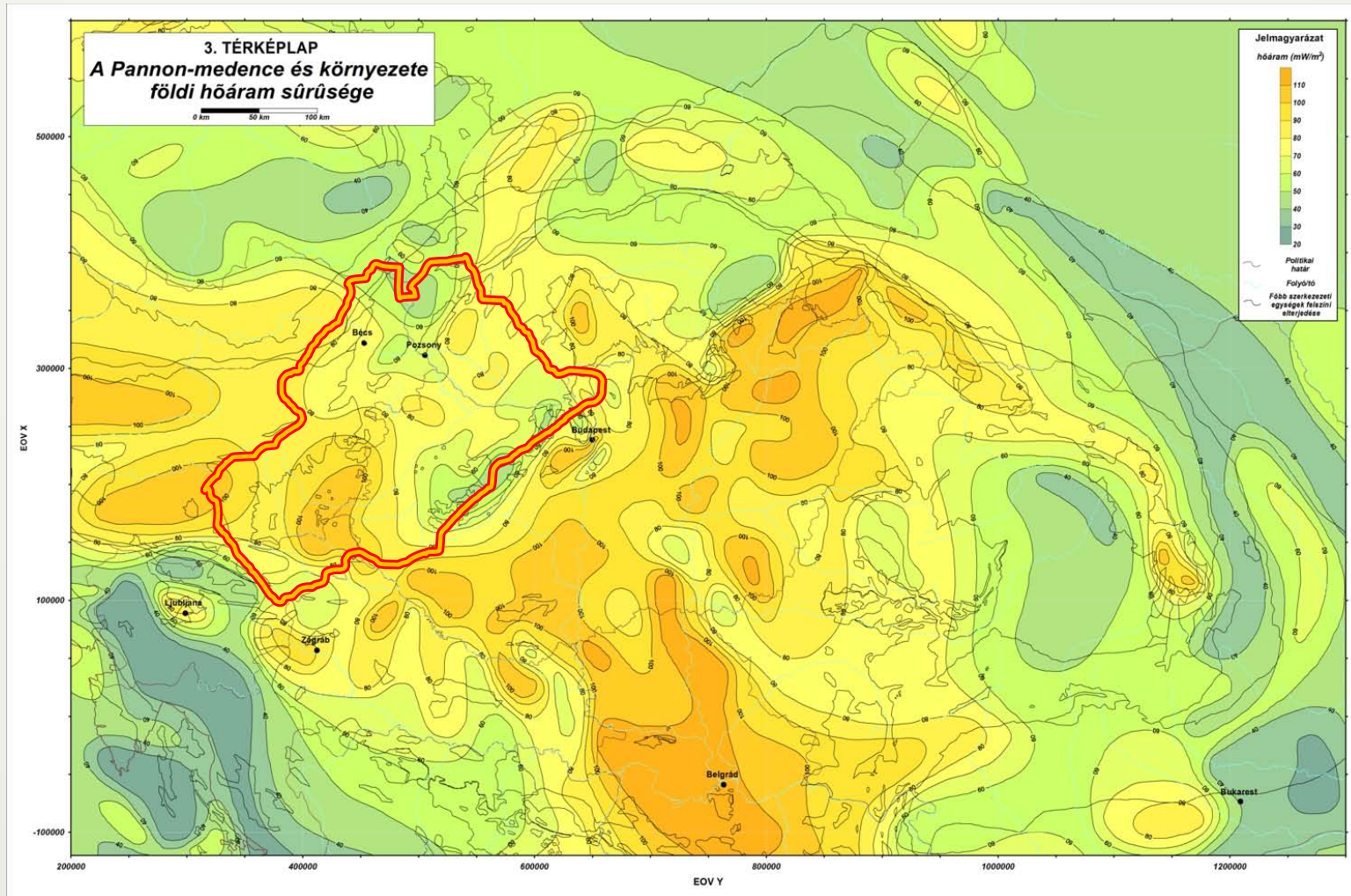
Woudloper (2009)

Project region – tectonic scope



Lenkey et al. (2002)

Project region – geothermal scope



Atlas of the present-day geodynamics of the Pannonian basin (<http://geophysics.elte.hu>)

Thermal water occurrences in the project region

www.thermewien.at



Slovakia

Austria

BUDAPEST

Slovenia

Croatia

www.cc.matsuyama-u.ac.jp

Oberlaa

www.leherer.schule.at



Baden



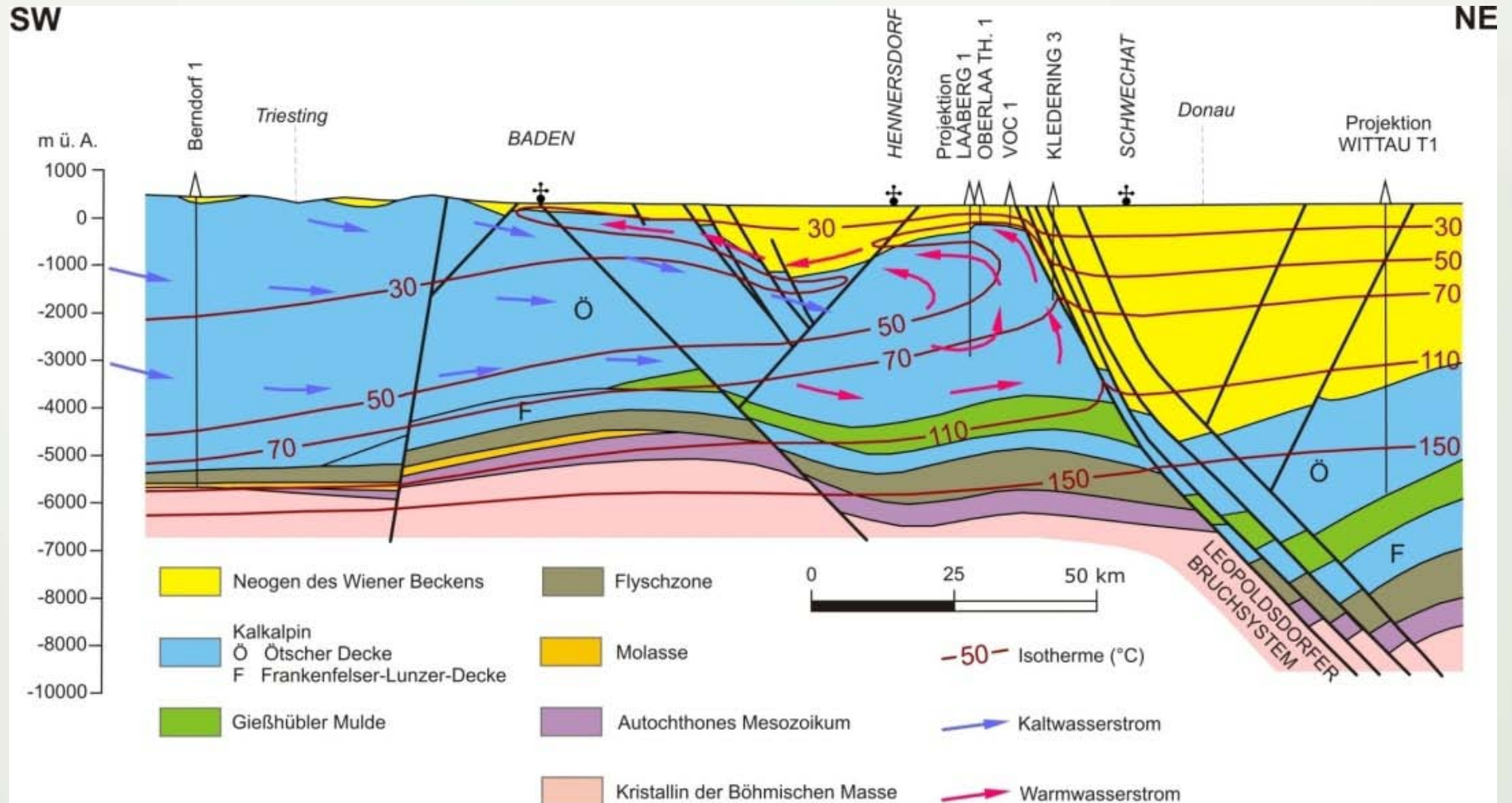
Hévíz

Background: Hydrogeological Map of Europe 1:1.500,000, UNESCO

<http://transenergy-eu.geologie.ac.at>



Thermal water in the Vienna Basin



Wessely (1983)

Planned outputs

In general, the project TRANSENERGY will provide **implementation tools for an improved transboundary thermal water management.**

The outputs of the project will be delivered by the **project web portal**. Following outputs will be delivered to the public:

- **Utilization maps**

This maps show the current production parameters of the thermal aquifers.

- **Multilingual database of geoscientific data**

The database comprises information about boreholes, yield, water temperatures, hydrochemistry, hydro-isotopes, petro-physical parameters etc.

