KINDRA

Knowledge Inventory for hydrogeology research

KHI1

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

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Slide 1

KHI1   see comments in the slide comments field below
Hinsby, Klaus, 15/09/2015

KINDRA DELIVERABLE D1.2

HARMONIZED TERMINOLOGY AND METHODOLOGY FOR GROUNDWATER RESEARCH CLASSIFICATION

How to classify groundwater research?

Keywords

Research topics

Societal challenges

EU policies

Actions

Other ????

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.

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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*	2665	*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*	1392
Heterogeneity	1843	Landfills	445	*GW budget*	
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*	1521	Legislation	170
Saturation	1368	Compaction	183	Organizations	487
Volcanic aquifer	126	Subsidence	228		
Vulnerability/protection		*Ecology*	547		
Aquifer vulnerability	297				
Groundwater protection	346				

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

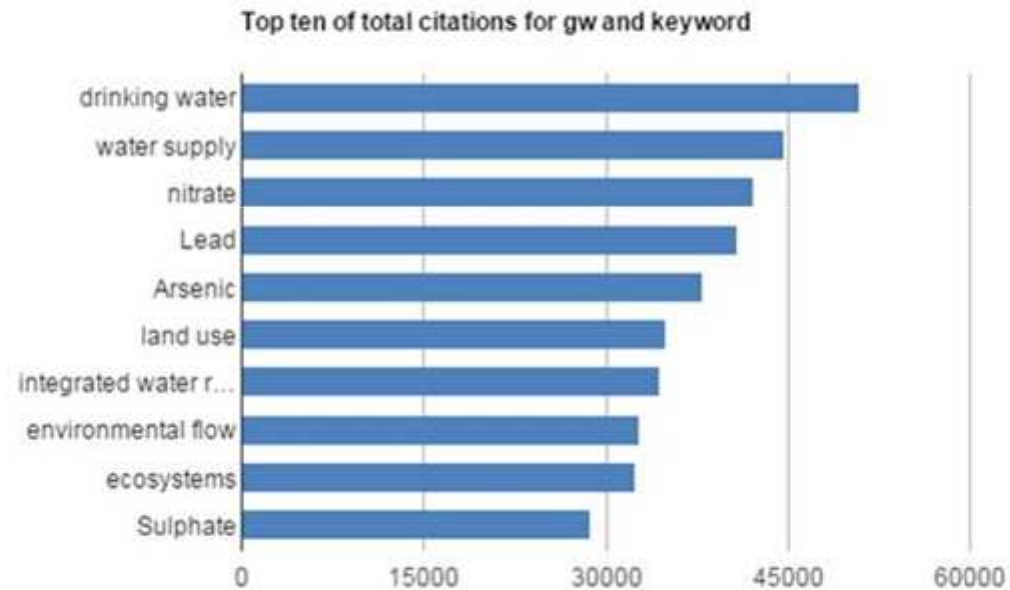**Top ten of total citations for gw and keyword**

