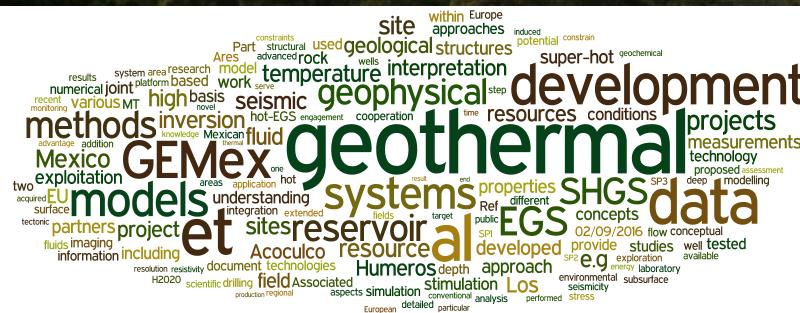


The Open Access Database of the GEMex H2020 project

E. Trumpy,

GeoNode Summit 2020 – 07th December 2020



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 727550

www.gemex-h2020.eu



- **GEMex**: Cooperation in Geothermal energy research **Europe-Mexico** for development of Enhanced Geothermal Systems (EGS) and Superhot Geothermal Systems (SHGS)
- **GEMex** is a complementary effort of a European and Mexican consortium on unconventional geothermal systems
- **GEMex** focusses on



- GEMex has selected two sites in the Transmexican Volcanic Belt - Acoculco for EGS development and Los Humeros as a superhot resource.



