



Knowledge Inventory for hydrogeology research



KINDRA workshop for Belgium and Luxembourg

KHI1

A Harmonised Research Classification System (HRC-SYS) for groundwater and hydrogeology research

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KINDRA Harmonised Terminology and Methodology for Groundwater Research Classification



KINDRA DELIVERABLE D1.2

HARMONIZED TERMINOLOGY AND METHODOLOGY FOR GROUNDWATER RESEARCH CLASSIFICATION

Diapositive 1

KHI1 see comments in the slide comments field below
Hinsby, Klaus; 15-09-15

How to classify groundwater research?



Extract from summary

The present document details the final terminology and classification methodology on groundwater R&D results and activities with keywords derived from EU directives and 20 scientific journals publishing groundwater research with high impact factors.

Ch3: Selection of keywords for classification

Main sources for keywords selection:

1. 20 key groundwater science journals
2. Scopus / Web of Science / Google Scholar
3. EU policy documents (Water Framework and Groundwater directives, Blueprint to Safeguard Europe's Water Resources)

Ch3: Selection of keywords for classification

(based on keywords from journals, WFD, GWD and Blueprint to safeguard European Water Resources):

Table 5.2: List of keywords from Scientific Journals and their grouping.

TOPICS		THEMES		ACTIVITIES	
GW bodies		Agriculture	1308	Quality assessment	
Alluvium aquifers	58	Climate		Laboratory experiments	1377
Aquifer	6462	Arid regions	898	Hydrochemistry	468
Aquitard	192	Climate change	4529	Vulnerability mapping	173
Carbonate rocks	321	Hydrologic cycle	320	Monitoring	
Artesian waters	66	Infiltration	2425	Groundwater monitoring	1455
Flow regime	1264	Health		Modeling	
Crystalline rocks	225	Drinking water	2538	Analytical solutions	1127
Fracture rocks	793	Urban areas		Hydrochemical modeling	250
Geomorphology	320	Artificial recharge	241	Numerical modeling	3655
Groundwater	9741	Developing countries	498	Scale effects	2972
Groundwater flow	5101	Groundwater recharge	2384	Conceptual models	
Heterogeneity	1843	Landfills	445	GW budget	1392
Hydraulic properties	1534	Urban groundwater	449	Assessment	5994
Island hydrology	76	Waste disposal	398	Water budget	941
Karst	761	Water supply	2269	Policy	
Paleohydrology	27	Yield	3284	Groundwater management	1863
Permeability	1661	Mining		Legislation	170
Saturation	1368	Compaction	183	Organizations	487
Volcanic aquifer	126	Subsidence	228		
Vulnerability/protection		Ecology			
Aquifer vulnerability	297		547		
Groundwater protection	346				

Ch3. Selection of keywords - Web of science assessment of most popular groundwater reseach topics:

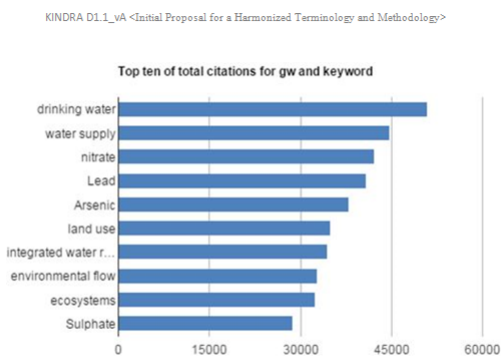


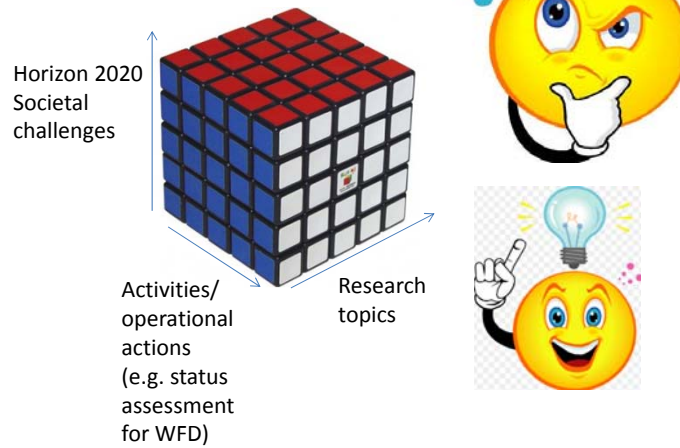
Figure 3.3.2: Top ten of keywords sorted by total citations for TS=groundwater and keyword.

