GEO-Zentrum
an der KTB

Umweltbildung
.Bayern

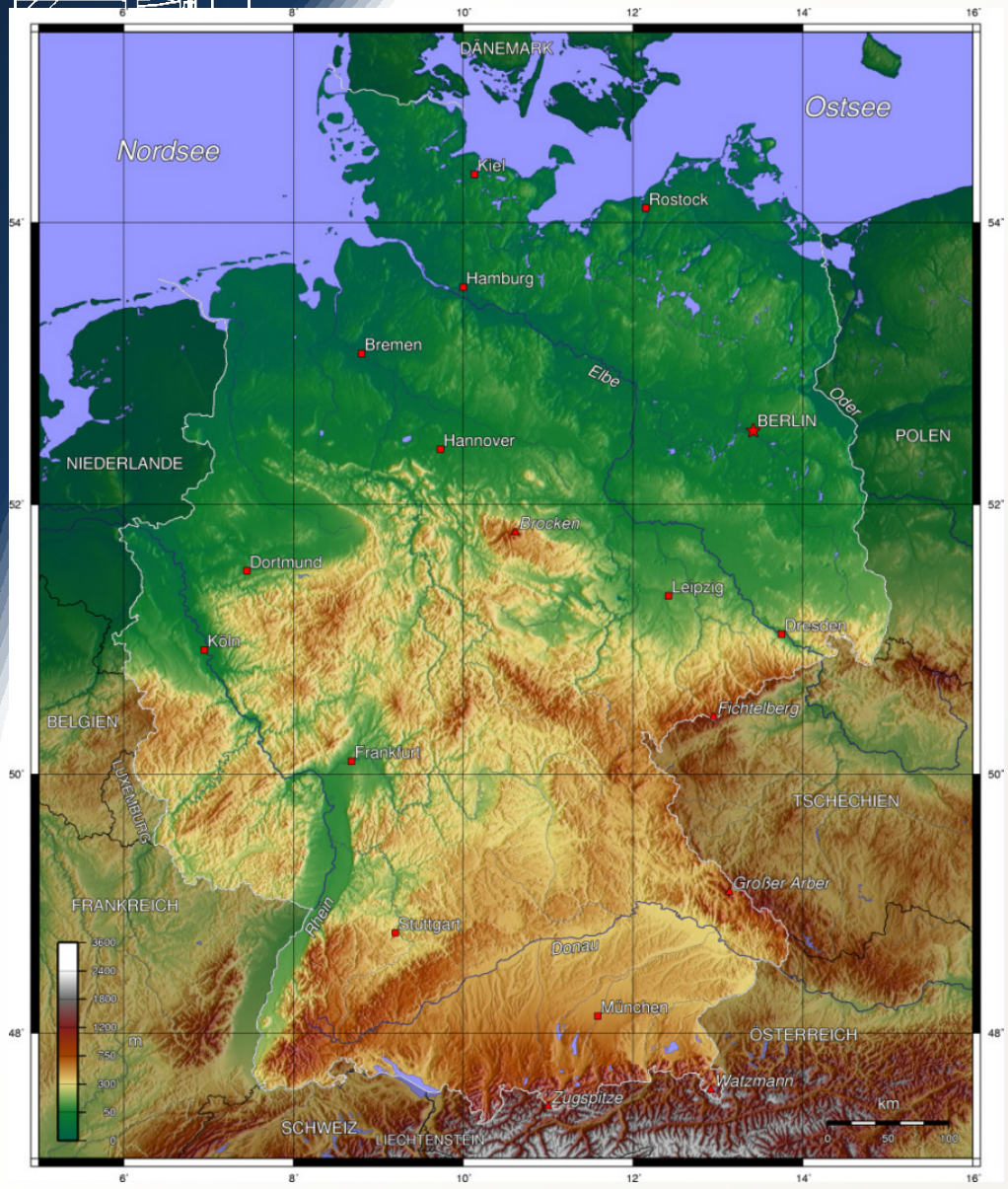
GEO-Zentrum an der KTB

History and usage for outreach and education

Dr. Frank Holzförster

ICDP 2018 Training Course 19.-23.11.2018

Location



- 190 km north of Munich
- 170 km west of Prague
- in the Czech-Bavarian Geopark

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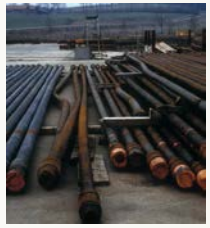
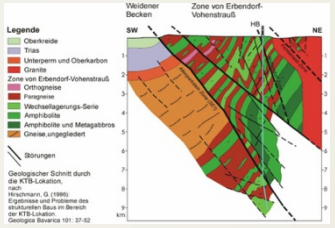
Background

Continental Deep Drilling Program of the Federal Republic of Germany (KTB)

Fundamental research project (1987 - 1994)

with two 4.000 m and 9.101 m deep drillholes exploring the continental crust





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Development

1987: Start of active drilling phase for
pilot hole KTB-VB

1989: **Completion of KTB-VB** at 4.000,1 m

1990: Start of active drilling phase for
main hole KTB-HB

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Development

1990: Public interest results in **tours to the drilling site** (guided by the academic staff of the field laboratory)

1992: Installation of **Information Centre KTB** with own staff (financed by federal german and bavarian state governments)

1994: **Completion of KTB-HB** at 9.101 m

1996: **Completion of initial research program**

1994-98, ongoing: **Long term measuring programs** develop towards **Deep Crustal Laboratory** of GFZ Potsdam

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Development

1998: Registration of the **legal society** GEO-Zentrum an der KTB e.V.
