EnvSeis Newsletter

Summer/Fall 2023

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Overview

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Events' summaries

Supervision short-course

Long before the arrival of the ESRs, the supervisors had a first short course on supervision skills in Potsdam. The first question in our mind was: How to convince senior and junior researchers to follow a one-week course on supervising in Potsdam? How to make it interesting? It is not without some interrogations that we started planning the program.

Our dear Stuart Lane (UNIL) kickstarted the workshop with a presentation on supervision and expectations based on his experience at the UNIL. For the whole week, regular interventions and games animated by Psychologist Julia Lehnof were given on topics such as leadership, expectation management, communication tools and dealing with conflicts. As a hands-on activity, we also had half a day of active listening animated by the Scratch Improvisation Theater company. And yes, our dear supervisors had to make weird sounds and moves, and they all play the part! Finally, people from Dragonfly told us about managing mental health and mentoring.

In the end, everybody was refreshed and ready to reflect on their practices despite the moody weather ☺

Fieldwork and data analysis short courses

Envseis PhD students have attended two meetings so far. The first one in Leuk/ Arolla La Monta, Switzerland, introduced us to fieldwork methods. Some of the ESRs were missing has they were not hired yet. This reunion consisted in courses on geomorphology of rivers (Lina Polvi Sjöberg, Umeå University), glacier dynamics/processes (Stuart Lane, UNIL) and their monitoring using seismic stations (Eric Larose, ISTerre). These courses were illustrated during hikes along the Illgraben river course as well as the haut glacier d'Arolla. This fieldwork course was followed by an introduction on data processing (Eleonore Stutzmann, IPGP) and seismic wave simulation (Rafael Abreu, IPGP).

The second meeting was a workshop organized in Aussois, France. This time, almost all ESRs were present. Throughout this two-day workshop, PIs were given the opportunity to present different aspects of environmental processes and monitoring using seismic techniques. Hence, they explained what the different sub-projects of the ESRs in the EnvSeis project consist of. Most importantly, it has been the occasion to introduce in detail the EnvSeis doctoral network, what it offers to the ESRs and what is expected from us. These expectations involve making progress in science but also communication and collaboration within and outside the EnvSeis network. But no pressure!

First follow-up on the individual ESRs projects

Stefania Ursica
GFZ, Potsdam, Germany

My recent months have been filled with a blend of studying and boots-on-the-ground experiences. I ventured for almost a month to the China Loess Plateau, where I sampled sediment-laden waters and searched for charcoal to date the dusty terraces of the Yellow River. I also immersed myself in decoding the complex data of a Taiwanese observatory, and I'm not ready to dry up yet. Next on the agenda: I'm gearing up for training on DAS monitoring and some more fieldwork. I'm thankful for these chances and thirsty for more.

Picture from Stephania, showcasing her fieldwork area.

Sibashish Dash
GFZ, Potsdam, Germany

Since joining GFZ Potsdam in mid-May, my journey has been an enriching blend of scientific exploration and cultural immersion. It's been a remarkable experience, delving into the world of seismic studies while savoring the diverse tapestry of European culture and cuisine. One of the highlights of this adventure was the opportunity to participate in a short field course and a comprehensive data analysis course in Arolla, Switzerland. These experiences were like steppingstones in my quest for seismic knowledge. Further expanding my horizons, I embarked on a workshop in France that delved into every facet of environmental seismology. It was a privilege to engage with experts in the field and deepen my understanding. Subsequently, I found myself amidst the stunning landscapes of Brienz, Switzerland, where I conducted fieldwork. Collecting seismic data from our instrument network felt like decoding nature's secrets. Currently, I am fully engrossed in data analysis for my first project.

Juliane Starke

ISTerre, UGA, Grenoble, France

I just started with her PhD-project in September at ISTerre at the University Grenoble Alpes. The university welcomed me with a lot of administrative paperwork. After fighting my way through this, I attended the EnvSeis-Workshop in Aussois, where I learned about landslides, rivers and met all the people involved in the project. Now I will have many meetings with many supervisors to learn about COMSOL, working in the acoustic lab and on the fatigue of rocks…

Selina Wetter

IPGP, Paris, France

I started my PhD project, which centers on calving events in Greenland, by first identifying smaller calving events spanning the last 30 years. At IUGG 2023 in Berlin, I presented first results using a detection algorithm based on the STA/LTA method and machine learning (Random Forests) for event classification. Additionally, I conducted fieldwork alongside the Greenfjord project near a calving glacier in South Greenland during August.

Jiahui Kang

WSL, Zurich, Switzerland

In the last four months, my PhD has centered on monitoring mass movements using DAS data, particularly for early warning applications. I initially delved into relevant literature and attempted to replicate an algorithm for recognizing car signals from DAS data through CWT transformation. After gaining an initial understanding of DAS data, I shifted my focus to analyzing precursors in the context of the Brienz rockslides event. This involved implementing deep learning techniques to distinguish car noise, surroundings, and mass movement signals. Going forward, I aim to enhance data precision and advance our interpretations further.

