Re: Re: [EXTERNAL] Re: AGU e-lightning presentation about Kennicott Glacier--seeking contributions

Cameron Markovsky <cmarkovsky99@gmail.com>
Fri 2021-12-10 12:45
To: Loso, Michael G <Michael_Loso@nps.gov>

1 attachments (462 bytes)
2020sites.csv;

Sure thing,

The most recent data is in the Kennicott Stake Records-V5.xlsx file. This includes all the measurements up to July 2021. It needs to be updated with the late summer measurements though (from the last expedition in September). The CSV folder has .csv files for each individual stake, but it is all the same data as the excel file. In the code, I have it filter through the data and only get stakes that have two melt periods for 2020 and one for 2021. The stakes included in the figures on the poster, along with their lat/long, are on the attached .csv. Hopefully, this helps some, I can also give .csvs for all the newly drilled stakes and I have a bunch of little code snippets to help convert the data to more readable formats that I'm happy to pass along if it seems useful. I think that I have most of it included in the final_model code though.

Best,
Cameron

On Fri, Dec 10, 2021 at 1:34 PM Loso, Michael G <Michael_Loso@nps.gov> wrote:

> Thanks Cameron
>
> Favor to ask--can you point me towards the portions of those data that would be the complete dataset to utilize to create a more complete melt/DDF plot? I'm thinking the 2020 and 2021 data, but not sure if there is more. And don't want to use anything you think is flawed. Basically the two datasets that I see on the poster.
>
> Thanks,
>
> Mike
>
> ---
>
> **Michael G. Loso, Ph.D.**
> Geologist, Resource Stewardship & Science
> Wrangell-St. Elias National Park & Preserve
>
> Principal Investigator and co-PI, Glaciers
> Central & Southeast Alaska Networks, Inventory & Monitoring Program
>
> Michael_Loso@nps.gov
> 907.529.9372

From: Cameron Markovsky <cmarkovsky99@gmail.com>
Sent: Thursday, December 9, 2021 09:02
To: Loso, Michael G <Michael_Loso@nps.gov>
Cc: eipetersen@alaska.edu <eipetersen@alaska.edu>
Subject: Re: Re: [EXTERNAL] Re: AGU e-lightning presentation about Kennicott Glacier--seeking contributions

Sure thing!

Here is a folder with my final code, the stake class code, .csv files for each stake, and the raw data set.

Let me know if there's anything I can provide!

Hope all is well,
Cameron

On Tue, Dec 7, 2021 at 12:41 PM Loso, Michael G <Michael_Loso@nps.gov> wrote:

> Thanks Cameron
>
> I don't think I'll make any mods in time for this presentation, but it would be great to get all your melt data and whatever code you used to generate the melt equation (or just the equation, whatever) so I can take this to the next step next round. Thanks!
>
> Mike
>
> **Michael G. Loso, Ph.D.**
> Geologist, Resource Stewardship & Science
> Wrangell-St. Elias National Park & Preserve
>
> Principal Investigator and co-PI, Glaciers
> Central & Southeast Alaska Networks, Inventory & Monitoring Program
>
> Michael_Loso@nps.gov
> 907.529.9372

From: Cameron Markovsky <cmarkovsky99@gmail.com>
Sent: Tuesday, December 7, 2021 10:25
To: Loso, Michael G <Michael_Loso@nps.gov>
Cc: eipetersen@alaska.edu <eipetersen@alaska.edu>
Subject: Re: Re: [EXTERNAL] Re: AGU e-lightning presentation about Kennicott Glacier--seeking contributions

Hi Mike,

Sorry for the delay. Of course, the same thing happened to me for your last email and I just saw this one. That all looks great to me! I can send over the code and equation of the graph if you still need it but I think that's pretty good. I think it's

