Publication and archiving of research data at the Geophysical Instrument Pool Potsdam (GIPP)

Gerard Muñoz & Christian Haberland

79. Jahrestagung der Deutschen Geophysikalischen Gesellschaft (DGG)
Braunschweig
6. März 2019

The Geophysical Instrument Pool Potsdam (GIPP)

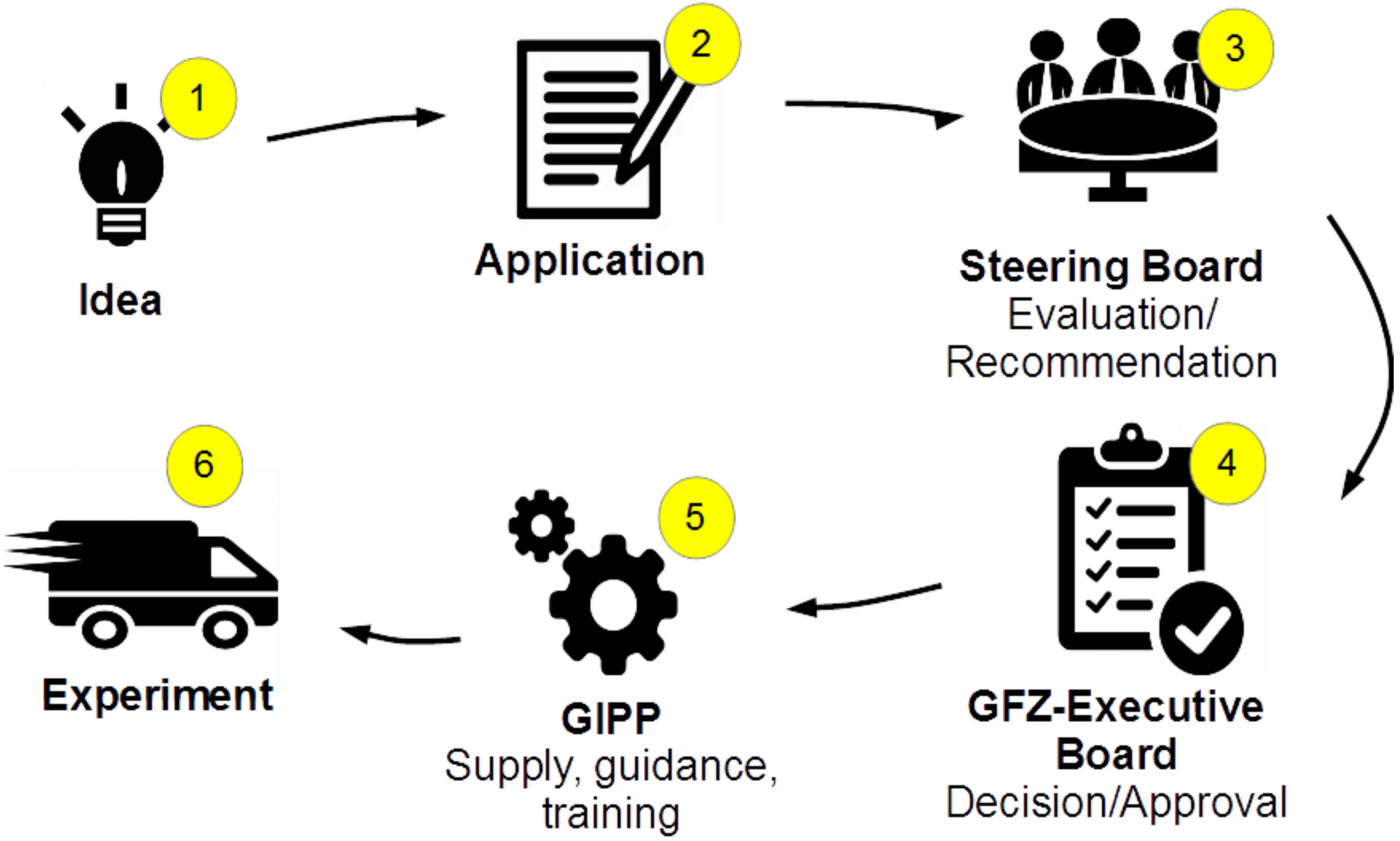



Mission:

