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)

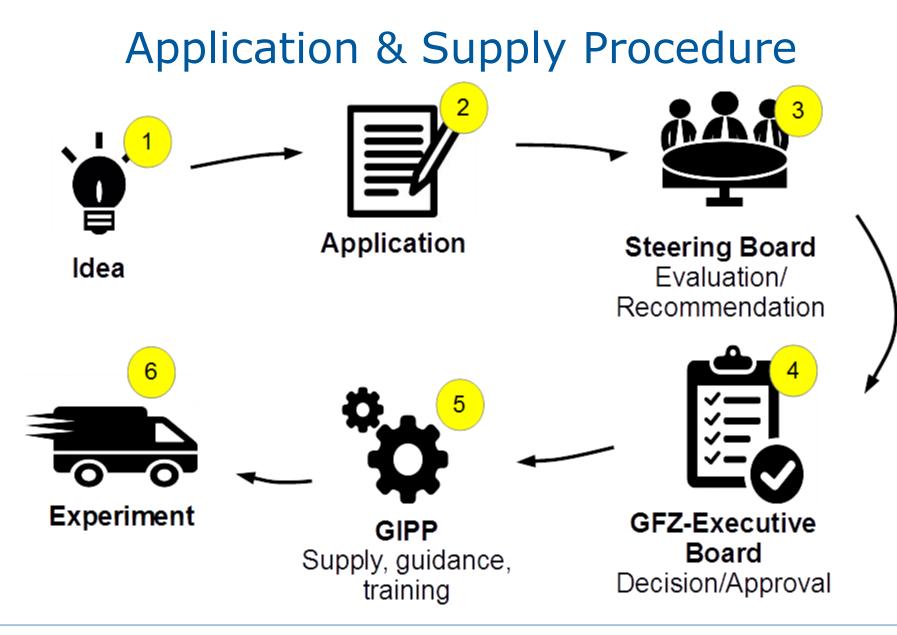


### **Mission:**

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







## **Responsibilities & duties**

### **GIPP responsibilities/duties:**

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



### User's responsibilities/duties:

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



# Seismology

65

017

350

3335









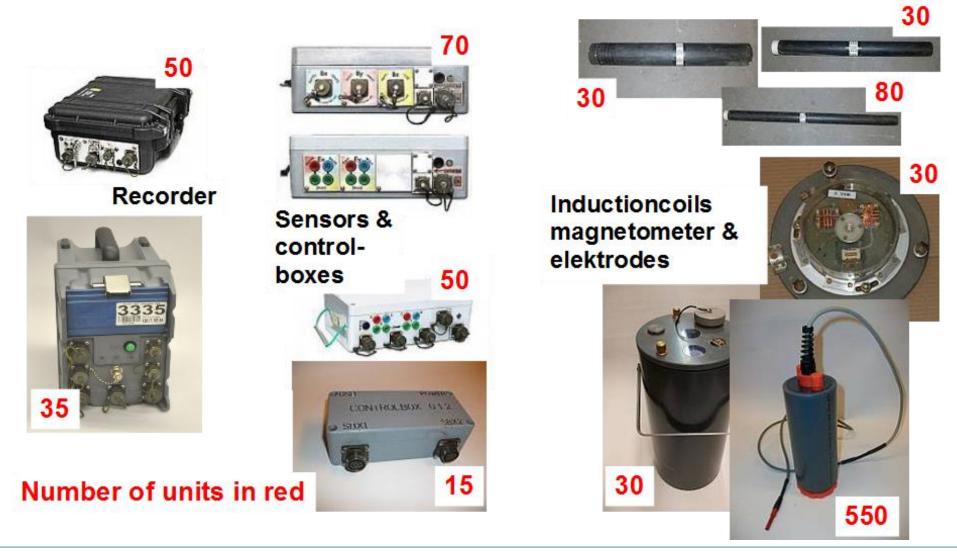
Sensors







## Magnetotellurics





## Seismics



Recorders



219(1ch) + 280 (3ch)