Partners



Europe



Hochschule Bochum
Bochum University
of Applied Sciences



UNIVERSITA
DEGLI STUDI
DI TORINO

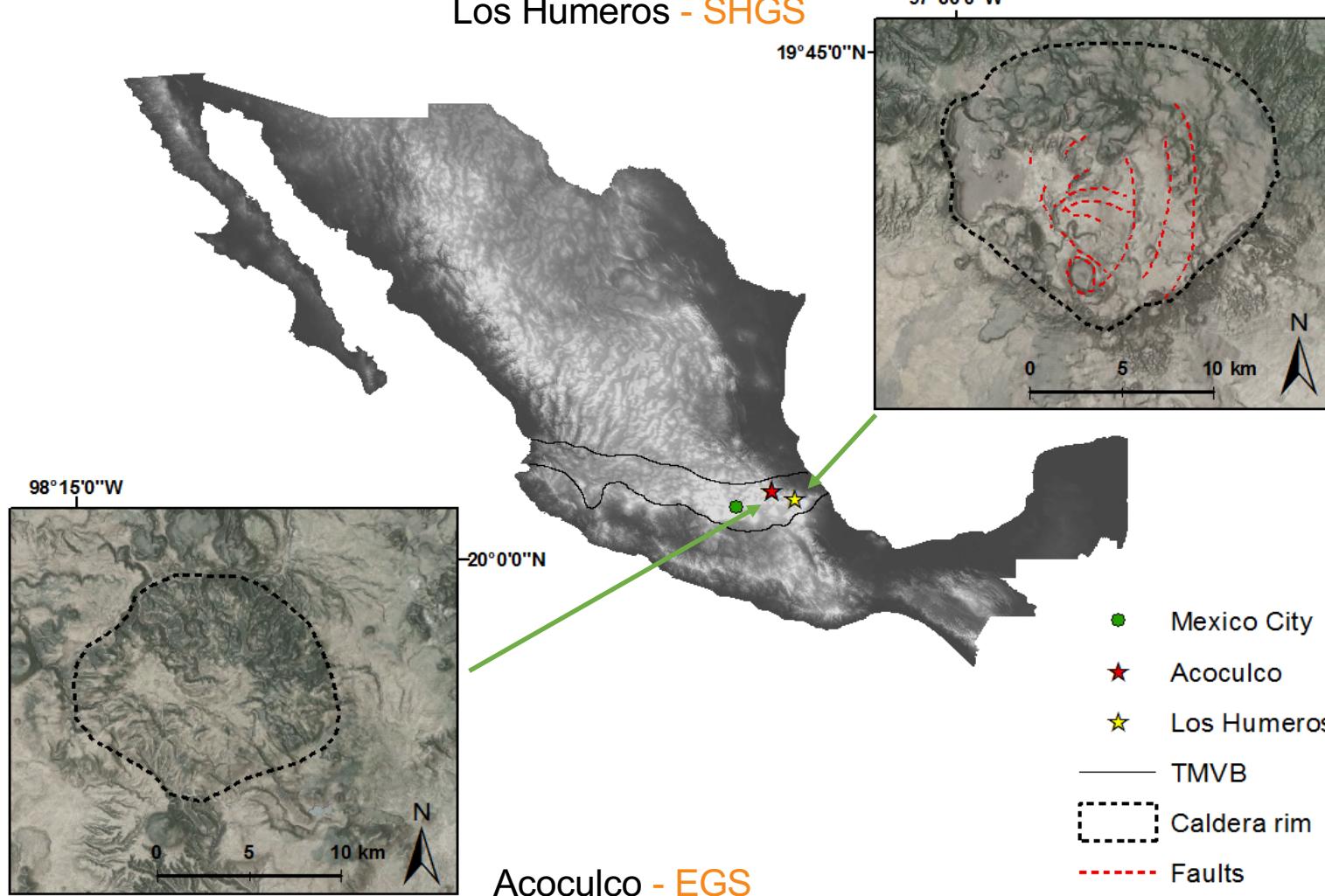


Mexico



Geothermal sites

Los Humeros - SHGS



Figures: Anna Jentsch, GFZ



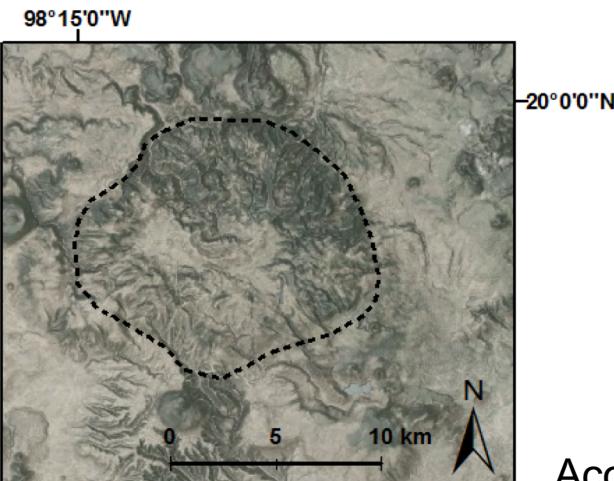
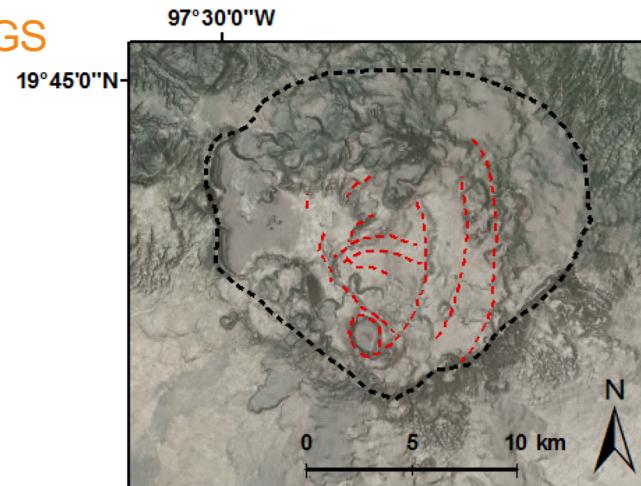
GEMex: Geothermal energy research Europe-Mexico

www.gemex-h2020.eu



Los Humeros - SHGS

- site already developed: > 40 wells, > 94 MWe installed capacity
- formations with > 380°C, but highly acidic fluids



Acoculco - EGS

- under exploration
- 2 wells found high temperatures (~300°C at 2km depth) but no fluids
- stimulation currently planned