The “Geophysical Instrument Pool Potsdam (GIPP)” of the GFZ “German Research Centre for Geosciences” provides seismic and magnetotelluric instruments and sensors

- Research infrastructure since 1993
- Run by Section 2.2 Deep Geophysical Sounding
- For academic research: GFZ and national and international loans
- Funded by GFZ
- 6+ staff (mainly technical) + apprentice
- Transparent procedures (“rules”), external steering board

Application & Supply Procedure



Responsibilities & duties

GIPP responsibilities/duties:

- Supply of seismological and electromagnetic field equipment
- Packing, preparation
- For temporary experiments (<2yrs)
- Maintenance of equipment
- Market/product analysis; purchases
- Guidance/training of users, assistance
- **archiving of data (partly with GEOFON)**
- Hard- and software-development, company spin-off

User's responsibilities/duties:

- Field operation
- Transport/shipping/customs
- Permits
- Consumables
- Fully liable (insurance!)
- **Data delivery**

Seismology

Recorders

219(1ch) + 280 (3ch)

Sensors

Magnetotellurics

Recorder

Sensors & control-boxes

Number of units in red

Inductioncoils magnetometer & elektrodes

Seismics

Recorders

219(1ch) + 280 (3ch)

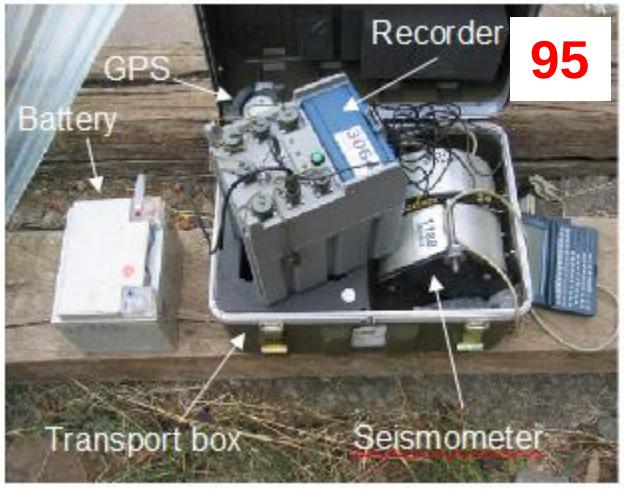
Sources

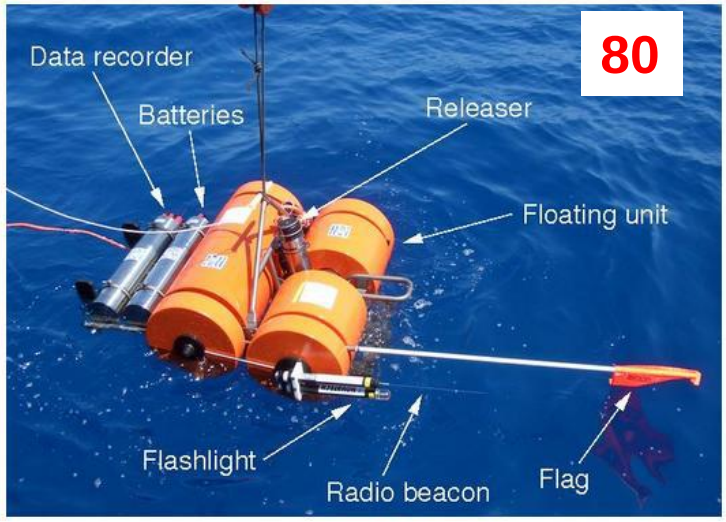
Sensors

Number of units in red

DEPAS

German Pool for Amphibious Seismology





GIPP / GEOFON Data management

- Seismologic, controlled source seismic and magnetotelluric data
- Raw data (time series) from loggers (**level 0**) in several formats (miniSeed, CUBE, Emerald,…)
- Modified data (filtered, re-sampled, cut to time segments) and converted into standard formats (miniSeed, Emerald) (**level 1**)
- Organized in Projects / Experiments (GIPP Experiment Database)
- Experiment, Stations and Files metadata included
- Archived in various levels of completeness (up to data publication with doi and report)