Planned outputs

- **Cross-border geoscientific models**

The whole project area will be covered by a **supra-regional models** and selected pilot areas by **detailed models**. The models are of the following types:

- geological models
- hydrogeological models
- thermal models

Boundaries of supra-regional and pilot area models



Planned outputs

- **Geoscientific maps and cross sections**

They show the results of the modelling activities. This includes among others:

- Depths of geological units
- Lithology of geological units
- quantitative status of thermal aquifers
- water temperature
- hydrogeochemistry
- geothermal potential (heat in place)
- geothermal resources (extractable heat in place)

Planned outputs

- **Scenario-modelling**

In the pilot area virtual thermal water extractions and re-injections will be modelled.

The scenario modelling will demonstrate the **limits of thermal water productivity** in terms of water quantity and heat.

- **Feasibility study**

A feasibility study will demonstrate the applicability of the project results.

It will be made for one **cross-border geothermal power plant** for electricity and/or heat production. It will also take under consideration infrastructural and economical aspects.

The demonstration site will be selected together with a External Evaluation Board (EEB) which has been established to monitor the project.

Planned outputs

- **Interactive web-application delivering the models, maps and cross sections**

These web-application will comprise information like geology, water temperature, hydraulic and hydrogeochemical conditions and the actual thermal water extractions.

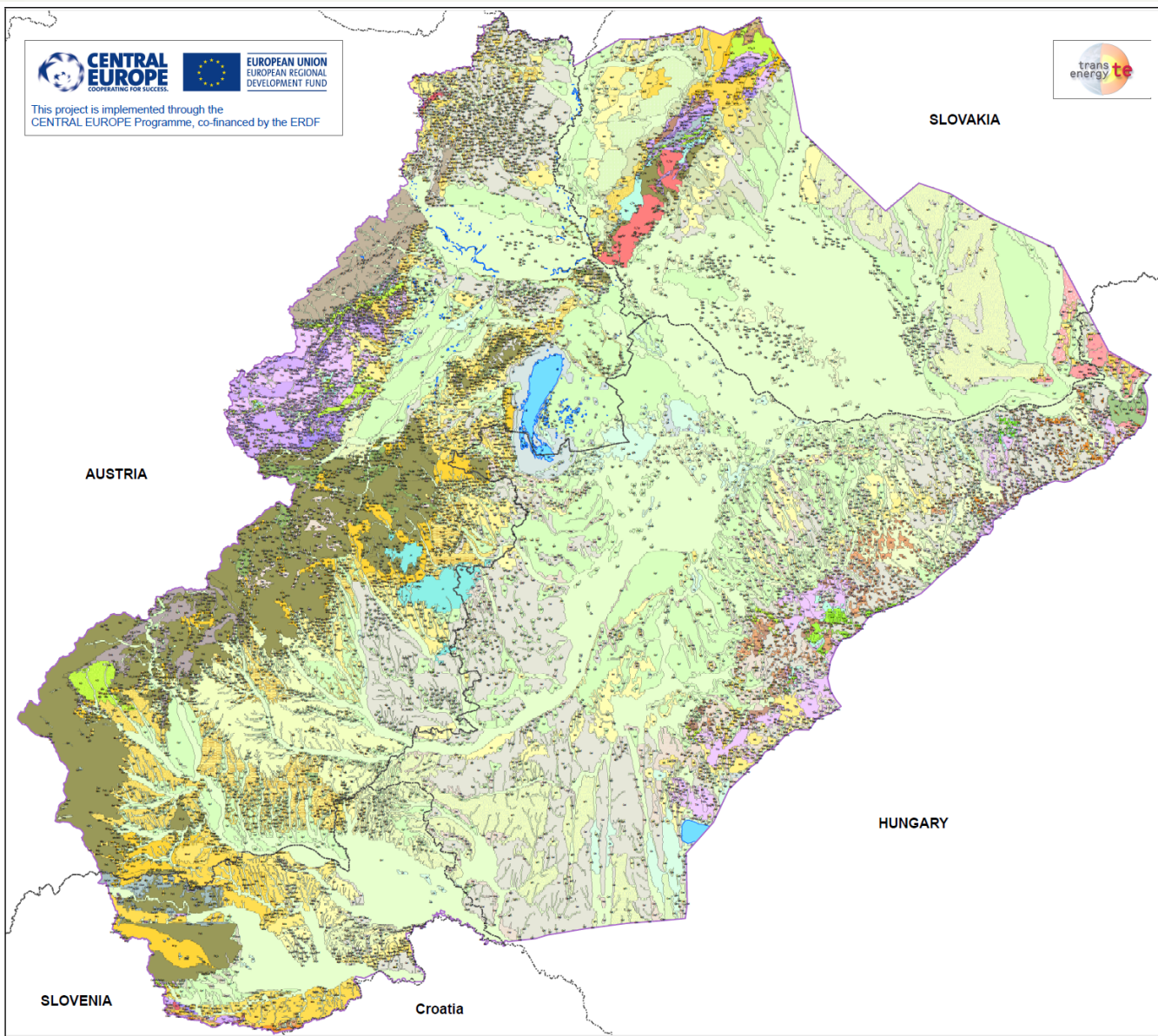
- **Strategy-paper**

The strategy-paper should support an efficient and sustainable geothermal energy use in the project region. It will comprise:

- actual status of thermal water utilisation
- recommendations for decision makers concerning the legal and funding situation
- ranking list of potential geothermal reservoirs
- monitoring concepts for selected site

Project outputs – supra-regional geological model

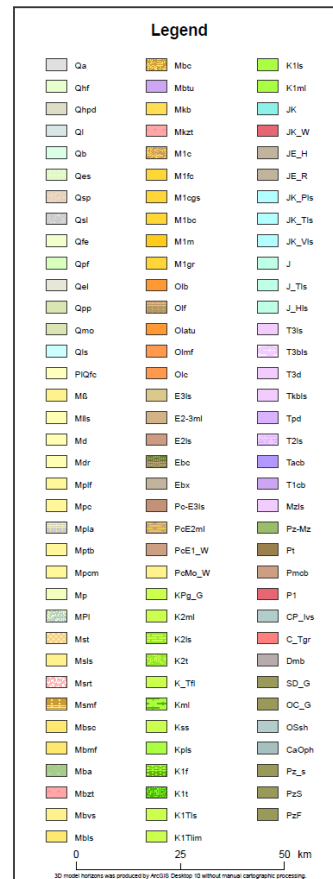
Enclosure 1.1.



