GeoPLASMA-CE
Minutes

Compiled by I. Görz on November 17, 2017

Date, Time	13.11.2017, 13:00 – 18:00
	14.11. 2017 9:00 - 12:30
Location	Czech Geological Survey, Prague, Klarov 3
Concern	WPT3-Workshop – 3d modelling

Participants

LP – GBA	GOTZL Gregor STEINER Cornelia PORPACZY Clemens	*PP08 – PGI-NRI*	MYDLOWSKI Adam WYRWALSKA Urszula
PP05 – CGS	HOLECEK Jan FRANEK Jan JELINEK Jan	*PP04 – LfULG*	GORZ Ines
PP07 – GeoZS	SRAM Dejan	*PP03 – geoENERGIE*	GRIMM Rüdiger
PP09 – AGH UST	MITAN Kamil HAJTO Marek PAPIERNIK Bartosz MICHNA Michal ZABEK Gabriel	*PP06 – SGIDS*	SVASTA Jaromir

Agenda

1. Introduction (Jan Holecek, Gregor Gotzl, Ines Gorz) 13:00-13:15

2. Joint geodata management (Gregor Gotzl) 13:15-14:45:
   - Data structure
   - Input data management
   - Output data management
   - Metadata description

3. Coding of object-related attributes (Ines Görz) 15:15-16:15
   - Age code
   - Pet-Key

4. 3D modelling software used in GeoPLASMA-CE (Dejan Sram, Bartosz Papiernik, Jan Franek, Ines Gorz) 16:30-18:00:

   - Jewel Suite
   - Petrel
   - Move
   - Skua-Gocad

5. Data Preparation (Clemens Porpaczy) 9:00-9:45

6. Quality Check (Ines Gorz) 9:45-10:15

7. Export formats for Location query and the workflows for potential modelling (Ines Gorz, Adam Mydlowski) 10:15-10:45

8. Workflow open loop systems (Cornelia Steiner) 10:45-11:30

9. Workflow closed loop systems (Ines Görz) 11:30 - 12:15

10. Data base structure for new measurements (Jan Holocek) 12:15-12:30

Outcomes

WPT3-workshop – 3D modelling

1. Introduction

Jan Holecek and Gregor Gotzl welcome the workshop participants. Ines Gorz gives a brief introduction, which steps of the workflow and which tools on the web platform the 3D models are needed for.

Summary

2. Joint geodata management

Gregor Gotzl presents the joint data structure and data management tools. He suggests documenting raw data automatically by a file register.

Input parameters are all data which will be used to produce an output. A parameter list with 54 parameters is available for the partners specifying the meaning of each parameter, the unit and minimum quality standards. For the metadata description, the LP-GBA provides an EXCEL or ACCESS table.

The output parameters are delivered to the LP-GBA and will be used on the web platform. They have to be delivered with the variable type, unit, location and resolution specified in the deliverable D.T2.3.1. "harmonized data management infrastructure". The relation to the input data has to be specified as n:n relation.

Summary

1. The input parameter list will be terminated by the end of November 2017. The partners can send corrections and suggestions concerning it to LP-GBA until 21 of November 2017.

2. For clarification the harmonized workflows have to contain statements, when the True vertical depth sub sea level and when the True vertical depth below ground level are used as Z-values.

3. The output parameter list has to be completed until 28 of November 2017 with descriptions of the meaning of each variable and variable types.

4. The deliverable D.T2.3.1. "harmonized data management infrastructure" will be completed until 30 of November 2018.

Decision

3. Coding of object-related attributes

The partners tested the age code and the petrographic key.

Summary

1. The LfULG will provide a script for decoding .

Decision

4. 3D modelling software used in GeoPLASMA-CE

Summary

The partners briefly presented their 3D modelling software and the work in their pilot areas. One point of discussion was how to handle grid-based facies modelling in the output data sets. GiGa is not able to incorporate grids into the location queries. Therefore, all lithological units have to be delivered as triangulated surfaces of unit tops in Gocad ASCII format.

5. Data Preparation

Summary

Clemens Porpaczy gave an overview over problems during data preparation. He stated that wellmarker data bases are missing. Cross sections are mainly used as conceptual models, since they are too schematic to define unit boundaries. He pointed to the fact that cross-sections are often not properly scaled in the vertical direction.

6. Quality Check

Summary

Ines Gorz presented checklists and tools for the quality check of the 3D model. They can be found on own cloud in the workshop folder. The partners discussed problems with data preparation in their pilot areas.