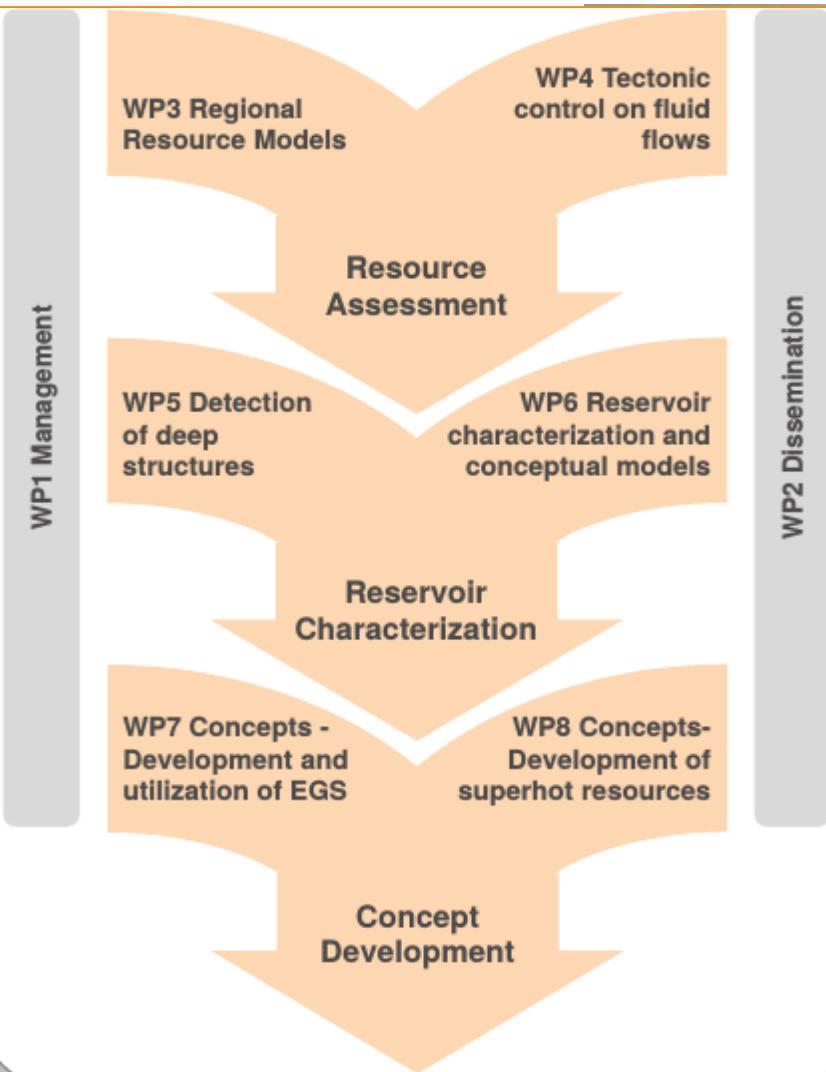
Figures: Anna Jentsch, GFZ



GEMex: Geothermal energy research Europe-Mexico

www.gemex-h2020.eu





Task 2.3: Open Access DB



Objective:

Geothermal data, in the form of maps, datasets and models will be organized and collected in a open access database and will be made available in a spatial data infrastructure according to international standards and protocols

Preliminary
data

Collected
data

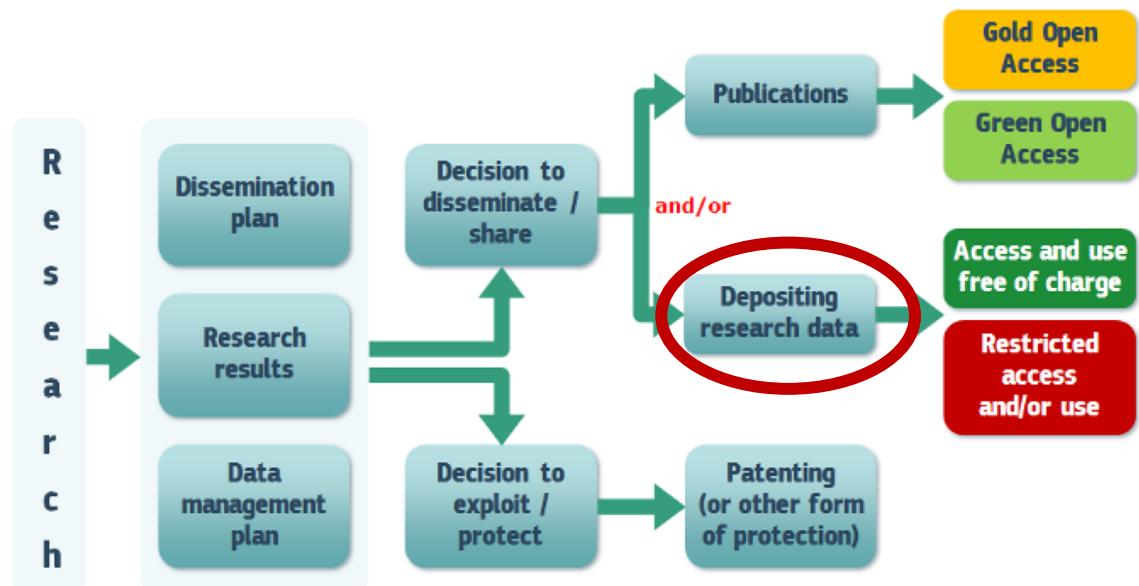
Resulting
data



National Research Council of Italy

- ❑ Horizon 2020 rules on open access to scientific publications is an obligation
- ❑ open access to research data, where opting-outs are possible, and research data management

Research data: statistics, results of experiments, measurements, observations resulting from fieldwork, survey results, interview recordings and images. The focus is on research data that is available in digital form.