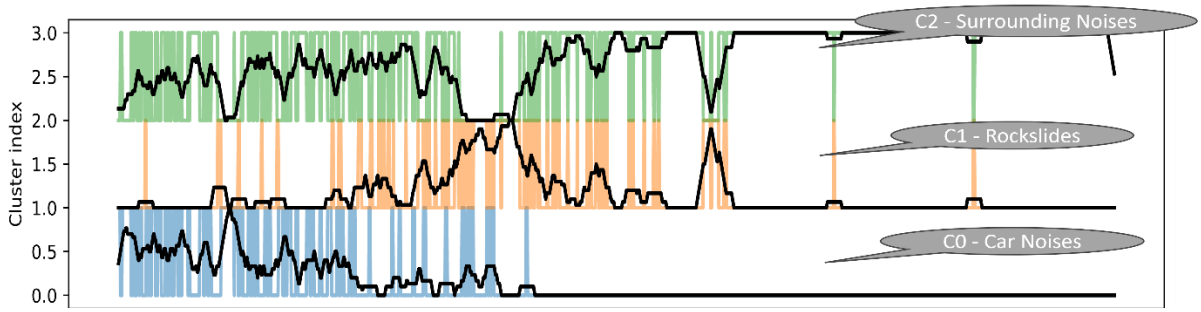
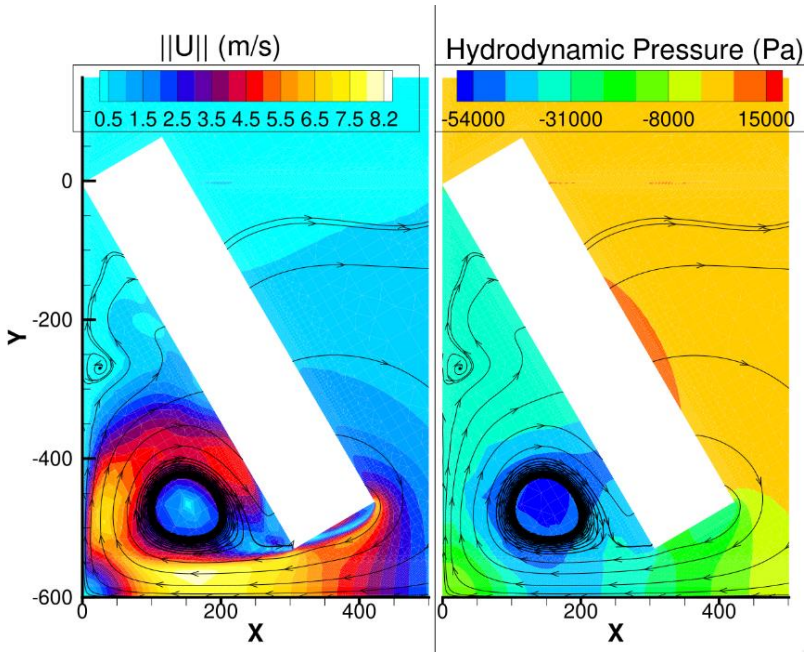


Figure showing the distinction between different seismic signals and related type of sources. © Jiahui Kang

Nicolas De Pinho Dias
IPGP, Paris, France

Simulations of iceberg capsize using computational fluid dynamics is a promising tool to evaluate fluid forces acting on a glacier during after the calving. After improving the code Fine/Marine developed at Ecole Centrale de Nantes to model a contact between a glacier and the iceberg, we have validated the iceberg capsize 2D model by comparison to lab experiments (open ocean capsize: Burton et al. 2012, ungrounded glacier: Amundson et al. 2012). The next step is to run 3D simulations to reproduce a third lab experiment (grounded glacier, Murray et al. 2015). Then it will be possible to compute forces acting on a glacier during the capsize and compute the generated seismic signal.



Snapshots extracted from a simulation showing the velocity magnitude (left) and the hydrodynamic pressure (right) during a full-scale iceberg capsize. X and Y unit is meter. Streamlines are showing fluid direction and are correctly deflected by the wall on the left (x<=0).

© Nicolas de Pinho Dias

Aiswarya Padmadas
BGU, Beer-Sheba, Isreal

Though I haven't started my work 'officially' yet, I have been taking a class in Observational Seismology for the past 1.5 months. Understanding seismic waves can be difficult especially with the noise and when we have data for longer duration. This course is under Research Institution: New Mexico Tech (dealt by Susan Bilek, Professor of Geophysics); which has been really helpful as a good start to understand what waves wants to tell us.