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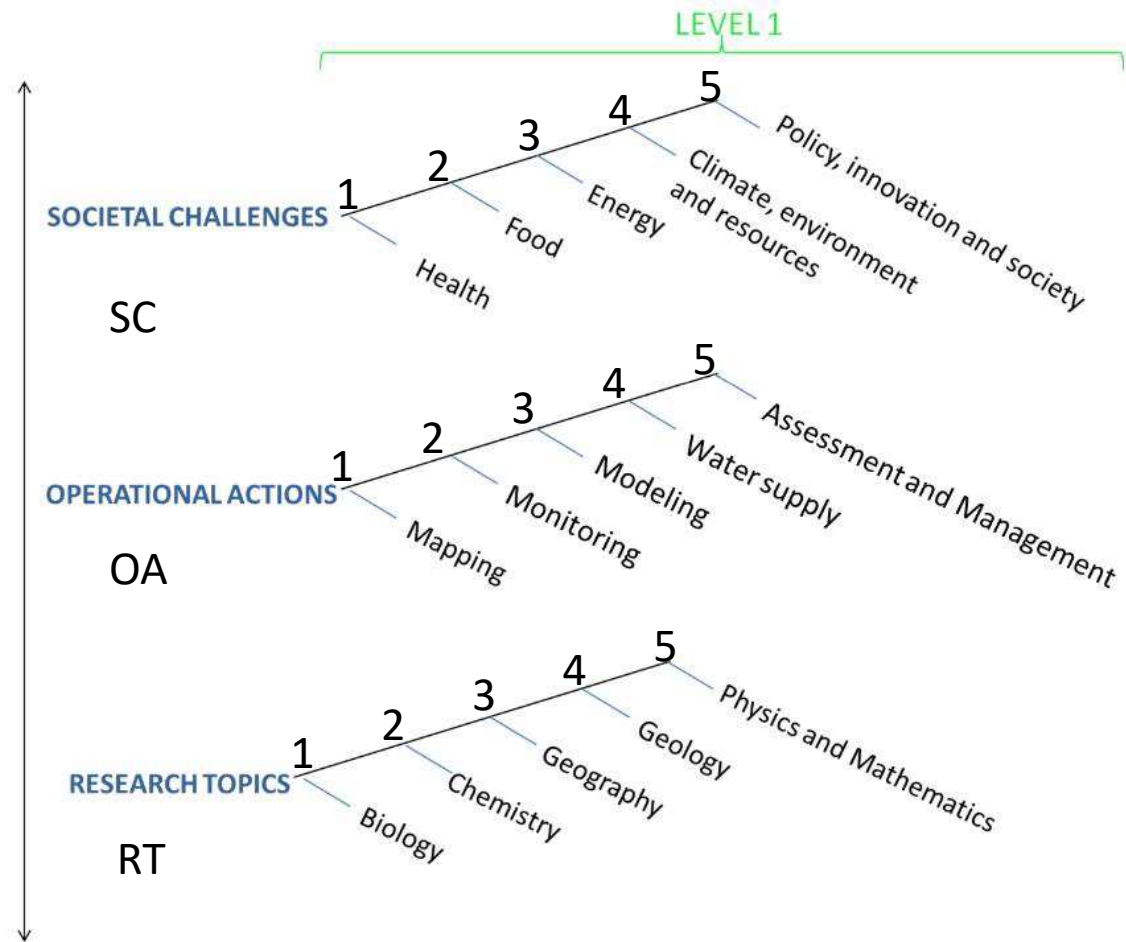
Grouping of >200 keywords selected from peer reviewed journals and EU policy documents:

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
		Research Topics	
Biology	Ecosystem	Aquatic ecosystem	Stygofauna
		Terrestrial ecosystem	Wetland
		Dependent ecosystem	Wetland
	Ecology		
	Ecohydrology	e-flow OR ecological flow OR environmental flow	
	Ecotoxicology	Status	Microbial processes
			Biological status
			Chemical status
			Ecological status
			Quantitative status
	Human toxicology	Human health	
Chemistry		Contamination	
	Geochemistry	Natural background or Pollution	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)?

Horizon 2020 Societal challenges

Activities/ operational actions (e.g. status assessment for WFD)

Research topics

# 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	1. Mapping	1. Biology
2. Food	2. Monitoring	2. Chemistry
3. Energy	3. Modelling	3. Geography
4. Climate, environment and resources	4. Water supply	4. Geology
5. Policy, innovation and society	5. Assessment and Management	5. Physics and Mathematics