GEMex Open Access Database:

- Platform for management and publication of **spatial data** (SDI)
- **Open Source Platform**
- Allow non-specialized users to **share data** and **create interactive maps**
- **Data management tools**, metadata implementation and map visualizations
- Guideline to prepare the data
- Hosted by CNR

- 2D data:
 - ✓ Points (point of samples, boreholes, ...)
 - ✓ Lines (faults, alignments, cross-sections traces...)
 - ✓ Polygons (areas of alteration, geological formations, ...)
 - ✓ Maps (as georeferenced images)
 - ✓ Grid maps resulting from 3D modellings and numerical simulation



Old instance (2016 – 2020)

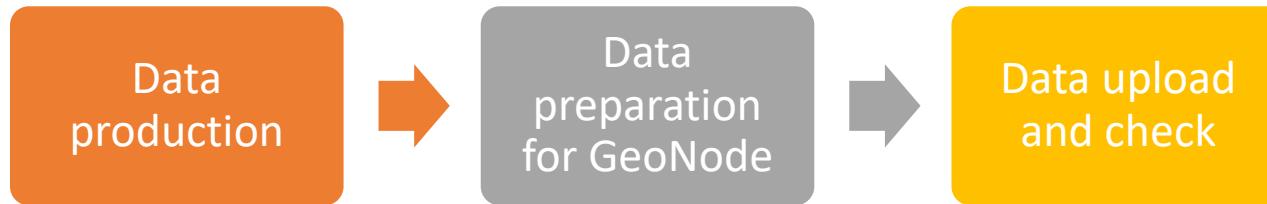
- Technical details
 - ✓ 4 single core QEMU virtual cpu
 - ✓ 8 Gb RAM
 - ✓ Ubuntu 14.04.6 LTS
 - ✓ Apache 2.4.7
 - ✓ Tomcat 7.0.52
 - ✓ OpenJDK 1.8.0_222
 - ✓ Geoserver 2.9
 - ✓ Postgresql 9.3.24
 - ✓ **GeoNode 2.4 – multi site**



New instance (2020 – 2022)

- Technical details
 - ✓ 4 single core QEMU virtual cpu
 - ✓ 8 Gb RAM
 - ✓ Ubuntu 18.04.5 LTS
 - ✓ Apache 2.4.29
 - ✓ Tomcat 9.0.16
 - ✓ OpenJDK 11.0.9
 - ✓ Geoserver 2.16.2
 - ✓ Postgresql 10.14
 - ✓ **GeoNode 3.1**





Guidelines to deliver (spatial) datasets on Open Access DataBase

1. File format (SHP, geotiff)
2. File description
 - title** (e.g. rocks_sampling_location_all_20180528)
 - abstract** (i.e., describing each dataset contents)
 - purpose** for which you created the datasets
 - any possible other **supplemental information** (e.g., the background data to create the map if any, the accuracy, the used methodology to create the map, ...)
 - declaration on the **data quality**
 - keywords**



OADB – GeoNode landing page



The screenshot shows the GeoNode landing page with the following sections:

- Welcome:** A banner stating "GeoNode is an open source platform for sharing geospatial data and maps. The GEMex Open Access Database will collect the data during all the life time of GEMex project".
- Search for Data:** A search bar with a magnifying glass icon and a link to "Advanced Search".
- 122 Layers:** An icon of a layer symbol, a link to "Explore layers", and a description: "Click to search for geospatial data published by other users, organizations and public sources. Download data in standard formats.".
- 15 Maps:** An icon of a location pin, a link to "Explore maps", and a description: "Data is available for browsing, aggregating and styling to generate maps which can be saved, downloaded, shared publicly or restricted to specify users only.".
- 3 Documents:** An icon of a document with a grid, a link to "Explore documents", and a description: "As for the layers and maps GeoNode allows to publish tabular and text data, manage theirs metadata and associated documents.".
- 4 Users:** An icon of a person, a link to "See users", and a description: "GeoNode allows registered users to easily upload geospatial data and various documents in several formats.".
- Discover the available datasets:** A section showing icons for various datasets: GEOLOGY, GEOCHEMISTRY, GEOPHYSICS, ELEVATION, MODELLING, PLACES, TRANSPORTATION, and WATER.
- Footer:** Links to "Data Layers", "Documents", "Remote Services", "Maps Explore Maps", "About People Groups", "Powered by GeoNode Developers | About", and language selection ("English").
- EU Flag:** The European Union flag in the bottom left corner.



Features:

- Landing page look & feel customization
- **122** layers
- **15** maps

OADB – GeoNode list of layers



GEMex Data Maps About Search Register Sign in

Explore Layers

Upload Layers



Selection
No list items selected. Use the selection fields to add.

Create a Map

Filters Clear

TEXT

Search

KEYWORDS

TYPE

Raster Layers 54

Vector Layers 68

CATEGORIES

RESPONSIBLES

GROUPS

GROUP CATEGORIES

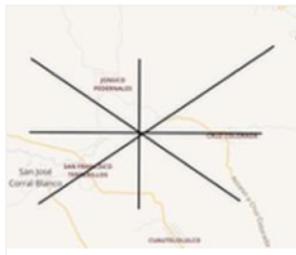
DATE

REGIONS

EXTENT

122 Layers found

0 1 v



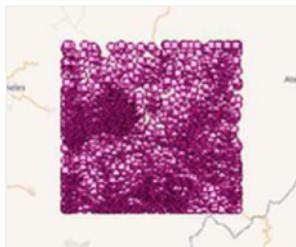
MODELLING

ACO_density_contrasts_crossections

The objective of this dataset is to give information to all GEMEx partners on the results of the gravity measurements in the Acoculco geothermal field. The results are given in density contrasts in 2D cross-sections. This dataset contains 2D cross-sections of the 3D density model in Acoculco. The val...