192 ch



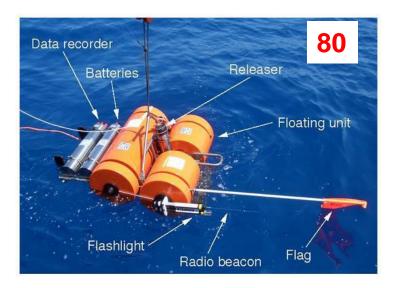
Number of units in red





### German Pool for Amphibious Seismology

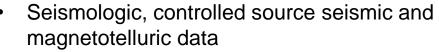






# GIPP / GEOFON Data management





- 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

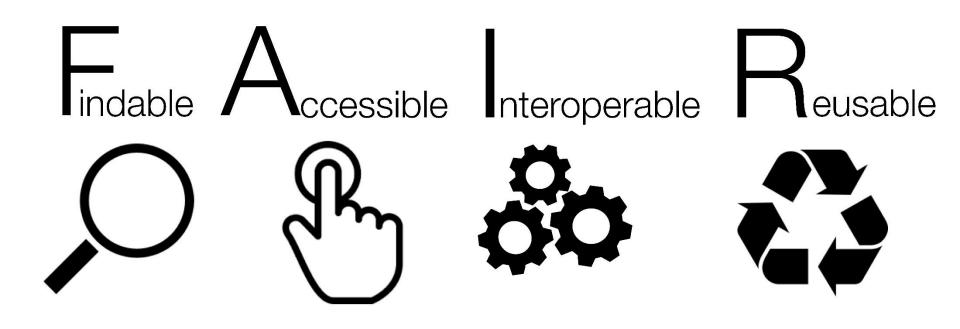
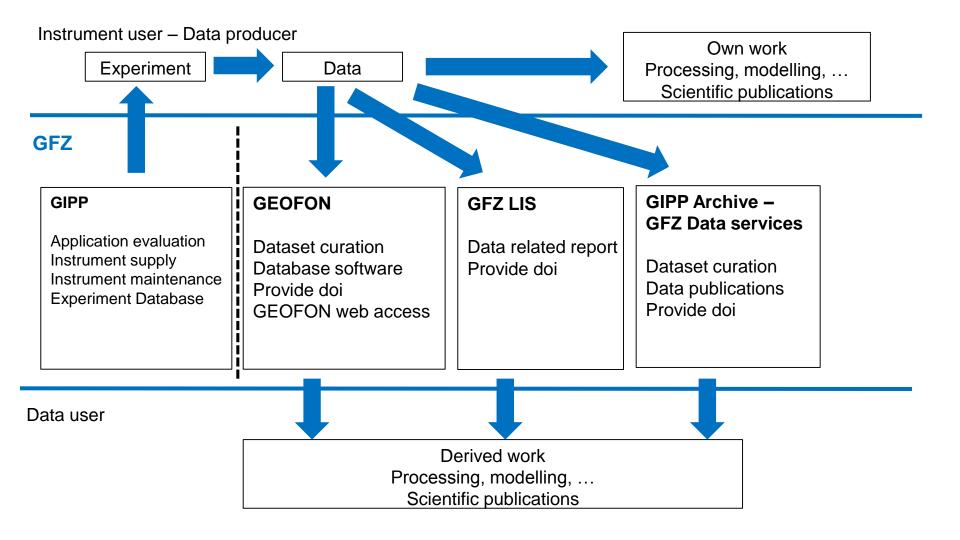