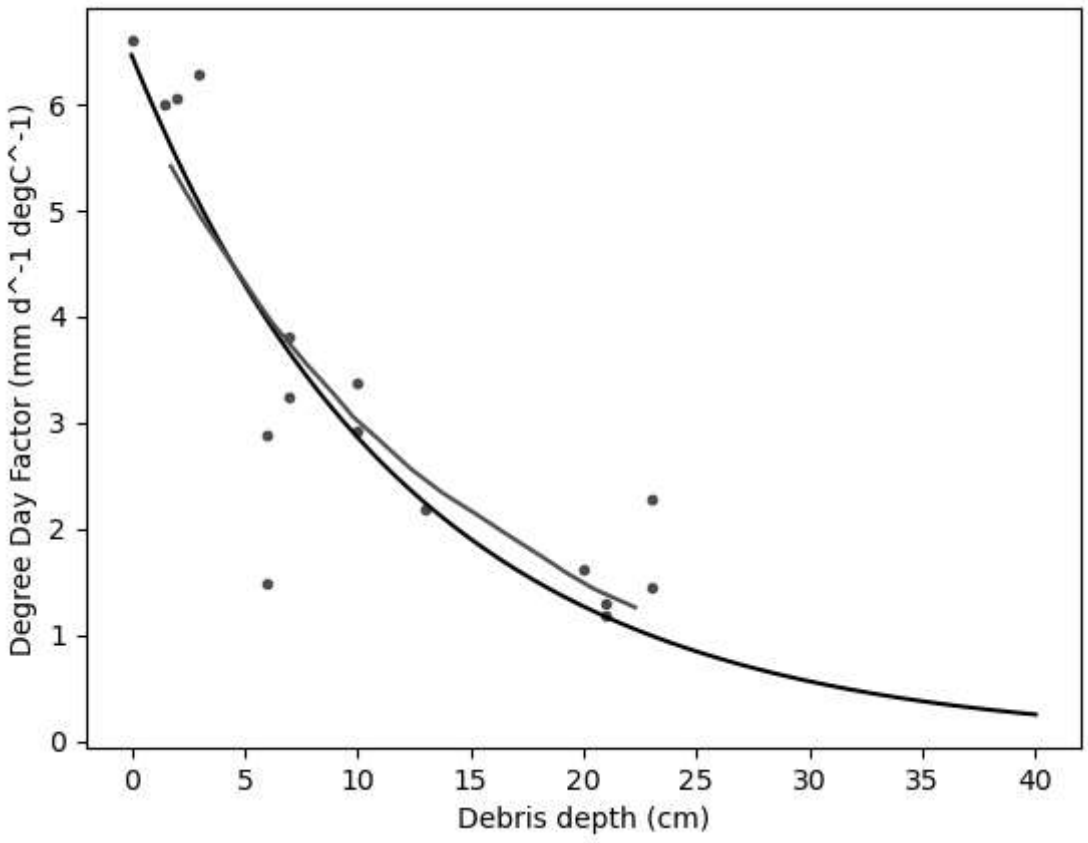
definitely plausible that it can underestimate DDF for low debris thicknesses (we observed higher ones in the 2021 data) so that would be good to think about moving forward. I'd be happy to discuss it more.

Let me know if there's anything else I can help with!

