GeoERA RESOURCE GROUNDWATER

Resources of groundwater, harmonized at Cross-Border and Pan-European Scale

Deliverable 4.1

Template that can be used by all participating surveys to collect the required data

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SUMMARY

This document is the deliverable for task 4.1 of work package 4 (TRANSFLUX: Harmonization of data, monitoring and modelling in a transboundary setting) of the RESOURCE project. It presents the comparative tables of data review, that can deem to be usable for groundwater hydrodynamic numerical modelling purposes in cross-border areas. Tables were prepared by all participating institutions in the WP4 (PIG-PIB, LGT and GIU - Geoinform of Ukraine). This template is used under task 4.1 (Comparison and unification of methods for groundwater modelling in Poland and Lithuania).

In this document the general idea behind the template is explained, as well as the thought of some of the choices that were made based on the WP4 TRANSFLUX Polish-Lithuanian working meeting in Sidorówka (Poland) on 16-10-2018.

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1 INTRODUCTION

The general idea behind the RECOURCE WP4 project is to develop a numerical hydrodynamic model for the Lithuanian-Polish cross-border area, that will cover the Quaternary multi-aquifer system for selected parts of the transboundary river basins. The project has two fundamental research goals: the verification and determination of the transboundary groundwater flow directions in the cross-border area and the estimation of the volume of groundwater, which flows through the state border between Poland and Lithuania. This research is directed on the identification and harmonization of the hydrogeological system, integrating the information through a numerical model in order to examine the groundwater regime in the area covering the eastern border area of Poland and the western boundary zone of Lithuania. The main crucial part of the project, which focuses on the numerical model development was preceded by the comparison of the scope of data, which are available in each institution involved in the WP4 and could be used for hydrodynamic modelling purposes for cross-border areas. To be able to get this information from all RESOURCE WP4 partners a template of comparative tables has been made. The template of comparative table in a doc. file, in which each row indicates the scope of specific inforamtion important from the point of view of the issue being into consideration. Each participant of WP4 RESOURCE filled necessary information and provided filled tables. Some information need further clarification in detail among involved cooperators, as well as need to be standardized or adjust for the transboundary use.

During our joint working meeting with representatives from LGT (Lithuanian Geological Survey), which was held in October 16th 2018 in Sidorówka (Poland) was presented proposal of GIS layers with boundary conditions for the modelling area, covering the Lithuanian-Polish cross-border zone. Discussions included the boundary conditions, proposed for modelling purposes and issues related to the transboundary spatial extent of particular model layers. Numerical model will probably be developed in Groundwater Vistas software. The meeting also was a good opportunity to compare existing numerical models, that were already accomplished in Poland and in Lithuania. For the area of the GWB No. 22, which is located in the Polish border zone with Lithuania, it was elaborated numerical model of the groundwater filtration.

2 COMPARATIVE TABLES

The comparative tables allow us to realize the similarities, as well as obstacles in common work aimed at development of numerical hydrodynamic models, which will cover cross-border areas in this part of Europe. Comparison of information about available data is a first step into harmonization process in the initial stage of the project and can contribute to choose best practices and solutions for dealing with problems in the common work in WP4.

2.1 Table 1. Data of PGI for cross-border groundwater numerical modelling purposes (PL-LT)

Type of data	Format/scale/ units	Availability	Directly useful/ need to be converted or adjust	Comments
Depth of the top of aquifer [m]	.pdf (profiles), .xls files	+	Directly useful	Data are available in database of the Polish Geological Institute-National Research Institute
Top of aquifer [m a.s.l]	.pdf (profiles), .xls files, numerical model of GWB No. 22	+	Directly useful	Data are available in database of the Polish Geological Institute-National Research Institute. For GWB No. 22 was developed hydrodynamic numerical model
Depth of the bottom of aquifer [m]	.pdf (profiles), .xls files	+	Directly useful	Data are available in database of the Polish Geological Institute-National Research Institute
Bottom of aquifer [m a.s.l]	.pdf (profiles), .xls files, numerical model of GWB No. 22	+	Directly useful	Data are available in database of the Polish Geological Institute-National Research Institute. For GWB No. 22 was developed hydrodynamic numerical model