Image: wikimedia, SangyaPundir



## GIPP Data cycle





## Experiment database

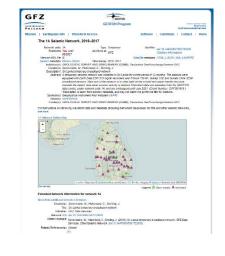


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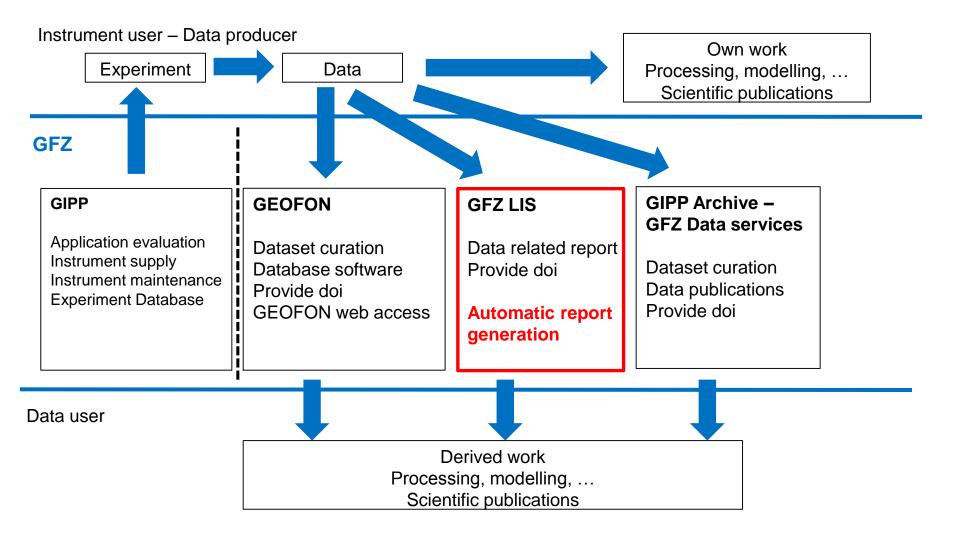


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## **GIPP** Data cycle





## Data publication / reports

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### Xml files with metadata

# Xslt stylesheet



## Data publication / reports

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

Gerard Mufloz", Ute Weckmann 🐍 Josef Pek<sup>3</sup>, Světlana Kováciková<sup>3</sup>, Radek Klanica<sup>3</sup>

Deutsches GesfüschungsZeichun, Telsonfeichen, 14473 Polisken
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 Charles University, Faculty of Sciences, Albertox, 6, 12843 Pregue
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#### Abstract

The area around <u>Novi</u> <u>Kostel</u>/NW-Bohemia is part of the <u>geodynamically</u> active <u>Variscan</u> orogenic bet 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 <u>Cheb</u> Basin are <u>favored</u> as a possible location for several scientific diffings.

Magnetoplajukic (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 metis or metallic compounds. Fluid phases have electrical esistivities aroters of magnitude lower than that of the rock markix, and relatively small amount of fluids, when interconnected, can thus decrease bulk rock resistivity to 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 mantie.

#### Coordinates: 50.132915 N, 12.462838 E

Experiment time frame: from 17.09.2015 to 01.10.2015 Keywords: Magnetatellurics, West Bohemia, <u>Vagland</u>, Conductive channel, Fluids, Earthquake swarm

#### 1. Introduction

The basement of the western part of the Bohemian Massif (Czeh Republic) belongs to the Vanisgan orgonic beit in Europe, build up by Pre-Permian rocks. The Egrer Rift, located in this area, is the easternmost termination of the European <u>Cenpcoin</u>; nft system (ECRS). The western part of the Egrer Rift is dominated by ongoing magnatic processes gligitagid in the intra-continental lithospheric manife. These processes include the occurrence of repeated earthquake swarms of V < 4.5 (e.g. Fischer et al., 2014). The swarm region is part of the N-S striking Regensburg-Leipzig <u>seismo-active zone</u>. The intersection area between the VSW-ENE running Egrer Rift and the Regensburg-Leipzig zone is called <u>Cheb</u> Basin. The main focal area, located close to <u>Novi Kostel</u> (NE part of the <u>Cheb</u> Basin).

