

1 SUMMARY

1.1 Workflow since project start

The ThermoMap project consists of three basic phases. This reporting period mainly covers the first and the second phase, named 'Data collection and data harmonisation' as well as 'Processing, Analysis & Visualisation'.

The systematic approach of the three different steps within the project process chain is shown in Figure 1.

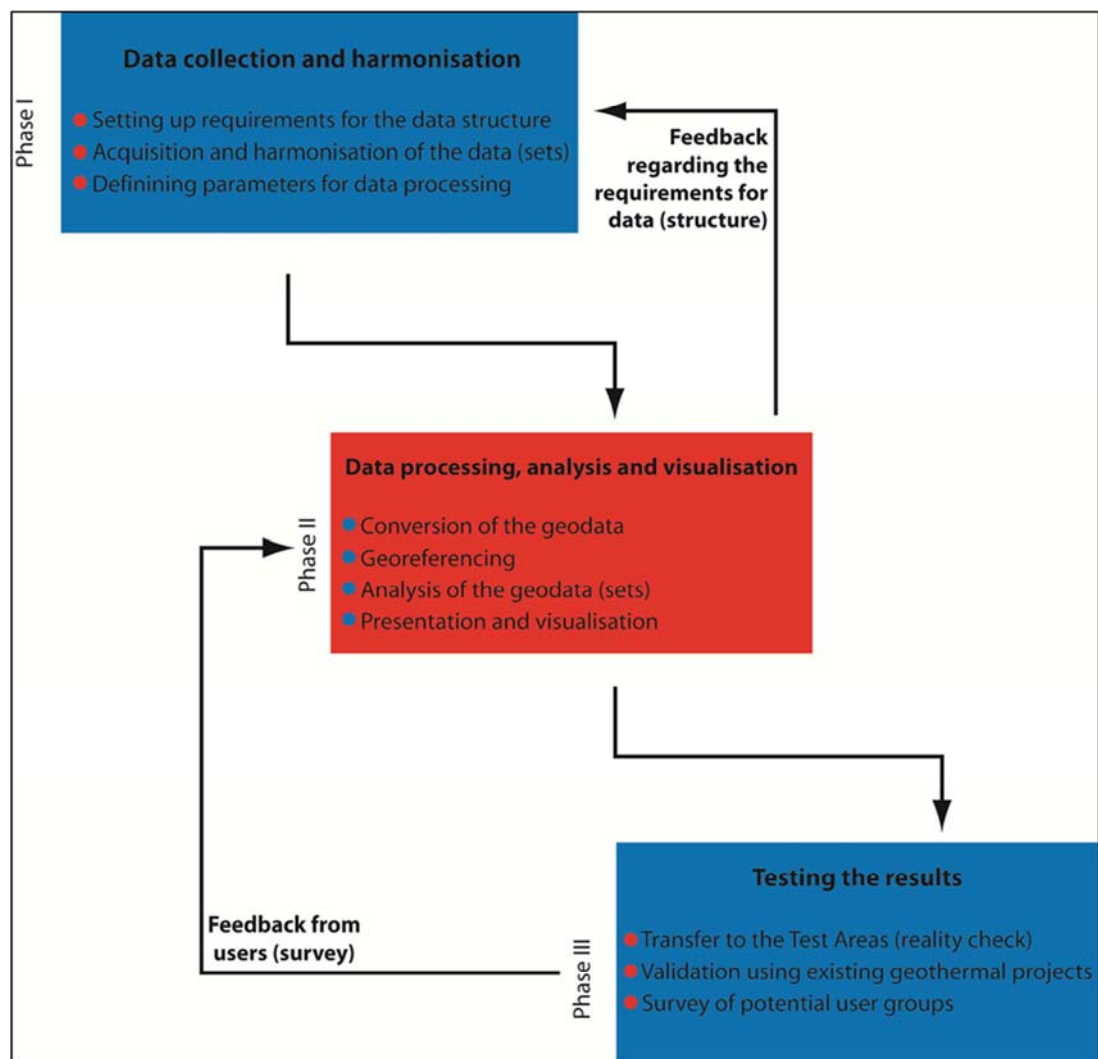


Figure 1: Graphical depiction of the three phases of the ThermoMap-project system chain

In order to filter out adequate data and to harmonise it onto a common basic level within the first project step, two working groups have been set up:

On the one hand the parameter definition group which takes care about the data filtering, on the other hand the standardisation group which should specify the standard for the data harmonisation.