to secure the information centre now named **GEO-Zentrum an der KTB** (financed by local administration and private people; its purpose is to establish the GEO-Zentrum an der KTB as an Geoscience Outreach Centre and to strengthen the geosciences in the German educational system)

2004: **Reorganisation of the financial basis** of the institution, achieved by communal, commercial and industrial founders of the **Foundation GEO-Zentrum an der KTB** (sole purpose is supporting the GEO-Zentrum an der KTB; founding members are district Neustadt a.d. Waldnaab, district Tirschenreuth, Vereinigte Sparkassen Eschenbach Neustadt Vohenstrauß, KCA DEUTAG Drilling GmbH, town of Windischeschenbach)

Vereinigte Sparkassen
Eschenbach i.d.OPf. Neustadt a.d.Waldnaab Vohenstrauß
Gut für die Region seit 1835.

KCA DEUTAG

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Development

2004: Installation of out-of-school Geoscience Laboratory **GEO-Lab**
(themes: rocks, soils, plate tectonics)

2006-08: **Building Activities** (core shed, two exhibition halls, enlargement of GEO-Lab)

2008: Opening of permanent exhibition **‘System Earth‘**

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Development

2008-10: **Widening of educational program**
(themes: tectonics, energy, natural ressources, volcanism, earthquakes, program adaptions for primary and pre-primary schools)

2009: **Further Education Program for Geography teachers**, more than 1.000 participants since then