- Seismological data
- Data in miniSeed format cut to time segments of interest (**level 1**)
- Miniseed headers edited to contain station ID, network ID and channel ID.
- Organized in networks (temporary or permanent) from GFZ or other institutes
- Temporary networks can coincide with GIPP experiments
- Network and station metadata included in station.xml files
- Archived in high level of standardization (geofon.gfz-potsdam.de)

FAIR principles

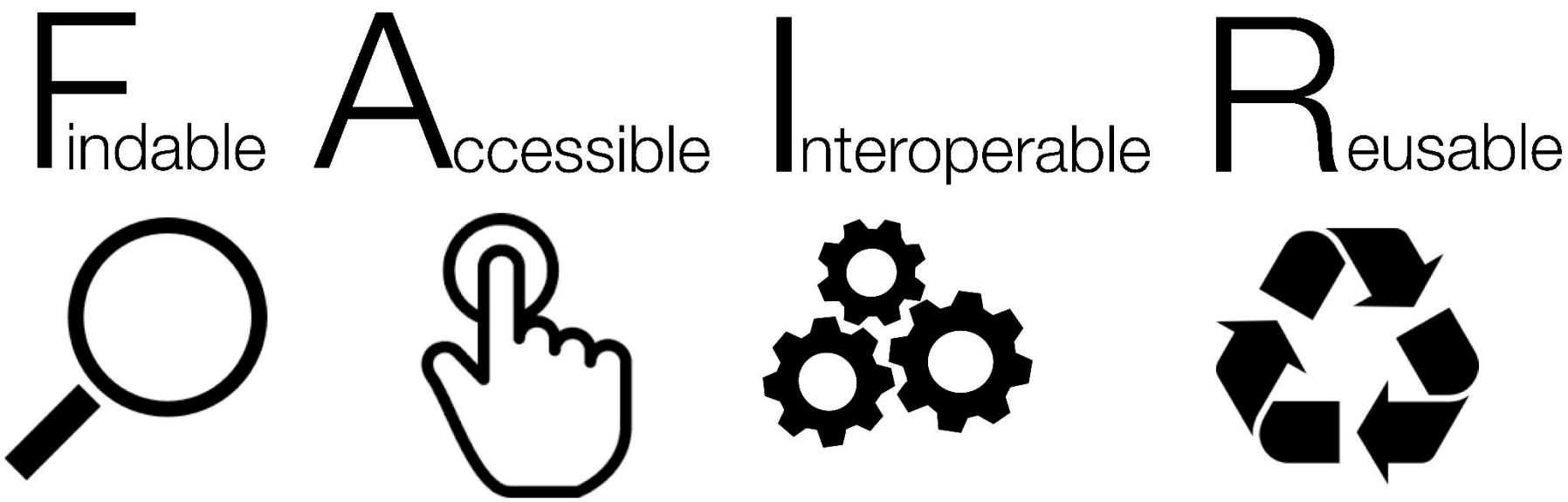
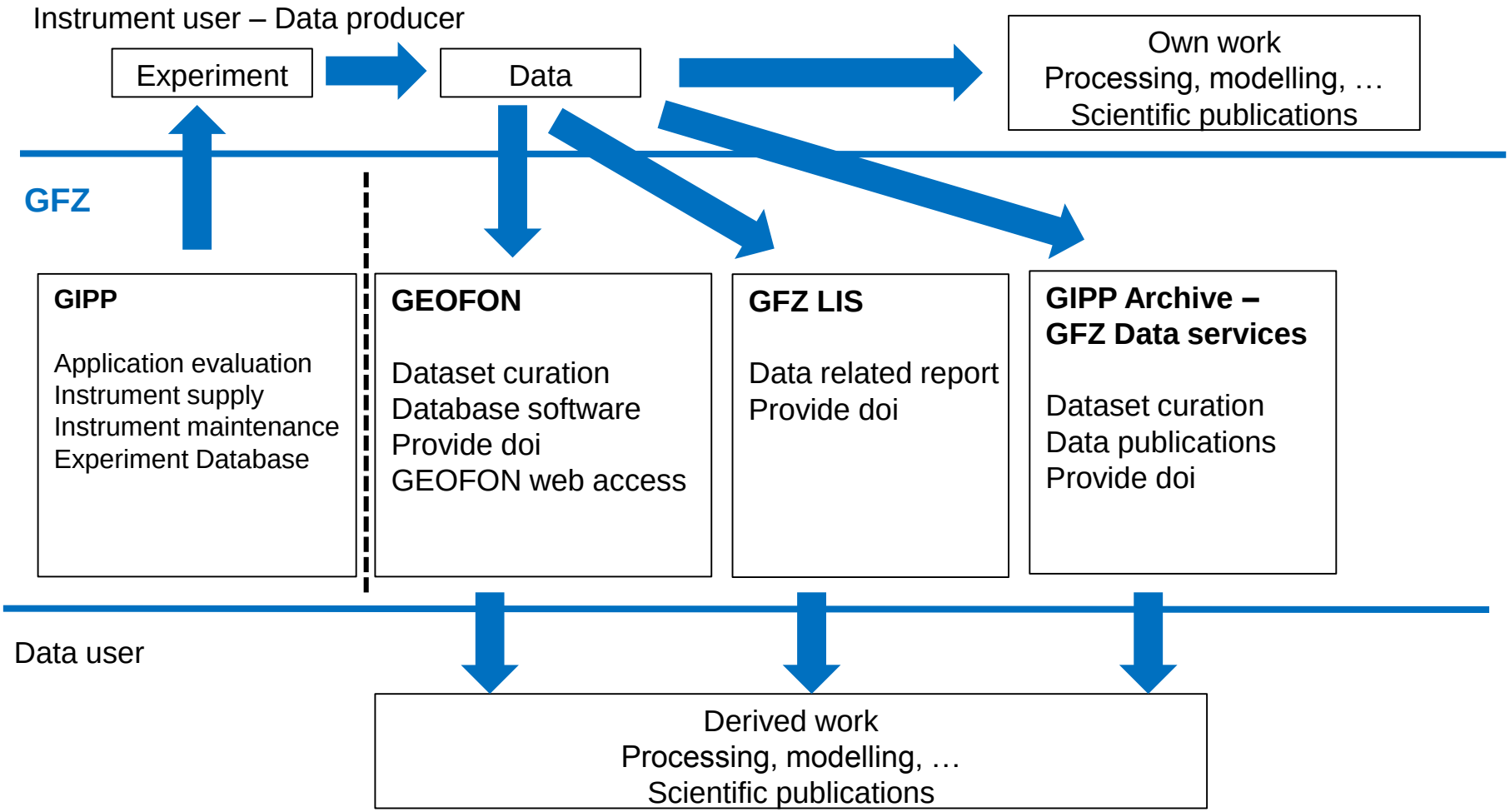
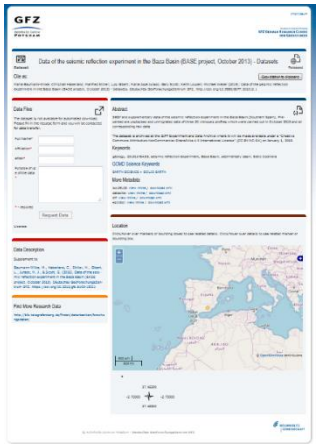


