



International Course and Field Seminar
Characterization and Engineering of Karst Aquifers
 Trebinje, Bosnia & Herzegovina



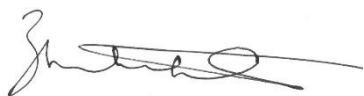
Provisional program – 2018:

Day	Time (h)	Topic/Activity	Lecturer	
(27 May)	10 AM -	Arrival, Transfer, Registration		
	7.30 PM -	Welcoming reception - Hotel VIV		
Day 1 (28 May)	9–9.30AM	Opening ceremony (HET, GSRs, FMG)	Z. Stevanović	
	9.30 – 11 AM	Introductory note, program; Historical development of karstology and karst hydrogeology; Importance of karst and karst distribution worldwide; Geo-heritage sites; Dinaric karst		
	11.15 AM – 12.45	Carbonate and non-carbonate rocks: mineralogy, depositional environments, classifications		D. Milovanović
	2–2.45 PM	Chemical factors of karstification; Role of tectonics		D. Milovanović
	3 – 4 PM	Porosity and permeability of karstic rocks; Karstification process and its features: Surface and subsurface karst landforms		Z. Stevanović
	4-5.30 PM	Groundwater circulation in karst: recharge, flow types and directions, discharge	Z. Stevanović	
Day 2 (29 May)	8 AM-6 PM	<i>Field trip:</i> Travel to Montenegro, Nikšić polje – general hydrogeology, dams and reservoirs, combat water losses, engineering solutions, visit of drilling/grouting sites (if operational); Glava Zete spring and HE PP; Bolje sestre intake for Montenegro coast – welcome by Director Jevrić, general geology, water resources availability in karst	M. Radulović V. Vlahović O. Radulović G. Jevrić Z. Stevanović Bolje sestre staff	
Day 3 (30 May)	9 AM-6 PM	Bolje sestre intake. Problem of tapping karst waters, investigation program, technical solutions. In-the-field test – tracing of piezometer, case study exercise (water treatment, monitoring). Skadar Lake – general biota and eco system, submerged flows, water balance. Boat floating and shoreline sites visit.	Z. Stevanović M. Radulović R. Parizek P. Milanović MM Radulović V. Marinović S. Milanović Bolje sestre staff	
Day 4 (31 May)	8 AM-6 PM	<i>Field trip:</i> Travel to Montenegro Coast. Tunnel Sozina, Budva, Kotor - UNESCO Heritage site and its water supply. Fresh-brackish water interface, huge temporary springs and vruljas along Boka Kotorska Bay: Ljuta, Spila, Sopot. Case study exercise, film display; “Stone Sea” – “Angry” karst of Orjen Mt., Grahovsko karst polje; Return to Bosnia & Herzegovina: Oko spring intake, Gorica dam and Chemical Lab visit.	M. Radulović P. Milanović Z. Stevanović S. Milanović Lj. Vasić	
Day 5 (1 June)	9-10.45 AM	Problems related to construction of dams, reservoirs and other structures in karst; Investigation, design, corrective measures, case studies.	P. Milanović	
	10.45-2.30 PM	<i>Half-day field trip</i> to Grančarevo dam (and Gorica ?). In the field test – tracing of piezometer, sampling, analyses in the Chem. Lab. Case study exercise.	guided by P. Milanović and other lecturers	

	3.30-4.30 PM	Presentation on the HE system Trebišnjica; <i>DVD movie "Trebišnjica"</i> . Other case studies, Discussion	P. Milanović
	4.30-5.45 PM	<i>Case study</i> : Appalachian Karst: Principles and Practices	R. Parizek
Day 6 (2 June)	9 – 10.30 AM	Methods in karst hydrogeology – an overview; geology, remote sensing, geophysics, water points inventory – exploratory drilling, groundwater tapping, hydrogeological properties and field tests	Z.Stevanović
	10.30 – 11.30 AM	Methods in karst hydrogeology – climate, hydrology, statistics (exercise)	V. Ristić Vakanjac
	11.45 AM – 12.45	Methods in karst hydrogeology – geomorphology, speleology, speleo diving, hydrogeology maps, GIS modeling, database	S. Milanović
	2–3 PM	<i>Professional practice</i> : Investigations of groundwater flow in karst aquifers: Dye tracing case studies from the U.S.	L. Anne Bledsoe
	3.15–4.15 PM	<i>Professional practice</i> : Quality dynamics at karst-springs. A challenge for drinking water supplies. Isotopic methods in karst, GW ageing – Kučaj-Beljanica (Serbia) case	Lj Vasić
	4.15-5 PM	<i>Junior expert class</i> : Karst aquifer vulnerability; Anthropogenic impact and hazards; Karst Disturbance Index	B. Petrović
	5-5.45 PM	<i>Junior expert class</i> : Groundwater management and transboundary aquifers in karst: problems and solutions	V. Marinović
	5.45– 6.15	<i>Protecting the nature</i> : "Forgotten species" (movie by S. Milanović) (exercise)	
Day 7 (3 June)	8.30 AM -	<i>One-day field trip and seminar</i> (classical karst features, phenomena, engineering structures): Popovo polje – Tučevac cave (training) - Trebišnjica sinking river -Vjetrenica cave – vrelo Bune – Mostar - spring Vrelo Bregave – Dabarsko polje – Fatničko polje (estavelle Obod) - Bilečko Lake (submerged source of Trebišnjica River) – Trebinje	guided by P. Milanović
Day 8 (4 June)	8.45 – 9.45AM	Characterization of karst aquifers; Groundwater budget; Specific regime of karstic groundwater (quantity, quality); Safe yield; Aquifer control and sustainability	Z. Stevanović
	9.45 - 11.15AM	Water resources cycle in karst; Surface-groundwater interaction; Feasibility studies and engineering design; Environmental impact assessment; <i>Case studies</i>	O. Bonacci
	11.30 - 12.30	Modeling of karst aquifer – Springs hydrograph analysis and stochastic models (exercise)	V. Ristić Vakanjac
	12.30- 13.30	<i>Case study</i> : Leakage from reservoirs, specific research methods and remedial measures	S. Milanović
	3-4.15 AM	<i>Spectacular and remote karst</i> : National parks of Mackenzie Mts. in the Northwest Territories of Canada; glacial, periglacial, canyon and karst landscapes	D. Ford
	4.15-5 AM	IGRAC Mission: Transboundary aquifers: problems, solutions and experiences	N. Kukurić

	5.15 – 6.30 PM	<i>Work and demonstration in the field: Springs inventory (visit of Lušac spring in Trebinje suburb). Concluding course remarks</i>	S. Milanović Lj. Vasić HET / FMG staff
Day 9 (5 June)	9.30 – 12.30 AM	Exam: Written test and verbal discussion for students	Z. Stevanović, V. Ristić Vakanjac S. Milanović
	5.30 PM	Results of the exam, Certificates, Closing ceremony	
	6.00 PM -	Farewell party: Local winery / Dinner in national restaurant	
6 - 8 June		Karst Conference KARST 2018: Expect the Unexpected	Trebinje

Coordinator CEKA 2018



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