



A degassing chamber

Type of the project

Semester project

Laboratory

Smart Environmental Sensing in Extreme Environnements – SENSE

Professor

Professor Jérôme Chappelaz

Supervisor

Professor Jérôme Chappelaz

Contact person at Sailowtech

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Student

To be determined

Context

Sailowtech is an association and a MAKE project that aims to raise awareness of environmental issues, particularly those relating to aquatic environments. It promotes frugal and participative field science, open-source science, and low-tech approach. To achieve this, Sailowtech organizes scientific sailing expeditions in lakes, seas, and oceans to discover field science, test the protocols and devices build by students during the semester.

Understanding the dissolution of greenhouse gases in the ocean is crucial because it directly influences ocean acidity, which has profound implications for marine ecosystems and biodiversity. Additionally, the ocean serves as a significant carbon sink, playing a key role in regulating Earth's climate by mitigating the impact of excess atmospheric greenhouse gases.

Currently, the measurement of greenhouse gases dissolved in water (sea, ocean, lakes) requires sampling and laboratory analysis using complex and expensive equipment. The idea of this project is to take advantage of simpler sensors that measure the concentration of CO₂ in the gas phase, by developing a device that allows liquid samples to be transferred from the liquid to the gas phase. Such equipment would be affordable and portable, enabling its use in sailing expeditions such as those organized by Sailowtech.

Description of the project

The project involves creating a degassing chamber to transfer water samples from the liquid phase to the gas phase. Once the water is in the gas phase, a low-cost CO₂ sensor (such as [this one](#)) will be able to take precise and continuous measurements of the concentration of CO₂ contained in the pumped water. The device needs to be small enough to fit on a sailboat.

Main Tasks



- Establishment of a state of the art of the initial situation,
- Define a project schedule for the semester,
- Establishment of the list of material and the corresponding budget,
- Prototyping of a degassing chamber,
- Establishment of a state of the art of the potential improvements of the device.

Deliverables

At the end of the project, the student will be able to deliver the following content :

- A degassing chamber,
- An instruction manual of the device,
- A report (including a recap the different steps, a “tutorial” of the device, the different scenarios of improvement and explanation of the one we choose, personal experience)

Documentation

- <https://atlas-scientific.com/probes/co2-sensor/>
- [Developments in marine pCO₂ measurement technology: towards sustained in situ observations](#)

Planned interaction with Sailowtech

The aim of this project is to build a device that can be used on a Sailowtech cruise. Consequently, there will be several meetings with Sailowtech (about 3/4 in the semester) to follow the progress of the project and to assess additional requirements for remote measurement. In addition, you will be counted as a member of Sailowtech, and will therefore be able to take part in the various activities and potentially test the device during one of our expeditions.

Contact

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