River-aquifer fluxes and biodiversity

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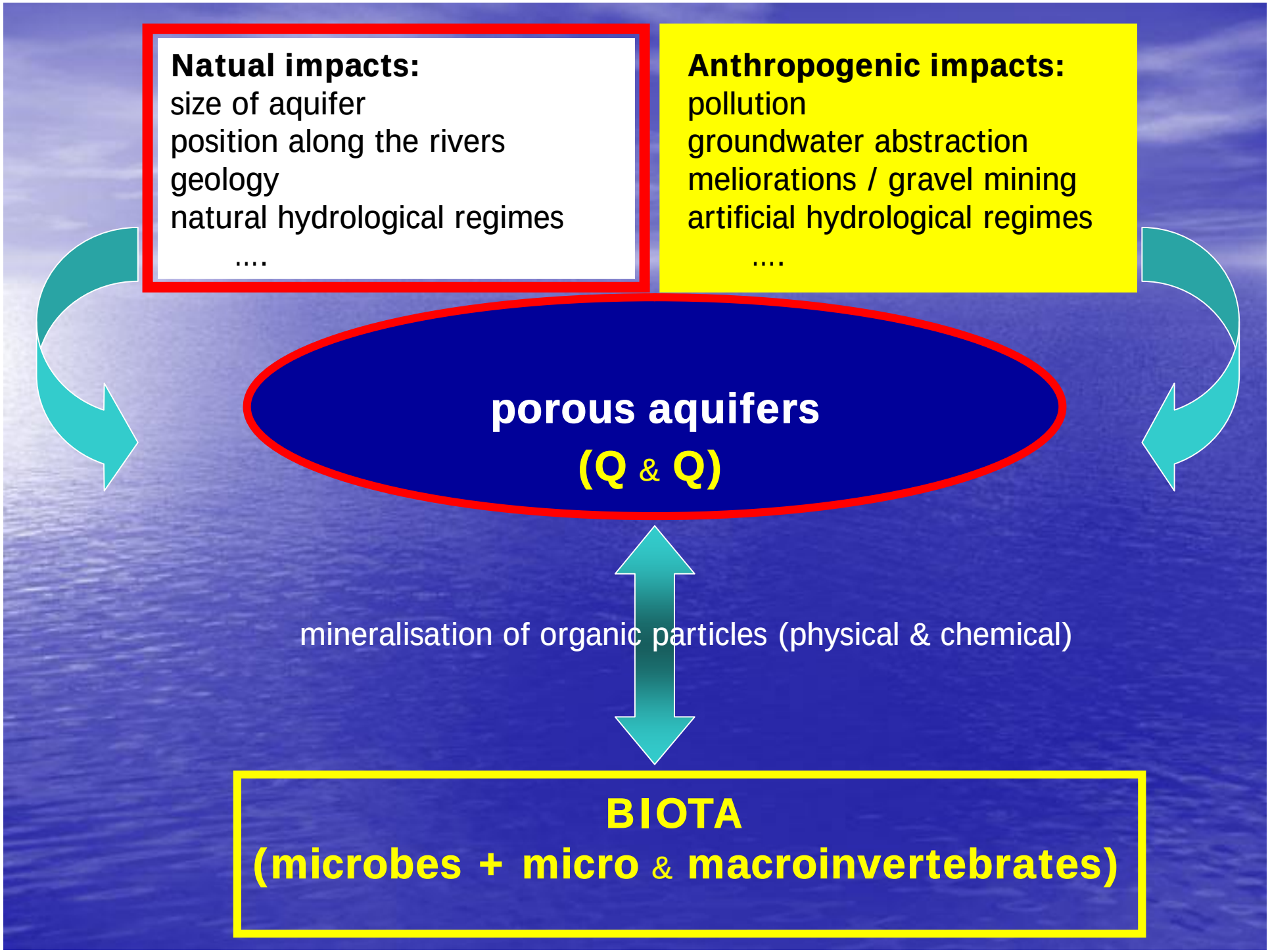
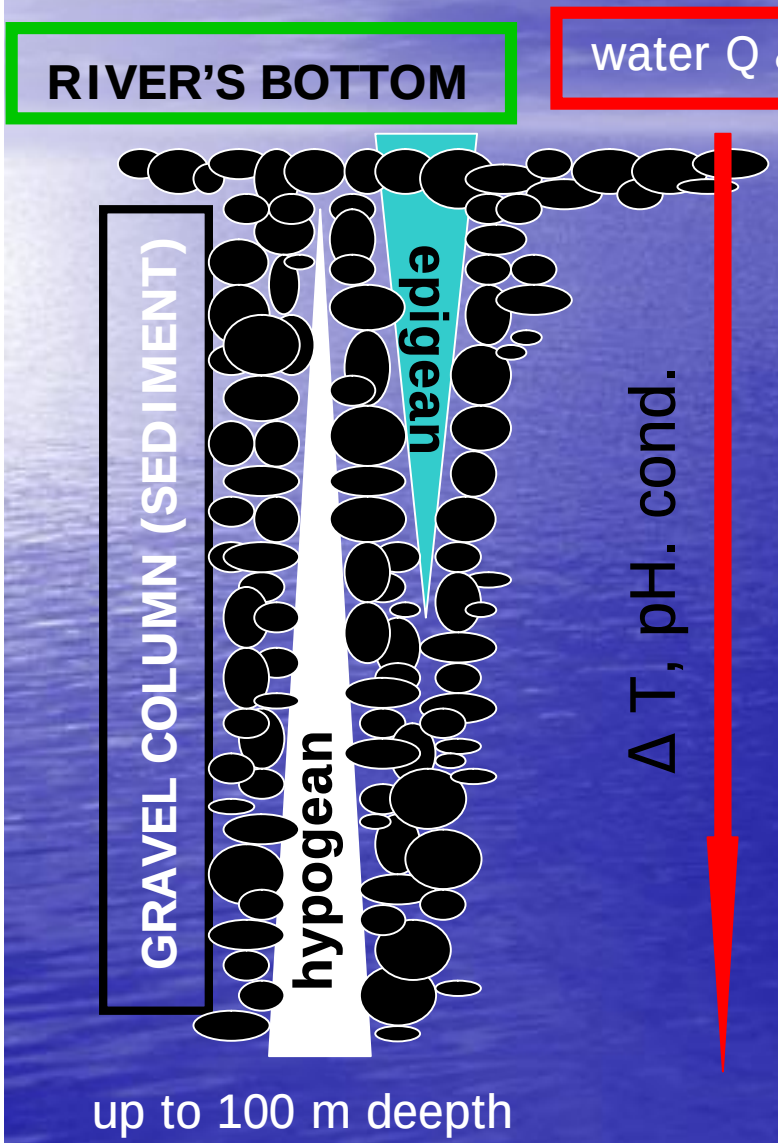