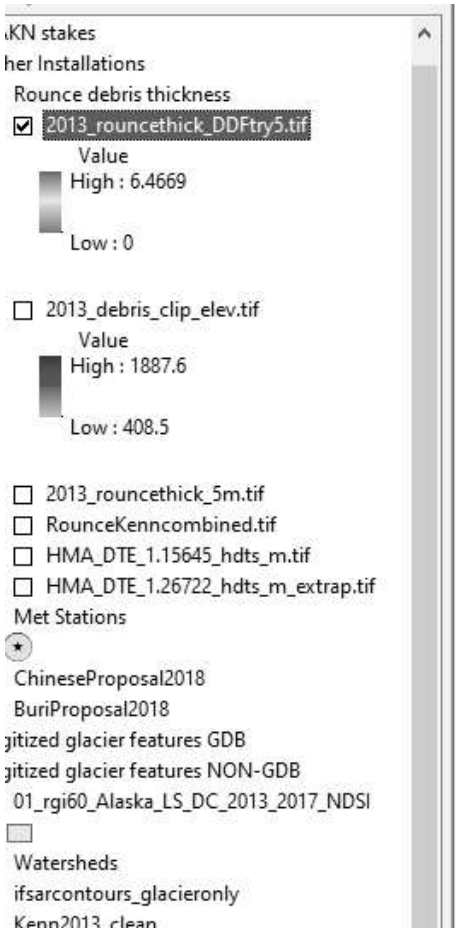
Thanks,
Cameron

On Tue, Dec 7, 2021 at 12:22 PM Loso, Michael G <Michael_Loso@nps.gov> wrote:

> Cameron (and Eric)
>
> Sorry I didn't get your email earlier, Cameron. It hit my junk mail in a poorly timed way. But I was able to get a copy of your poster from Eric and extracted your debris thickness vs. measured melt data from 2020, added my own separately derived clean-ice DDF (which fits really nicely with your data!), and derived a negative exponential DDF equation that I was able to apply to the rounce debris-thickness map as a first pass at deriving actual melt values from the synthetic temperature record I've developed. Lots more to do, but it took some work to get here so I'm pleased.
>
> Just wanted to double-check that my plan is ok with you. Here's my plot derived from your data, including the curve. I will credit you directly with this. The black curve is mine, the red is the one in your poster (I didn't have the equation for it, and in any case wanted to fit using my 0-depth point as well):



> Using that I derived a raster map of DDFs on the debris-covered parts of the glacier, using Scherler for the outline of the debris and Rounce for the actual debris thicknesses. I think the DDF is maybe too low in the lowest elevations, suggesting I should add an asymptote greater than zero to the equation for the curve above, but I'm not at the point of rigorously justifying that yet. So this is what I use.



Anyway, the rest is blah blah blah and I've got to put it all on a poster the rest of today. But just wanted to make sure you're (both) okay with how I'm using that data. You're of course a co-author, Cameron, and I'll highlight your work (and your presentation).

All good?

Mike

Michael G. Loso, Ph.D.
Geologist, Resource Stewardship & Science
Wrangell-St. Elias National Park & Preserve

Principal Investigator and co-PI, Glaciers
Central & Southeast Alaska Networks, Inventory & Monitoring Program

Michael_Loso@nps.gov
907.529.9372

From: Cameron Markovsky <cmarkovsky99@gmail.com>
Sent: Sunday, December 5, 2021 07:56
To: guowq@lzb.ac.cn <guowq@lzb.ac.cn>
Cc: Loso, Michael G <Michael_Loso@nps.gov>; rehock <rehock@alaska.edu>; Regine Hock <regine.hock@geo.uio.no>; ericpetersen <ericpetersen@arizona.edu>; Thompson, Anna C

<anna_thompson@partner.nps.gov>; tristan.amaral3 <tristan.amaral3@gmail.com>; hhd <hhd@lzb.ac.cn>; dhguan <dhguan@lzb.ac.cn>; 杨瑞堂 <yrt@lzb.ac.cn>
Subject: Re: Re: [EXTERNAL] Re: AGU e-lightning presentation about Kennicott Glacier--seeking contributions

Hi Everyone,

Thanks for reaching out Mike and sorry for the delayed response, I've been out of town for a few days.

My affiliations are 1 and 6 (the UAF GI and University of Utah). As for a figure, I'd be happy to provide one for the presentation. Is there a specific figure that you think would be best (Debris-depth vs. DDF graph maybe?). I'm also happy to just send over a .zip with all of the different figures in it and you can choose which one would be best.

Thanks and hope everyone is doing well!

