Glaciology lab: Bed inclination and surface mass balance with OGGM

Lab report 2

[Name] with [Lab partner]

Introduction

[In paragraph form: Why do we need to use numerical models in glaciology? What are some example questions that a numerical model might answer?]

[Describe the theoretical relationship between glaciers and their bed slope. Similarly, define the equilibrium line altitude and describe the theoretical concept of what happens to glaciers when their ELA changes.]

[Introduce the Open Global Glacier Model and give information that readers might need to understand the lab]

[Describe how you were able to use OGGM] We used a Jupyter Hub maintained on a cluster at the University of Bremen to access and run OGGM. The Jupyter notebook environment allows us to…

Methods

[For each experiment, describe the methods in paragraph form. The questions below are to remind you of what should be included in your description.]

Experiment 1.

1. How did you define the geometry of the bed?
2. What were the initial settings for bed shape and glacier width? What new settings did you try?
3. How did you define the mass balance?
4. What method must we use to study the glacier change over time?

Experiment 2.

1. What mass balance parameters did you vary, and what is their physical meaning?
2. How did you vary the parameters in the model?

Results

[From each experiment, present one or more images with a figure number and descriptive caption to illustrate your main result. Answer the questions in paragraph form.]

Experiment 1:

1. How does the final length of the glacier depend on bed slope?
2. How does the pattern of glacier growth over time depend on bed slope?

Experiment 2:

1. How does the shape of the glacier depend on the equilibrium line altitude?
2. Let’s consider two glaciers with the same ELA, but one with a large mass balance gradient and one with a smaller mass balance gradient. Which one should we expect to store more water?

Discussion

[In paragraph form, highlight key points of your results and interpret them with added context. The questions below should be answered in your report.]

1. Compare and contrast the numerical glacier in OGGM with the goo glacier you observed in the lab.
2. What is simulated in OGGM that was not included in the goo glacier?
3. How might a real glacier differ from what you have simulated in this experiment?
4. What insight can you gain by combining these OGGM experiments with your goo glacier experiments?

Conclusions

[Summarize the key takeaways of the two experiments]