Type of data	Format/scale/ units	Availability	Directly useful/ need to be converted or adjust	Comments
Thickness of aquifer [m]	.pdf (profiles), .xls files, numerical model of GWB No. 22	+	Need to be adjusted	GIS layers should be harmonized and merged in the Polish-Lithuanian cross-border zone
Depth of groundwater level [m]	.pdf (profiles), .xls files	+	Directly useful	Data are available in database of the Polish Geological Institute-National Research Institute
Groundwater level [m a.s.l]	.pdf (profiles), .xls files, numerical model of GWB No. 22	+	Need to be adjusted	For GWB No. 22 was developed hydrodynamic numerical model. Groundwater level contour maps should be harmonized and merged in the Polish-Lithuanian cross-border zone
Depth of the top of aquitard [m]	.pdf (profiles)	+	Need to be adjusted	
Top of aquitard [m a.s.l]	.pdf (profiles), numerical model of GWB No. 22	+	Need to be adjusted	For GWB No. 22 was developed hydrodynamic numerical model. GIS layers should be harmonized and merged in the Polish-Lithuanian cross-border zone

Type of data	Format/scale/ units	Availability	Directly useful/ need to be converted or adjust	Comments
Depth of the bottom of aquitard [m]	.pdf (profiles)	+	Need to be adjusted	
Bottom of aquitard [m a.s.l]	.pdf (profiles), numerical model of GWB No. 22	+	Need to be adjusted	For GWB No. 22 was developed hydrodynamic numerical model.
Thickness of aquitard [m]	.pdf (profiles), numerical model of GWB No. 22	-	Need to be adjusted	For GWB No. 22 was developed hydrodynamic numerical model. GIS layers should be harmonized and merged in the Polish-Lithuanian cross-border zone
Spatial extent/ transboundary connection	Numerical model of GWB No. 22; .shp files	-	Need to be adjusted	Transboundary connections should be determined
k coefficient	Information in .pdf [m/24h]			
GIS or model layers	Numerical model of GWB No. 22	+	Need to be adjusted	Transboundary connections should be determined. GIS layers should be harmonized and merged in the Polish-Lithuanian cross-border zone

Type of data	Format/scale/ units	Availability	Directly useful/ need to be converted or adjust	Comments
Water level in river or lake [m a.s.l]	Archive data in atlases		Need to be adjusted	Data of Institute of Meteorology and Water Management
Ground surface elevation [m a.s.l]	.grd files	+	+	Digital Terrain Model – suitable for regional hydrodynamic model
Water abstraction in groundwater intakes		-	-	Detailed data need to be collected or updated during field investigations
Surface deposits (distribution)	Maps of Quaternary sediments in Poland 1: 50 000 (raster, partly vector maps); .shp or .jpg files		Need to be adjusted	
Type of land use	Layers of Corine Land Cover-CLC2012, digital	+	Directly useful	
Hydrogeological maps; groundwater level (hydroizohypses) contour maps	Numerical model of GWB No. 22; .shp	+	Need to be converted	For GWB No. 22 was developed hydrodynamic numerical model. Groundwater level contour maps should be harmonized and

Type of data	Format/scale/ units	Availability	Directly useful/ need to be converted or adjust	Comments
				merged in the Polish-Lithuanian cross-border zone
Hydrological maps	Archival maps and data	-	-	Data of the Institute of Meteorology and Water Management

2.2 Table 2. Data of LGT for cross-border groundwater numerical modelling purposes (LT-PL)

Type of data	Format/scale/ units	Availability	Directly useful/ need to be converted or adjust	Comments
Depth of the top of aquifer [m]	.shape, grid	+	Directly useful	
Top of aquifer [m a.s.l]	.shape, grid	+	Directly useful	
Depth of the bottom of aquifer [m]	.shape, grid	+	Directly useful	
Bottom of aquifer [m a.s.l]	.shape, grid	+	Directly useful	
Thickness of aquifer [m]	.shape, grid	+	Directly useful	
Depth of groundwater level [m]	.shape, isolines	+	Need to be converted	
Groundwater level [m a.s.l]	.shape, isolines	+	Need to be converted	Local extent

Type of data	Format/scale/ units	Availability	Directly useful/ need to be converted or adjust	Comments
Depth of the top of aquitard [m]	.shape, grid	+	Need to be adjusted	
Top of aquitard [m a.s.l]	.shape, grid	+	Need to be adjusted	
Depth of the bottom of aquitard [m]	.shape, grid	+	Need to be adjusted	
Bottom of aquitard [m a.s.l]	.shape, grid	+	Need to be adjusted	
Thickness of aquitard [m]	.shape, grid	+	Need to be adjusted	
Spatial extent/ transboundary connection				
k coefficient	tab., LKS-94 coordinates, digital	+	Need to be converted	Local extent
GIS or model layers	-	-	-	