DISTRIBUTION OF ORGANISMS



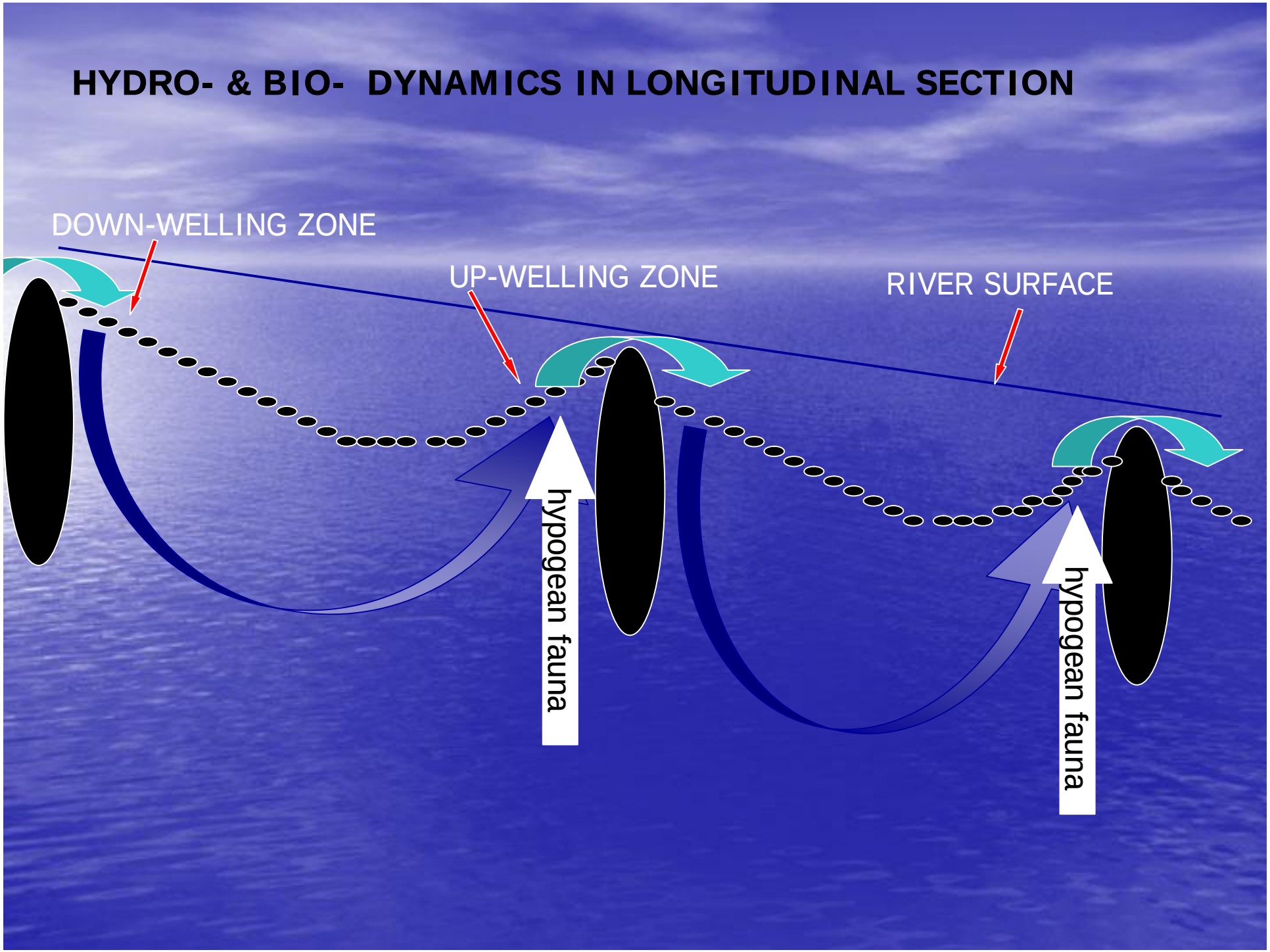
EPIGEAN ORGANISMS:

- can not survive in deeper layers
  (no special adaptations; body size)

HYPOGEAN ORGANISMS:

- can not survive in surface water
  (outcompeted / preyed upon...)

- special adaptations:
  - physiologiocal (low metabolic rate)
  - morphological (body size & shape)
  - behavioural (not well known...)



Role of micro and macroinvertebrates for WQ:
(in connection with microbes' activity)

mechanical fragmentation of organic particles
increas of water permeability of sediment
impact on oxygen concentration
effects on chemical conditions

ABUNDANCES: from 100 org. /l to > 1 org. / 1000 l
(near surface) (deep leyers)

THE MOST IMPORTANT IS CONTACT BETWEEN SURFACE AND PHREATIC ZONE = HYPORHEIC ZONE
(up to 2 m depth)

"SKIN OF GROUNDWATER"

STRUCTURE (only stygobionts):

