Marine Geodesy – Lab 3 – May 20th 2021

Please put you name and student ID on the paper or in the mail you send me (bruce.thomas@gis.uni-stuttgart.de). ***Submission is for Thursday, June the 2nd.*** *I want commented codes easy to run and a PDF text describing your work with figures. Do your best!* ☺ *Good luck!*

During this lab, we will work on some datasets provided by: Iinuma, Takeshi, Motoyuki Kido, Yusaku Ohta, Tatsuya Fukuda, Fumiaki Tomita, and Iwao Ueki. "GNSS-Acoustic Observations of Seafloor Crustal Deformation Using a Wave Glider." *Frontiers in Earth Science* 9 (March 11, 2021): 600946. https://doi.org/10.3389/feart.2021.600946.

Task 1: On ILIAS, download and unzip WG_dataset.tar dataset. Understand the data in the context of the paper and make a table presenting the data. Try to answer the questions below:

i. What data set are you working with?
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 (e.g. baseline lengths, vertical positions, etc.)
v. How do you transform the available parameter(s) into the final results? (i.e. what is the mathematical origin of your final parameter in terms of your input parameters?)
vi. Are there any parameter(s) you need that are not part of your input data? If so, how do you get them? (e.g. online data set, chose representative value(s), explore possible range of values, etc.)

Task 2: Calculate the transducer position using the *Transducer_position.mat* code. Comment and modify it if needed.

Task 3: Map the transducer position (the path followed by the WG) compared with the transponders location. Add a coastline if needed.

Task 4: Explain *ray_trace_chadwell.mat* code. Try to make it work with the WG data and the sound speed data *sound_speed_data_hawaii.txt*.

Task 5: Explain the iterative approach to find the best starting angle for the direct path with *find_direct_raypath.mat*.