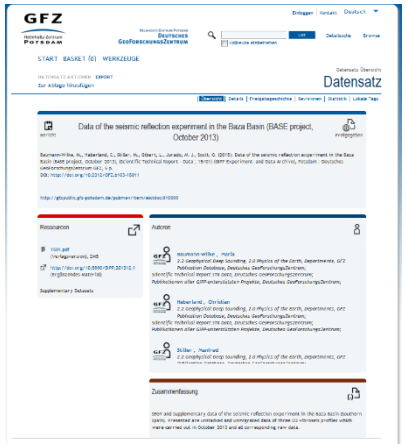
Image: wikimedia, SangyaPundir

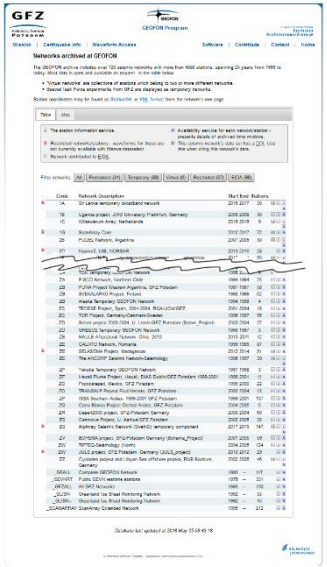
GIPP Data cycle

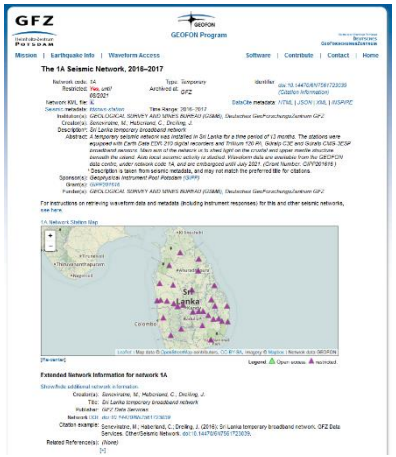


Experiment database

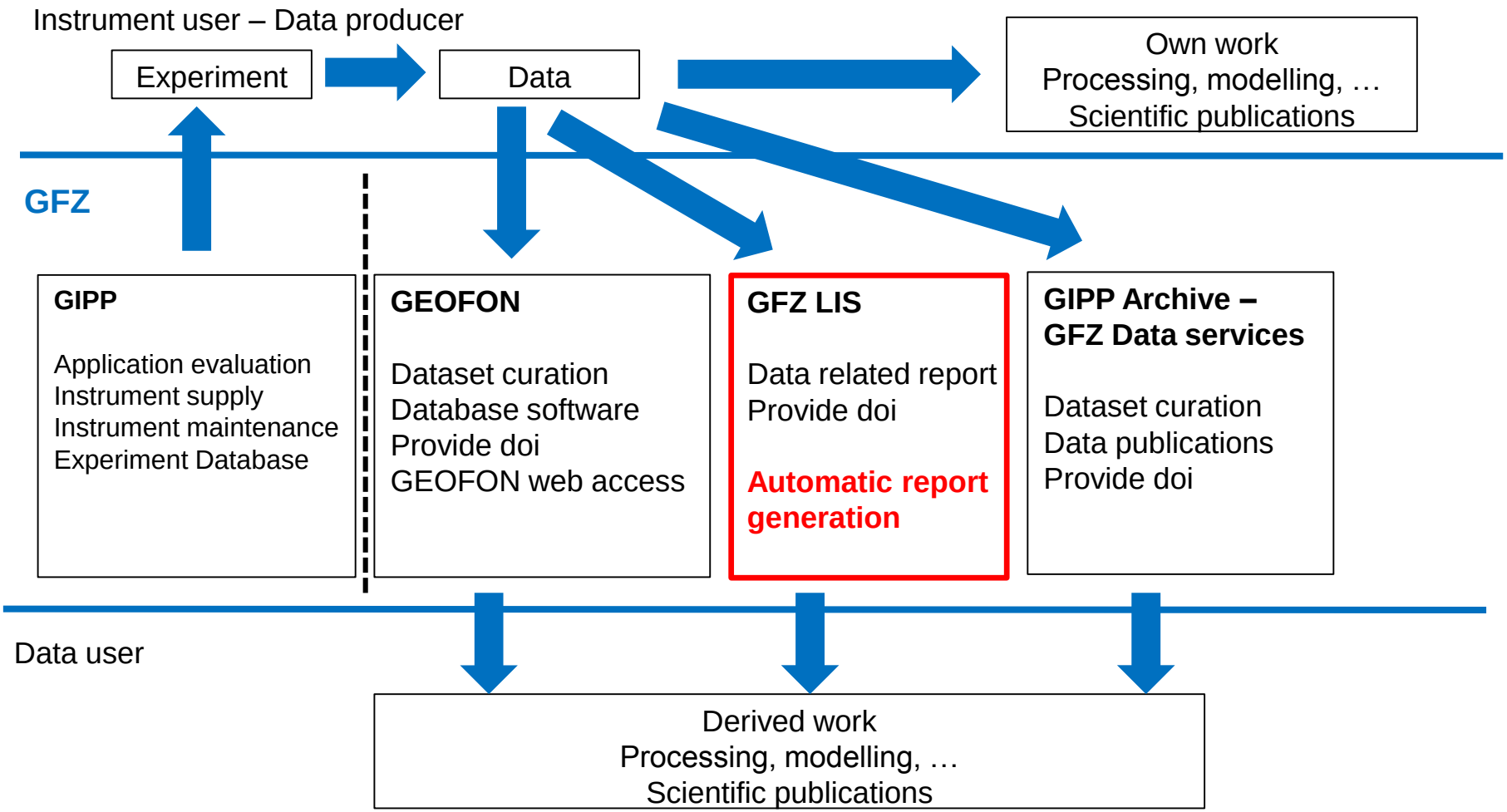








GIPP Data cycle



Data publication / reports

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      <institute>Deutsches GeoForschungsZentrum</
      <address>Telegrafenberg, 14473 Potsdam</addr
    </affiliation>
    <email>gmunoz@gfz-potsdam.de</email>
    <phone>0331 288 28678</phone>
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  </proj.resp.scientist>
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Xml files with metadata

Xslt stylesheet

Data publication / reports

Report on the data of project EMERES 2015
(Site characterization of the PIER-ICDP drill locations to understand the relation between earthquake swarms, mofette fields and crustal fluid pathways by imaging the electrical conductivity structure)

Gerard Muñoz[1*], Ute Weckmann[1,2], Josef Pek[3], Světlana Kováčiková[3], Radek Klanica[3, 4]

[1] Deutsches GeoForschungsZentrum, Telegrafenberg, 14473 Potsdam
[2] University of Potsdam, Institute of Earth and Environmental Science, Karl-Liebknecht-Str. 24-25, 14476 Potsdam-Golm
[3] Czech Academy of Sciences, Institute of Geophysics, Boční II/1401, 14131 Prague
[4] Charles University, Faculty of Sciences, Albertov 6, 12843 Prague
[*] corresponding author

Abstract

The area around Nový Kostel/NW-Bohemia is part of the geodynamically active Variscan orogenic belt in Europe, and experiences repeated occurrence of intra-plate earthquake swarms and is characterized by numerous mineral springs and CO2 emissions. These phenomena are usually related to volcanic activity. To better understand the underlying processes, the Eger rift and the Cheb Basin are favored as a possible location for several scientific drillings.

Magnetotelluric (MT) data sense the electrical resistivity of the Earth, a physical parameter that is particularly sensitive to the presence of low-resistivity phases such as aqueous fluids, partial melts or metallic compounds. Fluid phases have electrical resistivities orders of magnitude lower than that of the rock matrix, and relatively small amount of fluids, when interconnected, can thus decrease bulk rock resistivity by several orders of magnitude. Measurements of electrical resistivity can therefore be used to constrain the volume of subsurface fluids, their interconnectivity and the rheology of the crust and mantle.