During a comprehensive clarification meeting of both working groups the frame conditions for the setup of the catalogue (D3.1: Catalogue for data requirements, arithmetic instructions and derivation rules) and the required data thereof have been agreed upon.

Subsequently the catalogue has been developed. This catalogue highlights data sets required for the calculation of the estimated shallow geothermal potential expressed by the parameters Heat Conductivity and Heat Capacity for the Test Areas as well as for the Outline Map.

The catalogue has been developed in order to inform the partners about the data, the quality requirements and to support them in the collection of these datasets.

The aim of D3.2 (Standardisation Instruction Manual) was to clearly reflect the standard the collected data is to be harmonised on. Furthermore, it was intended to give support in the way of standardisation of the country specific data sets for the calculation of the superficial geothermal potential on a large to medium scale to all the data providing partners. Therefore, rules and definitions for the standardisation process have been developed.

The first part describes the standardisation procedure for the data sets and the way of calculating the superficial geothermal potential for the first 10 meters within the Test Areas on a medium scale level for three depth layers. Each data providing partner allocated at least one test site for its country. In the second part of the manual the way of standardisation of the data sets for the whole data providing countries is described. The method of calculating the superficial geothermal potential is shown in detail on a large scale level.

Besides of the data sets' standardisation the manual presents the consolidation of the different parameters and describes their functions for the calculation of the superficial geothermal potential. These types of calculation are depicted in specific 'cooking recipes' for the scope of the Test Area as well as for the Outline Map. The reason for this division is the fact that in regard to most of the required parameters the data quality and quantity is not yet adequate enough to estimate the geothermal potential comprehensively for all partner countries and all depth layers.

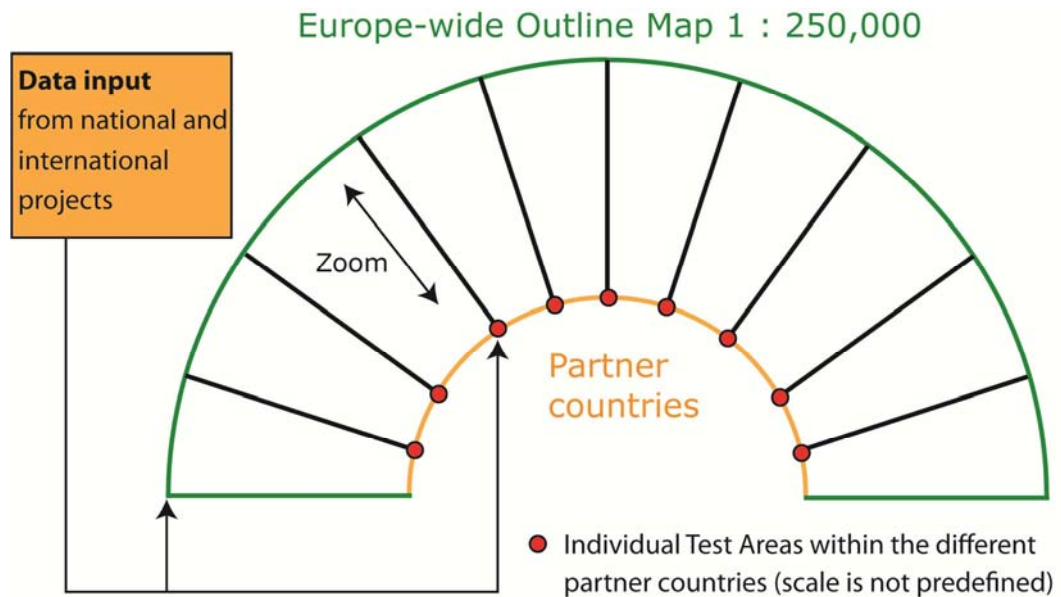


Figure 2: System interrelation between Test Areas and the Outline Map

For the time being the test sites are to be considered as country-specific ‘data hotspots’ which can be extended and will grow in line with the universal data harmonisations respectively data generating. In the long term a full area covering data availability would be appreciated on a large scale level in the ideal case. On the contrary, the Outline Map can be considered as a ‘cheese cover’ which covers the partner countries on a medium scale level and allows approximating the superficial geothermal potential roughly. A corresponding development progress is shown in Figure 2.

