GeoERA

Establishing the European Geological Surveys Research Area to deliver a Geological Service for Europe

Technical review report for project RESOURCE

This report is part of a project that has received funding by the European Union's Horizon 2020 research and innovation programme under grant agreement number 731166.

INTRODUCTION

Technical review report is part of GeoERA's Monitoring and evaluation process for co-funded projects (*hereinafter: project*). The aim of a technical review is to assess the work carried out under the project over a certain period and provide recommendations. Such technical review evaluates the project reports and deliverables, the proper use of resources, the management of the project and the expected impact.

Technical review report consists of four sections, each representing one level of monitoring and/or evaluation of the project:

Level	Monitor / Reviewer	Input	Aim
1 – Monitoring of progress indicators	Monitoring and reporting officer (GeoZS)	MPPR* FPPR**	Monitoring of the effectiveness of implementation of selected projects with respect to finance, time and administration.
2 – Scientific review	Reviewers (GeoZS)	Submitted deliverables MPPR FPPR	Quality review of the deliverables and review of achieving scientific and professional goals.
3 – Review of the theme progress	Theme coordinators	MPPR FPPR	Review of achieving theme objectives.
4 – GeoERA Progress evaluation	Stakeholder Council member(s)	Sections 1 and 2 of this report Review meetings	Overall project progress and general recommendations.

*MPPR = Midterm Project Progress Report (see PI doc no 2)
**FPPR = Final Project Progress Report (see PI doc no 2)

Monitoring and evaluation process:

M0 = End of reporting period
M1 = Submitted (Final) Project progress Report (MPPR / FPPR)
M2 = 1 – Monitoring & 2 – Evaluation
M3 = 3 – Evaluation of the theme progress
M3 = (Final) Review Meeting & 4 – Progress evaluation

Each project will be reviewed twice: for first project period M1-M18 – Technical review report, and second project period M19-M36 – Final review report.
Technical review report is based on Horizon 2020 templates but adopted to GeoERA needs. Technical reviews of projects shall be carried out on a confidential basis.

GENERAL INFORMATION

ERA-NET Cofund Grant Agreement:	731166
ERA-NET Cofund acronym:	GeoERA
Call identifier:	H2020-LCE-2016-2017/H2020-LCE-2016-ERA
Project full title:	RESOURces of groundwater, harmonized at Cross-Border and Pan-European Scal
Project acronym:	RESOURCE
Project reference number:	GeoE.171.004
Project topic:	Groundwater
Project specific topic:	GW3-Harmonization of groundwater resources information at cross-border to Pan-European scale
Lead partner:	TNO Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek (The Netherlands Organisation for applied scientific research)
Project website:	http://geoera.eu/projects/resource/

☒ Technical review report
☐ Final review report

Period covered	01/07/2018 – 31/12/2019
Review meeting date	19.2.2020

Contributor:	Role:	Approved on:
Barbara Simić	Monitoring and reporting officer	01.03.2020
Maja Ilić	Monitoring and reporting officer	02.03.2020
Jure Krivic	Scientific reviewer	02.03.2020
Luka Serianz	Scientific reviewer	02.03.2020
Jasna Šinigoj	Scientific reviewer	11.03.2020
Matija Krivic	Scientific reviewer	10.03.2020
Klaus Hinsby	Theme coordinator	01.03.2020
Andree Bolduc	Stakeholder Council member	27.03.2020

1 LEVEL 1 – MONITORING OF PROGRESS INDICATORS

In this section the project is monitored "remotely" on the basis of the respective reports. This part is filled in by Monitoring and reporting officer with aim to monitor the effectiveness of implementation of the selected projects with respect to finance, time and administration, based on submited MPPR and FPPR.

	Yes	Partially (comment needed)	No
PROJECT MANAGEMENT			
Has the MPPR / FPPR report been submitted on time?	☒		☐
Have there been any changes in project partnership?	☒	See comment no.1	☐
Has the project management been performed as required?	☒		☐
Has the collaboration between partners been effective?	☒		☐
Do you identify evidence of underperforming partners, lack of commitment or change of interest of any partners?	☐ (see comment)		☒
DELIVERABLES and MILESTONES			
Have the planned deliverables for the period been submitted on time according to timeline in Project Agreement?	☐	See comment no.2	☒
Have the planned deliverables for the period been completed (from MPPR / FPPR, sheet 4)	☒		☐
Have any changes to deliverables occurred (type/ dissemination level)? (from MPPR / FPPR, sheet 4 and 5)	☒	See comment no.3	☐
Have planned milestones been achieved for the reporting period? (from MPPR / FPPR, sheet 4)	☒		☐
Have the project partnership identify any difficulties achieving any of the deliverables / milestones?	☐		☒
DEVIATIONS (from MPPR / FPPR, sheet 5)			
Has the project partnership identify any deviations that will not affect projects outputs?	☒		☐
Have any deviations occur on the project, with impact on project outputs?	☐		☒
In case of deviations, have the project adopted corrective measures?	☒		☐
DISSEMINATION, COMMUNICATION			
Has the project adopted its dissemination plan?	☐		☒