Type of data	Format/scale/ units	Availability	Directly useful/ need to be converted or adjust	Comments
Water level in river or lake [m a.s.l]	.shape, grid	+	Directly useful	
Ground surface elevation [m a.s.l]	.shape, grid	+	Directly useful	
Groundwater abstraction	LGS database, .xls	+	Need to be adjusted	
Surface deposits (distribution)	tab., LKS-94 coordinates, digital	+	Need to be converted	
Type of land use	Layers of Corine Land Cover-CLC2012, digital	+	Directly useful	
Hydrogeological maps; groundwater level (hydroizohypses) contour maps	.shape, WGS-84 geographic coordination, isolines	+	Need to be converted	Local extent
Hydrological maps	xls. files	-	Need to be adjusted	Data of Lithuanian hydrometeorological service

2.3 Table 3. Data of Geoinform for cross-border groundwater numerical modelling purposes (assessing data availability of Ukraine using PGI template)

Type of data	Format/scale/ units	Availability	Directly useful/ need to be converted or adjust	Comments
Depth of the top of aquifer [m]	.pdf (profiles), .xls files	+	Directly useful	Data are available in database of GEOINFORM
Top of aquifer [m a.s.l]	.pdf (profiles), .xls files	+	In some cases need to be calculated by subtraction the depth of the top of aquifer from surface level	Data are available in database of GEOINFORM
Depth of the bottom of aquifer [m]	.pdf (profiles), .xls files	+	Directly useful	Data are available in database of GEOINFORM
Bottom of aquifer [m a.s.l]	.pdf (profiles), .xls files	+	In some cases need to be calculated by subtraction the depth of the bottom of aquifer from surface level	Data are available in database of GEOINFORM
Thickness of aquifer [m]	.pdf (profiles), .xls files	+	Directly useful	Data are available in database of GEOINFORM
Depth of groundwater level [m]	.pdf (profiles), .xls files	+	Directly useful	Data are available in database of GEOINFORM
Groundwater level [m a.s.l]	.pdf (profiles), .xls files	+	Can be obtained by subtraction the depth to groundwater level from surface level in case of incomplete coverage	Data are available in database of GEOINFORM
Depth of the top of aquitard [m]	.pdf (profiles)	+	Directly useful	Data are available in database of GEOINFORM
Top of aquitard [m a.s.l]	.pdf (profiles)	+	Can be obtained by subtraction the depth to the top of aquitard from surface level a in case of incomplete coverage	Data are available in database of GEOINFORM
Depth of the bottom of aquitard [m]	.pdf (profiles)	+	Directly useful	Data are available in database of GEOINFORM

Bottom of aquitard [m a.s.l]	.pdf (profiles)	+	Can be obtained by subtraction the depth to the bottom of aquitard from surface level a in case of incomplete coverage	Data are available in database of GEOINFORM
Thickness of aquitard [m]	.pdf (profiles)	+	Directly useful	Data are available in database of GEOINFORM
Spatial extent/ transboundary connection		-		No information on groundwater body
k coefficient	.pdf (profiles) [m/24h]	+	In case of incomplete coverage and a lack of data (should be checked for certain aquifer) need to be extrapolated	Data are available in database of GEOINFORM
GIS or model layers		-		Could be developed with GIS
Water level in river or lake [m a.s.l]		-	Need to be adjusted	Data of Hydrometeorological Institute of Ukraine but can be adopted
Ground surface elevation [m a.s.l]	.grd files	-	Not in .grd extension – need to be converted	Available DEM could be adopted
Water abstraction in groundwater intakes	xls files	+	Directly useful	Data are available in database of GEOINFORM
Surface deposits (distribution)	Maps of Superficial deposits in Ukraine 1: 200 000 (raster, partly vector maps); .shp or .jpg files	+	Need to be digitized and converted from printed, partly vector maps into .shp or ipg format	Data are available in Funds of GEOINFORM
Hydrogeological maps; groundwater level (hydroizohypses) contour maps	In form of printed archival maps	+	Need to be converted	Data are available in Funds of GEOINFORM
Hydrological maps	Archival maps and data	-	-	Belong to Water Agency of Ukraine

Information about data, which were prepared and provided by the Geoinform of Ukraine can be useful for hydrogeological modelling purposes for transboundary areas e.g. in the Ukrainian-Polish cross-border zone, for both: conceptual and numerical models.