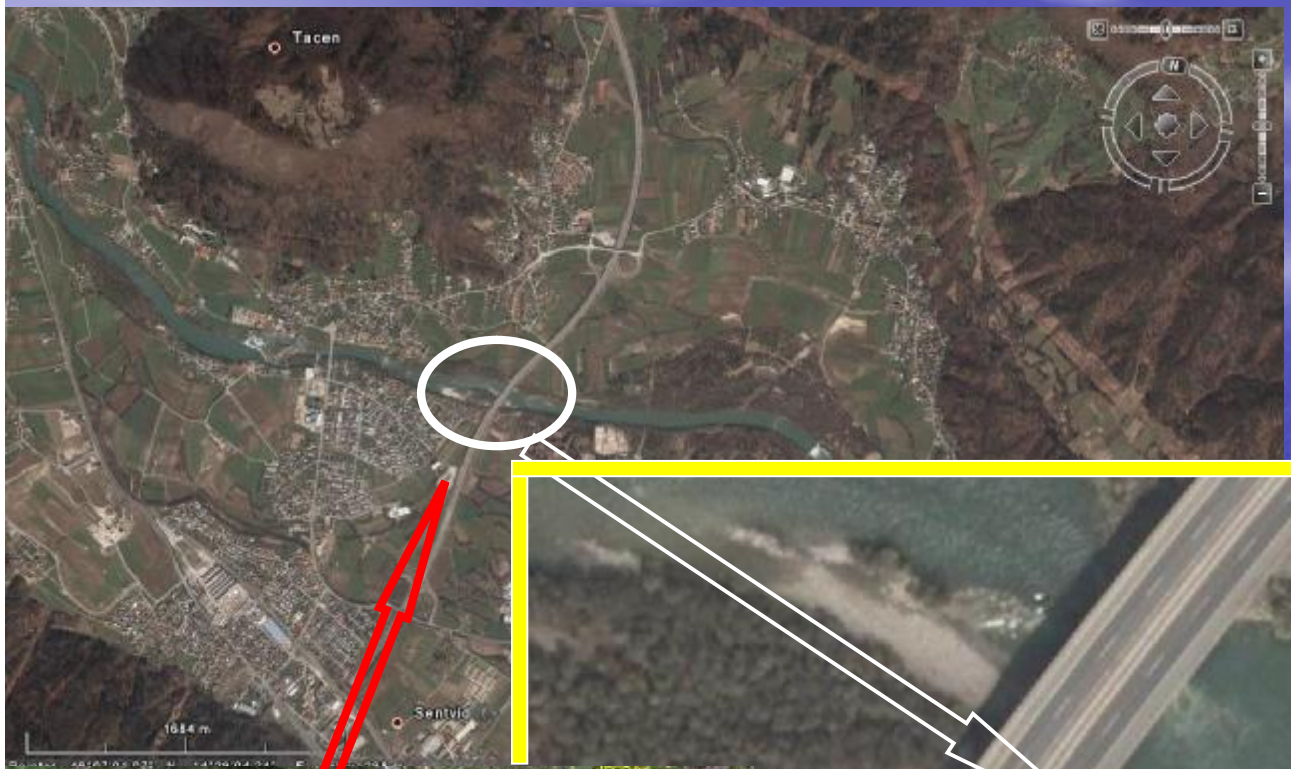
- Protozoa
- Plathelminthes (flat worms)
- Aschelminthes (round warms)
- Oligochaeta (rain worms)
- Crustacea:
    - Ostracoda
    - Copepoda (!!!) – the most common group
    - Isopoda
    - Amphipoda

