



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



Provisional program – 2019:

Day	Time (h)	Topic/Activity	Lecturer	
(26 May)	10 AM -	Arrival, Transfer, Registration		
	7.30 PM -	Welcoming reception - Hotel VIV, Trebinje		
Day 1 (27 May) Trebinje B&H	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	Porosity and permeability of karstic rocks; Karstification process and its features: Surface and subsurface karst landforms		Z. Stevanović
	3 – 4.30 PM	Groundwater circulation in karst: recharge, flow types and directions, discharge	Z. Stevanović	
Day 2 (28 May) Trebinje B&H	9 – 10.30 AM	Methods in karst hydrogeology – an overview; geology, remote sensing, geophysics, water points inventory, 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, exploratory drilling, hydrogeology maps, GIS modeling, database	S. Milanović	
	2–3.15 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	
	3.15–4.15 PM	<i>Junior expert class:</i> Karst aquifer vulnerability; Anthropogenic impact and hazards; Karst Disturbance Index	B. Petrović	
	4.15-5.15 PM	<i>Junior expert class:</i> Groundwater management and transboundary aquifers in karst: problems and solutions	V. Marinović	
	5.15-5.45 PM	<i>Protecting the nature: “Forgotten species”</i> (movie by S. Milanović) (exercise)		
Day 3 (29 May) Trebinje B&H	9-10.45 AM	Problems related to construction of dams, reservoirs and other structures in karst; Investigation, design, corrective measures.	P. Milanović	
	10.45-2.30 PM	<i>Half-day field trip.</i> Oko spring intake. Grančarevo and Gorica dams. 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	Problems related to construction of dams, reservoirs and other structures in karst: case studies	P. Milanović	
	4.30-5.00 PM	Presentation on the HE system Trebišnjica; <i>DVD movie “Trebišnjica”</i> . Discussion		

Day 4 (30 May) Field trip, Virpazar MNE	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 G. Jevrić Z. Stevanović Bolje sestre staff
Day 5 (31 May) Virpazar MNE	9 – 11.30 AM	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).	Z. Stevanović M. Radulović P. Milanović S. Milanović Bolje sestre staff
	11.30 AM - 12.15 PM	Mineralogical and geochemical methods for the study of carbonate rocks – overview	E. Tarassova
	12.15 – 1.45 PM	Modelling karst hydrogeological systems: Challenges and solutions	A. Kovacs
	2.30 - 6 PM	<i>Boat floating and shoreline sites visit.</i> Skadar Lake – general biota and eco system, submerged flows, water balance.	MM Radulović D. Radojević V. Marinović
Day 6 (1 June) Field trip, Trebinje B&H	8 AM - 5 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.	M. Radulović P. Milanović Z. Stevanović S. Milanović Lj. Vasić
Day 7 (2 June) Field trip, Trebinje B&H	8.30 AM – 5.30 PM	<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 (3 June) Trebinje B&H	8.30 – 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 and engineering design; Environmental impact assessment; <i>Case studies</i>	O. Bonacci
	11.30 - 12.45	Application of stable isotopes in karst hydrogeology	M. Brenčić
	1.30 - 2.30 PM	Modeling of karst aquifer – Springs hydrograph analysis and stochastic models (exercise)	V. Ristić Vakanjac
	2.30 – 3.30 PM	<i>Case study:</i> Leakage from reservoirs, specific research methods and remedial measures	S. Milanović
	3.45 – 4.45 AM	Regional groundwater flow in karst	M. Brenčić
	4.45-5.30 AM	IGRAC Mission: Transboundary aquifers: problems, solutions and experiences	N. Kukurić
	5.45 – 6.45 PM	<i>Work and demonstration in the field:</i> Springs inventory (visit of Lušac spring in Trebinje suburb).	S. Milanović Lj. Vasić HET / FMG staff

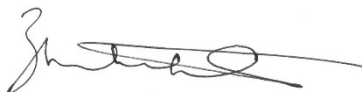
Day 9 (4 June) Trebinje B&H	9.30 – 12.30 AM	Exam: Written test and verbal discussion for students	Z. Stevanović, V. Ristić Vakanjac S. Milanović
	5.30 PM	Results of the exam, Certificates, Closing ceremony	
	6.00 PM -	Farewell party: Local winery	

B&H- Bosnia & Herzegovina

MNE-Montenegro

Along with the terms the places for overnight stay are shown

Coordinator CEKA 2019



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