Geological map of Supra-Regional Area

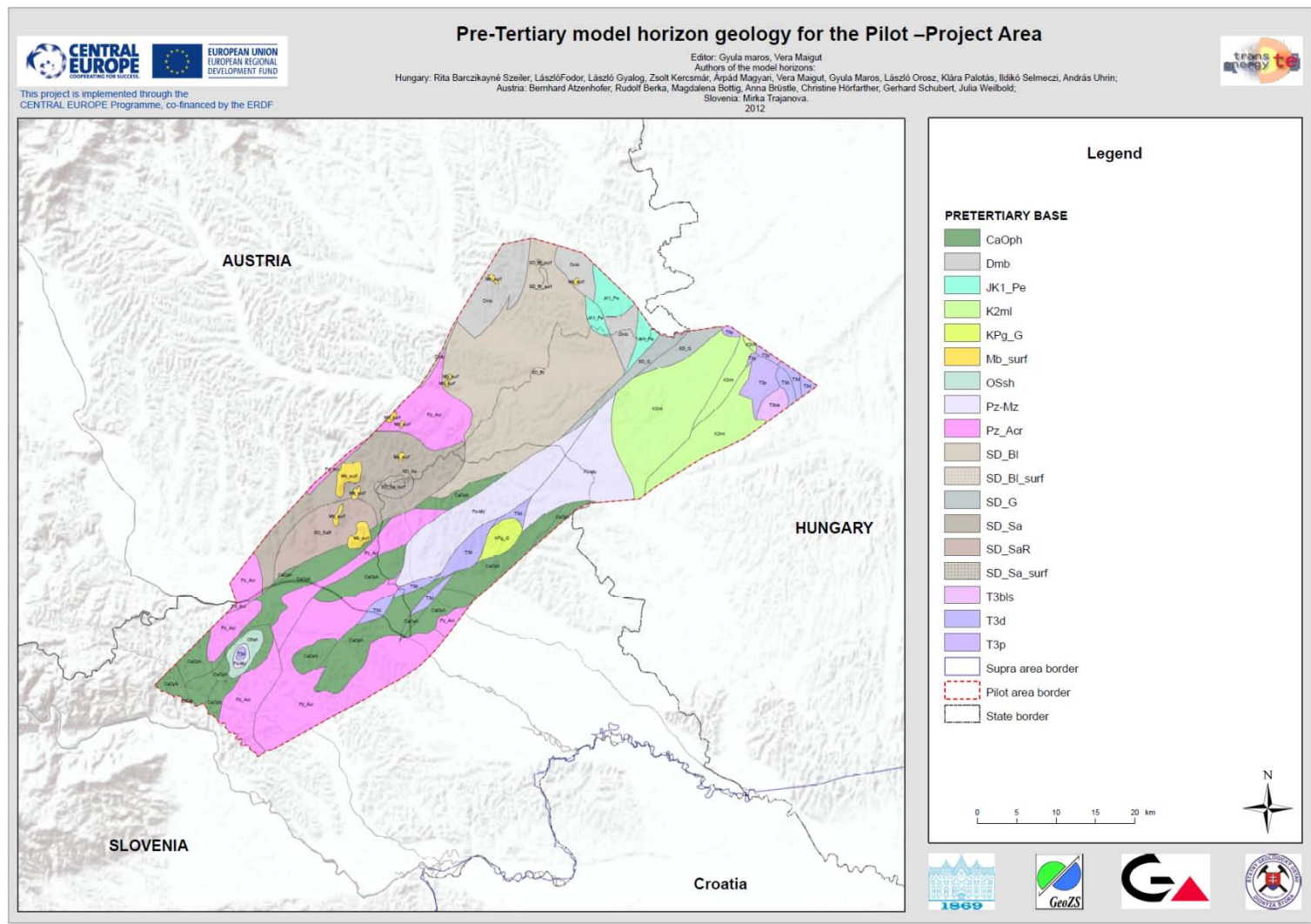
Scale: 1:500 000

Editor: Gyula Maros, Vera Maigut
 Authors of the model horizons: Hungary: Rita Barcsikayné Szeller, László Fodor, László Gyálgyóg, Zsolt Kercsmár, Árpád Magyari, Vera Maigut, Gyula Maros, László Orosz, Káris Palotás, Balázs Saleneczi, András Uhrin, Zsuzsanna Viktor; Austria: Bernhard Atzenhofer, Rudolf Berka, Magdalena Bottig, Anna Brüstle, Christine Hörstner, Gerhard Schubert, Julia Weiböck; Slovakia: Ivan Baráth, Elemér Fordinál, Balázs Kronomé, Juri Magyar, Alexander Nagy; Slovenia: Bogomir Jelen, Helena Ridelj, Igor Rižnar, Mirka Trajanova. 2011



Project outputs – geological models of pilot areas

Geological map of the pre-Tertiary basement of the pilot area Radkersburg-Hodos



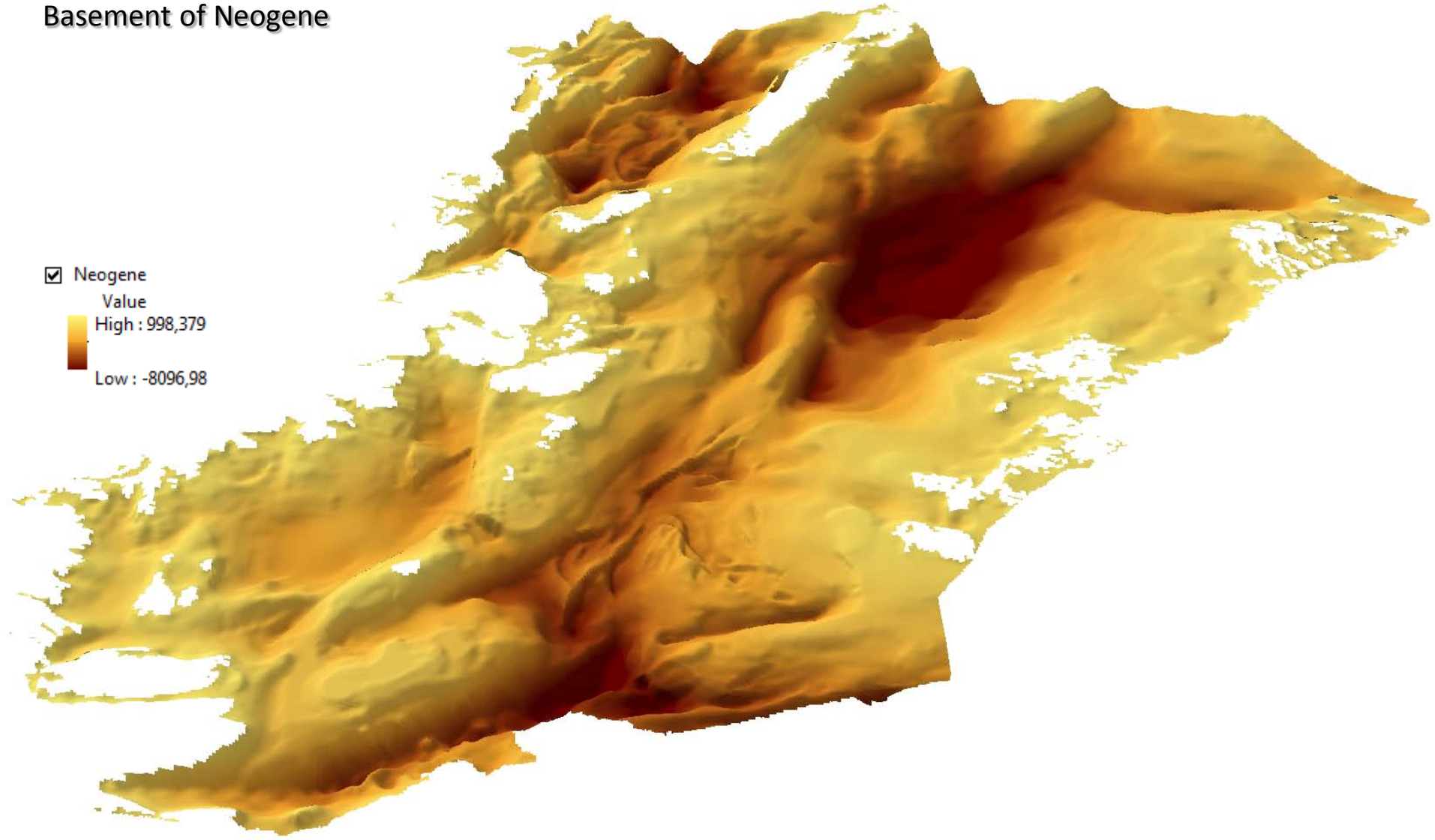
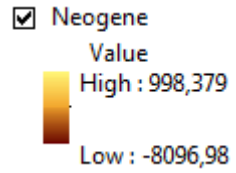
Pre-Tertiary basement



<http://transenergy-eu.geologie.ac.at>

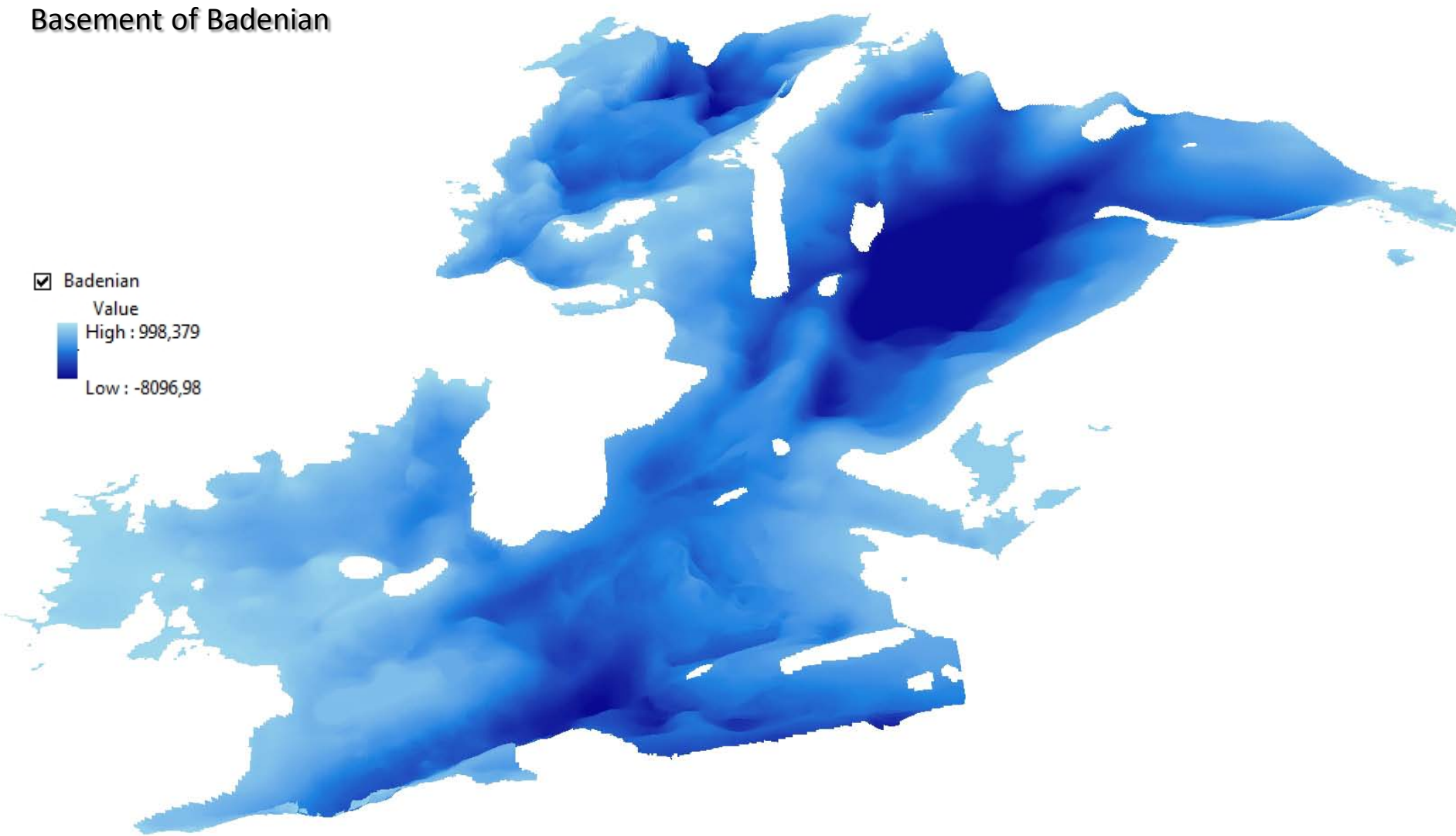
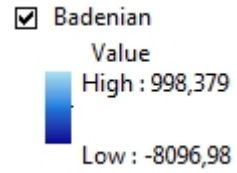
Project outputs – supra-regional geological model