Coordinates: *50.132915 N, 12.462838 E*
Experiment time frame: *from 17.09.2015 to 01.10.2015*
Keywords: *Magnetotellurics, West Bohemia, Vogtland, Conductive channel, Fluids, Earthquake swarm*

1. Introduction

The basement of the western part of the Bohemian Massif (Czech Republic) belongs to the Variscan orogenic belt in Europe, build up by Pre-Permian rocks. The Eger Rift, located in this area, is the easternmost termination of the European Cenozoic rift system (ECRS). The western part of the Eger Rift is dominated by ongoing magmatic processes originated in the intra-continental lithospheric mantle. These processes include the occurrence of repeated earthquake swarms of M < 4.5 (e.g. Fischer et al., 2014). The swarm region is part of the N-S striking Regensburg-Leipzig seismo-active zone. The intersection area between the WSW-ENE running Eger Rift and the Regensburg-Leipzig zone is called Cheb Basin. The main focal area, located close to Nový Kostel (NE part of the Cheb Basin).

The increased geodynamic activity also implies neo-tectonic crustal movements, Quaternary volcanism and degassing of CO from mineral springs and wet and dry mofettes. The high 3He/4He 2 ratio of the CO2 dominated gases up to Ra > 6 indicates a lithospheric mantle origin (Bräuer et al., 2014). At present, the Eger Rift is the only known intra-continental region of the ECRS where such deep seated, active lithospheric processes currently occur. However, the geodynamic nature and the implications of these processes still remain enigmatic.

2. Experimental setup and schedule

Magnetotelluric data were collected during a field campaign in September 2015 (from September 17th to October 1st) along two 50 km long profiles, roughly perpendicular to each other: one running approximately NNE-SSW with 25 stations and another one running approximately E-W with 22 stations. The choice of two approximately perpendicular profiles was made due to the peculiar geological setting in the study area. Since the area of interest is located at the intersection of the Mariánské Lázně Fault (MLF), with a NNW-SSE orientation, and the Eger Graben (EG), striking ENE-WSW, we tried to cross these structures at an angle with both our profiles.

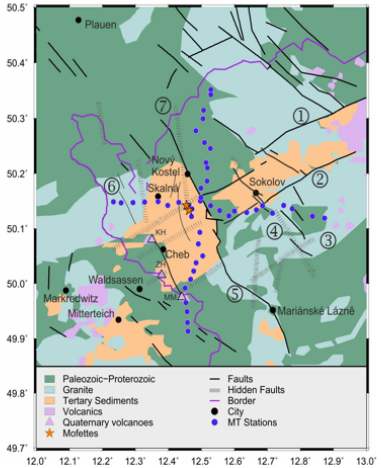

Figure 1: Geological map.

3. Station locations

The following table contains a list of all measured MT stations with starting and ending measurement times, station location (latitude, longitude and altitude) and available data types.