Gwendal Léger
University of Seville, Seville, Spain

I started my PhD in Seville this September. My PhD is about modelling submarine landslides and the seismic waves generated by it from a mathematical point of view. As I only started, I am currently in the reading phase, to get a good understanding of the basics necessary for this work. I will attend a series of courses in Udine, in Italy, during the first week of October, to learn more about landslides mechanics, granular behavior and field-scale flows. During the week, we will go on a field trip, which I'm looking forward to a lot because it is very rare for mathematicians to take part in field trips!

Amandine Missana
NTNU, Trondheim, Norway

The last four months have been a very busy but enjoyable start for me as part of this project. I have first dealt with literature review about seismology methods and landslides monitoring in Norway, and I got a lot of meetings with my stakeholders and media partners. I then took the fieldwork and seismology course in Switzerland, which gave me a very good kick-off for the basic processing of data that I received from colleagues at HVL, Sogndal, Norway. In August and September, I spent 2 weeks on fieldwork. With the help of my supervisors, NVE (The Norwegian Water Resources and Energy Directorate) and NORSAR (stakeholder partner), we installed 18 seismic stations in Northern Norway! I then took part in the first EnvSeis Workshop before diving more into the courses that I am taking this semester. I am now focusing on these courses, while continuing the visualization of some data, planning my first secondment at ISTerre in January, and organizing fieldwork in November to retrieve some of the seismometers we deployed.

Picture from Amandine, showing the open backscarp at Indre Nordneset, Northern Norway (GPS station for scale).

Eva Wolf
UNIL, Lausanne, Switzerland

My PhD started in May. I cross-entered the field from doing statistics in my Masters. Arriving in Geoscience, I had to learn a thousand different things in the first months. Especially how to do fieldwork: organization, logistics, risk assessment and installation of the equipment. With the help of my colleagues, I jumped right into it. My field sites are the Arolla and Otemma glacier, where I am using seismometers to determine bedload transport in the subglacial river. I installed two stations with three three-component geophones on each site, in the glacial forefield, close to the glacier terminus. To accompany these measurements, I also installed a gauging station including a water level sensor and a turbidity sensor. The measurements of course needed some calibration, which was done using dye tracing (measuring discharge) and taking suspended sediment samples (turbidity). To determine the ground properties and wave speed of the elastic waves, we did some active seismic experiment using a sledgehammer and a metal plate. These tests were done over the course of this summer. Just now, my first field season has finished, and I get a chance to take a closer look at my data. Hopefully, I will soon be able to report and compare about the bedload export from these two glaciers for our next newsletter.

Sophia Laporte
Umeå University, Umeå, Sweden

My summer field work this year took place in Abisko (northern Sweden), at Mjellejokka, a meandering river flowing into Torneträsk. I set out 6 geophones, four time-lapse cameras, two pressure sensors that will be measuring continuously during the time of my PhD. With help from my field assistant, I carried out total station surveys (bank profiles, thalweg, right and left river banks), ADCP profiles and drone flights that will be repeated every summer. It was a great field experience and I'm looking forward to collecting the data and getting into understanding ice-related sediment transport and erosion in this river!

Picture of Sophia conducting field measurements in Abisko

Guilherme de Melo
GEOMAR Helmholtz Centre of Ocean Research, Kiel, Germany

In the framework of the International Monitoring System (IMS), hydroacoustic stations operated by "The Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization" (CTBTO) record continuously the soundscape of the ocean. Signals arriving at hydrophones include anthropogenic signals generated by marine industry or shipping as well as signals from natural sources such as earthquakes, volcanic eruptions or storms. In this first project, I am studying seismic signals arriving at the IMS hydrophone triplet at Ascension Island in the Central Atlantic Ocean. I am using a cross-correlation technique to study so called T-waves, which are generated by strong earthquakes (magnitude Mw>5.5) in the equatorial Atlantic. My approach is based on sound propagation through the ocean and hence is going to provide an alternative characterization of the focal area of submarine earthquakes. My new "hydroacoustic epicenters" can be benchmarked against standard seismological source locations derived from global seismographic networks. Furthermore, my methodologies can be used to detect a wealth of natural or man-made hydroacoustic signals such as nuclear explosion, submarine implosions, landslides, or ice breaking.

What's next?

Short Course 4: Research Skills

GFZ is currently planning the next short course for the ESRs. This course will take place in Germany (Potsdam or Berlin) between February 20 and 22, 2024. The goal of this course is to introduce the ESRs to topics related to peer-reviewed publishing, ethics, statistics, and communication. Of course, this event will be one more occasion for the ESRs to meet.

Workshop 2: Discussion

In addition to the short course, a second event will take place at the end of Spring 2024. BGU is currently working on finding the location and the dates. This workshop will be the opposite of the first workshop we had this September, as this time the ESRs will present their projects. The goal of this workshop will be to enhance discussion and collaboration between the ESRs and PIs in the EnvSeis network.

We all look forward to these two promising upcoming events!