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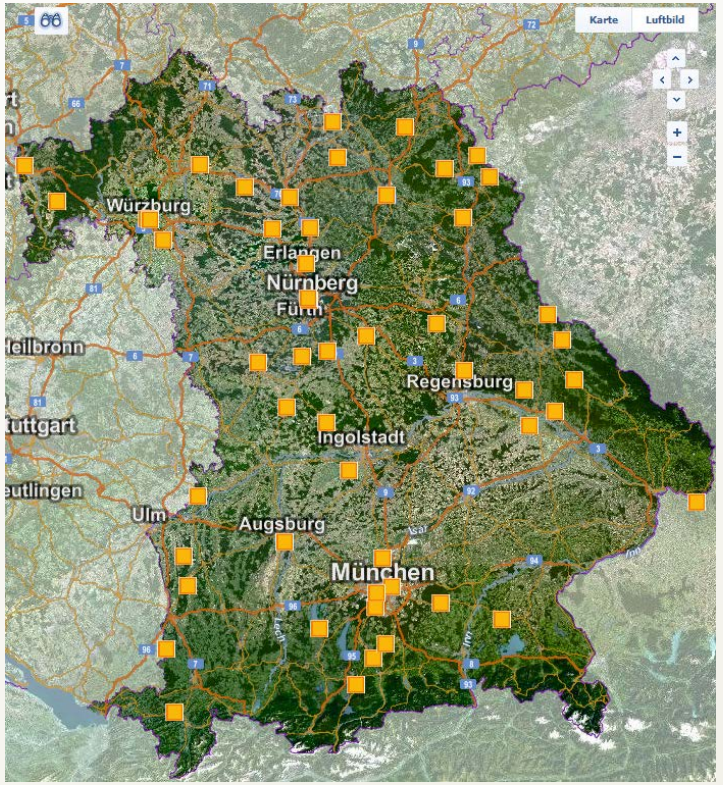
Development



2011: **Umweltstation, with the focus on Geosciences** (School of Education for Sustainable Development) approved by Bavarian State government

2012: Permanent exhibition **‘Minerals of the Oberpfalz-Region‘**

2013: **Partner Education Program** with school administration and schools in Czech Republic, Plzen district (high school level)

2013: **Widening of educational program** (for job-specific education)

2014: **Partner Education Program** with University Erlangen-Nürnberg (development of MSc-Studies in Didactics in Geological Sciences, for Geography teachers)

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Development

2015: **Partner Education Program** with University of Pedagocics in Agriculture and Environmental Education Vienna, Austria,

2015: **Partner Education Program** with Goethe Institut Tbilissi, Georgia (tri-national school partners in the Caucasus region for environmental eduction transported in german lessons)

2016: **Kita to go** – A program visiting pre-primary schools for early education in geology

2017: **Launch of „The Rock Box“** for teaching on rock identification and the rock-cycle

2018: Joining IGEO-network **GeoScienceEducation**

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Acknowledgements and awards

2004: Assignment of **teaching load (2 hours)** by the Bavarian State Ministry of Education, renewed in 2005

2006: **Selected Landmark in the Land of Ideas 2006** (national innovations award)

2006: Assignment of **teaching load (4 hours)** by the Bavarian State Ministry of Education, renewed in 2006 and 2007

2007: **E.On Bayern Umweltpreis 2007** (environmental education award)

2008: **Umweltbildung.Bayern** (quality certificate for excellent education for sustainable development), since then bi-annually renewed

Deutschland
Land der Ideen
Ausgewählter Ort 2006

Umweltbildung
.Bayern

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Acknowledgements and awards

2008: Assignment of **teaching load (10 hours)** by the Bavarian State Ministry of Education, annual renewals

2010: **Umweltstation** approved by Bavarian Committee of Sustainability

2010: **Decade Project 2010/11** (awarded by the United Nations Decade of Education and Sustainable Development)

2017: Assignment of **teaching load (12 hours)** by the Bavarian State Ministry of Education

Nachhaltigkeit lernen
Weltdekade der Vereinten Nationen 2005-2014
Bildung für nachhaltige Entwicklung
UNESCO
Offizielles Projekt der Weltdekade
2010 / 2011