Have the planned dissemination activities been completed for the reporting period? (from MPPR / FPPR, sheet 6)	☒		☐
Have the partners' disseminated project results and information adequately?	☒		☐
Is the project following dissemination plan?	☒		☐
Is the project interacting in a satisfactory manner with other GeoERA projects?	☒		☐
Is the project interacting in a satisfactory manner with national/international bodies?	☒		☐

FINANCE			
To the best of your estimate, have the resources used been utilised for achieving the project? (according to MPPR / FPPR, sheet 9)	☒		☐
To the best of your estimate, have the resources used been in a manner consisted with the principle of economy, efficiency and effectiveness? *	☒		☐
Are there any major deviations in the budget consumptions from the financial plan? (zero consumption in M18; deviation from plan exceeding 20% in M36)	☐		☒
Are there any major deviations in the Person - Months consumptions from the plan? (zero consumption in M18; deviation from plan exceeding 20% in M36)	☐		☒
Are any budget modifications for the project needed? (from MPPR / FPPR, sheet 5)	☐		☒

***The principles of economy, efficiency and effectiveness**: refers to the standard of "good housekeeping" in spending public money effectively. Economy can be understood as minimising the costs of resources used for an activity (input), having regard to the appropriate quality and can be linked to efficiency, which is the relationship between the outputs and the resources used to produce them. Effectiveness is concerned with measuring the extent to which the objectives have been achieved and the relationship between the intended impact and the actual impact of an activity. Cost effectiveness means the relationship between project costs and outcomes, expressed as costs per unit of outcome achieved.

Comments (highlighting the project progress) / deviations / recommendations:

Comment no.1: Partner Regione Toscana TR transferred all its activities and budget to partner Regione Umbia RU. The change has no effect on the project implementation.
Comment no.2: In the first reporting period 9 deliverables were due:
8 deliverables were submitted in time
1 deliverable was postponed into the second reporting period (amendment 1)
Comment no.3: Changes to deliverables:
D1.1: postponed from M7 → M19
Deliverable 1.1 has been originally named *Annual activity reports and financial and management reports M7, M19, M31.* The deliverable was changed with amendment

1 to harmonize Project plan with GeoERA reporting requirements. The changes have no impact on the project outputs.

The RESOURCE project aims at demonstrating the potentials of the harmonization of information about Europe's groundwater resources through cross-border demonstrations projects, through harmonized characterization approaches for Karst and Chalk aquifers and through a first information product at Pan-European scale, where available data is compiled and integrated to produce a map of fresh groundwater resources of Europe.
In the first reporting period all scientific deliverables were submitted in time.
The project has not adopted the communication and dissemination plan. The comparison between planned indicators and achieved numbers is not possible. The project has so far reached more than 15.000 people, which is about the average of other GeoERA projects. The project stands out with its promotion in Washington, USA, thus expanding GeoERA reach and target audience. The project consortia identified its stakeholders in authorities and EU bodies. Also, they established Advisory board with participants representing UNESCO, GEUS and International association of hydrogeologists.
Overall financial consumption at the end of the first reporting period is 40 %, which is a bit low. According to the project plan, the majority of activities will be done in the second reporting period, consequently the financial consumption will increase. Project lead mentioned that some project partners were not as cooperative as expected. General recommendation to Project lead is to check the finalized activities and financial consumption of partners mid-year 2020. In case the project and financial status does improve until then, other solutions should be sought with active support with the aforementioned.

No challenges in achieving project outcomes are recognized, the project lead provides good support to partners with implementation of project activities.

Overall recommendation to project is to remind project partners that may not be experienced in European funds, to use the support provided to the project by the GeoZS Monitoring team and get familiar with rules and obligations that these funds require.

Overall assessment of the project:

☐ 5 - **Overachiever** (the project has achieved all objectives and goals for the period and has even exceeded expectations)

☒ 4 - **Excellent progress** (the project has fully achieved its objectives and goals for the period)

☐ 3 - **Good progress** (the project has achieved most of its objectives and goals for the period with relatively minor deviations)

☐ 2 - **Acceptable progress** (the project has achieved some of its objectives; however corrective action will be required)

☐ 1 - **Unsatisfactory progress** (the project has failed to achieve critical objectives and/or is not at all on schedule)

Summary of dissemination activities (detailed activities are annexed to this report):