To evaluate the demands of practical users within D3.3 an online questionnaire was developed and sent to previously well-defined target groups and its members via Internet-link. The evaluation of this survey has been realised until end of 2011 (see chapter 2.2.2).

Furthermore, a Member Country data catalogue (D3.4) was created at the end of the year 2011, based on the standardisation (D3.2) of the required data/-sets (D3.1). The final version of this deliverable was submitted in month 17 (January 2012).

The harmonised country data catalogues (see chapter 2.2.2) are a concluding document listing and describing all required parameters, needed for the estimation of the superficial geothermal potential within the Test Areas and for the Outline Map (1 : 250,000), and also the corresponding data (sets), that are necessary for the GIS-implementation within Work Package 4.

Within the second process component ‘Processing, Analysis & Visualisation’ a Help Desk Forum (D4.1) has been installed to support the data providing partners in conversing the geodata required in D3.1.

For the analysis of the geodata a detailed Training Manual, as the key instrument for the implementation of the WP3-specifications into practice, has been developed by the WP4-leader PLUS (see also chapter 2.2.3). This training manual will guide the data providing partners in the coordinated analysis of the geodata within their Test Areas as well as for the Outline Map's scope. The submission of D4.2 had to be postponed because of the time delay of D3.1 & D3.2 and also due to the deadline for the respective country specific structure of the geodatabase (31st October 2011 – fixed at the meeting in Orleans, France; see Minutes, p. 9).

Notwithstanding, the following Deliverable 4.3 describing and illustrating the WebGIS inter-face technology (see also chapter 2.2.3) was able to be submitted in timeline with the DoW in month 18 (February 2012).

In February 2012, in the run-up to the Reykjavik meeting (March 2012), WP 5-leader ISOR and FAU discussed some first ideas for the content, strategy and realisation of the third phase (Testing the results) with regard to D5.1 (Quality report on reality check of data). Outcomes from these and further meeting-related discussions will be presented within the next Progress Report covering the period from March to August 2012.

1.2 Results (main results already achieved and expected final results)

During the set-up of the catalogue for the test areas several parameters have been proven themselves to be essential for the calculation of the Heat Conductivity and the Heat Capacity.

Those parameters namely are the grain size (texture class), the bulk density, the water content and the temperature (air respectively soil temperature).

For classifying the texture, the grain size triangle according to the USDA-system is used (see Fig. 3). Further data sources with regard to important soil properties are for instance the WRB-classification system (soil type), the ESDAC (meta)data set (soil type and texture for the scope of the Outline Map) and the Ad-hoc AG Boden (German soil survey manual). In the end, the exemplary calculation of Heat Conductivity and Capacity values as a function of the evaluated parameters leads to an overall table of all possible values of the superficial geothermal potential. These have to be processed and illustrated within the specially developed GI-system (WP4).

To evaluate the demands of practical users of the estimation system an online-questionnaire has been developed, released and evaluated (for detailed results see chapter 2.2.2). The questionnaire was put online to make the answering more user-friendly and to reach more possible target group members.

Furthermore, a final member country data catalogue was created by each data providing country partner for collecting the required data sets from national or international bodies.

