IACS Working Group on Debris Covered Glaciers

Status report for the period November 2020 – August 2021

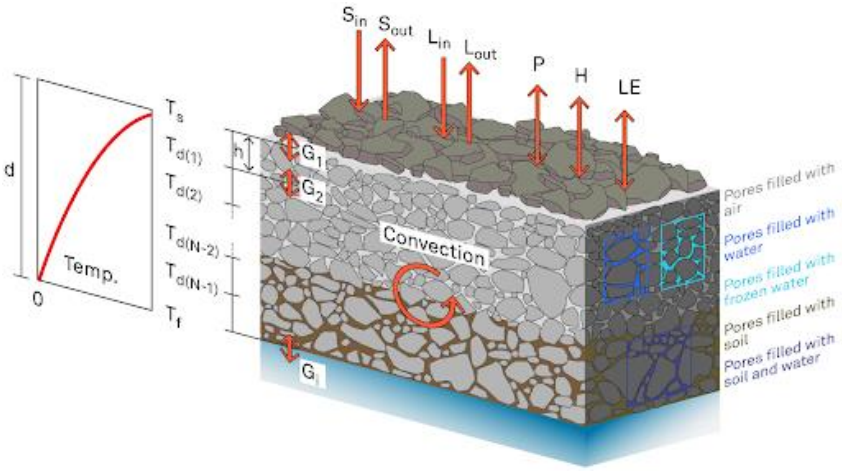
Lindsey Nicholson, Francesca Pellicciotti and Dave Rounce

This is the third report of the WG, which was established in September 2018 aiming to advance our ability to map debris thickness, identify model complexity required to estimate sub-debris melt and coordinate knowledge exchange on debris-covered glaciers. While valuable progress has been made on several efforts (detailed below), we note that the pandemic has greatly affected our progress over the past year as WG leads and members were forced to find new ways of working from remotely and caring for family. The impossibility to meet in person at major conferences also hindered progress, as we note our meetings at EGU, AGU and similar venues were major occasions to further progress, stimulate discussion and foster team spirit and focus within the DCG community.

1) Melt model intercomparison:

The multi-author publication (led by Francesca Pellicciotti) comparing 14 sub-debris melt models over multiple locations and climatic zones has seen in this reporting period substantial advances and is now close to completion. The leading authors (Francesca and Adria Fontrodona Bach from her group) have received two full rounds of reviews by co-authors and are now making the last edits to the final version, which we plan to submit by the end of September. The publication highlights a number of key results on model complexity, and importantly paves the way for future research: it has identified the lack of knowledge of debris properties as a crucial knowledge gap which affects model applications across the range of model complexity, and it highlighted the processes that need to be included in future model developments (see Figure below, from the paper).

Title: DCG-MIP: The debris-covered glacier melt model intercomparison experiment



2) Conference sessions:

Well-attended conference sessions, stimulating good discussion and networking opportunities were proposed and (co-) chaired by WG members at:

- EGU 2021: CR6.2 Evolution of debris-covered glacier land systems

Because of the online format and some saturation by the community towards digital conferences we decided not to organise a session at AGU, as in the past reporting period.

3) Working group status and meetings:

The current membership stands at 67, coming from 18 nations, with 1/3 of the members being female. Working group general meetings were held online on 10th December 2020 and 7th May 2021. In addition several online focus group meetings were held to progress specific activities, and to finalise the DGC MMI paper in particular, which is nearing its completion and therefore required more meetings.

4) Special issue in Frontiers:

The Frontiers Journal Research Topic "Debris-Covered Glaciers: Formation, Governing Processes, Present Status and Future Directions", edited by WG members is now reaching the finalization stages. From 40 promised submissions we received 20, which Frontiers informs us is respectable. 10 are published, 8 are in review, 1 is in initial validation stage and 1 has been rejected. We hope this will represent the state of the knowledge in 2021 (https://www.frontiersin.org/research-topics/15132/debris-covered-glaciers-formation-governing-processes-present-status-and-future-directions), and for collections of more than 8 papers we have the option to produce a Frontiers 'book' of the collection.

5) UNESCO manual on field measurements on debris-covered glaciers

A new initiative was started in 2021 (led by WG members Anderson, Fyffe, Sakai, Schoessow, Steiner) to produce a manual joint, free, UNESCO-IACS publication 'Methods manual for the study of debris-covered glaciers'. Content for this will be gathered through a limited series of online global roundtables and edited into a coherent document by the authors listed above.

6) Web outreach:

Our website www.rockyglaciers.org is unfortunately relatively inactive but we continue to seek controbutions and volunteers to add content. On the otherhand the @rockyglaciers.twitter handle is relatively successful and active with several people from our team postting albeit irregularly.

7) Data sharing platform and planned publication:

The shared zenodo data community continues to grow (https://zenodo.org/communities/iacswgondcgs/). A list of >100 further datasets that the community wishes to publish as freely available datasets with an accompanying Earth System Science Data (ESSD) publication has been compiled and the accompanying metadata is being homogenised for the sumbission. This publication (led by Lindsey Nicholson) has been structured and outlined, but was on hold over summer 2021 as many contributors were away. A submission is planned by the end of the year.

8) Debris thickness mapping

Several WG members have independently made much progress in this area over the course of the WG – and these advances help define the relevant information gap to be addressed in the planned community effort and publication. Initial meetings have begun to define the scope of a debris thickness comparison and analysis section that will begin this year.

9) Funding aspects:

We have not spent any money in 2021. Our only outgoing is the GBP 98.88 for the hosting of rockyglaciers.org for 10 years. We continue to advise ECS and WG members lacking funding that we have some financial capacity to support them in participating in WG activities, but this has not been taken up during COVID restrictions.