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0005	2015-09-17	2015-09-19	50.148840	12.369096	502.988373	✓	✓
0006	2015-09-17	2015-09-20	50.141942	12.397864	483.323456	✓	✓
0008	2015-09-22	2015-09-25	50.147382	12.431426	487.169708	✓	✓
0009	2015-09-22	2015-09-25	50.142447	12.462083	496.467651	✓	✓
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0011	2015-09-18	2015-09-19	50.142037	12.528126	621.029236	✓	✓
0012	2015-09-18	2015-09-20	50.132602	12.555034	526.158508	✓	✓
0013	2015-09-21	2015-09-24	50.122968	12.582805	526.121216	✓	✓
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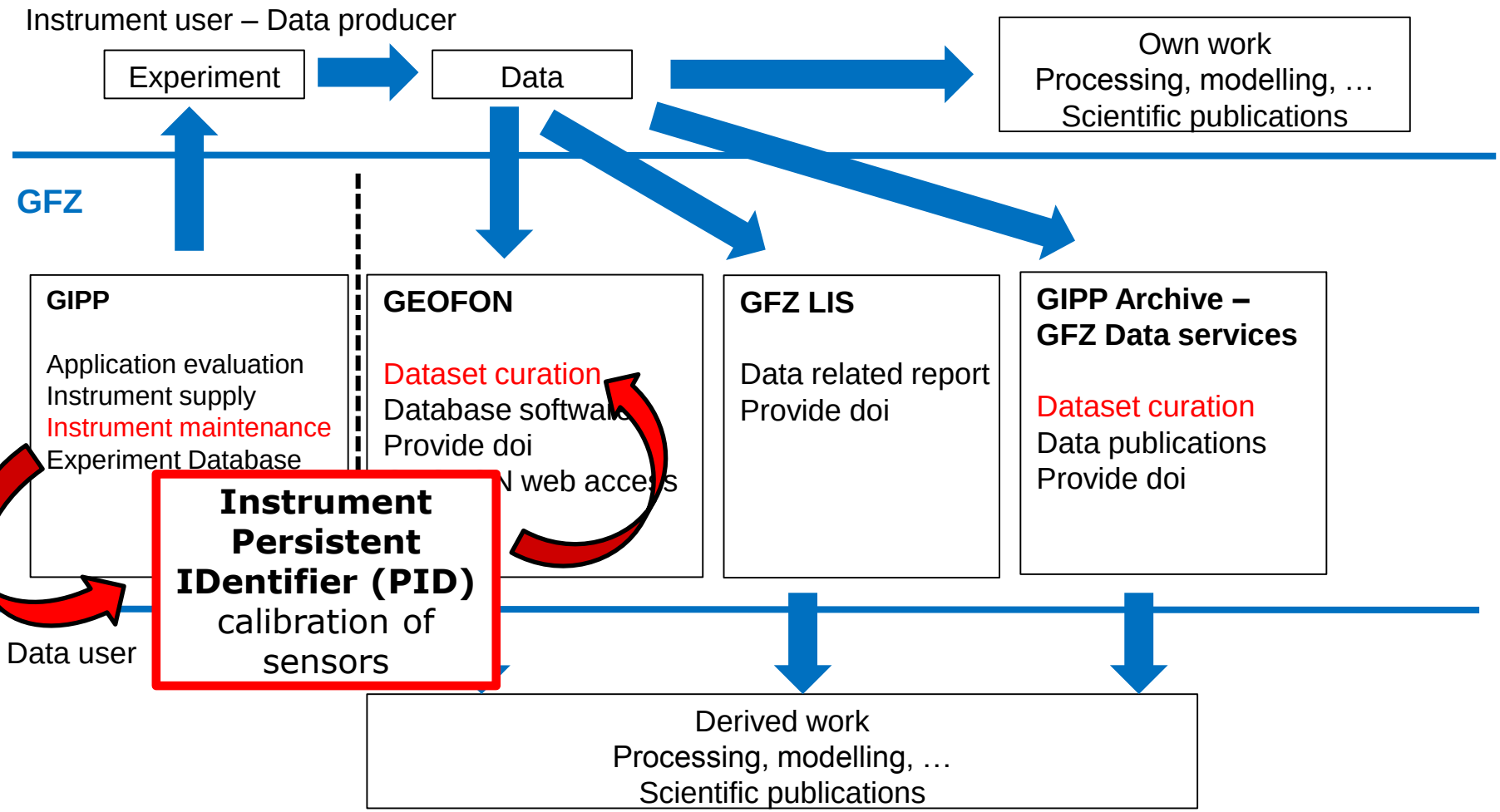
GIPP Data cycle



Instrument SensorML files

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Outlook

- Optimize workflow for data publication
- Integrate SensorML metadata into handle.net Persistent Identifiers
- Improve integration with GEOFON database
- Report templates for heterogeneous seismic experiments