Basement of Neogene



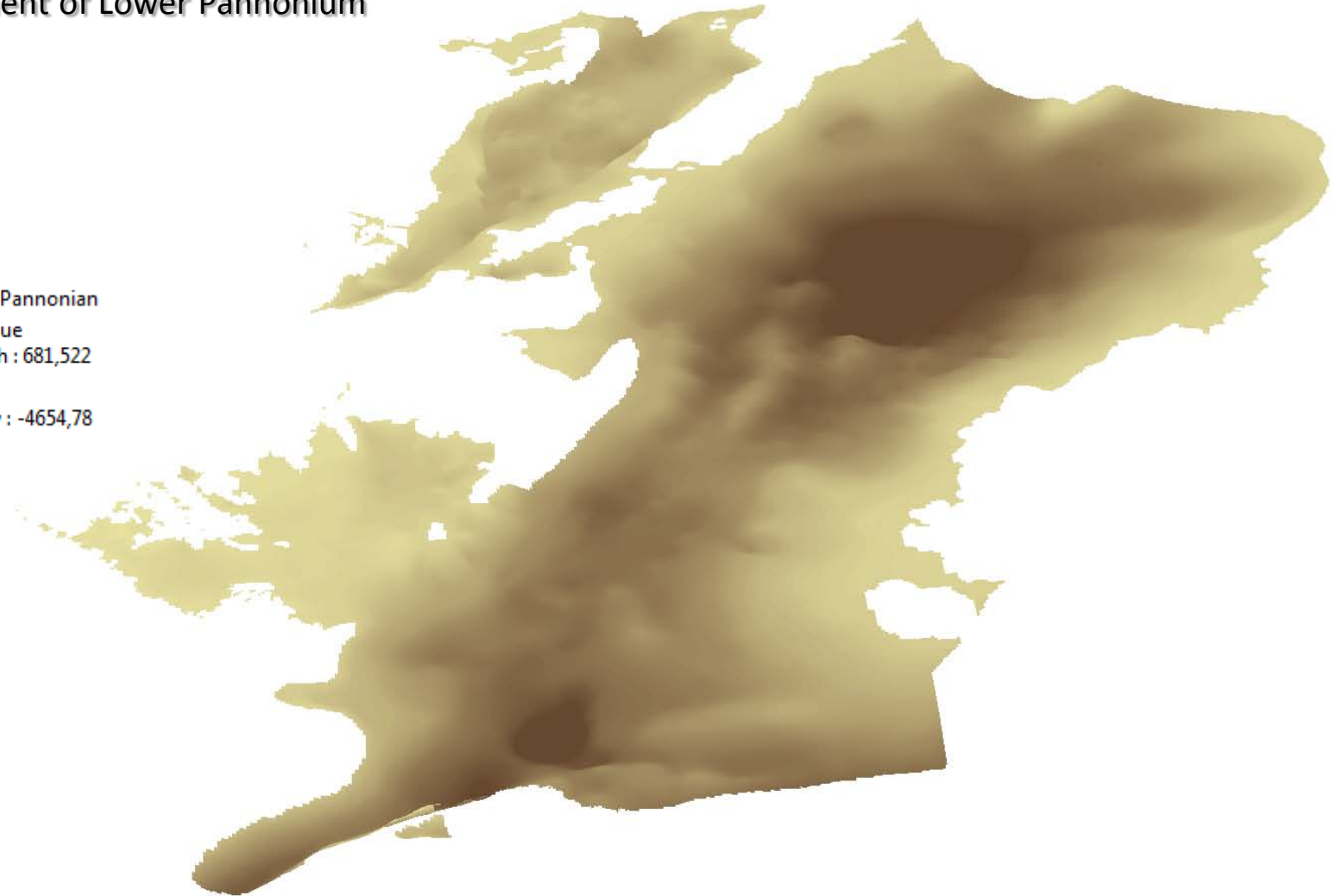
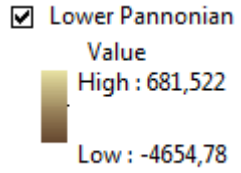
Project outputs – supra-regional geological model

