

## **Skupina / Group**

### **Geotermalni viri in geokemija geotermalnih tokov / Geothermal sources and geochemistry of geothermal currents**

**Mentor: Dr. Salvatore Giammanco / Salvatore Giammanco, PhD.**

Predavanja bodo v obliki delovnih skupin na sledeče teme:

- Pomembnost geotermalne energije kot obnovljive in čiste oblike energije;
- Geokemija geotermalnih tekočin;
- Geotermalni viri po svetu, primeri iz Sicilije
- Geotermalna področja v Sloveniji in poudarek na Šaleški dolini
- Pomembnost naravnih polutantov – plinov – v atmosferski sestavi plinov
- Metode geokemičnega napovedovanja za odkrivanje geotermalnih virov oz. rezervoarjev in ocenah njihovega potenciala;
- Osredotočanje na različne metode merjenja pretok CO<sub>2</sub> v prsti in za merjenje količine oz. koncentracije radona v prsti in tudi v notranjih prostorih.;
- Opis statističnih metod, ki se uporabljajo za analizo geokemičnih podatkov in za kartiranje podatkov.

Veliko časa bo posvečenega terenskemu delu s ciljem uporabe metod za merjenje odtokov CO<sub>2</sub> v zemlji in merjenju radona v zemlji, z namenom, da bi odkrili anomalije odplinjevanja na teh področjih. Meritve se bodo izvajale z uporabo prenosnih instrumentov na področjih prelomnih con v okolici Velenja in na termalnem področju blizu Topolšice. Drugi del terenskega dela bo posvečen meritvam radona v prostoru, z namenom, da bi odkrili količino radona v hišah in na delovnem prostoru.

Lectures will be given to the working group, focused on topics such as:

- Importance of geothermal energy as a renewable and clean energy;
- Geochemistry of geothermal fluids;
- Geothermal resources in the world, with examples from Sicily;
- Geothermal areas of Slovenia and focus on Salek Valley;
- Importance of natural pollutant gases in the global atmospheric gas budget;
- Methods of geochemical prospection to detect geothermal reservoirs and assess their potential;
- Focus on the different methods to measure natural gas emissions;
- Details on the methods for measuring soil CO<sub>2</sub> effluxes and for measuring radon concentrations both in soil and indoor;
- Description of the statistical methods used for geochemical data analysis and data mapping.

A lot of time will be spent for field work, aimed at applying the methods for measuring soil CO<sub>2</sub> effluxes and radon in soil to detect anomalous degassing areas. Measurements will be carried out over faulted zones around Velenje and near the Topolšica geothermal area using portable instruments. Another part of the field work will be devoted to measurements of radon indoor for detection of radon levels into houses and working places.

## **Skupina / Group**

### **Koliko je gozd narava in koliko rezultat človekovega dela? / How much is the forest natural and to what extent is the result of human activities?**

**Mentor: Damjan Jevšnik**

Dan 1:

Uvodno predavanje o slovenskem gozdu v muzeju Vrbovec, ogled muzeja, kjer je od letos tudi razstava o sedanjem gospodarjenju z gozdom v Sloveniji. (2 uri)

6 ur na terenu z revirnim gozdarjem (izbira drevja za posek, gojitvena dela v mladem gozdu...).

Dan 2: Gozd za ljudi - rekreacija v gozdu, vse funkcije gozda, konkretno delo na gozdni poti.

Dan 3: Dan namenjen uporabi lesa. Predavanje: Zelena javna naročila, vse prednosti uporabe lesa, možnosti uporabe lesa. Ogled vzorčne hiše, kjer so predstavljene najrazličnejše uporabe lesa in razstavnega objekta v industrijski coni Nazarje.

Day 1:

Introductory lectures on Slovenian forest in the museum Vrbovec, excursion around the museum where this year you can attend an exhibition about forest management in Slovenia (2 hours).

6 lessons of field work with a local forester (selection of trees for forest clearing, activities related to growing of young forests...)

Day 2: Forest for people – recreation in the forest, all forest functions, a concrete activity on forest path.

Day 3: A day designed for use of wood. Lecture: 'Green' public offers, all advantages of using wood, possibilities of using wood, visiting a sample wooden house with many various uses of wood and an exhibition object in the industrial area Nazarje.

