

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Geologija karbonatov
Course title:	Carbonate Geology

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Okoljske in regionalne študije, doktorski študij 3. stopnje	Paleobiologija in sedimentarna geologija	brez letnika	/
Environmental and Regional Studies, doctoral study, 3 rd level	Palaeobiology and Sedimentary geology	not specified	/

Vrsta predmeta / Course type

Izbirni/Elective

Univerzitetna koda predmeta / University course code:

DIP06

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
20	10	30			120	6

Nosilec predmeta / Lecturer:

Adrijan Košir

Jeziki /

Languages:

Predavanja / Lectures:

Vaje / Tutorial:

Slovenščina, angleščina/Slovenian, English

Slovenščina, angleščina/Slovenian, English

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Končana druga bolonjska stopnja ali univerzitetni študij VII stopnje.

Prerequisites:

Second-cycle Bologna degree or a university (level VII) degree.

Vsebina:

- Uvod v karbonatne depozicijske sisteme
- Današnje karbonatne platforme in primerjava s karbonatnimi sistemi v geološki preteklosti
- Karbonatni sedimenti in komponente; klasifikacija apnencev in dolomitov
- Karbonatna okolja in faciesni mozaiki
- Karbonatni šelfi in rampe
- Karbonati, evaporiti in siliciklastiti
- Faciesi notranjih delov platform
- Grebeni in peščena telesa na robovih platform in na rampah
- Pobočni in pelagični karbonati
- Kontinentalni karbonati

Content (Syllabus outline):

- Introduction to carbonate systems
- Modern carbonate platforms and comparison with ancient carbonate depositional systems
- Carbonate sediment components; limestone and dolomite classification
- Carbonate environments and facies mosaics
- Carbonate shelves and ramps
- Carbonates, evaporites and siliciclastics
- Platform interior carbonate facies
- Reefs and sandbodies on platform margins and ramps
- Slope and pelagic carbonates
- Continental carbonates
- Sequence stratigraphy
- Introduction to diagenesis

- Sekvenčna stratigrafija
- Uvod v diagenozo
- Poroznost in zlog karbonatnih kamnin
- Diageneza apnenca, diagenetska okolja in evolucija poroznosti
- Dolomitizacija in dolomit
- Zakrasevanje karbonatnih kamnin
- Paleokras
- Sedimentologija karbonatnih rezervoarjev in vodonosnikov;
- Tektonika karbonatnih kamnin

- Porosity and rock fabrics in carbonates
- Limestone diagenesis, diagenetic environments and porosity evolution
- Dolomitisation and dolostones
- Karstification of carbonate rocks
- Palaeokarst
- Sedimentology of carbonate reservoirs and aquifers
- Tectonics of carbonate rocks

Temeljni literatura in viri / Readings:

- James, N.P. and Dalrymple, R.W., 2010: Facies Models 4, Geological Society of Canada, GeoText 6, 3, 323-586.
- Schlager, W., 2005: Carbonate Sedimentology and Sequence Stratigraphy, SEPM Concepts in Sedimentology and Paleontology, #8, 1-200.
- Tucker, M.E. & Wright, V.P., 1990: Carbonate Sedimentology. - Blackwell Scientific Publications, 1-482, Oxford.
- McIlreath, I.A. & Morrow, D.W., 1990: Diagenesis. - Geoscience Canada Reprint Series 4, Geological Association of Canada, 1-125; 277-316, Ottawa, Canada.
- Ford, D.C., Williams, P., 2007. Karst Hydrogeology and Geomorphology. John Wiley & Sons, Chichester, 1-102; 209-270; 321-400.
- Palmer, A.N., 2007. Cave geology. Cave Books, 1-454, Dayton, Ohio.

Temeljni pregledni članki iz revij/fundamental reviews from journals: Earth-Science Reviews, Sedimentology, Sedimentary Geology, Journal of Sedimentary Research.