Basement of Badenian



Project outputs – supra-regional geological model

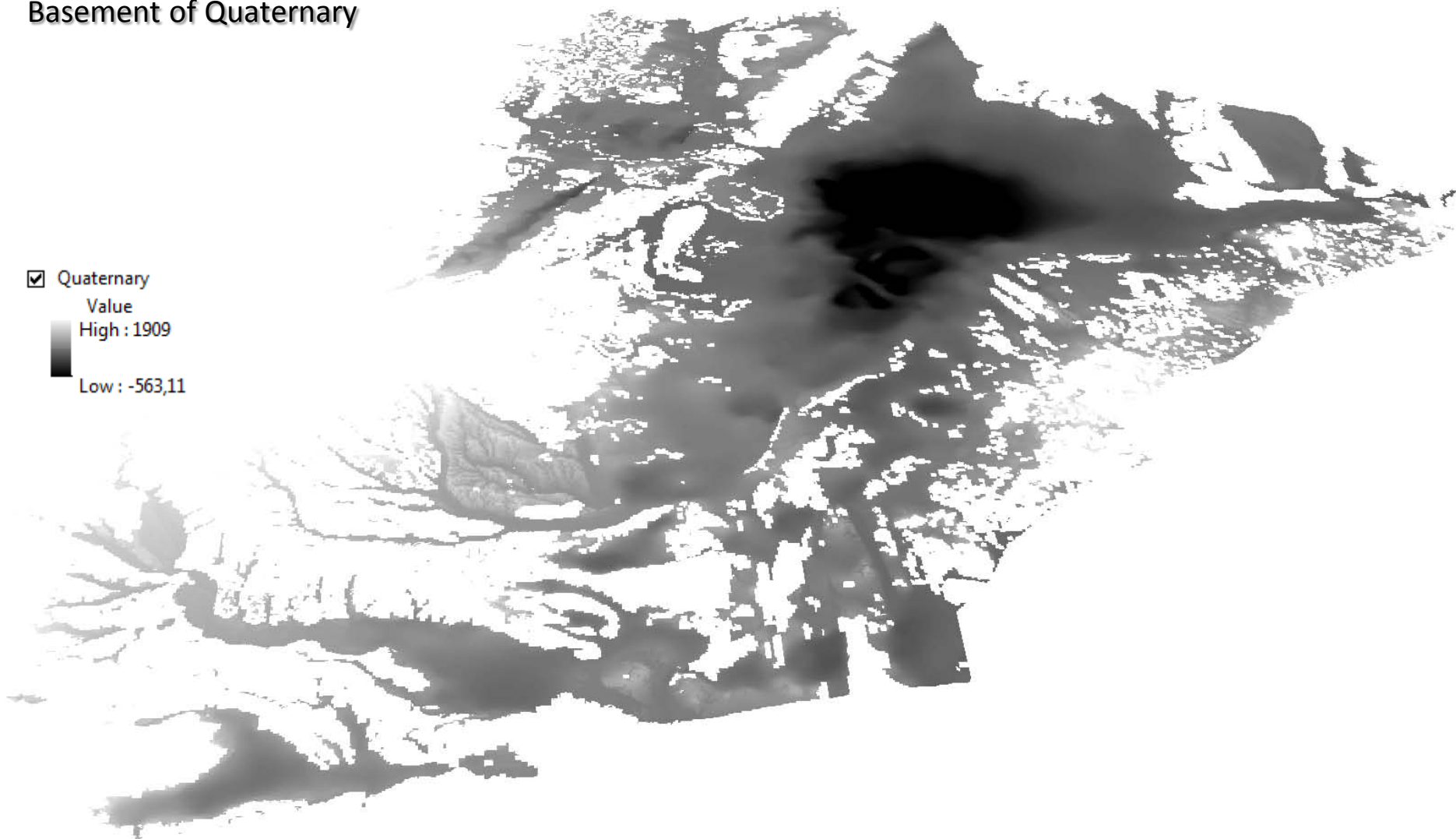
Basement of Lower Pannonium



Project outputs – supra-regional geological model

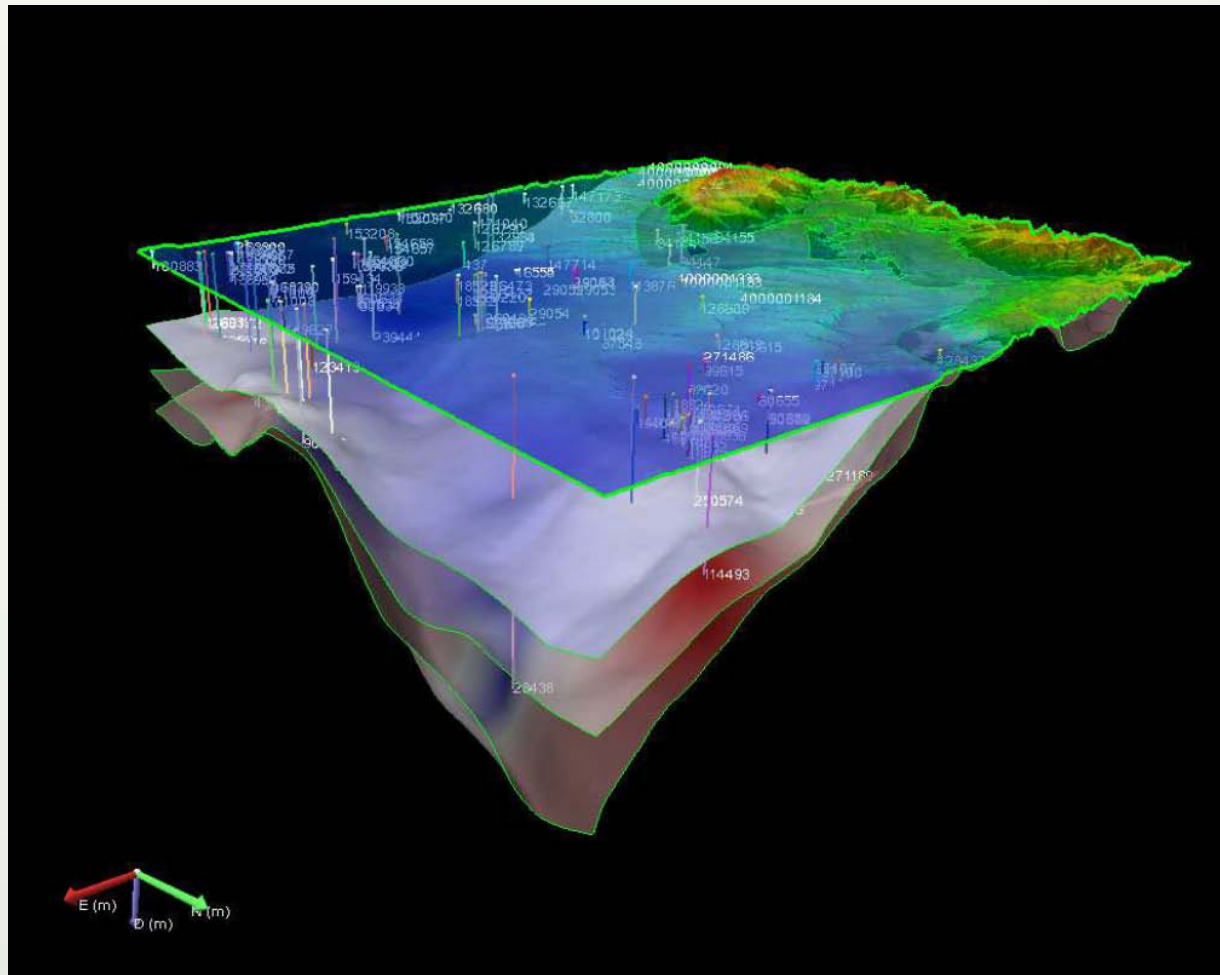
Basement of Quaternary

Quaternary
Value
High : 1909
Low : -563,11



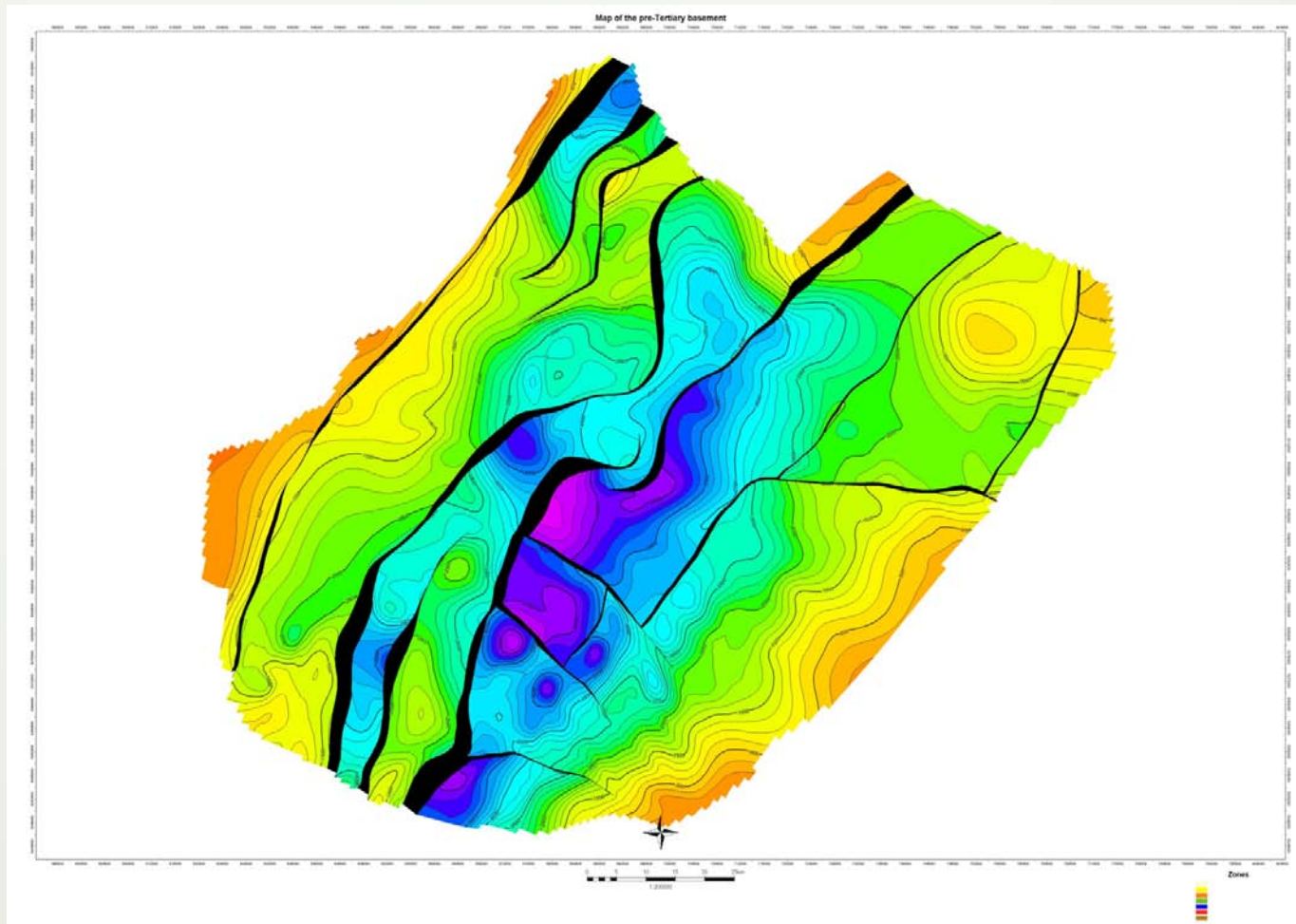
Project outputs – geological models of pilot areas

Lutzmannsburg-Zsira area: pre-Cenozoic, pre-Lower Pannonian and pre-Upper Pannonian horizon model from NE viewpoint, modelled by JEWEL and KINGDOM