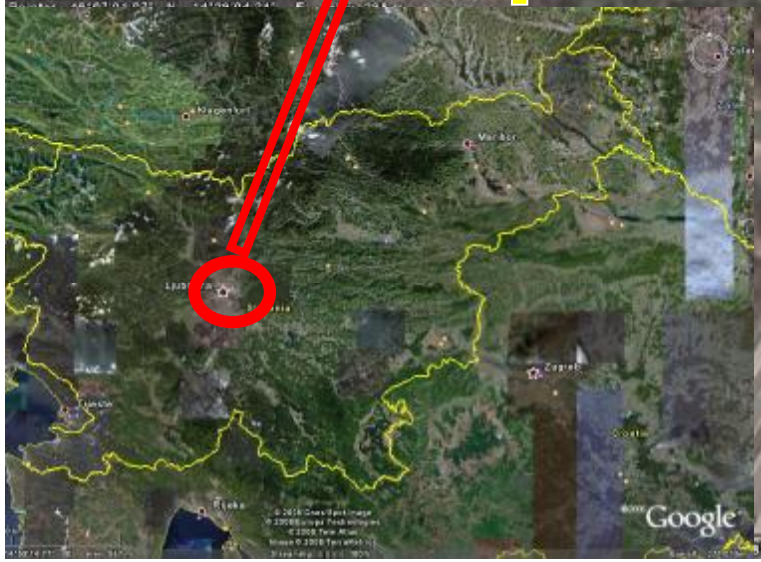
PROJECT:

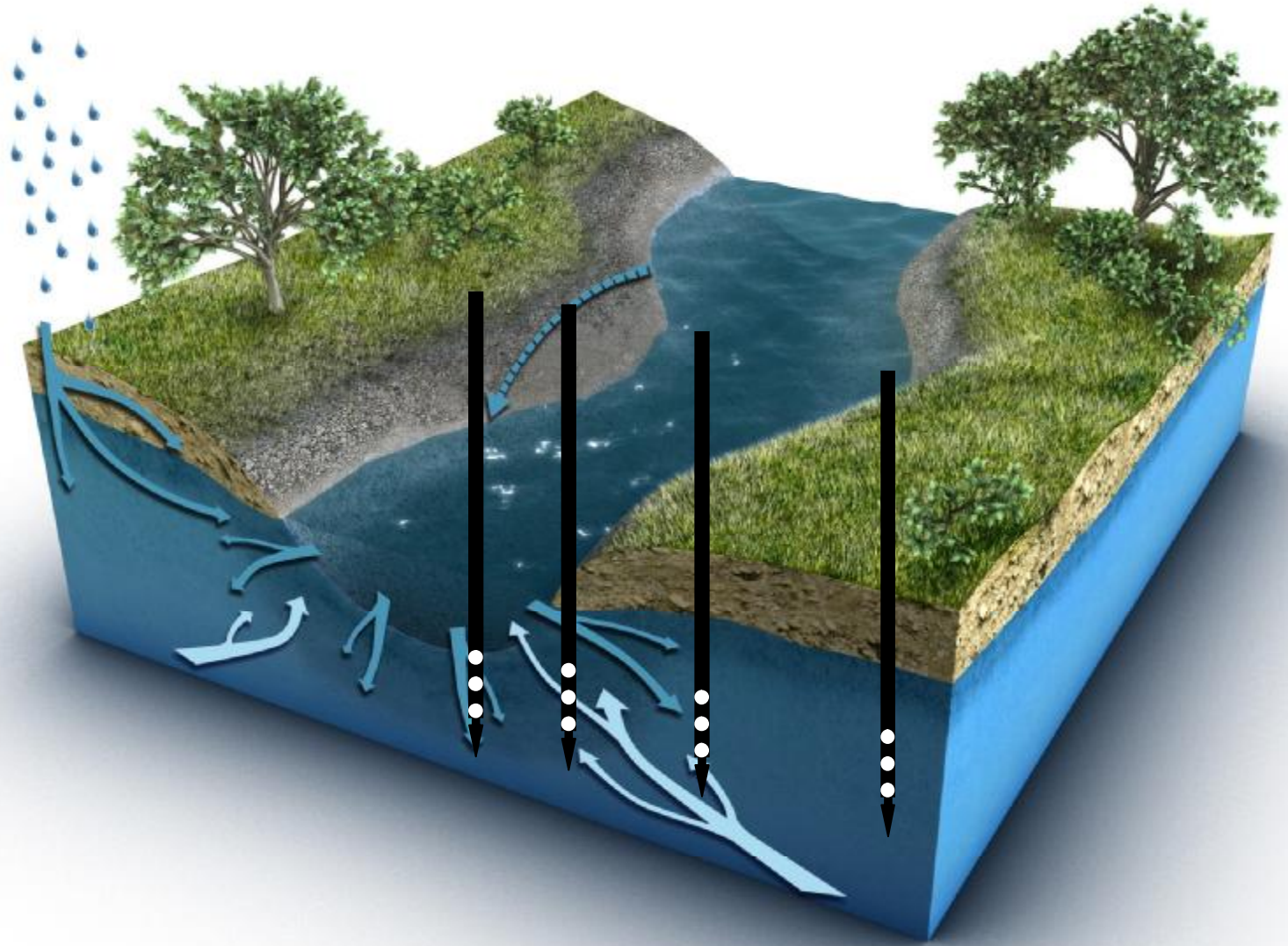
Relation between biodiversity and hydrogeological conditions in loading zone of porous aquifer from the river