Activity	Target audience	Number of people reached
Publications	Non-EU institution	>300
Publications	Scientific community	300
Events	Policy makers	>300
Events	Scientific community	697
Events	Other	30
Meetings	EU institution	218
Meetings	Non-EU institution	18
Meetings	Policy makers	20
Meetings	Scientific community	190
Media	Scientific community	>200
Media	General public	>13.000
		~15.273

Are the dissemination activities adequate? (link to GeoERA WP5)

☐ 5 - **Overachieved** (the projects dissemination activities have exceeded expectations)

☒ 4 - **Excellent** (the projects dissemination activities have fully achieved its expectations)

☐ 3 - **Good** (the projects dissemination activities are adequate; however, some additional activities are needed)

☐ 2 - **Acceptable** (the projects dissemination activities need corrective actions; additional activities are needed)

☐ 1 - **Unsatisfactory** (the project has failed to disseminate)

Cummulative financial statement:

	Person months	Total eligible costs	Reimbursement rate	GeoERA contribution	In-kind contribution
Plan	369,85	2.465.646	29,7%	732.300	1.733.356
1st period consumption	182,26	922.975	29,7%	274.124	648.851
2nd period consumtion					

2 LEVEL 2 – SCIENTIFIC REVIEW

In this section the project is reviewed ”remotely” on the basis of the respective reports. This part is filled in by reviewer with aim to review the quality of the deliverables and review of achieving scientific and professional goals. Scientific review is based on submitted deliverables and reported Impact statement in MPPR/FPPR.

Impact statement (from MPPR / FPPR, sheet 8):

The RESOURCE project aims at demonstrating the potentials of the harmonization of information about Europe’s groundwater resources through cross-border demonstrations projects, through harmonized characterization approaches for Karst and Chalk aquifers and through a first information product at Pan-European scale where available data is compiled and integrated to produce a map of the fresh groundwater resources of Europe. WP2 provides the link of the RESOURCE project with the Information Platform project and is responsible for dissemination activities. The main impact derived from the project will be that the general public and stakeholders will have access to information of groundwater resources at Pan-EU by means of the EGDI webservice. Impact is further enhanced by a dissemination strategy that is actively making use of social media, national and international conferences and reaching out to the scientific community, policy makers and regional and national stakeholder and the general public. WP3 builds on the established 3D transboundary geological structure that was inherited of previous Flemish-Dutch-German projects, but extending those with harmonized information on hydraulic properties, groundwater heads, groundwater quality and age, in strong cooperation with regional stakeholders that play an active role and provide guidance to the work process and will have access to a cross-border visualization tool. The stakeholders hope to use the provided information new transboundary groundwater management and the project provides independent information that forms the basis for such groundwater planning. WP4 establishes the first- Polish-Lithuanian hydrogeological transboundary harmonization in order to assess cross-border flow and flux patterns. The work performed includes the harmonization of available geological information and schematization, but also assess field data on cross-border surface water flow for calibration purposes. WP5 works towards a common tool for the interpretation of data time series from karst aquifers. The tool shall allow sharing a common, harmonized and up to date way of classifying karst aquifers regarding several management issues such as (i) water reserves evaluation, (ii) flow regulation and (iii) vulnerability assessment. WP6: The project is progressing towards a first harmonized pan-European assessment of the 3D structure of aquifers and the volumes of water involved. The surveys that participate in RESOURCE found a common language and developed a common tool to collect the data on the fresh groundwater resources and data collection is now underway. The result of this work will be distributed through EGDI and the general public will be able to assess volumes and depths of groundwater resources using map, virtual borehole and cross-section views. This will help to appreciate the possible role of groundwater in water supply, while making the public

community aware of the protection measures necessary for sustainable use of the resource.

Expected impact (from Project Agreement):

Groundwater is the most important resource for fresh water for human consumption, irrigation and industrial and other uses and delivers base flow to river systems with associated ecosystems. Although EU member states deliver information about their "groundwater bodies" to the EU for the Water Framework Directive, this does not yet lead to a harmonized pan-European assessment of the 3D structure of aquifers, the volumes of water involved and its quality. This predicament was also identified at the EU Working Group C on Groundwater, dedicated to the Common Implementation of the WFD and GWD, but the EC Directives offer a lot of responsibility and flexibility to its member states. However, harmonisation of geological and hydrogeological information and harmonized 3D characterization of aquitards and aquifers is a prerequisite for any transboundary groundwater management and RESOURCE strives to stimulate advanced cross-border demonstration projects that establish such a 3D cross-border harmonization, in order to eventually harmonize data and information at a Pan-European scale. To date there has been no attempt to make pan-European harmonized compilations of available groundwater and hydrogeology data. Key aim of this the approach followed under RESOURCE is to deliver stakeholder access to relevant harmonized groundwater data for sustainable and integrated management of the subsurface and integrated surface and subsurface spatial planning in accordance with EU policies. This will benefit not just the groundwater research community, but also public and private partners and public-private partnerships developing sustainable water policies and innovative water and environment solutions. Innovative and broadly applicable solutions and products for sustainable water management will support and preserve Europe's leading role in this area. We intend to deliver synchronized information that can be used for cross-boundary aquifer management and subsurface spatial planning, in areas where many subsurface activities strive for prioritization. The proposed project yield information and methods for water managers to balance the pressure of the many activities demanded and the ecosystem services that the groundwater/subsurface can provide, both at cross-border scale and EU scale. Therefore, the results will be relevant for regional authorities responsible for groundwater management in the greater cross-border area, to drinking water supply companies and to the member states governments that perform groundwater management at national and supranational level, including the definition of national strategic groundwater reserves, as in the Netherlands (Broers et al. 20157). Additionally, the EU scale maps will help member states and the commission to obtain an up to date overview of groundwater resources and special groundwater at an appropriate scale for policy development and evaluation. The project will yield considerable progress beyond the current state-of-the-art in demonstrating the merits of 3D cross-border geologic and hydraulic and chemical characterization, as such enabling groundwater managers of cross-border