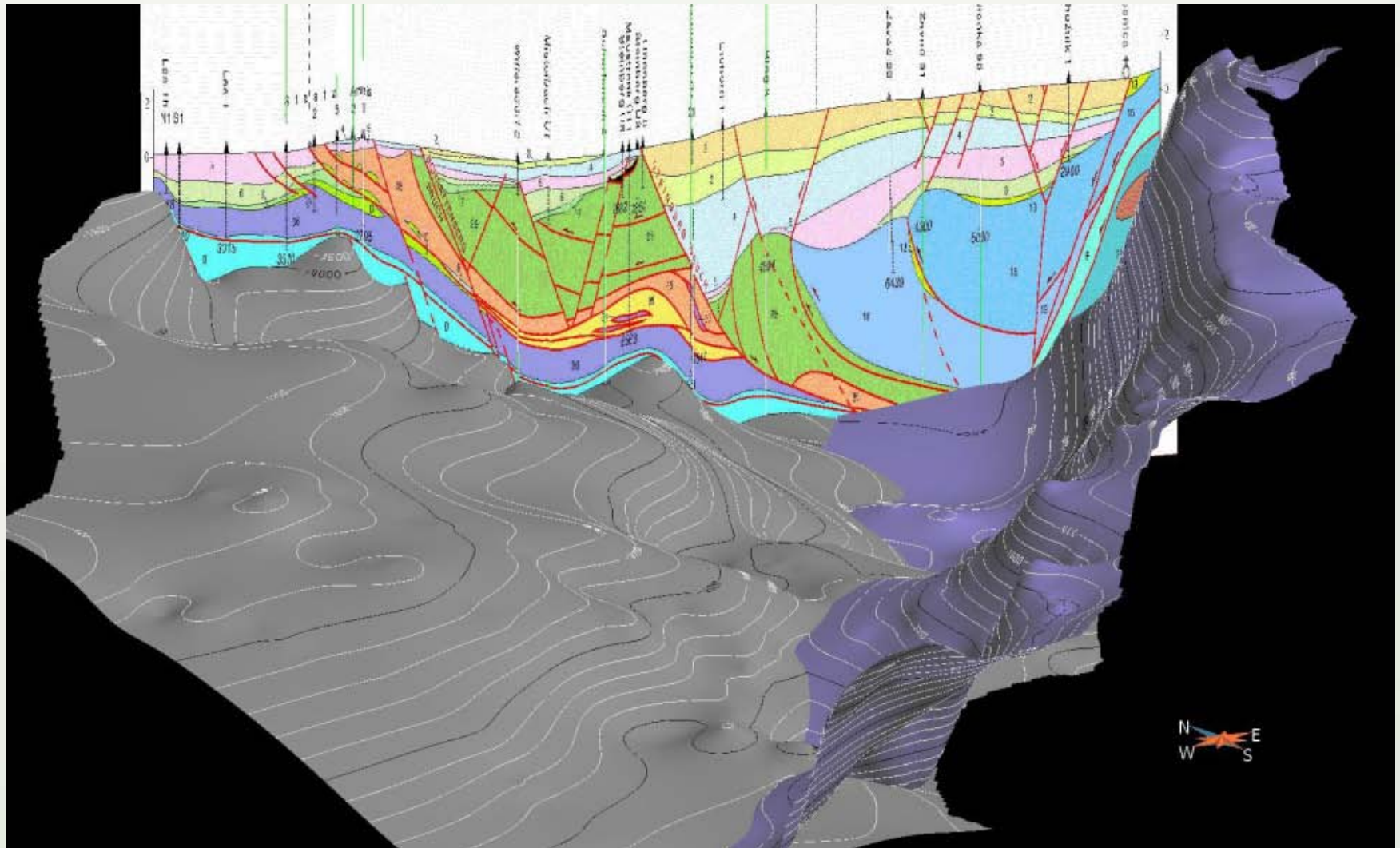
Project outputs – geological models of pilot areas

Pre-Tertiary basement of the pilot area Danube Basin modelled by PETREL



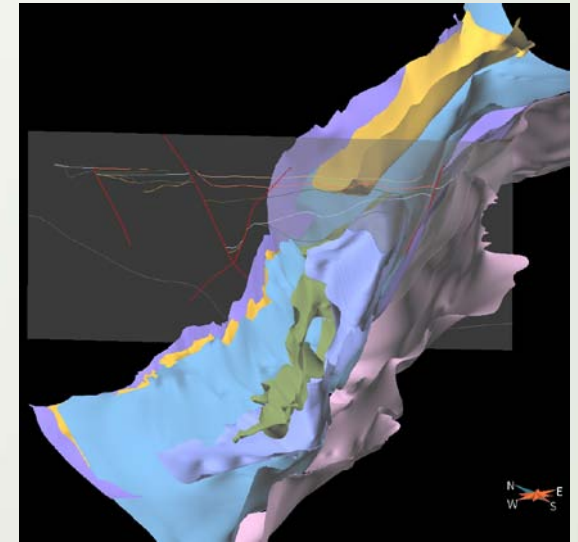
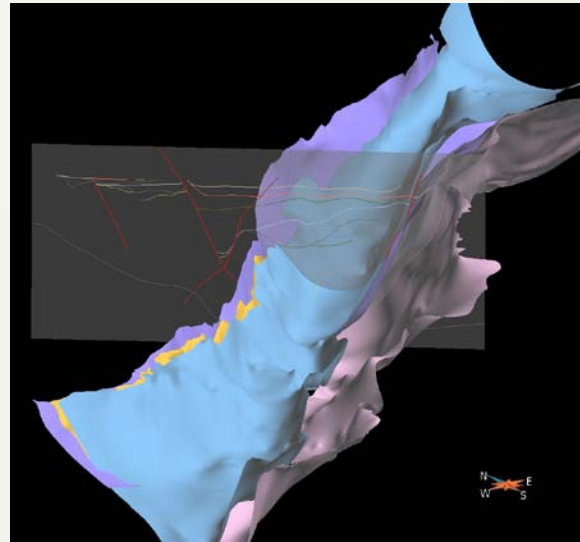
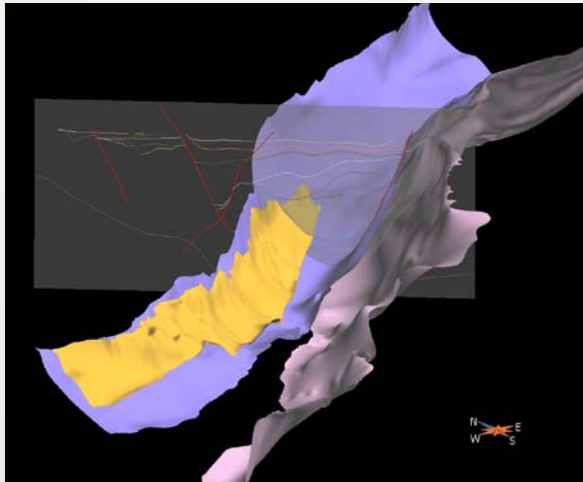
Project outputs – geological models of pilot areas

Detail of GOCAD model in the Vienna Basin – grey – crystalline of Bohemian Massif, blau: crystalline of Austroalpine unit



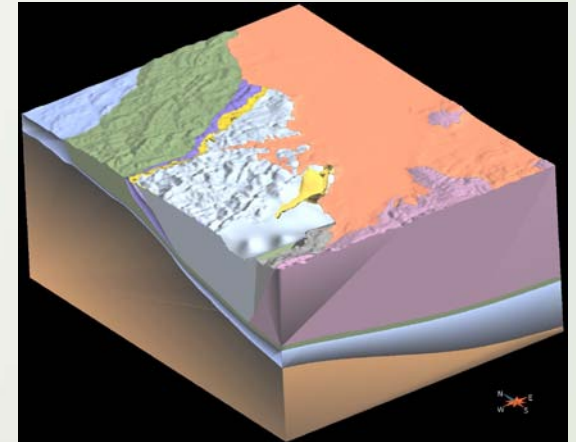
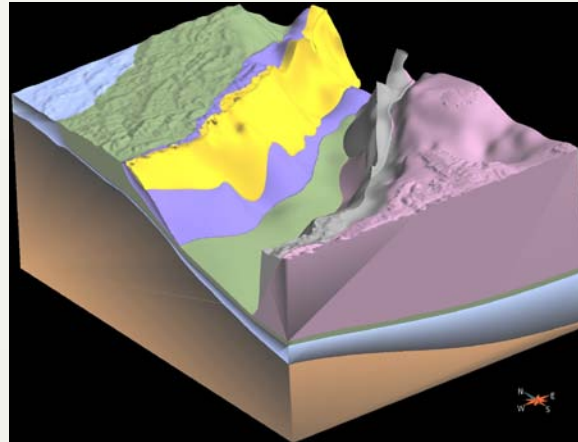
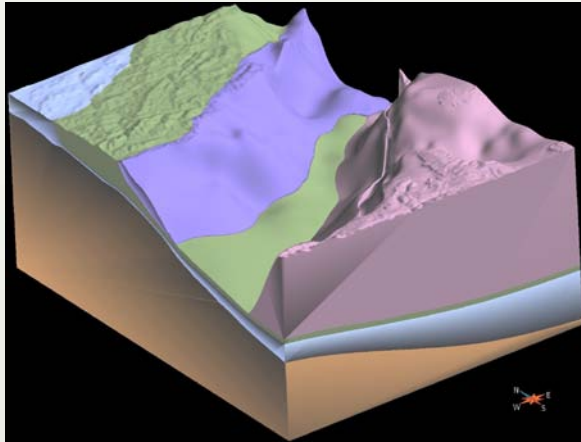
Project outputs – geological models of pilot areas

GOCAD surface model of the main units of the Vienna Basin – from left to right the base of: purple – Bajuvaric Nappes, yellow – Giesshuebel Gosau, pink – Mesozoic Carbonates, blue – Tirolic Nappes, yellow - Brezová-Myjava Area Gosau, green – Giesshuebel Gosau, lavender – Juvavic Nappes.