Best,
Cameron

On Tue, Nov 30, 2021 at 7:43 PM guowq@lzb.ac.cn <guowq@lzb.ac.cn> wrote:

> Hi Mike,
>
> Ruitang is visiting UiO now and has visited UAF, so I suggest to add both in follows the common convention of visiting scholar. But it's up to Ruitang's decision. All of we Chinese colleagues are affiliated to the State Key Laboratory of Cryospheric Sciences.
>
> Best,
> Wanqin
>
> ---
>
> **From:** Loso, Michael G
> **Date:** 2021-12-01 05:20
> **To:** Regine Hock
> **CC:** Regine Hock; Petersen, Eric Ivan - (ericpetersen); Wanqin Guo; cmarkovsky99@gmail.com; Thompson, Anna C; Tristan Amaral; hhd@lzb.ac.cn; dhguan@lzb.ac.cn; yrt@lzb.ac.cn
> **Subject:** Re: [EXTERNAL] Re: AGU e-lightning presentation about Kennicott Glacier--seeking contributions
>
> Thanks Regine,
>
> Eric, let me know if you have any different funding support for this work, other than what Regine provided.
>
> I agree that one of Cameron's figures would be good to include. Have not heard back from him--anyone know if there is a better email address to use?
>
> A few photos from you, Regine, and anyone else, would be welcome. I'll create a little slide show.
>
> Thanks Wanqin for the data. If Eric has any newer data I'll hope he forwards it. Can you clarify one point from your email: should I be listing UAF and UiO as co-affiliations for Ruatang? And/or for all of you from the State Key Laboratory?

Mike

Michael G. Loso, Ph.D.
Geologist, Resource Stewardship & Science
Wrangell-St. Elias National Park & Preserve

Principal Investigator and co-PI, Glaciers
Central & Southeast Alaska Networks, Inventory & Monitoring Program

Michael_Loso@nps.gov
907.529.9372

From: Regine Hock <rehock@alaska.edu>
Sent: Monday, November 29, 2021 09:39
To: Loso, Michael G <Michael_Loso@nps.gov>
Cc: Regine Hock <regine.hock@geo.uio.no>; Petersen, Eric Ivan - (ericpetersen) <ericpetersen@arizona.edu>; Wanqin Guo <guowq@lzb.ac.cn>; cmarkovsky99@gmail.com <cmarkovsky99@gmail.com>; Thompson, Anna C <anna_thompson@partner.nps.gov>; Tristan Amaral <tristan.amaral3@gmail.com>; hhd@lzb.ac.cn <hhd@lzb.ac.cn>; dhguan@lzb.ac.cn <dhguan@lzb.ac.cn>; urt@lzb.ac.cn <urt@lzb.ac.cn>
Subject: [EXTERNAL] Re: AGU e-lightning presentation about Kennicott Glacier--seeking contributions

Hi Mike,

thanks for reaching out. Great to present such a comprehensive overview of what is going on on Kennicott.

Here some info:
- affilations are correct for me
- grant: NSF grant # 1917536 (number probably not important but NSF should be acknowledged
- logo attached
- photos: do you have enough. I took a lot of the instrumentation in 2020 and could make them all available to you if you like.
- A cool figure to include could be Cameron´s melt vs debris thickness figure (although he will present himself, but it is key figure)

Good luck
Regine

UiO : University of Oslo

On 29 Nov 2021, at 17:47, Loso, Michael G <Michael_Loso@nps.gov> wrote:

Hi all,

You may recall I submitted an abstract, for which you are a coauthor, to AGU this fall. I'm not going in person, but still planning to do the poster/e-lightning presentation. As a reminder, I've pasted the title and abstract below.

I'm writing to ask for ideas and contributions. This is of course a work in progress and I'm focusing on gathering together existing data and doing a preliminary analysis of that data--I won't get to the point of running the enhanced temperature index model, but I do have a bunch of QC'd ablation stake data (for the NPS stakes), a pretty comprehensive climatic forcing analysis, a bathymetry map for the proglacial lake, a proglacial river discharge record, and a contemporary hyposometry / glacier outline to work with. Some of these items already include contributions from some of you, but if you have additional items to share, I'd like to include your ongoing work in this poster. For those of you who have your own related presentations at AGU (Eric and Cameron--any others?), my goal would not be to steal your thunder but include one figure or graphic or result that "advertises" your work and points the viewer towards your own more detailed presentations.

