Eric Gagliano

ESS 505: The Cryosphere

**Term Project Extended Outline**

“I'd like to meet with each of you next week to discuss your projects. If you could prepare and send me an extended outline (1-2 pages outline or bullet points) of what you plan to present before we meet, that would be appreciated. This won't be a graded assignment, but I think it would be useful to do this by Wednesday of next week at the latest so that there is some time for revisions before the presentations on the following Friday. ”

The final paper should be the format, style, and length equivalent of a publication in Geophysical Research Letters or Geology. Both journals aim to rapidly publish short-format, high-impact research of interdisciplinary interest. Paper length should be approximately 2000 to 2500 words (~4 formatted pages), including the abstract (250 words or less), but excluding figure/table captions, citations, and references. Approximately four display items (figures or tables) can be included. No more than 30 references should be cited. If data and/or new computational methods are presented in the paper, information on data/computational code availability should be given. Supplements/appendices can be used to further explain mathematical or other background information and allow presentation of additional data, but the paper should be written such that this information is truly supplemental and is not essential to understand the main conclusions. Both Geology and Geophysical Research Letters provide manuscript templates to aid in formatting.

You will also give a (12-minute) oral presentation in the final discussion section of the course. The format should be similar to that of a talk given at the American Geophysical Union (AGU) fall meeting, Geological Society of America (GSA) annual meeting, or another international conference. The presentation should be accessible to anyone with an undergraduate degree in geology or a related field, but also present information of interest to specialists. Generally, the presenter spends 2 to 3 minutes introducing the topic, 8 minutes discussing the study and its results, and 2 to 3 minutes summarizing the study (with emphasis on the impact of the results). If there is sufficient time, a few questions are permitted. In our case, we will allow 3 to 5 minutes of questions. Tentatively, presentations are planned for the final lab section (Friday December 11th 2020).

**Topic:** For my topic I would like to look at using InSAR to measure SWE.

**Data:** Use Sentinel-1 data in OpenSARlab. Could possibly look at GLISTIN data if needed.

**Location:** Might look around South Cascade Glacier area because of ground truth availability and snow on both glaciated and non-glaciated areas. Could look at Grand Mesa area for calibration. Look at wet vs dry snow, accumulation vs ablation areas.

**Starting place and resources:** Elias Deeb’s dissertation “ESTIMATING SNOW WATER EQUIVALENT (SWE) USING INTERFEROMETRIC SYNTHETIC APERTURE RADAR (INSAR)” from University of Utah in 2012. “SNOW MASS RETRIEVAL BY MEANS OF SAR INTERFEROMETRY” (Rott 2003). “InSAR for estimation of changes in snow water equivalent of dry snow” (T. Guneriussen 2001). “On the estimation of temporal changes of snow water equivalent by spaceborne SAR interferometry: a new application for the Sentinel-1 mission” (Conde 2019).

**Things to consider after talking with Knut:** Wet snow may be a problem on South Cascade Glacier, look at it anyway. Also potential locations could include some Alaska benchmark glaciers.

Problems so far: lots of issues with opensarlab that probably won’t be fixed in time

Use SNAP?

Use dinosar?

How get validation swe?