regions to manage their resources with a good understanding of geological structure, groundwater flow and age patterns in order to prioritize competing uses of the subsurface and effectively protect their resources. Stakeholders will be involved in the two cross-border projects in order to support and promote cross-border discussions, decisions and policymaking, regarding subsurface resource management, exploitation and associated impacts. As such, the RESOURCE project aims to provide a strong impulse to consolidate the cooperation and communication between national/regional subsurface surveys and national and EU stakeholders that deal with groundwater management and protection. The overview of European groundwater resources that we strive to achieve (Figure 8) will yield useful information to derive information on the depletion of groundwater resources in relation to the recharge to the groundwater systems, and the well-protected deeper paleo resources that may be used as strategic reserves. This would promote a more integrated approach towards realizing national and EU societal challenges that are linked with the protection and sustainable management of EU's fresh groundwater resources, supporting the interfacing between DG's (e.g. GROW, ENER, ENV, RTD) and various policy departments.

Through the cooperation with the GeoERA Information Platform, the results will be accessible through easy-access tools for regional authorities responsible for groundwater management in the greater crossborder area, drinking water suppliers and member state governments that perform groundwater management at national and supranational level. Open access to these results will enable private companies and/or research institutions to develop new groundwater services on top of the integrated climate, groundwater-surface water models and results e.g. in public-private partnerships and competitive and collaborative environments. The work will provide improved access to downloadable hydraulic and (hydro)chemical parameters of main European aquifers and aquitards (or groundwater bodies) that can be implemented in groundwater models and coupled surface water - groundwater models at regional and EU scale, and can be applied to the assessment of trends in groundwater quantitative and chemical status based on both human health and well-being and good status objectives for groundwater dependent or associated ecosystems. At EU scale, the Pan-EU mapping effort yields an information product that visualizes the extent and importance of Europe's main aquifer systems including important characteristics such as volumes, depths of confining and permeable layers and the depth of the salt-fresh water interface. This adds considerably to the current information delivered by member states, as in practice the WFD groundwater bodies are administrative units and have been delineated and analysed in diverging ways across Europe. Often depths and volumes are not registered for the WFD. By providing a harmonized map of depth and volumes of European groundwater, together with first estimates of abstracted volumes, groundwater recharge and surface water discharge, we can make a major step forward. The maps to be provided do not intend to break up groundwater systems into administrative groundwater bodies, but rather emphasize the connectivity across borders and thus gives insight in transnational important systems. By creating the maps, we will use the experiences gained by the

cross-border demonstration projects that are part of RESOURCE. A map of the depth and volume of fresh groundwater as a principal resource of water for the EU can be considered as a basic information layer, needed for almost all attempts to manage groundwater at a scale larger than member states and to formulate policy goals for groundwater within the EU. Indirectly, the map of the depth of freshwater resources gives information about residence times of groundwater in the subsurface, which yields information about the long-term susceptibility of groundwater systems. The maps and water balance estimates also form the basis for more thorough analysis of the development of groundwater systems in time, for example in modelling Figure 8 Spatial extent of the pan-European groundwater resources map to be created under WP6. Green: participating surveys, dashed green: country covered partially through contribution of regional surveys, yellow: survey not yet contributing, grey: not a GeoERA partner. 11 studies that address global change effects on water demands or the long-term effects of groundwater contamination by diffuse agricultural use or by local industrial spills. As such, the cooperation and exchange of information with the other groundwater projects that will be funded under GeoERA, will be stimulated by organizing central Consortium Assembly meetings together with the other projects, in order to collectively exchange ideas within the whole groundwater community within the geological surveys in GeoERA