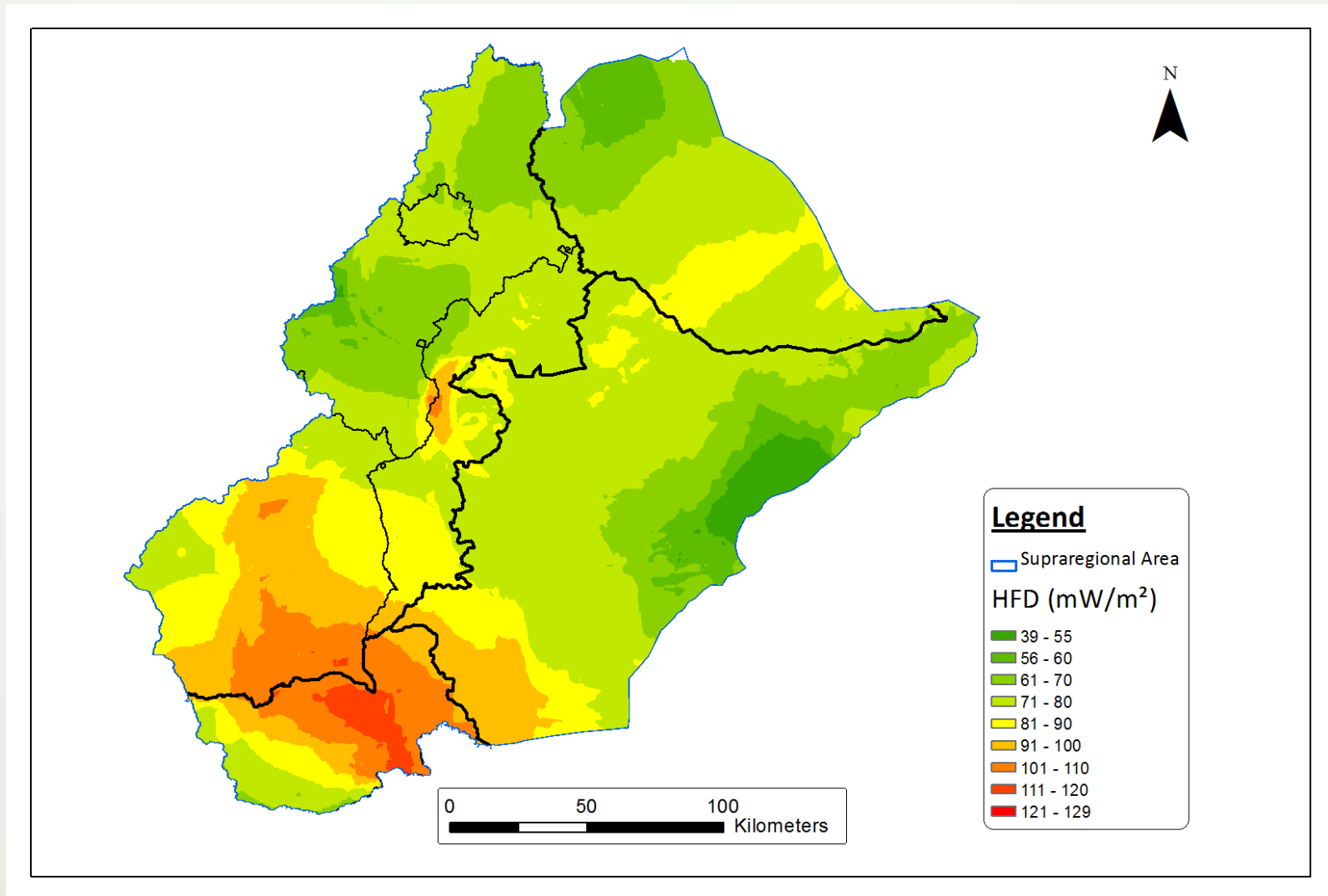
Project outputs – geological models of pilot areas

GOCAD volumetric model of the southern part of the Vienna Basin – from the base to the top: Bohemian Massive and lower units (up to -15 km), blue - Molasse, green - Flysch Units, purple - Bajuvaric Nappes, yellow – Giesshuebel Gosau, grey – Greywacke Zone, lavender on the right – Central Alpine and Tatric Units, orange – Neogene Basin sediments.



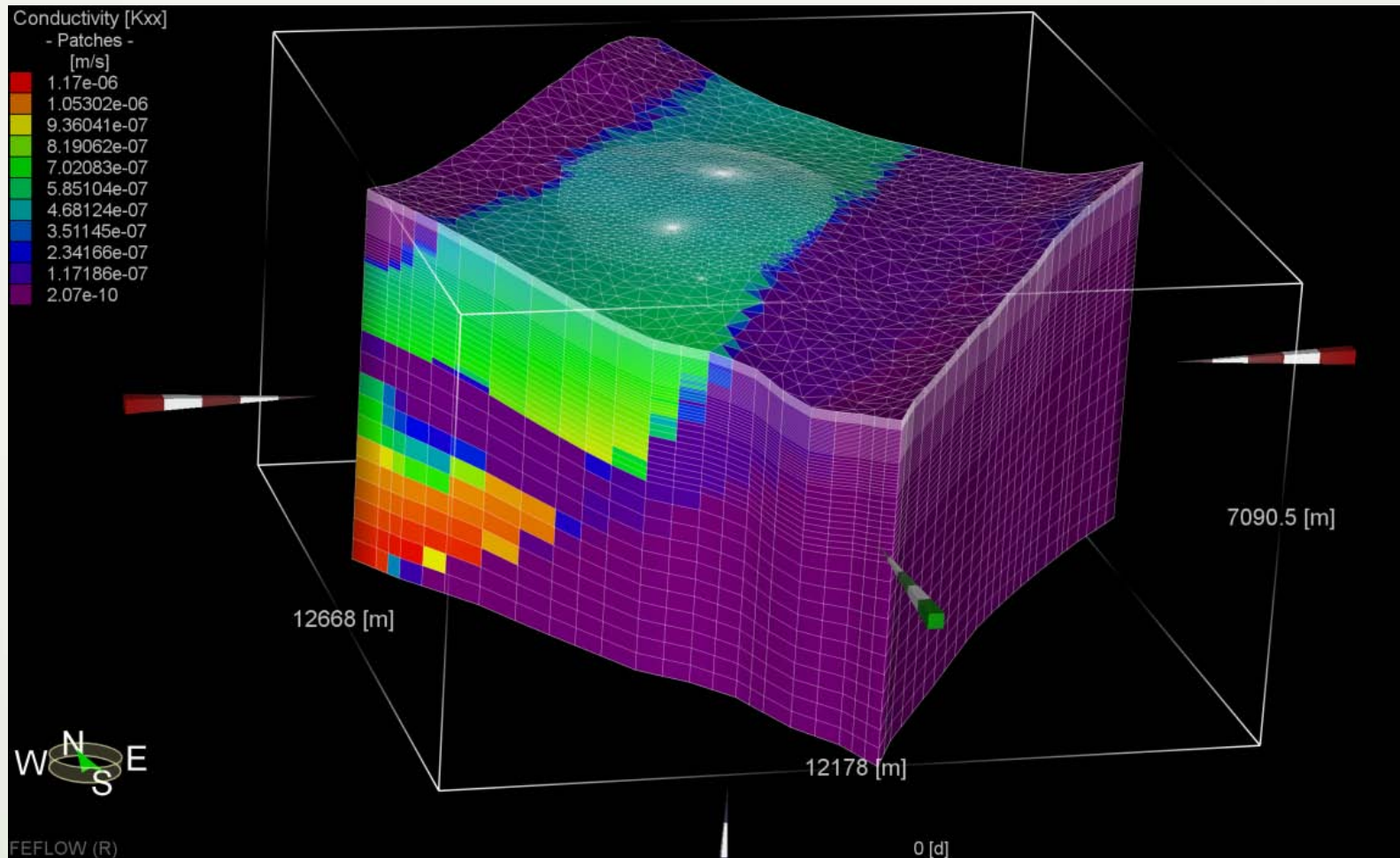
Project outputs – supra-regional geothermal model

Heat flow map



Project outputs – scenario modeling in pilot areas

FEFLOW model block of a scenario model in the Vienna Basin from SSW viewpoint; the numeric grid is tightened in the surrounding of two wells. The hydraulic conductivity is shown by the colour.