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## **Skupina / Group**

### **Ekološke značilnosti reke Pake / Ecological characteristics of the river Paka**

**Mentorica: doc. dr. Nataša Smolar-Žvanut / Mentor: Nataša Smolar-Žvanut, PhD, associate professor**

Pregledali in analizirali bomo obstoječe podatke o ekološkem, kemijskem in hidro-morfološkem stanju reke Pake. Izdelali bomo seznam vseh rab vode na reki Paki. Na izbranih odsekih vodotoka bomo v sklopu terenskega dela vrednotili eko-morfološko stanje (obrežje, struga in okolje) reke Pake s pomočjo RCE metode. Indeks RCE je metoda razvita za vrednotenje majhnih (<3 m široki), nižinskih vodotokov na osnovi fizičnih in biotskih značilnosti vodotoka, upošteva značilnosti njegovega zaledja. Metoda je osnovana na 16 značilnostih obrežja

vegetacije in zaledja, morfoloških značilnostih struge ter biotskih razmer v vodnih in obrežnih habitatih. Pri vrednotenju opazovalec izbere mesto opazovanja ter upošteva odsek v dolžini 50 m po toku navzgor in 50 m po toku navzdol od mesta opazovanja. Opazovane značilnosti zabeleži v obrazec RCE, v katerem je vsaka od značilnosti razdeljena v štiri različno ovrednotene kategorije. Z vrednostjo 1 je označeno najbolj spremenjeno ali degradirano stanje izbrane značilnosti vodotoka, z najvišjo vrednostjo (ki je med 15 in 30) pa najbolj nespremenjeno – naravno stanje.

Na osnovi rezultatov vrednotenja reke Pake bomo pripravili nabor ukrepov za izboljšanje stanja voda.

Focus is on checking and analysing the existing data about ecological, chemical, hydro-morphological condition of the river Paka. We are going to produce the list of all water uses from or in the river Paka. In certain sections of the river we are going to evaluate eco-morphological condition within our field work (the river bank, the river bed and its surroundings) by means of the RCE method. RCE index is a method designed for measuring smaller (< 3 m of width), valley water systems based on physical and biotic features of the river taking into account the characteristics of its hinterland. The method is based on 16 features of riparian vegetation and the hinterland, morphological features of the river bed and biotic conditions in aquatic and riparian habitat. When evaluating the observer selects the spot of observation and takes into consideration a section in the length of 50 m upstream and 50 m downstream from the observing spot. The observer writes down all the observed features in the RCE form, where each of the observed features is divided into 4 different categories. The value 1 means the most altered or degraded condition from the selected characteristic of the river. Its highest value (lying between 15 and 30) means the least altered or unchanged i.e. natural condition. Based on the results from evaluating the river Paka we are going to produce a set of measures how to improve the river condition.

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## **Skupina / Group**

### **Uvod v pedologijo z rabo in varstvom tal / Introduction in pedology with use and preservation of soils**

**Mentor: doc. dr. Borut Vrščaj / Borut Vrščaj, PhD, associate professor**

Tematika poletne šole bo raziskovanje tal in njihove vloge v kopenskih ekosistemih ter trajnostna raba in varovanje tal. Udeleženci bodo pridobili osnoven vpogled v zgradbo tal kot naravne tvorbe, seznanili se bodo z osnovami terenskih raziskav tal.

Primerna raven: dodiplomski študij naravoslovno tehničnih fakultet in visokih šol ter slušateljev geografije.

#### **Dan 1:**

**Teoretični del** (predavalnica na prostem ali v prostorih, polovica dneva)

- Osnove pedologije: strnjen uvod v pedologijo kot naravoslovno vedo (1 ura)
- Tla kot naravno telo: osnove zgradbe tal, horizonti, glavne fizikalne lastnosti (1 ura)
- Pedosekvence v Sloveniji: lastnosti, potenciali rabe, degradacije, trajnostni pristop (1 ura)

**Praktični del:** Terenske raziskave tal in diskusije o rabi in varovanju tal

Uvod v terenske raziskave tal: izkop talnega profila na reprezentativni lokaciji, prikaz opisa profila, pregled morfoloških in fizikalnih lastnosti, uporaba barvnega atlasa in obrazcev za opis; merjenje kislosti in obstojnosti strukturnih agregatov Ø1. Pokarbonatna tla (Topolšica /okolica).