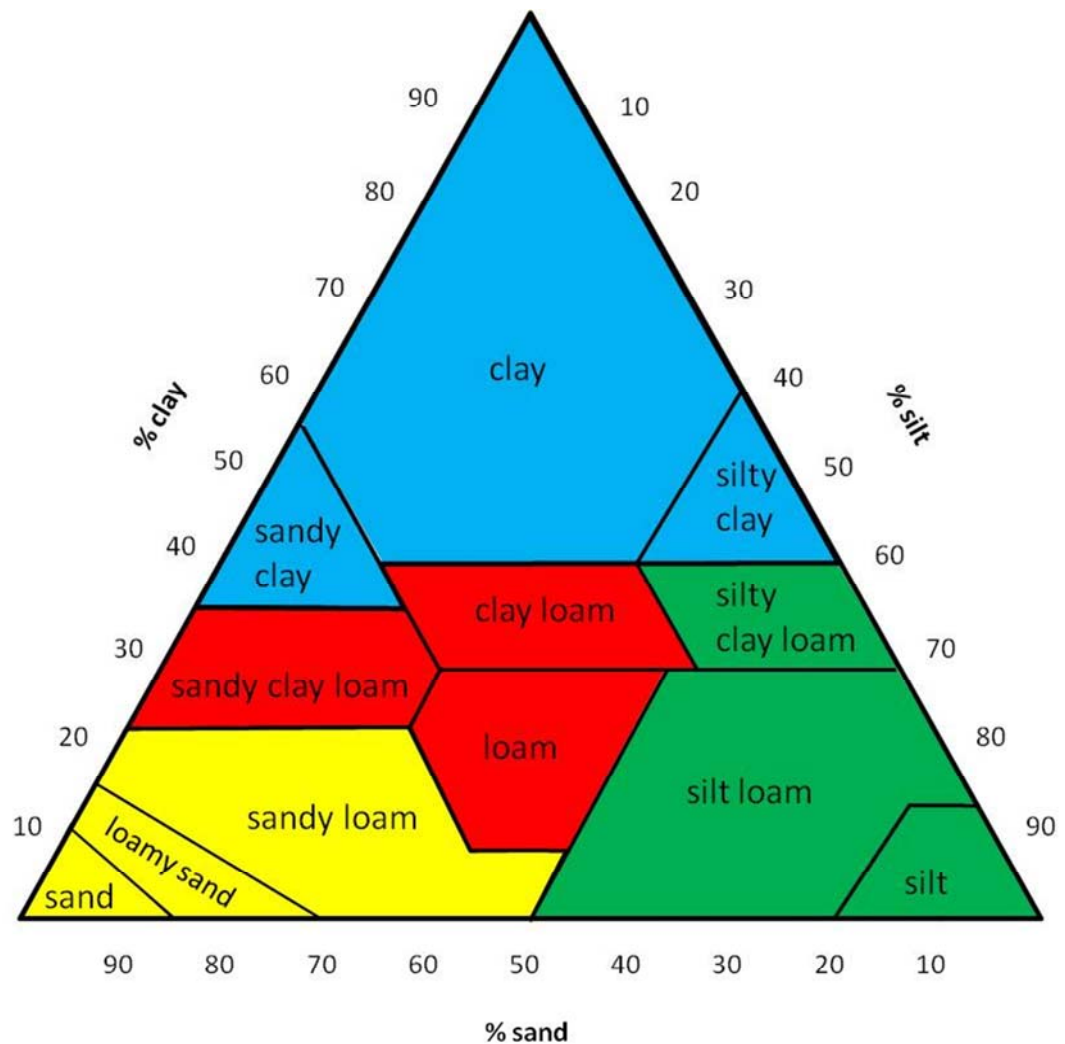


Figure 3: Grain size respectively texture triangle according to the USDA soil classification system the ThermoMap estimation is principally based on. The colouration reflects the main grain size groups sand (yellow coloured classes), loam (red coloured classes), silt (green coloured classes) and clay (blue coloured classes).

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The Work Package 4 is still running, after developing the Training manual for the coordinated analysis of geodata (D4.2) as well as the WebGIS interface technology (D4.3) the analysis and appropriate visualisation of the harmonised geodata is currently realised to be able to achieve the next project milestone (MS4: Geodata analysed).

1.3 Final results, use and potential implications with regard to socio-economic and societal aspects

The analysis of the harmonised geodata will be performed in a specially developed GIS environment (second phase of the project – Visualization / WP 4) and is facilitated by standardized methods. The resulting superficial geothermal potential will be mapped on a local scale in 14 test sites across Europe (third phase of the project – Testing / WP 5) and on a medium scale for all partner countries (Outline Map, scale 1 : 250,000).

The resulting values of the foreground parameter Heat Conductivity and all background parameters will be integrated in a specific Web Service (ThermoMap MapViewer user interface) accessible for all interested target groups via Internet.

With special regard to the general discussion about the provision of renewable and sustainable energies and the turning away from conventional energy resources, the ThermoMap project can deliver new impulses for a decentralized, sustainable and low environmental impacting energy supply of the future.

At the end, ThermoMap will provide different user-groups with an interactive information tool running in a web browser. Private users may check the superficial geothermal potential of their local environment, community planning and administration authorities may test the geothermal potential of their entire administrative unit.

Researchers participating in ThermoMap will have access to the entire geodata pool, which will be set up in Web Map Service (WMS), Web Coverage Service (WCS) and Web Feature Service (WFS).

The ThermoMap project addresses private users who for example want to build or renovate a house in a sustainable way; it also addresses community planning and administration authorities, which want to display new housing areas and want to inform about the utilisation of the superficial geothermal potential at the same time.