Project Website

The screenshot shows a web browser displaying the Transenergy website. The browser's address bar shows the URL <http://transenergy-eu.geologie.ac.at/>. The website header features the 'trans energy te' logo on the left, and the 'CENTRAL EUROPE COOPERATING FOR SUCCESS.' logo and the 'EUROPEAN UNION EUROPEAN REGIONAL DEVELOPMENT FUND' logo on the right. Below the logos, a text line states: 'This project is implemented through the CENTRAL EUROPE Programme co-financed by the ERDF.'

The main content area is titled 'Transenergy — Transboundary Geothermal Energy Resources of Slovenia, Austria, Hungary and Slovakia'. On the left side, there is a vertical navigation menu with the following items: Home, Aims of TE, Involved Organisations, TE Team & Contact, Results, Public Event, News, Links, Partners Section, and EEB-Section. Below the menu are flags for the United Kingdom, Austria, Hungary, Slovakia, and the Czech Republic, followed by the text '© Geological Survey of Austria'.

The main content area contains a welcome message: 'Welcome to the website of Transenergy!'. Below this is a paragraph: 'This website informs about a central European project, which started in April 2010. The aim of "Transenergy" is to create a common geothermal information system in four central European countries. Having an environmental focus the purpose is seeking for sustainable, transboundary utilization of geothermal energy resources.' Below the text is a video player showing the 'trans energy te' logo with a play button. To the right of the video is a map of Central Europe with a red outline indicating the 'Boundary of Project Region' and green shaded areas indicating 'Participating Countries'. The map labels the countries A (Austria), H (Hungary), SLO (Slovenia), and SK (Slovakia).



Project Website

Project team and contacts

The screenshot shows the website <http://transenergy-eu.geologie.ac.at/>. The page features a navigation menu on the left with items like Home, Aims of TE, Involved Organisations, TE Team & Contact (highlighted), Results, Public Event, News, Links, Partners Section, and EEB-Section. The main content area is titled "Transenergy — Transboundary Geothermal Energy Resources of Slovenia, Austria, Hungary and Slovakia". It lists contact persons for MAFI (Hungary), GBA (Austria), SGUDS (Slovakia), and GeoZS (Slovenia). Logos for the Central Europe Programme and the European Union European Regional Development Fund are also present.

Transenergy contact persons

MAFI - Magyar Állami Földtani Intézet	Annamária Nádor (projek manager)	nador@mafi.hu
GBA - Geologische Bundesanstalt	Gerhard Schubert	gerhard.schubert@geologie.ac.at
SGUDS - Štátny geologický ústav Dionýza Štúra	Radovan Černák	radovan.cernak@geology.sk
GeoZS - Geološki zavod Slovenije	Andrej Lapanje	andrej.lapanje@geo-zs.si

Transenergy Team

MAFI - Geological Institute of Hungary	GBA - Geological Survey of Austria
Edit Babinszki - Communication	Bernhard Atzenhofer - TE Website, GIS
Nóra Gál - Utilization aspects	Rudolf Berka
János Halmai - Financial manager	Magdalena Bottig - 3D modeling
Vera Malgut - GIS	Anna Brüstle - Geophysics
Gyula Maros - Geological modeling	Gregor Götzl - Project coordinator
Annamária Nádor - Project manager	Christine Hörfarter - Research, administration
László Orosz - Database	Thomas Hofmann
Ágnes Rotár-Szalkai - Hydrogeological modeling, WP5 leader	Stefan Hoyer - Numeric modeling
Teodóra Szűcs - Hydrogeochemical modeling	Gerhard Schubert - Project manager
György Tóth - Hydrogeological modeling	Julia Weibold - Data assessment
	Fatime Zekiri - Geophysics

SGUDS - State Geological Institute of Dionýz Stur	GeoZS - Geological Survey of Slovenia
František Bottlik - Website, GIS	Tadej Fuks - Researcher
Radovan Černák - Project coordinator on Slovak side	Katarína Hribemik - Website, GIS
Balázs Kronome - 3D geological modeling	Špela Kumelj - Website, GIS
Peter Malik - Dissemination	Andrej Lapanje - Project manager
Daniel Marcin - Geothermal water exploitation	Nina Mali - Researcher
Slavomír Mikita - Database management, GIS	Martin Podboj - Website, GIS
Anton Remšík - Scientific guaranty on Slovak side	Milja Požar - Website, GIS
Jaromír Švasta - Numerical modeling, Databases, GIS	Joerg Prestor - Researcher
	Dušan Rajver - Researcher
	Helena Ritelj
	Nina Rman - Researcher
	Barbara Simič - Project coordinator
	Jasna Šinigoj - Website, GIS
	Štefanija Štefanec
	Mirka Trajanova



Project Website

Download of results

The screenshot shows a web browser window displaying the Transenergy website. The browser's address bar shows the URL <http://transenergy-eu.geologie.ac.at/>. The website features a navigation menu on the left with items like Home, Aims of TE, Involved Organisations, TE Team & Contact, Results, Public Event, News, Links, Partners Section, and EEB-Section. The main content area is titled "Transenergy — Transboundary Geothermal Energy Resources of Slovenia, Austria, Hungary and Slovakia" and includes a sub-menu for "Project outputs". The "WP3 Utilization aspects" section lists various reports and maps, such as "Legislation overview report", "WP3-2-3 utilization maps", and "Operational monitoring on thermal boreholes". The website also displays logos for the Geological Survey of Austria and the European Union.

trans energy te

CENTRAL EUROPE
COOPERATING FOR SUCCESS.

EUROPEAN UNION
EUROPEAN REGIONAL
DEVELOPMENT FUND

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Transenergy — Transboundary Geothermal Energy Resources of Slovenia, Austria, Hungary and Slovakia

- Home
- Aims of TE
- Involved Organisations
- TE Team & Contact
- Results**
- Public Event
- News
- Links
- Partners Section
- EEB-Section

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Project outputs

- TE presentations at international conferences
- Project promotion materials
- Project launch event Vienna 2010

WP3 Utilization aspects

Legislation overview report

WP3-2-3 utilization maps

- Changes in exploitation of geothermal aquifers
- Main geothermal aquifers
- Operational monitoring on thermal boreholes 1) Groundwater level - aquifer pressure
- Operational monitoring on thermal boreholes 2) Cumulative quantity
- Operational monitoring on thermal boreholes 3) Water temperature
- Operational monitoring on thermal boreholes 4) Water chemistry
- Thermal boreholes exploitation characteristics
- Thermal waste water management
- Thermal water users and their activity
- Thermal water utilization and maximum outflow temperature
- Thermal water utilization map 1) Bathing
- Thermal water utilization map 2) Heating

Database of geothermal energy users and utilization parameters (output 3.2.1 and 3.2.2)

<http://akvamarin.geo-zs.si/users/>

Authorities' survey involved in the management of geothermal energy (outputs 3.1.1. and 3.1.2.)



Project Website

Project main events,
September 2012
Online registration

The screenshot shows a web browser window displaying the Transenergy website. The page features a navigation menu on the left, a main content area with a public event announcement, and a table of upcoming events. The website is supported by the Central Europe Programme and the European Union European Regional Development Fund.

trans energy te

CENTRAL EUROPE
COOPERATING FOR SUCCESS.

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

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Transenergy — Transboundary Geothermal Energy Resources of Slovenia, Austria, Hungary and Slovakia

- Home
- Aims of TE
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- Results
- Public Event.**
- News
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- EEB-Section

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The **PUBLIC EVENT** of **TRANSENERGY** project is a main forum, where stakeholders (decision-makers from authorities at national and regional levels, present and potential users, investors, as well as the interested public) are informed about the project results, and will have possibility for discussions. The Public Event is hold in September 2012 in each of the participating countries on national languages. The symposia are followed by 1 day field trips, showing the most interesting sites. Participation at the national symposium and the excursion is **FREE OF CHARGE, but registration is required**.

For details please click on the selected event.

Event	Organization	Information	Registration
Public Event 13.- 14.9.2012, Budapest	MAFI		On-line regisztráció
Public Event 7.- 8.9.2012, Vienna	GBA		Online-Anmeldung
Public Event 13.- 14.9.2012, Bratislava	SGUDS		On-line registrácia
Public Event 6.-7.9.2012, Moravske Toplice	GeoZS		On-line registracija