3D conceptual illustration of main categories of groundwater research classification and scientific output
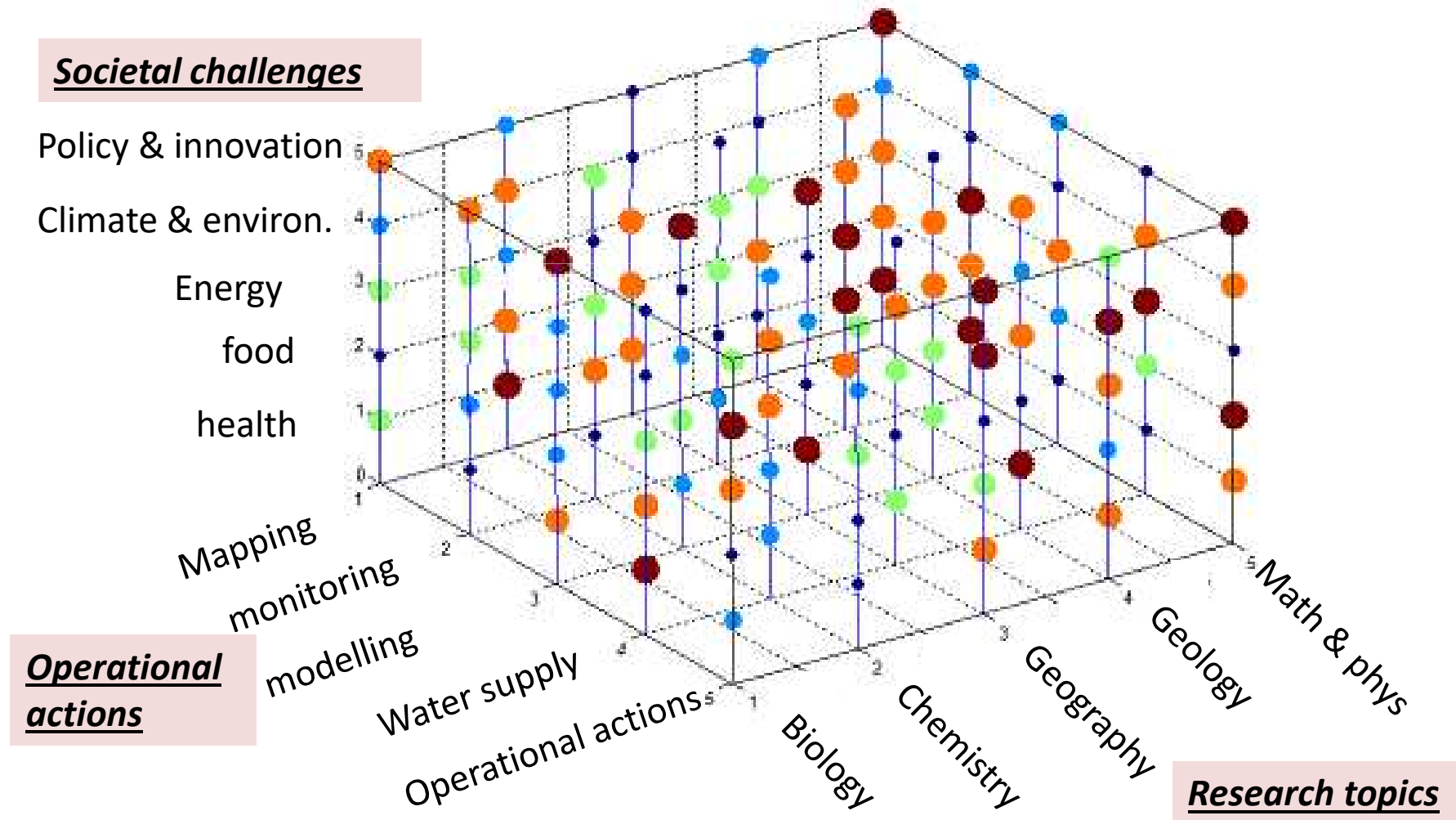
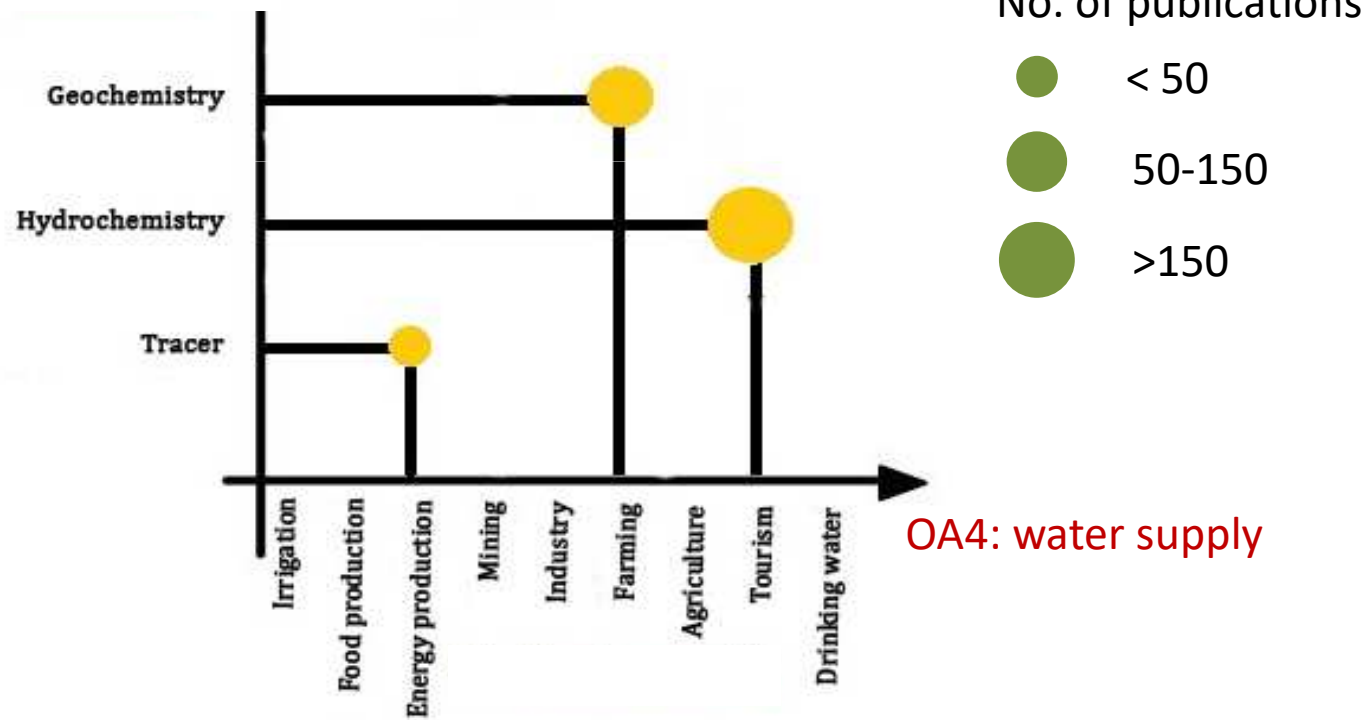# Example: 2D PLOT FOR SC1: HEALTH