Evaluation of deliverables

Deliverables list status			
No.	Title	Status (Approve/ Reject)	Comments
D1.2	Summary reports for Advisory Board meetings	Approved	/
D2.1	First draft of Data Management Plan	Approved	See below
This deliverable provides a first version of the RESOURCE Data Management Plan. It is structured according to the guidelines of the Overall GEOERA Data Management following Horizon 2020 FAIR Data and Management Plan. Since GIP-P did not yet provide recommendations and EGDI will furtherly develop, this report could be updated in the future.			
D2.2	Definition of prioritized Information Products for the GeoERA Information Platform as input for the GIP meeting on Groundwater	Approved	/
D3.1	Report describing the criteria set for crossborder harmonisation of groundwater data	Approved	/
D4.1	Comparison and unification of methods applied in groundwater modelling in Poland and in Lithuania. Choosing and development of best methodology	Approved	/

D4.2	Integration of data in a common dataset	Approved	/
D5.1	Karst Typology in Europe: state of the art	Approved	/
D6.1	Template that can be used by all participating surveys to collect the required	Approved	/

Has the quality as a whole been achieved according the objectives? Has the project as a whole been making satisfactory progress?

☐ 5 - **Overachiever** (the project has achieved all objectives and goals for the period and has even exceeded expectations)

☒ 4 - **Excellent progress** (the project has fully achieved its objectives and goals for the period)

☐ 3 - **Good progress** (the project has achieved most of its objectives and goals for the period with relatively minor deviations)

☐ 2 - **Acceptable progress** (the project has achieved some of its objectives; however corrective action will be required)

☐ 1 - **Unsatisfactory progress** (the project has failed to achieve critical objectives and/or is not at all on schedule)

Comments (highlighting the project progress) / deviations / recommendations:

The RESOURCE project aims to at demonstrating the potentials of the harmonization of information about Europe's groundwater resources through cross-border demonstrations projects, through harmonized characterization approaches for Karst and Chalk aquifers and through a first information product at Pan-European scale where available data is compiled and integrated to produce a map of the fresh groundwater resources of Europe. The project comprises 6 work packages, from which two are coordination based (WP1 and WP2), while other 4 are technical WPs.

Most of the WPs develop specific deliverables. 5 technical and 3 coordination deliverables were subbmited and are included in scientific review. In general it can be conculded that the derivelable reports are very good, clear and follow the project agreement. Based on the rewiew of submitted reports we can estimate that the progress of the project is good.

We dont have any recommendations and therefore we approve the scientific part of the RESOURCE project.

3 LEVEL 3 – REVIEW OF THE THEME PROGRESS

In this section the project is reviewed ”remotely” on the basis of the respective reports. This part is filled in by Theme coordinator with aim to review the achieved scientific goals in accordance with theme objectives, on the basis of Sheet 3 in MPPR / FPPR – Project contribution to GeoERA project.

Project contribution to GeoERA project (from MPPR / FPPR, sheet 3):

The RESOURCE project addresses the Specific Research Topics of the call, such as addressed under GW3 (GeoERA 2017). The set of deliverables will provide good practices in providing harmonized data and information across borders for proper assessments of water volumes, fluxes and water quality at a cross-border scale, which up to now are nearly absent but are needed for successful water planning and management in Europe, especially in a transboundary setting. The Pan-EU mapping approach and the cross-border demonstration projects under RESOURCE will lead to example products of a harmonized pan-European assessment of the 3D structure of aquifers and the volumes of water involved. Harmonization of hydrogeological information and harmonized 3D characterization of aquitards and aquifers is a prerequisite for any transboundary groundwater management. The RESOURCE proposal includes the following elements of research and development that address the scope of the call:

- Two cross-border demonstration projects that set a new standard for harmonization across borders, not only for 3D geological structures but also for hydrological characteristics such as groundwater heads, fluxes and water quality; these demonstration projects should be considered as a first step towards harmonization at European scale.
- Involvement of stakeholders in the cross-border demonstration projects in order to show and evaluate how synchronized cross-border information adds value to cross-border aquifer management and promotes sustainably prioritizing of different uses of shallow and deep groundwater resources.
- A truly pan-European effort to create a consistent pan-European information product that yields a spatial overview of the volume and depth of Europe’s fresh groundwater resources, including a first estimate of total abstraction rates from the resource and the identification of deep paleo waters that may function as strategic reserves
- Creation of a common methodological framework for characterization of karst aquifers and their vulnerability, with a guidance for managing and protecting various karst aquifer types.

Theme objectives:

To provide groundwater data, information and decision support tools for the long-term protection, sustainable management and improvement in groundwater

resources across Europe, taking into account societal challenges and EU policies, based on innovative methodologies to tackle diversity of hydrogeological settings and scales (regional to pan-European). Jointly developing harmonized and effective tools and methodologies for monitoring, modelling, data management and visualization will improve the understanding of groundwater systems at regional to pan-European scales.