Eugenio Trumpy 19 Oct 2020 1 0 0

Create a Map



ps_insar_envi_2003_2007_1

No abstract provided

Eugenio Trumpy 3 Jul 2020 6 0 0

Create a Map



MODELLING

LH_post_caldera_volcanics_g1

3D geomodel model built from map, cross-sections, field work, borehole data, analogue modelling, geochemical interpretation, geophysical surveys, thermal modelling, etc. Collaborative work achieved by European and Mexican Partners: BRGM, CeMIE-Geo, CNR, UMSNH, UNAM, Uni Bari, Uni Roma 3, Uni Utrecht...

Eugenio Trumpy 17 Jun 2020 6 0 0

Create a Map

- **68 vector**
- **54 raster**



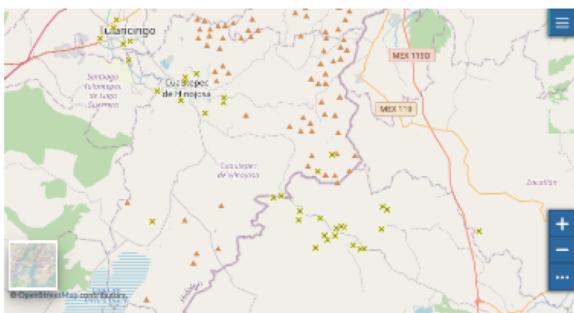
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OADB – GeoNode layer details



GEMex Data Maps About Search Register Sign in

chemical_isotopic_data_acoculco_waters



Info Attributes Share Ratings Comments Favorite

Title chemical_isotopic_data_acoculco_waters
License Not Specified
Abstract

The dataset Chemical_isotopic_data_Acoculco_waters reports major and minor chemical components and stable isotopic composition for hydrogen and oxygen determined in collected water samples. Calculated partial pressures (in bars and log10-value) and CO₂ concentrations of dissolved CO₂ were also included.

Publication Date June 4, 2020, 9:43 p.m.

Type Vector Data
Category Geochemical
Regions Mexico
Responsible eugenio

More info -

Maintenance There Are No Plans To Update The Data

Frequency Not Specified
Restrictions embargoed
Edition 1
Purpose The scope of the dataset is to provide information to GEMex scientist about the different kind of natural manifestation which can be collected in the studie...

Language English
Supplemental Information These datasets were published (with Embargo date 2021-12-31) on the Zenodo data repository [link DOI: <https://doi.org/10.5281/zenodo.3727572>].

Spatial Representation Type vector data is used to represent geographic data

Layer WMS GetCapabilities document

Download Layer
Metadata Detail
View Layer
Download Metadata
Legend

Maps using this layer
List of maps using this layer:
Geochemical

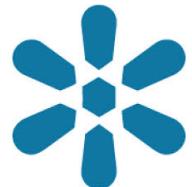
Create a map using this layer
Click the button below to generate a new map based on this layer.
[Create a Map](#)

Styles
The following styles are associated with this layer. Choose a style to view it in the preview map.
[\(default style\)](#)
[chemical_isotopic_data_acoculco_waters](#)

About
Responsible, Point of Contact, Metadata
Author

- Layer metadata
- Data and metadata download
- Link to publication in the ‘Supplemental info’

Data Layers Documents Remote Services
Maps Explore Maps About People Groups
Powered by GeoNode
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English



OADB – GeoNode layer details



chemical_isot

ACO_density_contrasts_crossections

Info **Attributes**

Title ACO_density_contrasts_crossections
License CC BY 4.0 (CC BY 4.0)
Abstract The objective of this dataset is to give information to all GEMEx partners on the results of the gravity measurements in the Acoculco geothermal field. The results are given in density contrasts in 2D cross-sections; his dataset contains 2D cross-sections of the 3D density model in Acoculco. The values represents density contrast in g/cm³ with a background density of 2.67 g/cm³. The gravity campaign corresponds to 84 gravity stations measured during the GEMex project, with participation ...

Publication Date Oct. 19, 2020, 3:24 p.m.
Type Vector Data
Category acoculco, gravity, "density model"
Regions Mexico
Responsible eugenio

Maintenance Frequency There Are No Plans To Update The Data
Restrictions 1
Edition 1
Purpose The objective of this dataset is to give information to all GEMEx partners on the results of the gravity measurements in the Acoculco geothermal field. The ...