Ch3: Merged and grouped list of selected keywords

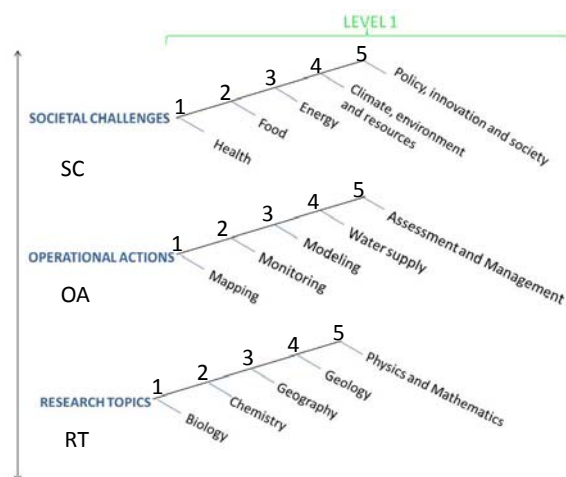
Grouping of >200 keywords selected from peer reviewed journals and EU policy documents:

Research Topics				
LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	
Biology	Ecosystem	Aquatic ecosystem	Stygofauna	
		Terrestrial ecosystem	Wetland	
		Dependent ecosystem	Wetland	
	Ecology	Ecohydrology	e-flow OR ecological flow OR environmental flow	
	Ecotoxicology	Human toxicology	Status	Microbial processes
Human health			Biological status	
Chemistry	Geochemistry	Natural background or Pollution	Contamination	
			Nitrate	
			Ammonium	
			Arsenic	
			Cadmium	
			Chloride	
			Lead OR Pb	
			Radon	
			Mercury	
			Sulphate or Sulfate	
			Metals OR "Heavy metals"	
			Pesticide	
			Pharmaceutical	
			Emerging contaminants	
			Chlorinated Hydrocarbons	
			Tetrachloroethylene OR Perchloroethylene OR PCE	
			Trichloroanisole OR TCA	
Trichloroethylene Or TCE				
Deterioration				

How to classify groundwater research (in Europe)?



