

## Marine Geodesy – Lab 4 – June 8<sup>th</sup> 2021

This lab is going to be organized on a 4 weeks' schedule. Each of you will work on one dataset available on ILIAS (data folder in Marine Geodesy Lesson). Please choose each one dataset – the 4 of them have to be picked, so please discuss together.

Where is the data (download from ILIAS):

- **marmara\_direct\_path\_acoustic**  
See lab 2
- **waveglider\_japan\_gnssa**  
See lab 3
- **santorini\_seafloor\_pressure**  
Vilaseca, Géraud; Deplus, Christine; Escartín, Javier; Ballu, Valérie; Nomikou, Paraskevi; Mével, Catherine; Andreani, Muriel (2016): Pressure, tilt, temperature and conductivity monitoring within the Immersed Santorini Caldera during Jul 2012 - Sep 2013. PANGAEA, <https://doi.org/10.1594/PANGAEA.855882>.
- **monterey\_gssm\_pressure**  
Wilcock WSD, Manalang DA, Fredrickson EK, Harrington MJ, Cram G, Tilley J, Burnett J, Martin D, Kobayashi T and Paros JM (2021) A Thirty-Month Seafloor Test of the A-0-A Method for Calibrating Pressure Gauges. Front. Earth Sci. 8:600671. <https://doi.org/10.3389/feart.2020.600671>.

The general aim of this work is to understand what are the observations collected and how they can help us measure ground motions of the seafloor. For that, you will need to follow several steps that you are going to discover progressively. What does the raw data show/record? What are the steps you need to work through to give some new perspectives to the data? What models do you need to implement? Which observations actively contribute to measuring positions/changes in seafloor?

The planning of the semester should follow the organization below. We will ask you to work in autonomy with at least one weekly meeting during the lab for questions and hints moving ahead in the study. You can ask your questions by email to [bruce.thomas@gis.uni-stuttgart.de](mailto:bruce.thomas@gis.uni-stuttgart.de) when needed to guide you. Each meeting will help you validate the lab by presenting and discussing your progress with the other students and me.

Lab	Date	Work
4	June 10 <sup>th</sup>	Think carefully about the data. How it needs to be worked with to get ground positions/motions.
5	June 17 <sup>th</sup>	Organize a methodology to study the dataset. Display graphically some results.
6	June 24 <sup>th</sup>	Go further in the results to interpret and discuss.
7	July 1 <sup>st</sup>	No online lab. Maybe a mid-term exam to give you an idea of the final exam.
8	July 8 <sup>th</sup>	Finish a complete report on the dataset with methodology, results and discussion.
9	July 15 <sup>th</sup>	Work on one of the other dataset + discuss.
10	July 22 <sup>nd</sup>	Work on one of the other dataset + discuss.

**Hint n°1:**

What are the first questions I should ask myself when I am working on sea floor geodesy data?

- i. What data set are you working with? What does it represent?
- ii. What format are the data in?
- iii. What parameter(s) are recorded in the data set?
- iv. What parameter(s) represent the final result we are looking for?
- v. How do you transform the available parameter(s) into the final results we are looking for?
- vi. Are there any parameter(s) you need that are not part of your input data? If so, how do you get them?

Answer and complete this list depending on your data and ideas.

**Hint n°2:**

- i. Generate appropriate plots of the input data: map, histogram of values, etc.
- ii. Identify outliers.
- iii. Identify missing data (see vi. in hint n°1).

Answer and complete this list depending on your data and ideas.

**Hint n°3:**

In all project, you need a workflow planning representing the input data, the output results and the logical actions between them. Try building a first draft of a general workflow for your dataset.