Language English
Supplemental Information In Acoculco, 84 gravity stations were acquired in May 2018 in an about 5 x 3 km² rectangular grid oriented NE-SW and NW-SE with a typical station distance of 400 m to each other. The data quality bases on the measurement accuracy of the differential GPS (vertical: 5 mm) and the gravimeter (0.001 mGal) and the standard deviation of the gravity and GPS measurements. During the surveys, gravity measurements were repeated three times. The measurement with lowest standard deviation was selected for further investigation.
Spatial Representation Type Nessuna informazione fornita

Layer WMS GetCapabilities

Data **Layers** **Documents** **Remote Services**

Info **Attributes** **Share** **Ratings** **Comments** **Favorite**

Download Layer **Metadata Detail** **View Layer** **Download Metadata**

Legend gravity_cross_sections_aco

Maps using this layer List of maps using this layer:
[Acoculco gravity](#)

Create a map using this layer Click the button below to generate a new map based on this layer.
Create a Map

Styles The following styles are associated with this layer. Choose a style to view it in the preview map.
[default style] gravity_cross_sections_aco

About Responsible, Point of Contact, Metadata


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[English](#)

Data **Layers** **Documents** **Remote Services**

Maps [Explore Maps](#)

About [People](#) [Groups](#)

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- Layer metadata
- Data and metadata download
- Link to publication in the ‘Supplemental info’

OADB – GeoNode layer details



chemical_isot

ACO_density_contrasts_crossections

LH_post_caldera_volcanics_g1

Info **Attributes**

Info **Attributes**

Info **Attributes**

Title: ACO_d...
License: CC BY
Abstract: The obj...

Publication Date: Oct. 19
Type: Vector
Regions: acocul...
Keywords: Modell...
Category: Mexico
Responsible: eugenio

Maintenance: There A...
Frequency: 1
Edition: 1
Purpose: The obj...

Language: English
Supplemental Information: In Acco...
Spatial Representation Type: rectang...

Data Quality: Nessun
Supplemental Information: Nessun
Representation Type: vector c...

Title: LH_pos...
License: Not Specified
Abstract: 3D geomodel model built from map, cross-sections, field work, borehole data, analogue modelling, geochemical interpretation, geophysical surveys, thermal modelling, etc. Collaborative work achieved by European and Mexican Partners: BRGM, CeMIE-Geo, CNR, UMSNH, UNAM, Uni Bari, Uni Roma 3, Uni Utrecht, and GEMex T3.3 team.

Publication Date: June 17, 2020, 2:41 p.m.
Type: Raster Data
Regions: Mexico
Keywords: Modelling
Category: Mexico
Responsible: eugenio

Maintenance: There Are No Plans To Update The Data
Frequency: embargoed
Edition: 1
Purpose: 3D reconstruction of the structures/geometries of the the underground of the Los Humeros area. The output of the 3D geomodel was used as input for numerica...

Language: English
Supplemental Information: DTM (30m x 30m grid), 56 drillholes from CFE (Comision Federal de Electricidad), Los Humeros updated local model (Calcagno et al., WGC2020), <https://data.d4sci.com/>
Spatial Representation Type: grid data is used to represent geographic data

Data Quality: Nessun
Supplemental Information: Nessun
Representation Type: vector c...

Download Layer
Metadata Detail
View Layer
Download Metadata

Legend

Maps using this layer
This layer is not currently used in any maps.

Create a map using this layer
Click the button below to generate a new map based on this layer.
Create a Map

Styles
The following styles are associated with this layer. Choose a style to view it in the preview map.
[default style] Post_CaldVolca_G1_ok

About
Responsible, Point of Contact, Metadata Author
 eugenio
CNR

Data
Layers
Documents
Remote Services

Layer WMS GetCapabilities

Data
Layers
Documents
Remote Services

Layer WMS GetCapabilities do...

Data
Layers
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English



- Layer metadata
- Data and metadata download
- Link to publication in the ‘Supplemental info’



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OADB – Geonode map description



GEMex Data Maps About Search Register Sign in

Los Humeros resistivity map

Download Map
Metadata Detail
View Map

Map Layers
This map uses the following layers:
LH_resistivity_2000bsl
LH_resistivity_1000bsl
LH_resistivity_0asl
LH_resistivity_1000asl
LH_resistivity_2000asl
LH_resistivity_2500asl
Los Humeros resistivity cross-sections
MT survey in Los Humeros 2018

Copy this map
Duplicate this map and modify it for your own purposes
Create a New Map

About
Responsible, Point of Contact, Metadata
Author
eugenio
CNR

Info Share Ratings Comments Favorite

Title: Los Humeros resistivity map
License: Not Specified
Publication Date: June 4, 2020, 8:46 p.m.
Category: Modelling
Regions: Global
Responsible: eugenio
More info: -
Language: English
Supplemental Information: No information provided