The increased geodynamic activity also implies neo-tectonic crustal movements, Quaternary volcanism and degassing of CO from mineral springs and wet and dry motistas. The high 3He/4He 2 ratio of the CO2 dominated gases up to Ra > 6 indicates a lithospheric mantle origin (GRauge et al., 2014). At present, the Eger Ritt is the only known infra-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

Magnetoptaliging, data were collected during a field campaign in September 2015 (from September 17th to October 1st a) long 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 <u>Magninask Lazar</u> Fault (MLF), with a NNW-SSE orientation, and the Eger Graben (EG), striking ENE-WSW, we tried to cross these structures at an anale with both our profiles.

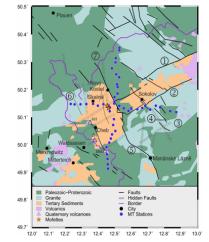


Figure 1: Geological map.

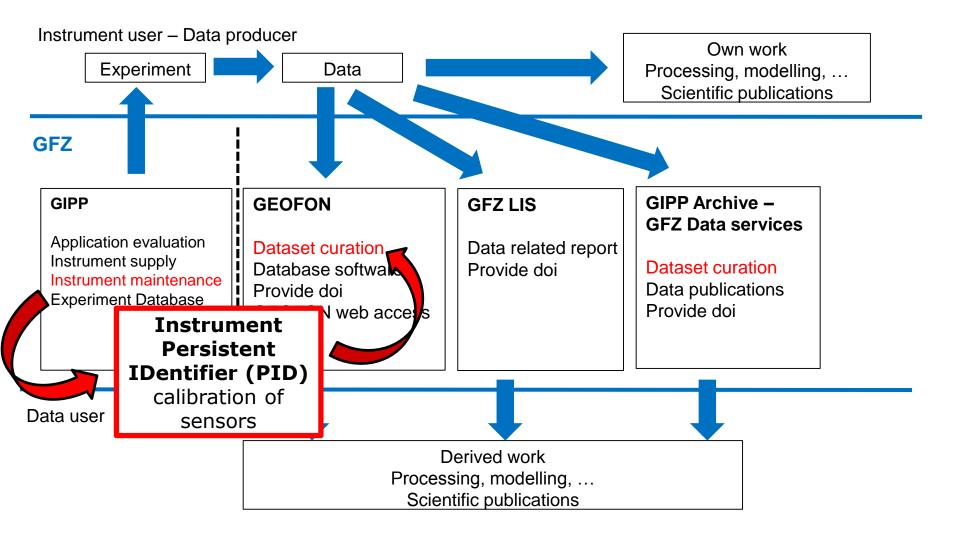
#### 3. Station locations

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.

Si	ite	Start date	End date	Latitude	Longitude	Altitude	SPAM4	RAW
-	101	2015-09-23	2015-09-26	50.148448	12.233195	622.218933	√ √	√
	102	2015-09-23	2015-09-28	50.147020	12,256950	588,120056	~	
	103	2015-09-17	2015-09-19	50.146976	12 292709	578.821045	~	4
00	104	2015-09-25	2015-09-28	50.148154	12.328457	542.203979	~	
00	105	2015-09-17	2015-09-19	50.148840	12.369098	502.988373	~	1
00	008	2015-09-17	2015-09-20	50.141942	12.397884	483.323456	~	~
00	108	2015-09-22	2015-09-25	50.147382	12.431428	487.169708	~	~
00	109	2015-09-22	2015-09-25	50.142447	12.462083	496.467651	~	~
00	010	2015-09-23	2015-09-25	50.149984	12.498942	491.349976	~	~
00	111	2015-09-18	2015-09-19	50.142037	12.528128	621.029236	~	~
00	112	2015-09-18	2015-09-20	50.132602	12.555034	526.158508	~	~
00	113	2015-09-21	2015-09-24	50.122968	12.582805	528.121218	~	1
00	314	2015-09-21	2015-09-24	50.131878	12.600505	509.345795	~	$\checkmark$
00	115	2015-09-21	2015-09-24	50.129200	12.637318	685.661682	~	$\checkmark$
00	016	2015-09-21	2015-09-24	50.134391	12.666380	706.811768	~	~
00	017	2015-09-24	2015-09-27	50.141747	12.685279	758.654053	~	~
00	118	2015-09-18	2015-09-20	50.128083	12.715415	779.839111	~	~
00	019	2015-09-18	2015-09-20	50.14215	12.749020	597.10	$\checkmark$	$\checkmark$
00	120	2015-09-24	2015-09-27	50.13594	12.77559	604.0765	~	$\checkmark$
00	121	2015-09-25	2015-09-28	50.122230	12.836887	597.780029	~	~
00	122	2015-09-25	2015-09-28	50.119184	12.873372	743.325989	~	~
00	123	2015-09-28	2015-09-28	50.368451	12.517895	749.525269	~	$\checkmark$
00	124	2015-09-19	2015-09-21	50.351758	12.528497	700.203064	~	~
00	125	2015-09-26	2015-09-28	50.342765	12.52880	683.14343	~	$\checkmark$
00	126	2015-09-19	2015-09-21	50.314274	12.506941	702.321716	~	$\checkmark$
00	127	2015-09-19	2015-09-22	50.298777	12.504664	669.306580	~	~
00	128	2015-09-19	2015-09-21	50.277210	12.483305	663.709351	~	~
00	129	2015-09-20	2015-09-23	50.255811	12.510075	769.399780	~	~
00	130	2015-09-20	2015-09-23	50.244914	12.527385	728.608459	~	X
00	131	2015-09-26	2015-09-28	50.219673	12.513932	637.886230	~	~



