



Międzynarodowa Środowiskowa Szkoła Doktorska  
przy Centrum Studiów Polarnych  
w Uniwersytecie Śląskim w Katowicach

ul. Bedzińska 60  
41-200 Sosnowiec  
tel. +48 32 368 93 80  
polarknow@us.edu.pl  
www.mssd.us.edu.pl



**IEDS/2026/IO/05**

## **Porewater transport (groundwater and recirculated seawater) as a key mechanism regulating carbon and nitrogen cycling and coastal ecosystem functioning**

**The leading unit:** Institute of Oceanology Polish Academy of Sciences

### **Requirements:**

1. MSc degree in physics, chemistry or related disciplines.
2. Experience in laboratory work and chemical analyses (e.g. nutrients, DIC, DOC, chlorides, macrocations, Rn)
3. Very good written and spoken English.
4. High motivation for scientific work.
5. Experience in field research and research cruises, public presentation of research results and writing of scientific articles will be appreciated.

### **Tasks description:**

1. Literature review
2. Analyses of water and sediment samples
3. Interpretation of data
4. Participation in the research cruises and sampling coastal campaigns
5. Preparation of the scientific articles
6. Participation in laboratory meetings, project meeting, scientific international conferences

### **Summary of a doctoral project:**

Coastal sediments are currently most often treated as sites of carbon accumulation and long-term sequestration. However, this perspective overlooks their role as dynamic environments through which intense porewater flow occurs. This project focuses on the advective transport of groundwater and recirculated seawater through sediments, i.e. submarine groundwater discharge (SGD), a process that strongly influences carbon and nitrogen cycling. Seawater recirculation is driven by waves, tides, and pressure and water level gradients.

The aim of the project is to determine how this flow controls exchange between sediments and the water column, the availability of nutrients and oxygen, and microbial processes. The research will also assess the impact of SGD on ecosystem productivity, benthic community



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structure, and greenhouse gas emissions. The project will improve our understanding of these processes and help refine current blue carbon accounting approaches.

**Other information:**

The work will be carried out under supervision of:

dr hab. Beata Szymczycha, [beatsz@iopan.pl](mailto:beatsz@iopan.pl), Institute of Oceanology Polish Academy of Sciences

Contact to the secretary of the IEDS doctoral school: +48 32 3689 380, e-mail: [polarknow@us.edu.pl](mailto:polarknow@us.edu.pl).

Website: <https://www.mssd.us.edu.pl/en/admission-2026-2027/>