7. Export formats for Location query and the workflows for potential modelling

Summary

Ines Gorz showed examples of different model presentations in GST. If a model unit is presented by a watertight boundary representation or as tetrahedral mesh, it can be displayed as colored polygon in the virtual borehole and in the cross sections. Boundary representations with errors and flying carpets are displayed as lines. Grids cannot be displayed. The top of each unit may combine stratigraphic horizons, faults or unconformities. Each surface, which is cut by the section or virtual borehole is displayed with its name. The partners can deliver additional information (rock name, age, ...) as table.

For the closed loop and open loop workflows the top of the units have to be delivered in a raster format. It has to be compatible with the master grid of the pilot area in cell location and resolution.

Adam Mydlowski gave a presentation about the conversion of a Gocad model into the master grid, the assignment of properties to it and its export as an ASCII-file.

8. Workflow open loop systems

Summary

Cornelia Steiner presented the workflow for the calculation of the geothermal potential for open loop systems. She explained that the aquifer outline is taken from the 3D model in a shapefile format (polygon). The mean groundwater level, the thicknesses of the saturated zone and of the aquifer, the top and bottom of the aquifer have to be exported as raster data sets from the 3D modelling software and to be imported in ArcGIs. The output variables are calculated either with ArcGIS or with EXCEL. The workflow was validated by a FE-Flow simulation in one part of the pilot area Vienna, such that a recovery factor for the ArcGIS/EXCEL –calculation was obtained which can be taken into consideration for the whole pilot area.

2. The partners decided to validate the workflow also in the pilot areas Krakov, Bratislava and Ljubljana in order to obtain PA-specific recovery factors.

Decision

9. Workflow closed loop systems

Summary

Ines Gorz presented the workflow for modelling of the geothermal potential for closed loop systems. The input data from the 3D model are the tops of the geological units. Additionally the borehole data will be used. The petrographic subunits of each model unit will be equipped with the specific thermal conductivities of the rocks (wet and dry) and a thickness-weighted mean for the whole unit will be calculated. Then the mean values of the wet and dry conductivities will be loaded to ArcGIS and be interpolated by the inversed distance method for the whole unit. Finally, the ArcGIS extension is used to calculate the mean heat conductivity for a specific depth level below ground surface (10m, 20m, 30m,..) and/or the heat extraction rate.

The colleagues from Krakow declared that they will not follow the harmonized workflow for the closed loop systems. They will calculate the geothermal potential in Petrel instead of ArcGIS,. The result of the work will be a 3D structural-parametric model constructed with the use of convergent Interpolation, a kind of spline interpolation (for the structural model) and kriging or Sequential Gaussian Simulation (for the parametric model) instead of the inverse distance method. The resultant maps will read the thermal conductivities at specific points of depth instead of calculating the average thermal conductivity for depth intervals.

Jan Franek said that he would not like to interpolate the specific heat conductivities at all, but instead assign a constant value to each geological unit. The partners agreed that assignment of a constant value is reasonable, if only few or no borehole data are available for a unit.

Rudiger Grimm discussed the base of material parameters which will be used for the calculations. A harmonized list should be compiled by the partners. However, this list should represent the variability of the paramters in the pilot areas, such that e.g. "granite" can be listed several times with various specific heat conductivities.

1. A team will deal with the compilation of the harmonized list containing the specific thermal conductivities used for the calculation of the geothermal potential. The team comprises Adam Mydlowski, Marek Haijto, Jan Holecek, Rudiger Grimm, Gregor Gotzl, Dejan Sram, Karina Hofmann and all interested GeoPLASMA-CE members.

Decision

10. Data base for new measurements performed in GeoPLASMA-CE

Summary

Jan Holecek presented the structure of the database. He explained that each pilot area would prepare one separate data base with the same data structure, such that all data bases can be combined by the end of the project. For this reason, it is important that the partners review the proposal to the data base and specify corrections before the data base will be used by the partners.

1. Review and corrections of the database has to be performed until **30 of November 2017**.

Decision

Important dates

Summary

Gregor Gotzl announced the GeoPLASMA-CE mid-term meeting for the week of **April 9-13 2017 in Bratislava**.

The workshop members agreed on having the next technical workshop on conflict potential mapping in the **first half of March 2018**. The venue has to be specified. The colleagues from Krakow check, whether the workshop could take place at the AGH.