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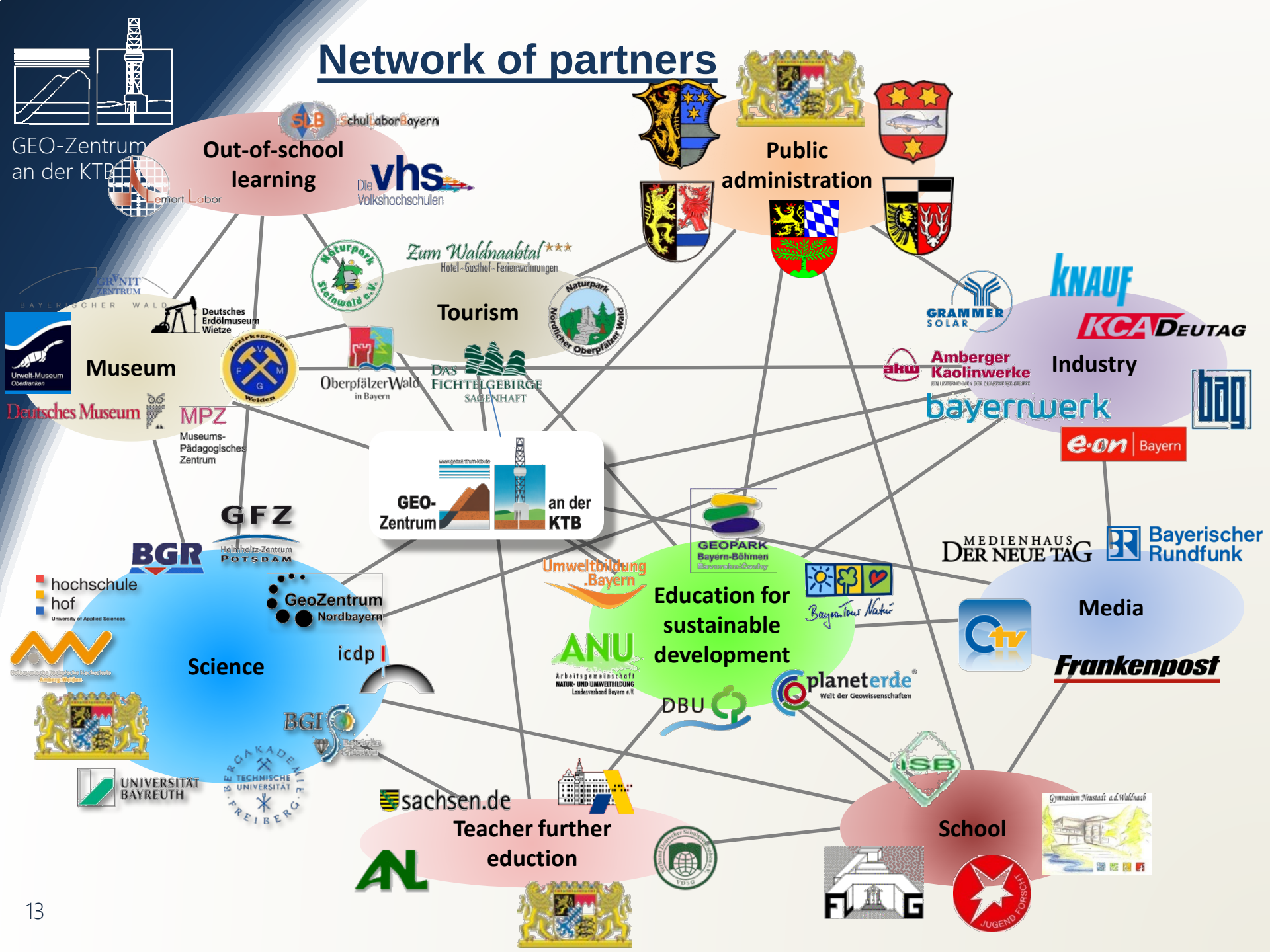
Network of partners



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Aims

People shall understand the various processes that characterise the complex System Earth. Using this knowledge they shall act responsible within our common living environment.

- **Realizing** the **connectivity** of the interior and exterior dynamics of the planet.
- **Understanding** the **interaction** of System Earth (litho-, pedo-, hydro-, atmosphere).
- Informing about the **importance of fundamental research**.
- **Stimulating interest** in natural sciences and engineering.