Cross-border, regional and pan-European examples of the most important and widely applicable data will be showcased on the Geoscience Information Platform, and may be visualized and downloaded together with e.g. data on competing interests for geo-energy and raw materials in a specific region. Importantly, GeoERA
provides the possibility of compiling and analysing geo-energy, groundwater and raw materials data in advanced 3D geological and geophysical modelling, interpretation and visualisation software. The ambition is to provide data and tools for the development of a globally leading groundwater information platform.

The flagship product of RESOURCE is the pan European groundwater resources map with information on depth, volume, salinity, age and hydraulic parameters in 10 x 10 km grids.

Has the project as a whole achieved the objectives and expected impact of the theme?

☐ 5 - **Overachiever** (the project has achieved greater impact on project theme and/or other themes than expected)

☐ 4 - **Excellent progress** (the project has fully achieved its objectives and goals towards the theme as expected)

☒ 3 - **Good progress** (the project has achieved most of its impact towards the theme for the period with relatively minor deviations)

☐ 2 - **Acceptable progress** (the project has minor impact; corrective action will be required)

☐ 1 - **Unsatisfactory progress** (the project has failed to achieve critical objectives and/or is not at all on schedule and/or has no impact on the theme; corrective actions are required)

Comments / deviations / recommendations:

With 32 funded and three non-funded partners RESOURCE is the largest project in terms of the involved number of scientists. The development of the Pan European groundwater resources map in WP6 involves all partners and it is the largest and most work intensive WP in the GeoERA groundwater projects. Hence, it does face some challenges both because of partners with little resources (some with only one or two

working weeks) and because of challenges simplifying and harmonizing the very diverse geology of Europe. Locally significant simplifications of the geology for the 10 x 10 km grid is required. However, the project makes good progress, and strong efforts are generally made by all the involved partners. A few partners are not pro-active but recent progress has been made also on this issue e.g. by inviting them for an additional update meeting. Considering low budgets of some of the partners the general progress is good.

The WPs of RESOURCE progresses as planned and no serious issues are expected during the last part of the project. It seems that GeoERA partners that are not involved and funded in WP5 will provide additional information for the Karst and Chalk map of Europe. Hence, RESOURCE stimulate additional work outside of the funded partner group on specific WPs.

4 LEVEL 4 – GEOERA PROGRESS EVALUATION

In this section the project is reviewed on the Review meetings, where projects present their overall progress and achievements. This section relates to particular project, broader impact of GeoERA as a whole on policies will be covered at the Final Review meeting with questionnaire and interview with Evaluator.

Based on technical review summaries provided by Sections 1 – 3 of this report, and project presentation on the (Final) Review meeting:

Has the project as a whole been making satisfactory progress according to your own understanding and expectations of the GeoERA project?

☐ 5 - **Overachiever** (the project has exceeded expectations)

☒ 4 - **Excellent progress** (as expected)

☐ 3 - **Good progress** (minor recommendations given below)

☐ 2 - **Acceptable progress** (below expectations; minor corrective action will be required)

☐ 1 - **Unsatisfactory progress** (the project has failed; corrective actions are required)

Overall comments for the project (overall recommendations, modifications, corrective actions, or re-tuning the objectives to optimize the impact or keep up with the State of the Art, re-focusing, or a simple praise)

This project's hidden objective is to answer the simple question, but requiring a complex answer: How much water is there in Europe? Having so many jurisdictions and partners is challenging, yet the project is making good progress. As mentioned during the review meeting, the IGRAC special volume on transboundary aquifers may provide some guidance, especially for policy issues. I also encourage taking a look at the Milk River Groundwater Atlas (a transboundary aquifer Canada-US): (https://geoscan.nrcan.gc.ca/starweb/geoscan/servlet.starweb?path=geoscan/downloade.web&search1=R=302719))

As with all transboundary projects, the vertical datum must be the same.

Of note, this publication :

https://geoscan.nrcan.gc.ca/starweb/geoscan/servlet.starweb?path=geoscan/downloade.web&search1=R=306555 is a collection of presentation from the GSC Groundwater Program, one of them specifically deals with preparing data for open access (Données du programme des eaux souterraines accessibles via la Plateforme Géospatiale Fédérale (PGF), données et cartes ouvertes / Groundwater program data accessible to the Federal Geospatial Platform (FGP), Open Data and Open Map)

Good job!