Definition of main categories for groundwater research classification

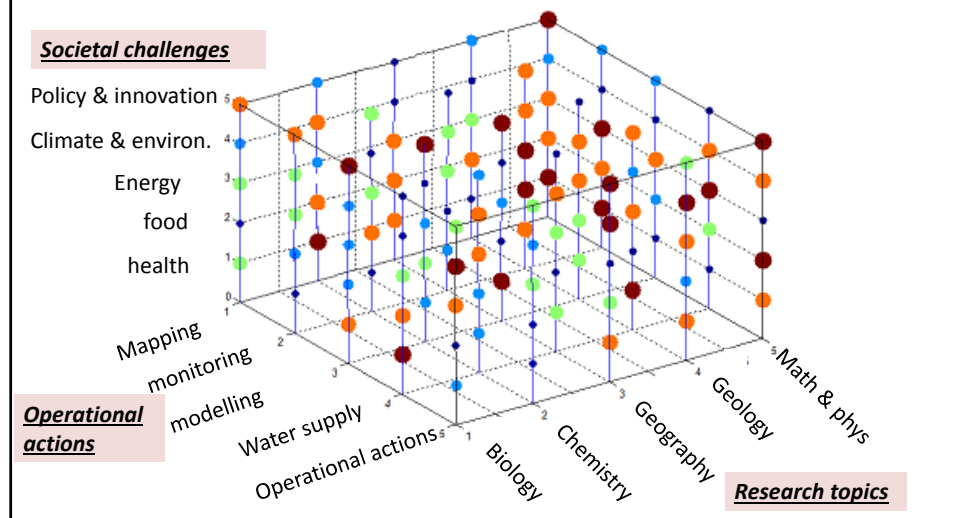


Main categories in HRC-SYS

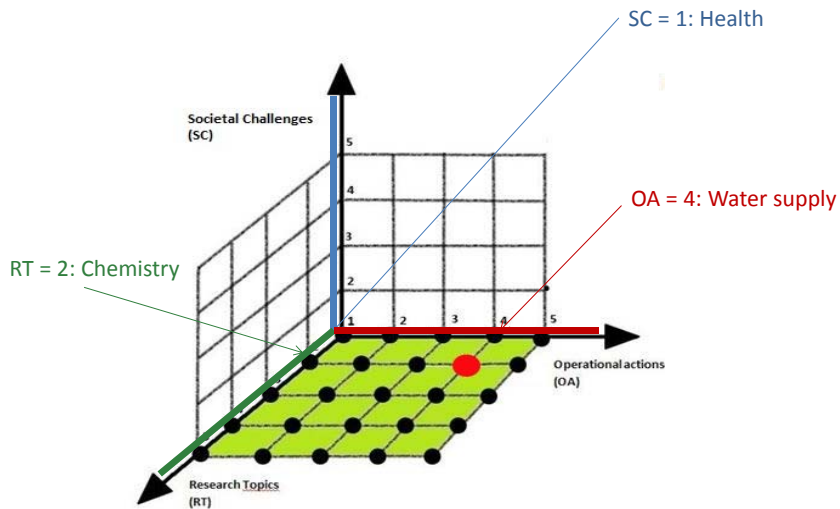
Table 2.1 The overarching groups, for an easy overview of the main research dimensions:

Societal Challenges	Operational Actions	Research Topics
1. Health 2. Food 3. Energy 4. Climate, environment and resources 5. Policy, innovation and society	1. Mapping 2. Monitoring 3. Modelling 4. Water supply 5. Assessment and Management	1. Biology 2. Chemistry 3. Geography 4. Geology 5. Physics and Mathematics

3D conceptual illustration of main categories of groundwater research classification and scientific output

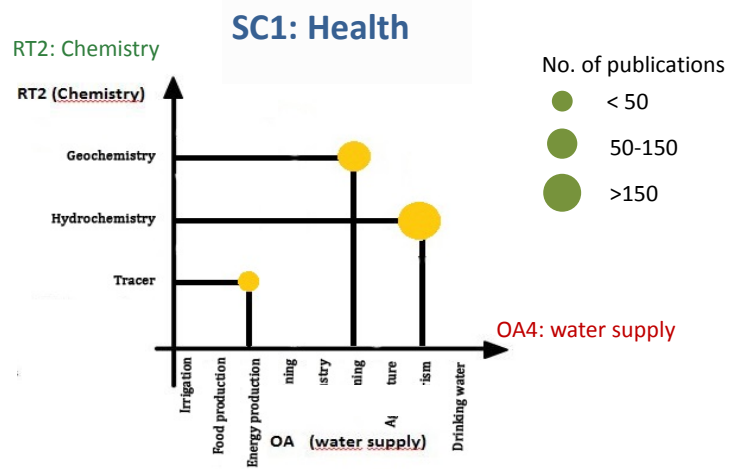


Example: 2D PLOT FOR SC1: HEALTH



Allowing future plots for the analysis of research activity

example: health – chemistry – water supply






Project partners










including:

- A Joint Panel of Experts (10 members)
- 20 third parties (associations acting as national members of EFG network)



The KINDRA project EIGR can be accessed by registered users at:

<http://kindra.kindraproject.eu/geonetwork/srv/eng/main.home>

Thank You 😊

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