**Dan 2 in 3:**

Seznanjanje z različnimi tipi tal okolice Velenja (do 15 km): Ø2. psevdoglej (Velenje), Ø3. distrična rjava tla na tufih in tufitih (Andraž); Ø4. hipoglej (Braslovče), Ø5. evtrična rjava tla na produ in pesku (Braslovče).

Vsebine razprav ob talnih profilih: grožnje in degradacije tal, raba tal, vplivi kmetijstva, industrije, prometa, poselitve; onesnaževanj in onesnažila, kroženje, imobilizacija, razgradnja onesnažil, obstojna /neobstojna onesnažila; primerjava degradacij tal; trajnostna raba tal / prostora.

The topic of the summer school is soil and land use research related to the ecosystem health, sustainable land use and soil protection. The lecture attendants will acquire a basic insight into the soil structure as natural body and an introduction to the field soil research and evaluation of land use sustainability.

Adequate level of the existing knowledge: college or undergraduate study of natural or biotechnical sciences or geography.

**Day 1:**

**Theoretical part** (open place lecture room outside and inside the building, half of the day)

- Basics of soil science: a concise introduction into soil science as a natural science (1 lesson)
- Soil as a natural body: basics of the soil structure, soil horizons, main diagnostic properties(1 lesson)
- Soils of Slovenia: soils, potentials, land uses, degradations, towards sustainable management (1 lesson).

**Practical part:** Field research of soils with discussions on land use and soil protection.

Introduction into field researches of soils: excavation of the soil profile on representative spots, description of soil profile, review of morphological and diagnostic features.

**Day 2 and 3:**

Getting acquainted with various types of soils in the neighbourhood of Velenje (up to 15 km): Ø2. pseudogley (Velenje), Ø3. district brown soils on tuffs and tufiti (Andraž); Ø4. hypogley (Braslovče), Ø5. Eutric brown soils on gravel and sand (Braslovče).

Discussions on soil profiles, threats and soil degradation, soil uses, effects of agriculture, industry, traffic, settlements, pollutants, circulation, immobilisation, decomposition of pollutants, durable and non-durable pollutants, comparison of soil degradation, sustainable use of soils/space.

## **Skupina / Group**

### **Hrup kot kazalec kakovosti zraka na območju MO Velenje / Noise as air quality indicator in the region of municipality Velenje**

**Mentorji: doc. dr. Natalija Špeh, doc. dr. Nikola Holeček, mag. Katarina Ostruh / Natalija Špeh, PhD, associate professor, Nikola Holeček, PhD, associate professor, M.Sc. Katarina Ostruh.**

Raziskovalno delo skupine bo osredotočeno na preliminarne meritve, potrebne za izdelavo strokovnih podlag, s katerimi bi ugotovili stopnjo izpostavljenosti posameznih območij in števila prebivalstva različnim virom hrupa, pripravili bi natančno prostorsko predstavitev in nabor najnujnejših in učinkovitih sanacijskih ukrepov. Rezultate študije bomo uporabili tudi za: a) oblikovanje predlogov protihrupnih ukrepov ter b) dopolnitev kartografske podlage in pogojev za namensko rabo (OPN občin) ter določitev stopnje varstva pred hrupom. To bi omogočalo bolj enostavno in verodostojno izdajanje dovoljenj prosilcem za izvedbo prireditev, predvsem v občinskih središčih.

Izsledki študije bodo služili kot izhodišče za opredelitev kritičnih območij s prekoračeno stopnjo hrupa ter določitev sanacijskih ukrepov.

Research work of the group will be focused on preliminary measurements needed for production of professional fundamentals which will enable to find out the level of exposure in individual territories and the number of residents to sources of noise. We will prepare a spatial presentation and the set of the most urgent and effective sanitation measures. The study results will be used as well for: a) making proposals of anti-noise measures and b) completion of cartographic bases and conditions for land use (OPN municipalities) and defining the level of protection against noise. This will enable a much easier and credible way of issuing licences to applicants for performance of various entertainment events in municipality centres.

The study results will serve as a starting point to determine some critical areas with exceeding level of noise, and to determine sanitation measures.