Annex 1: Review meeting list of participants

Name	Role	Organisation
Tessa Witteman	GeoERA coordinator	Netherlands Organisation for Applied Scientific Research
Barbara Simić	Monitoring and Reporting Officer	Geological Survey of Slovenia
Jasna Šinigoj	Scientific Reviewer	Geological Survey of Slovenia
Luka Serianz	Scientific Reviewer	Geological Survey of Slovenia
Klaus Hinsby	Groundwater Theme coordinator	Geological Survey of Denmark and Greenland
Andrée Buldoc	Stakeholder council member	Geological Survey of Canada
Hans-Peter Broers	Project manager	Netherlands Organisation for Applied Scientific Research
Cis Slenter	Project member	Flanders Environment Agency
Tomasz Gidzinski	Project member	Polish Geological Insitute
Jean-Christophe Marechal	Project member	The French Geological Survey
Tano Kivits	Project member	Netherlands Organisation for Applied Scientific Research
Koen Beerten	Project member	Belgian Nuclear Research Centre SCK•CEN

Annex 2: Communication and dissemination activities

Please select activity	Subcategory	Type of activity	Location	Date	Target audience	Number of people reached	Short name of project participant	Author(s)	Link (if applicable)
MEETINGS	Meeting with other GeoERA projects	GeoERA Kick-off	Brussels	03.07.2018	EU INSTITUTION	200	TNO	H.P. Broers	
EVENTS	WORKSHOP	WP3 workshop	Utrecht	27.09.2018	SCIENTIFIC COMMUNITY	15	VMM	G. Heuvelmans	
EVENTS	WORKSHOP	WP6 workshop	Vienna	11.10.2018	SCIENTIFIC COMMUNITY	35	TNO	T. Kivits	
EVENTS	WORKSHOP	WP5 kick off	Madrid	21.11.2018	SCIENTIFIC COMMUNITY	20	BRGM	J.C. Marechal	
EVENTS	WORKSHOP	WP3 scientific progress meeting	Antwerp	15.02.2019	SCIENTIFIC COMMUNITY	12	VMM	G. Heuvelmans	
MEETINGS	Internal project meeting	Project Board meeting	Budapest	20.02.2019	SCIENTIFIC COMMUNITY	10	TNO	H.P. Broers	
EVENTS	WORKSHOP	WP6 workshop	Budapest	21.02.2019	SCIENTIFIC COMMUNITY	25	TNO	T. Kivits	
EVENTS	WORKSHOP	WP3technical meeting	Mol	16.05.2018	SCIENTIFIC COMMUNITY	10	VMM	C. Slenters	
MEETINGS	Meeting with international body	WP3 stakeholder workshop	Maastricht	17.06.2019	NON-EU INSTITUTION (national, regional, local)	18	VMM	G. Heuvelmans	
MEETINGS	Internal project meeting	RESOURCE Project Assembly	Zagreb	19.11.2019	SCIENTIFIC COMMUNITY	40	TNO	H.P. Broers	
EVENTS	WORKSHOP	WP5 progress workshop	Zagreb	20.11.2019	SCIENTIFIC COMMUNITY	20	BRGM	J.C. Marechal	

EVENTS	WORKSHOP	WP6 progress meeting	Zagreb	21.11.2019	SCIENTIFIC COMMUNITY	35	TNO	T. Kivits	
EVENTS	WORKSHOP	WP3 progess meeting	Utrecht	08.11.2019	SCIENTIFIC COMMUNITY	15	VMM	C. Slenters	
MEETINGS	Meeting with other GeoERA projects	Groundwater PB meeting	virtual	02.12.2019	SCIENTIFIC COMMUNITY	7	GEUS	K. Hinsby	
MEETINGS	Meeting with other GeoERA projects	Groundwater PB meeting	virtual	12.12.2019	SCIENTIFIC COMMUNITY	7	GEUS	K. Hinsby	
MEETINGS	Meeting with other GeoERA projects	GIP - RESOURCE meeting	virtual	08.10.2019	SCIENTIFIC COMMUNITY	7	GEUS	K. Hinsby	
MEETINGS	Internal project meeting	WP4 progress meeting	Sidorowska	16.10.2018	SCIENTIFIC COMMUNITY	8	PIG	T. Gidzinski	
MEETINGS	Internal project meeting	WP4 progress meeting	Warsaw	30.05.2019	SCIENTIFIC COMMUNITY	6	PIG	T. Gidzinski	
MEDIA	ONLINE MEDIA	LinkedIn posts (personal profile)	virtual	continuous	GENERAL PUBLIC	>5000	GEUS	K. Hinsby	
MEDIA	ONLINE MEDIA	Twitter posts (personal profile)	virtual	continuous	GENERAL PUBLIC	> 5000	GEUS	K. Hinsby	
MEDIA	ONLINE MEDIA	Facebook blogs (GeoERA Groundwater group)	virtual	continuous	GENERAL PUBLIC	> 3000	GEUS	K. Hinsby	https://www.facebook.com/Geoera-Groundwater-48622 3845208811/