## **GIPP** Data cycle





### Instrument SensorML files

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	//www.opengis.net/swe/2.0" xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:gmd="
1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	//www.isotc211.org/2005/gmd" xmlns:gco="http://www.isotc211.org/2005/gco" xmlns:xsi="
	//www.w3.org/2001/XMLSchema-instance" xmlns:xlink="http://www.w3.org/1999/xlink"
	chemaLocation="http://www.opengis.net/sensorm1/2.0
	//schemas.opengis.net/sensorm1/2.0/sensorML.xsd">
	l:identifier codeSpace="uniqueID">11708/D079BFE0-820F-4B85-884C-FA29F850EAF5
	1:identification>
	ml:IdentifierList>
	<pre><sml:identifier></sml:identifier></pre>
	<pre><sml:term definition="http://sensorml.com/ont/swe/property/Owner"></sml:term></pre>
	<pre><sml:label>Program</sml:label></pre>
	<ml:value>qipp</ml:value>
	<pre></pre> /sml:identifier>
	<pre><ml:identifier></ml:identifier></pre>
	<pre><sml:term definition="http://mmisw.org/ont/ioos/definition/sensorID.html"></sml:term></pre>
	<pre><sml:label>Code</sml:label></pre>
	<pre><sml:value>MS-1008</sml:value></pre>
	<pre></pre> /sml:identifier>
	<sml:identifier></sml:identifier>
	<pre><sml:term definition="http://sensorml.com/ont/swe/property/Status"></sml:term></pre>
	<pre><sml:label>Status</sml:label></pre>
	<pre><sml:value>OK</sml:value></pre>
	<pre><sml:identifier></sml:identifier></pre>
	<pre><sml:term definition="http://sensorml.com/ont/swe/property/Manufacturer"></sml:term></pre>
	<sml:label>Manufacturer</sml:label>
	<sml:value>Mark Products</sml:value>
	<sml:identifier></sml:identifier>
	<pre><sml:term definition="http://sensorml.com/ont/swe/property/ShortName"></sml:term></pre>
	<pre><ml:label>Name</ml:label></pre>
	<pre><sml:value>MARK L-4C-3D</sml:value></pre>
	<pre></pre> /sml:identifier>
	<pre><ml:identifier></ml:identifier></pre>
	<pre><sml:term definition="http:sensorml.com/ont/swe/property/URL"></sml:term></pre>
	<pre><mi:label>URL</mi:label></pre>
	<pre><sml:value>http://sec22c122.gfz-potsdam.de/gipp/markl4cs/view/3</sml:value></pre>
	<pre></pre>
	<pre></pre>
	sy one recorderates



## 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