STUDY AREA: N-E of Ljubljana

- 2 rows with 4 steel pipes each
- inner diameter of 48 mm
- 2.5 m deep
- 30 cm of perforation (Φ10 mm)



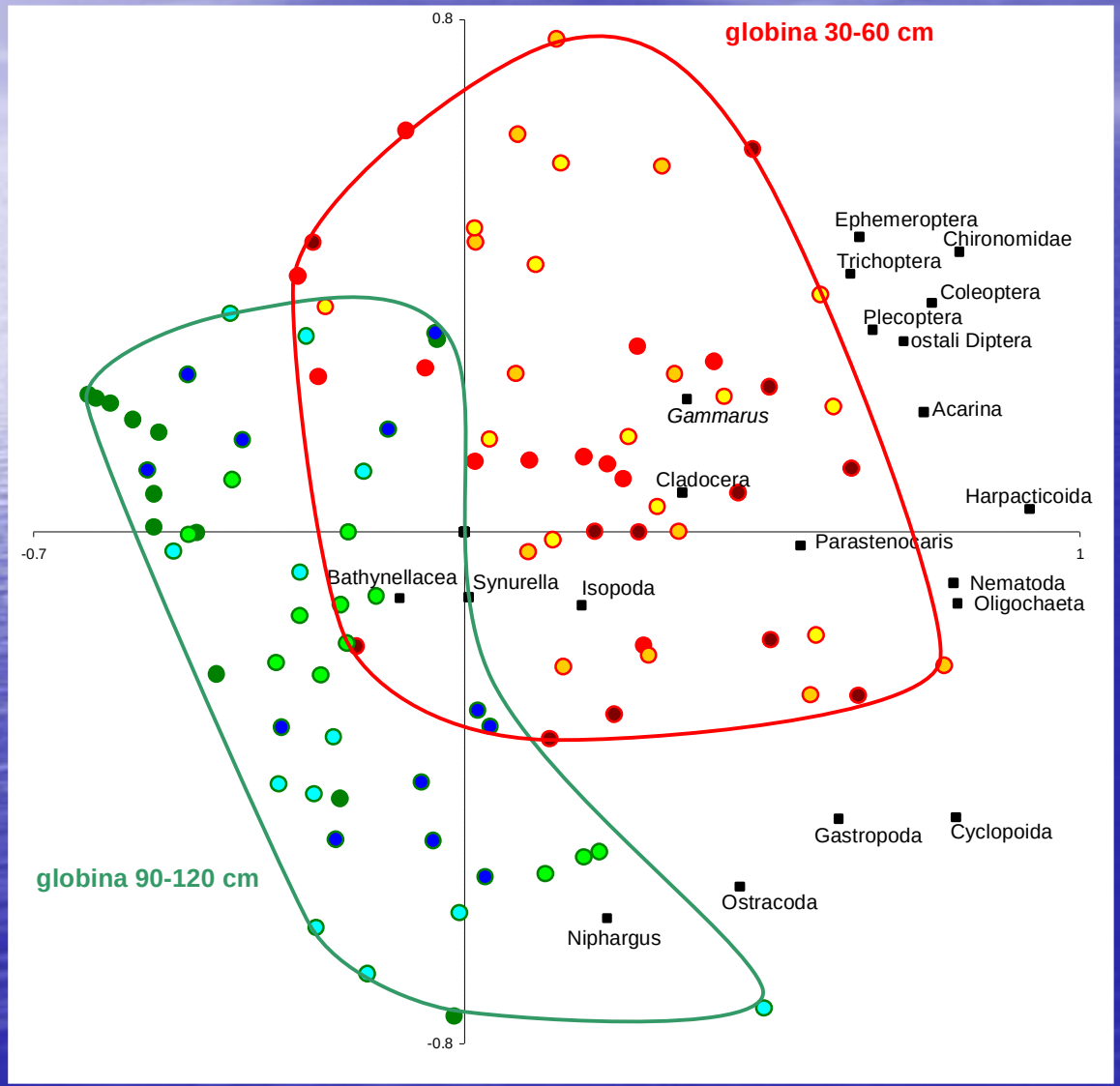




taxon	R1 30-60	R1 60-90	R2 30-60	R2 60-90	R3 60-90	R3 90-120	R4 170-190	R4 200-230	A2 230-250	A4 230-250
Acanthocyclops hispanucus										
Graeteriella unisetigera							1			
Bryocamptus echinatus										
Attheyella crassa	51	4								
Diacyclops clandestinus	9	4			1					
Acanthocyclops venustus									1	
Acanthocyclops kieferi	1	4				2		1		
Paracamptus schmeili	188	31								
Parastenocaris n.sp.										
Epactophanes richardi	1									
Acanthocyclops sambugarae		1		5	14	2				5
Megacyclops viridis	15									
Echinocamptus pilosus	3	2								
Elaphoidella elaphoides	21	2								
Nitocrella cf. neutra		1								
Paracyclops fimbriatus	1									
Bryocamptus dacicus	29									
Bryocamptus pygmaeus	16									
Bryocamptus zschokkei	9									
Alona gutata	3									

PCA analysis of invertabrate community and P & C parameters at two depths:

30-60 cm
90-120 cm



LOK	DATE	DIST.	DEPTH	TEMP.	OXYG.	OXYG.	COND.	
			cm	ºC	mg/l	satur.	uS/cmT=25	