Map layers WMS GetCapabilities document



- Map metadata (e.g. list of layers)

Data
Layers
Documents
Remote Services

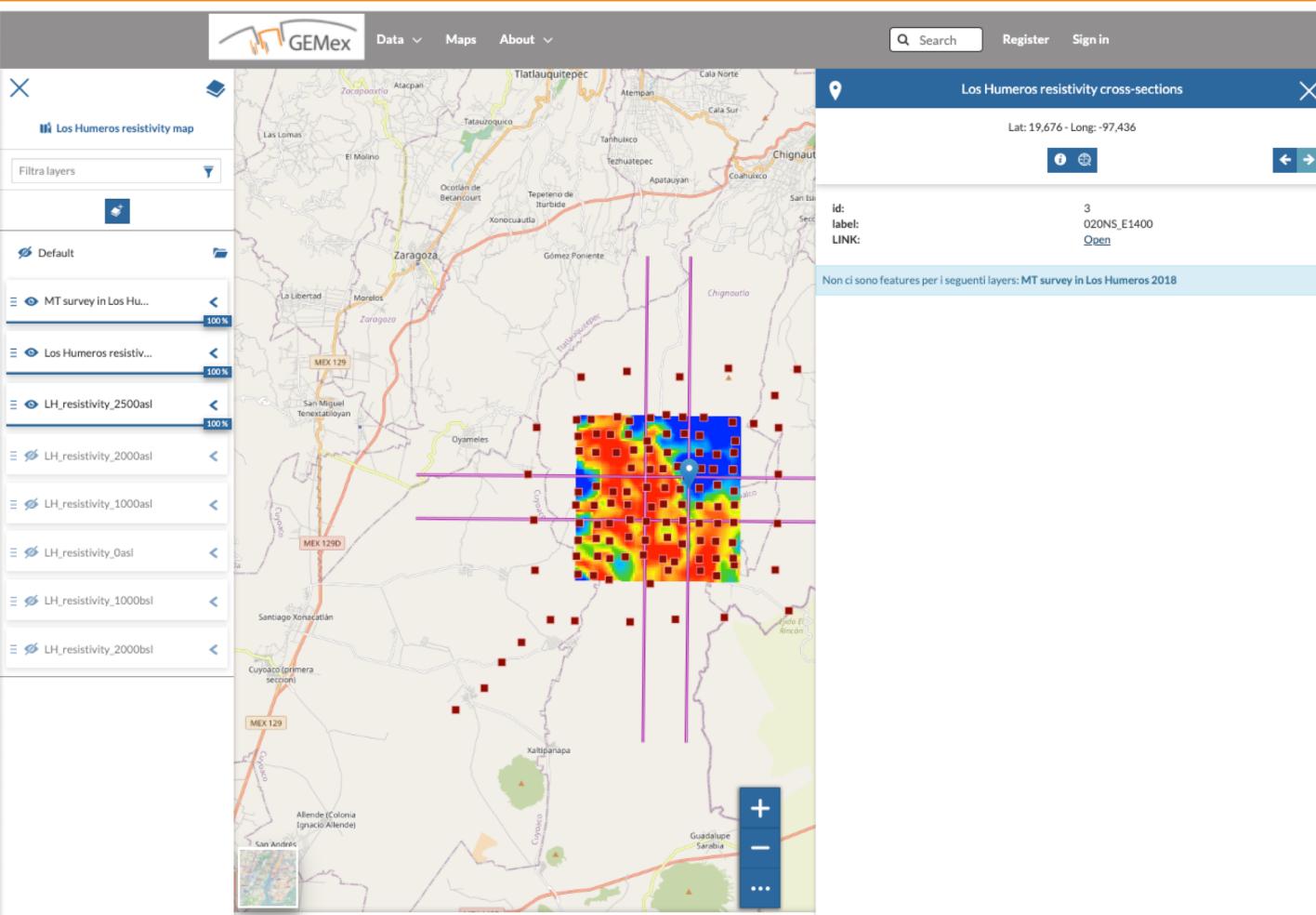
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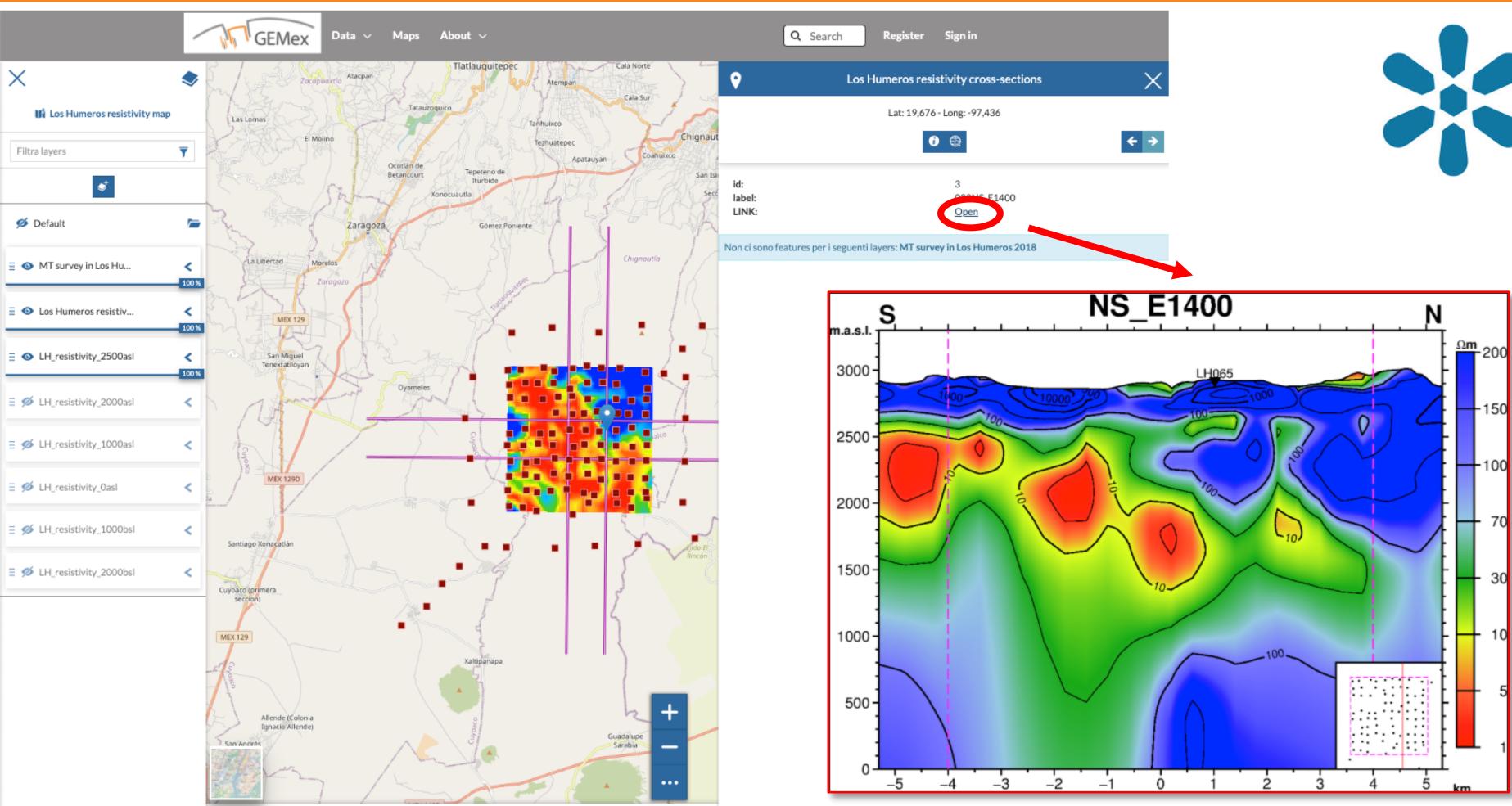
English