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Personnel and premises

1 Geologist

1 Biologist

2 Geography teachers

1 Environmental educator

8 Tourist guides

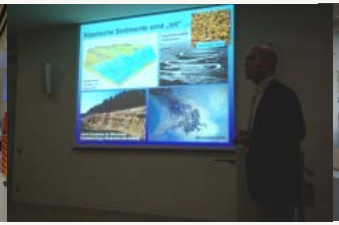
2 Technical staff

2 Cleaning staff

11.000 m² land

1.600 m² indoor space, comprising:

- 2 seminar rooms
- 2 lab-rooms
- 3 exhibition halls
- drilling rig with visitors platform
- core shed
- chamber of seismometer
- lecture hall
- caféteria
- museum shop



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Learning opportunities

Families, adults, public groups

Interested people shall explore the slowly acting, complex processes of change within the solid Earth and shall realize the interaction of the geological processes with life and society.

Activities for everybody

- **Guided tours**
- **Geological field trips**
- **Public talks**
- **Mineral and fossil fairs**
- **Conferences and workshops**
- **Programmes for children**
- **Concerts**
- **Focus themes, e.g. soil**

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Learning opportunities

Teachers and teaching assistants

Multiplicators learn to teach research as a matter of various linked school subjects, which only together can successfully address the major issues of the future. Understanding the System Earth as the human habitat serves as example for interdisciplinary research that involves physics, chemistry, geology, drilling technique, geodesy, biology, informatics etc.

Approved further training for multiplicators

- **Soil – fundament of life**
- **Geology – valuing Earth**
- **Landscape evolution**
- **Didactics in teaching Geology**
- **Volcanism**
- **Geodynamics – the dynamic system Earth**

Akademie für Naturschutz und Landschaftspflege

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Learning opportunities

School children (from 11 yrs old)

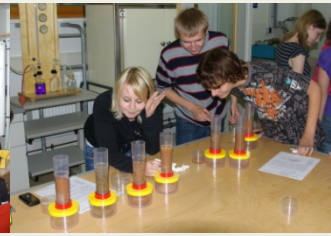
In class they engage with particular aspects of the System Earth. Learning modules of 3 hours duration offer an understanding of the basics and an insight to actual questions in geoscientific research.

5th year in school, on highest intellectual level

Learning modules

- **Rocks – the base of the world (5,7 - 5,6,9 - 5)**
- **Formation, analysis and vulnerability of soils (5,7 - 7,9 - 5)**
- **Plate tectonics (5 - 5,7,8,9 - 5,10,11)**
- **Tectonics (orogeny, rifting, faulting) (5 - 5,7,8,9 - 10,11)**
- **Energy ressources (9 - 6,7,9 - 7,11)**
- **Natural ressources (9 - 6,7,9 - 7,8,11)**
- **Volcanism (5,7,8,9 - 7,10,11)**
- **Earthquakes (5,7,8,9 - 7,10,11)**

HS - RS - Gym



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Learning opportunities

School children (from 11 yrs old)

In class they engage with particular aspects of the System Earth. Learning modules of 3 hours duration offer an understanding of the basics and an insight to actual questions in geoscientific research.

Guided tours + field excursions

- **Age-appropriate visits of the exhibition „System Earth“**
- **Exploring the drilling-rig**
- **Field excursions exploring geotopes near the KTB-site**

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Learning opportunities

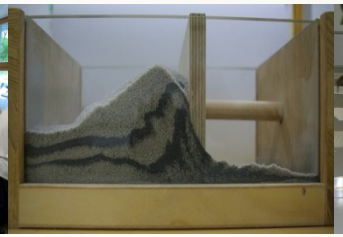
School children (from 6 – 10 years old)

In small research teams they investigate the System Earth. The learning modules of 2 hours duration stimulate the independent examination of natural processes.