R1	13/07/2007	river	0	13	8.4	83	296	
R1	13/07/2007	river	90-120	14.1	3.5	36	350	160
R2	13/07/2007	bank	90-120	14.3	3.9	39	360	12
R3	13/07/2007	1.5 m	90-120	14.5	4.5	46	362	12
R4	13/07/2007	3 m	170-200	15.7	6.6	65	375	3
A2	13/07/2007	6 m	210-240	15.7	5.2	53	435	3
A4	13/07/2007	21 m	210-240	13.6	6.7	66	684	15
R1	04/10/2007	river	0	11.1	7.9	73	318	
R1	04/10/2007	river	60-90	12.5	3.3	32	401	38
A1	04/10/2007	2 m	210-240	13.8	0.9	29	453	12
A2	04/10/2007	6 m	210-240	13.7	3.3	31	462	40
A3	04/10/2007	12.5 m	210-240	13.8	4.4	44	565	4
A4	04/10/2007	21 m	210-240	13.4	3.2	31	698	70
R1	13/02/2008	river	0	5.4	18.0	125	342	
A1	13/02/2008	2 m	210-240	6.5	2.2	19.5	518	
A2	13/02/2008	6 m	210-240	6.5	4.5	37.1	538	
A3	13/02/2008	12.5 m	260-290	7.3	6.0	50	840	
A4	13/02/2008	21 m	260-290	7.9	8.9	76.6	989	

EXPECTED RESULTS (biology):

- better knowledge on groundwater biodiversity

- sesonal patterns in Q / Q of fauna

coupling hydrological, physical & chemical parameters with biota

- effects of micro / macrofauna on water quality

- groundwater vs. epigean taxa as indication of water quality

- useful tool for modelling (?)