Cilji in kompetence:

Cilji

Namen predmeta je osvojiti globlje, napredno znanje o geologiji sedimentnih karbonatov s končnim poudarkom na razumevanju razvoja poroznosti in uporabnih vidikih karbonatnih sedimentov. Predmet vodi študentke in študente od osnovnih konceptov in načel klasifikacije in terminologije prek geometrije in faciesne zgradbe karbonatnih platform do diageneze (vključno z zakrasevanjem), poroznosti in tektonike. Dodaten poudarek se daje preteklemu (paleokras) in sedanjemu zakrasevanju karbonatov v Sloveniji in svetu. Predmet je preplet predavanj, študija terenskih primerov in laboratorijskih vaj z ustreznim materialom.

Kompetence

Objectives and competences:

Objectives

The purpose of the course is to provide a deeper, advanced knowledge in geology of sedimentary carbonates with a final emphasis in porosity and applied aspects. It takes students from basic concepts and principles of classification and terminology through carbonate platform facies and geometries to diagenesis (including karstification), porosity evolution and tectonics. Additional emphasis is put on past (palaeokarst) and recent karstification of carbonates worldwide and in Slovenia. Topic of the course will combine lectures, field examples and laboratory examination of the corresponding materials.

Competences

- Develop a research-level understanding of fundamental concepts and selected topics in carbonate sedimentology

- Razviti poglobljeno razumevanje temeljnih konceptov in izbranih vsebin karbonatne sedimentologije na raziskovalnem nivoju

Predvideni študijski rezultati:

Slušatelji in slušateljice se bodo naučili:

- razlikovati osnovne tipe geometrij karbonatnih platform in njihovo variabilnost;
- uporabljati koncept faciesnih modelov v različnih merilih – od zbruska do seizmične ločljivosti;
- razumeti primarne vidike depozicije karbonatov v prostoru in času;
- razumeti načine zakrasevanja ter vpliv litologije in klime;
- razločevati med primarno in sekundarno poroznostjo in razumeti procese razvoja poroznosti;
- razumeti procese in produkte dolomitizacije;
- povzeti glavne vidike geologije karbonatnih rezervoarjev ogljikovodikov in vodonosnikov ter jih razlikovati od tistih v klastičnih kamninah.

Intended learning outcomes:

The students will learn to:

- distinguish the main types of carbonate platform geometries and their variability;
- operate with carbonate facies concepts and models on different scales – from thin section to seismic-scale;
- understand the primary controls on carbonate deposition in space and time;
- understand types of karstification based on lithology and climate;
- distinguish development of primary and secondary porosity in carbonate rocks;
- understand principles of dolomitisation processes and products;
- summarise the main aspects of carbonate reservoirs and aquifers, and compare them with those developed in siliciclastic rocks.

Metode poučevanja in učenja:

- ☒ Predavanja
- ☒ Laboratorijske vaje
- ☒ Terensko delo
- ☒ Seminar
- ☒ Individualne naloge
- ☒ Konzultacije
- ☒ e-izobraževanje

Learning and teaching methods:

- ☒ Lectures
- ☒ Lab work/tutorials
- ☒ Field work
- ☒ Seminar
- ☒ Independent work assignments
- ☒ Consultations
- ☒ e-Learning

Načini ocenjevanja:

Daljši pisni izdelki
Javni nastop ali predstavitev
Končno ocenjevanje (pisni/ustni izpit)

Delež (v %) /
Weight (in %)

30
20
50

Assessment:

Long written assignments
Presentations
Final examination (written/oral)

Reference nosilca / Lecturer's references:

- Torromé D, Aurell M, Martín Pérez A, **Košir A** (2023) A carbonate palustrine system with marshes and shallow ephemeral lakes (Campanian, northeastern Iberian Basin). *Sedimentary Geology* 456:106516
- Bojanowski MJ, Jaroszewicz E, **Košir A**, Łoziński M, Marynowski L, Wysocka A, Derkowski A (2016) Root-related rhodochrosite and concretionary siderite formation in oxygen-deficient conditions induced by a ground-water table rise. *Sedimentology* 63:523-551

- **Košir A** (2004) Microcodium revisited: Root calcification products of terrestrial plants on carbonate-rich substrates. *Journal of Sedimentary Research* 74:845-857
- Brlek M, Korbar T, **Košir A**, Glumac B, Grizelj A, Otoničar B (2014) Discontinuity surfaces in Upper Cretaceous to Paleogene carbonates of central Dalmatia (Croatia): Glossifungites ichnofacies, biogenic calcretes, and stratigraphic implications. *Facies* 60:467-487.