- Save map
- Print map
- Query the map
- Measure distances and areas
- Style layers

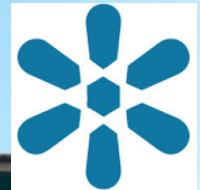




- Save map
- Print map
- Query the map
- Measure distances and areas
- Style layers



Conclusions & Considerations



- The Open Access Database will be maintained up to may 2022 (two years after the end pf the project)
- The GEMex OADB/**GeoNode** was largely used by researcher during the project...I suppose even now
- To get datasets was a hard exercise



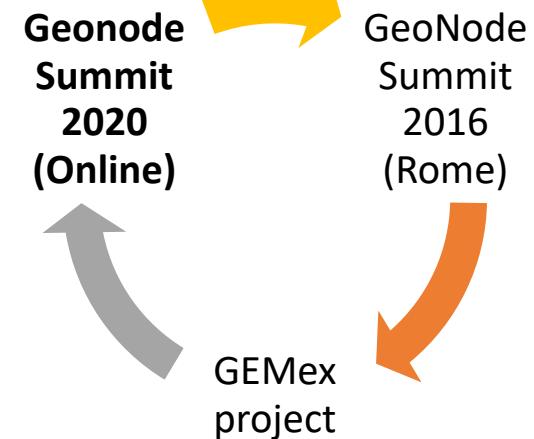
- Conceptual issues



- EC require to share and make available research data from funded projects



- Open Science principles**





<http://gemex.igg.cnr.it>