So, consider this email a solicitation for contributions. In particular, I'd appreciate the following:

- everyone, please check your name and affiliation for correctness
- everyone, if you have an institutional logo you want to share, please send me a .jpg or similar and I'll include it.

- everyone, same for funding--if you want it mentioned please send me the info
- Cameron and Eric, if you have a snapshot from your presentation that I can include to "advertise" your work, please send along
- Wanqin, Eric, and others: if you have any ablation stake results I can include in my analysis, please share (I already have your met station data--thanks)

Thanks all, and hope you had a good weekend.

Mike

Glacier monitoring and melt modeling on debris-covered Kennicott Glacier, USA

For submission to Session: C025 - Observations and Models of Glacier Change

Authors: Michael Loso[1], Regine Hock[2,3], Eric Petersen[3], Wanqin Guo[4], Cameron Markovsky[2, 6], Anna Thompson[1], Tristan Amaral[1, 5], Haidong Han[4], Donghui Shangguan[4], Ruitang Yang[4],

[1] Wrangell-St. Elias National Park and Preserve, Inventory and Monitoring Program, Alaska, USA

[2] Department of Geosciences, University of Oslo, Oslo Norway

[3] Geophysical Institute, University of Alaska, Alaska USA

[4] State Key Laboratory of Cryospheric Science, Northwest Institute of Eco-Environment and Resources, Chinese Academy of Science, China

[5] Colorado Snow Survey Office, Natural Resource Conservation Service, Colorado USA

[6] University of Utah, Salt Lake City, Utah USA

Abstract

Kennicott Glacier, within Wrangell-St. Elias National Park in southern Alaska, is a large (>380 km^2) valley glacier with multiple high-elevation tributaries and a debris-covered snout that terminates in a growing proglacial lake. Though it shares these characteristics with many Alaskan glaciers, the Kennicott is unique in being highly visible and accessible to visitors. It has been selected for long-term monitoring by the National Park Service Inventory and Monitoring Program and colleagues at University of Alaska Fairbanks and the Chinese Academy of Sciences. Here, we present the first results of a comprehensive mass balance monitoring program, focusing on the development and parameterization of an enhanced temperature index model that explicitly accounts for ablation on snow-, ice-, debris-, and lake-covered surfaces, with a separate model for ice cliffs in the debris-covered areas. The model is driven by observations of temperature at an array of weather stations on two mid-glacier nunataks, on four glacier-adjacent sites, and on the glacier surface at one debris-covered and two debris-free sites. We find substantial variability in measured lapse rates, which average -4.1 C/km during the melt season but require adjustments for the strong effects of debris-cover and on/off-glacier variability. Surface melt has been measured for up to six years at a stake network that ranges from ~2200 m in the accumulation zone to ~450 m in the completely debris-covered ablation zone. In addition to these 20+ traditional stake measurement sites, some of which are utilized to parameterize a debris-thickness-dependent melt parameter, we utilize direct measurements of surface-normal backwasting rates on ice cliffs at variable aspects. We compare output of the composite melt model with river discharge measured at the Kennicott River downstream of the glacier terminus, and calculate sensitivity of our results

to parameterization of the model subcomponents. Our results, coupled with a prescribed precipitation rate that we will enhance in future iterations of the monitoring program, are consistent with published geodetic balance estimates and provide insight into the relative importance of melt processes in multiple surface environments and also into the importance of detailed measurements of the temperature forcing.

Michael G. Loso, Ph.D.
Geologist, Resource Stewardship & Science
Wrangell-St. Elias National Park & Preserve

Principal Investigator and co-PI, Glaciers
Central & Southeast Alaska Networks, Inventory & Monitoring Program

Michael_Loso@nps.gov
907.529.9372

--
-Cameron Markovsky

--
-Cameron Markovsky

--
-Cameron Markovsky

--
-Cameron Markovsky