Learning modules

- **Researching rocks (3,4)**
- **Exploring the soil (3,4)**
- **Seasons, climate, weather (3,4)**
- **Energy – a peculiar „matter“ (3,4)**

4th year in school



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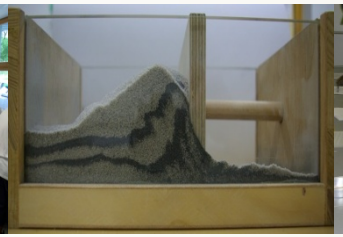
Learning opportunities

Children (younger than 6 years old)

Playing with rocks and simple learning models and listening to fancy stories young children experience interesting aspects of nature. The learning modules of 1,5 hours duration stimulate the childrens interest in how nature works.

Learning modules

- **The story of rocks**
- **Living in healthy ground**
- **What clouds tell**
- **Hedge, meadow, lawn - life based on soil**



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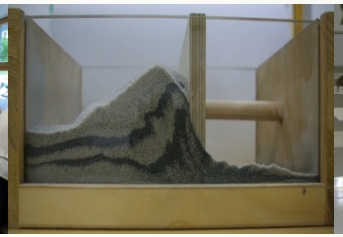
Learning opportunities

Teachers in education

As future multiplicators they are encouraged to show that research means scientific work crossing the boundaries of school subjects in order to find answers on demanding questions like the access to ressources and energy. Researching System Earth forms an example for interdisciplinary research involving geophysics, geochemistry, geology, drilling technology, geobiology, geoinformatics, geodesy etc.

MSc. studies Didactics in Geology

- Module **Models in Geology**



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Learning opportunities

Students

At an authentic site of fundamental research they shall recognize research as fruitful interaction of numerous disciplines and will experience aspects and methods of science communication into the public.

Field trip target for:

- RWTH Aachen
- TU Berlin
- TU Clausthal
- TU Darmstadt
- TU Dresden
- University Erlangen-Nürnberg
- TU Bergakademie Freiberg
- University of Freiburg
- University Göttingen
- University of Graz, Austria
- University of Greifswald
- University of Halle-Wittenberg
- University of Heidelberg
- Hochschule Hof
- Karlsruhe Institute of Technology
- University of Leoben, Austria
- University of Mainz
- University of Maryland, U.S.A.
- Open University Milton Keynes, GB
- TU Munich
- University of Oldenburg
- University of Plzen, Czech Republic
- Prague University, Czech Republic
- University of Regensburg
- Ostfalia Hochschule Suderburg
- University of Vienna, Austria
- University of Wageningen, Netherlands