Annex 2: Communication and dissemination activities

EVENTS	CONGRESS	Poster International Karst School	Postojna	17.06.2019	OTHER (customers)	30	HGI	#	
EVENTS	CONGRESS	IAH Conference	Malaga	22.09.2019	SCIENTIFIC COMMUNITY	>100	IGME	#	
MEDIA	ONLINE MEDIA	Research gate	virtual	continuous	SCIENTIFIC COMMUNITY	>100	GEUS	K. Hinsby	https://www.researchgate.net/ project/CHAKA-Project-Typology -of-karst-and-chalk-aquifers-and -recommendations-for-their-management
MEDIA	ONLINE MEDIA	Research gate	virtual	continuous	SCIENTIFIC COMMUNITY	>100	TNO	H.P. Broers	https://www.researchgate.net/ project/GeoERA-RESOURCE-RESOURces-of-groundwater-harmonized-at-Cross-Border -and-Pan-European-Scale
MEETINGS	Meeting with international body	EU CIS Working Group	Helsinki	14.10.2019	EU INSTITUTION	80	GEUS	K. Hinsby	
MEDIA	ONLINE MEDIA	RESOURCE webpage	virtual	continuous	GENERAL PUBLIC	>100	GEUS	K. Hinsby	https://geoera.eu/projects/resource9/
MEETINGS	Meeting with international body	Poster at Stakeholder meeting	Maastricht	17.06.2019	POLICY MAKERS	20	TNO	R. Vernes	
MEDIA	ONLINE MEDIA	Wordpress blog	virtual	continuous	GENERAL PUBLIC	>10.000	GEUS	K. Hinsby	https://geoera-groundwater.com

Annex 2: Communication and dissemination activities

PUBLICATIONS	ABSTRACTS	Poster at EGU	Vienna	07.04.2019	SCIENTIFIC COMMUNITY	>100	GEUS	K. Hinsby	https://meetingorganizer.copernicus.org/EGU2019/EGU2019-18215.pdf
EVENTS	CONGRESS	Oral presentation	Geneva	29.04.2019	POLICY MAKERS	>300	GEUS	K. Hinsby	https://www.unece.org/fileadmin/DAM/energy/se/pp/unfc_egrm/egrm.10_apr2019/egrm_02.05.2019/21_Hinsby_EGS_WREG.pdf
PUBLICATIONS	ABSTRACTS	Oral presentation AGU Fall meeting	Washington	10.12.2018	SCIENTIFIC COMMUNITY	200	TNO	H.P. Broers	https://ui.adsabs.harvard.edu/abs/2018AGUFM.H11G..08B/abstract
EVENTS	CONGRESS	Oral presentation LUWQ'2019	Aarhus	03.06.2019	SCIENTIFIC COMMUNITY	250	TNO	M. vaan Vliet	Land Use and Water Quality 2019 Aarhus,https://www.luwq2019.dk/
EVENTS	CONGRESS	Oral presentation LUWQ'2019	Aarhus	03.06.2019	SCIENTIFIC COMMUNITY	250	TNO	T. Kivits	Land Use and Water Quality 2019 Aarhus,https://www.luwq2019.dk/
MEETINGS	Internal project meeting	Water balance meeting	Duisburg	08.12.2019	SCIENTIFIC COMMUNITY	10	TNO	J. Buma	
PUBLICATIONS	ABSTRACTS	Oral presentation at NGWM2020	Oslo, no	08.01.2020	SCIENTIFIC COMMUNITY	> 100	GEUS	K. Hinsby et al	https://www.geologi.no/images/NGWM20/Abstract volume_NGWM20.pdf
PUBLICATIONS	ABSTRACTS	Oral Presentation at "Hydrologidagen"	Odense, dk	22.10.2019	NON-EU INSTITUTION (national, regional, local)	> 100	GEUS	K. Hinsby	http://hydrologidag.dk/media/21533/joergen-tulstrup

									-geus-introduktion-til-faelles -europaeisk-geologisk-informationsplatform.pdf
PUBLICATIONS	ABSTRACTS	Oral presentation at "the Groundwater days"	Lund, se	24.10.2019	NON-EU INSTITUTION (national, regional, local)	> 200	GEUS	K. Hinsby et al	https://www.slideshare.net/SGU_Sverige/klaus-hinsbythegeo-eraprogramfocusingongroundwaterprojects
MEETINGS	CONGRESS	Poster at EU meeting on 3D Geological Modelling	Bern	22.05.2019	SCIENTIFIC COMMUNITY	100	TNO	R. Vernes	https://www.swisstopo.admin.ch › events › 228_1557323535243.download
MEETINGS	Internal project meeting	Field tests cross-border region	Poland-Lithuania	01.08.2019	SCIENTIFIC COMMUNITY	5	PIG	T.Gidzinski	