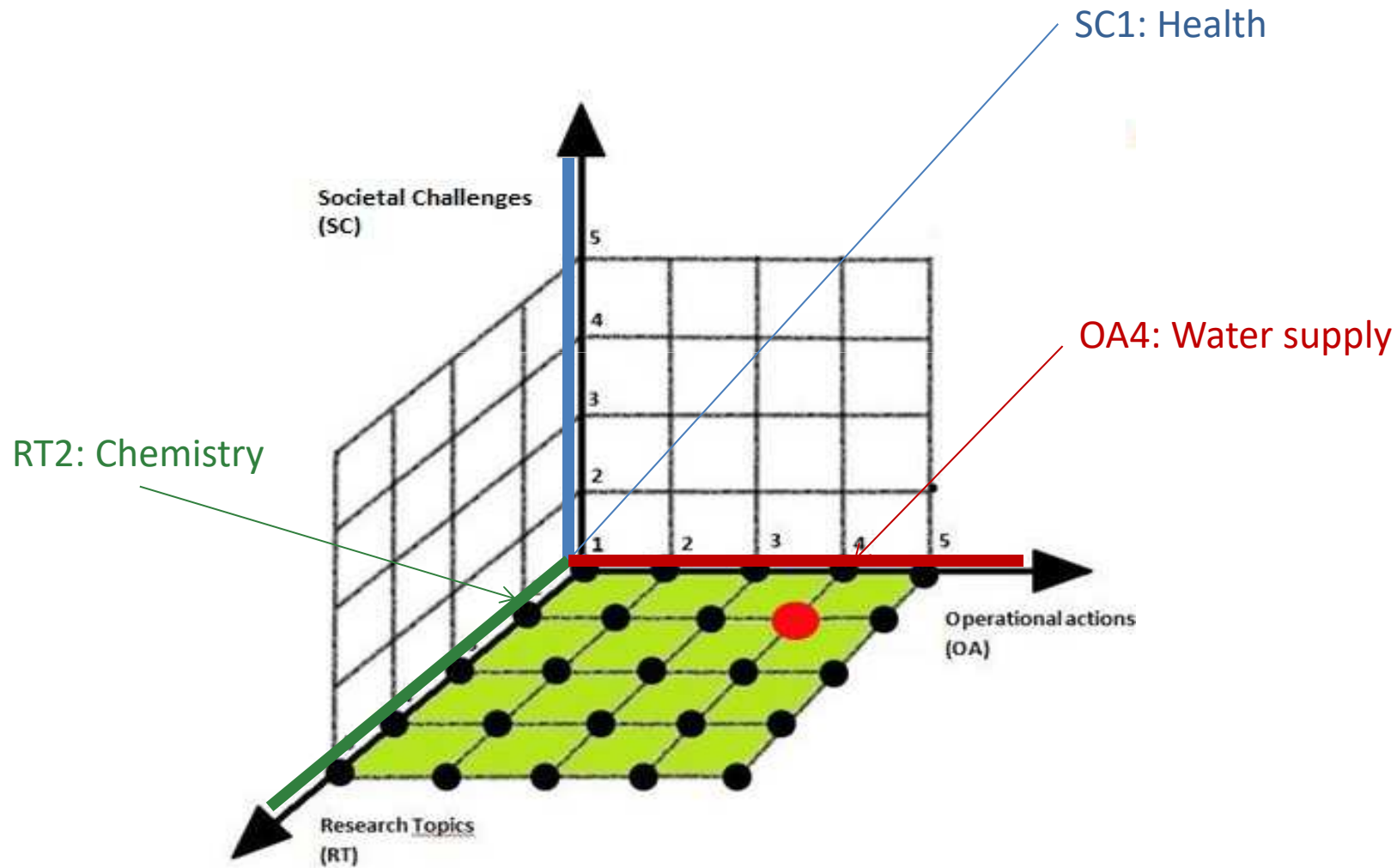
Plots for the analysis of research activity - example: health – chemistry – water supply

Thanks for coming

Have a nice day!