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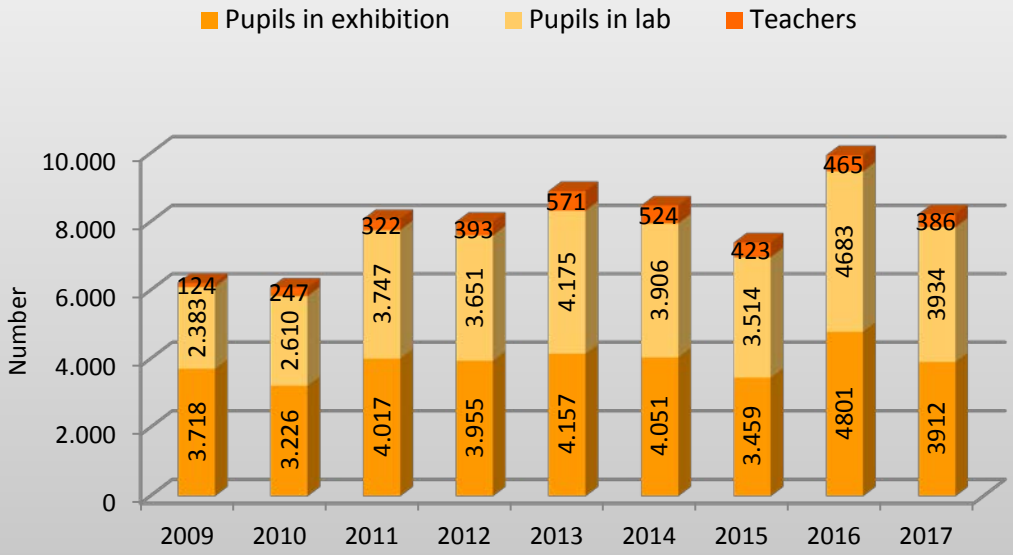
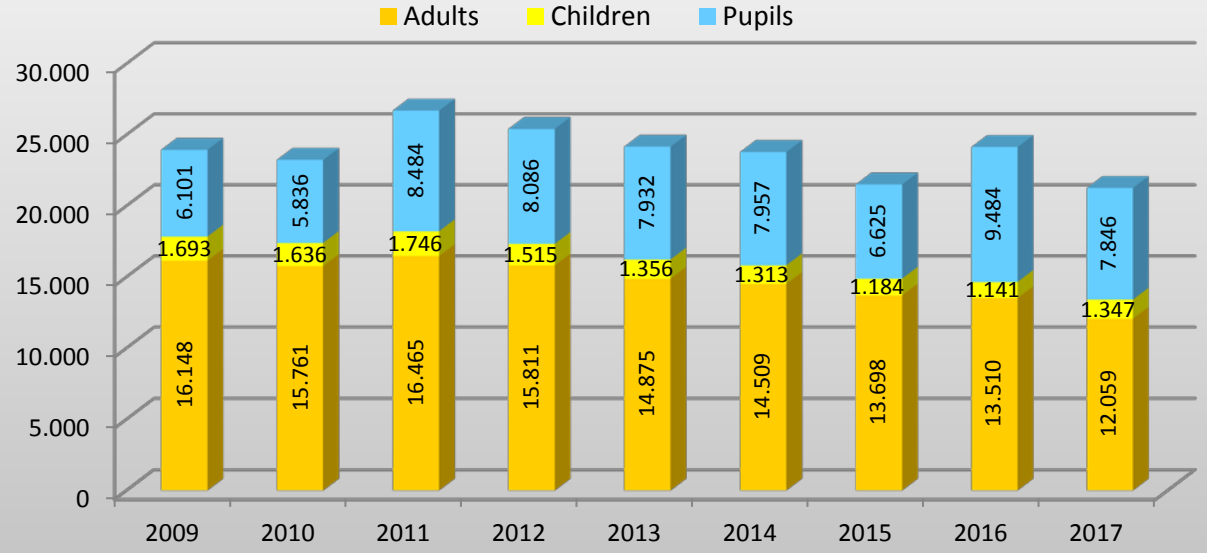
Participants from schools



Participants (total)



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Quality management

Evaluation:

Institute for the Didactics of Geography

Advisory board:

Academy for nature protection and landscape management *(edu)*
Baverian Academy for further education of teachers *(edu)*
Bavarian State Ministry of Environmental Affairs and Consumer Protection *(admin)*
Bavarian State Ministry for Education, Culture and Science *(admin)*
Federal Institute for Geosciences and Natural Ressources *(sci)*
German Petroleum Museum *(edu)*
Geological Survey of Bavaria *(admin)*
Helmholtz Centre Potsdam GFZ German Research Center for Geosciences *(sci)*
Institute for Educational Quality and Research in Education *(sci)*
TU Bergakademie Freiberg, Institute for Lagerstättenlehre *(sci)*
University of Bayreuth, Bavarian Geosience Institute *(sci)*
University of Erlangen-Nürnberg, Geocenter Northern Bavaria *(sci)*

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Logistics

Lab days	4 per week
Capacity	2 groups of 30 participants each
Languages	German, English, Czech
Bookings	www.geozentrum-ktb.de, +49 9681 400430
Costs	½ day: 5,50 €, 1 day: 7,50 €
Accessibility	motorway, railway
Accommodation	1 youth hostels and 1 church retreat house nearby

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.Bayern

We pass on knowledge!

Umweltstation

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Windischeschenbach

Nachhaltigkeit lernen
Weltdekade der Vereinten Nationen 2005-2014
Bildung für nachhaltige Entwicklung
UNESCO
Offizielles Projekt der Weltdekade
2010 / 2011

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