Corrigendum to The Cryosphere, 15, 133–148, 2021
https://doi.org/10.5194/tc-15-133-2021-corrigendum

The Cryosphere
Open Access
EGU

Corrigendum to "Spectral characterization, radiative forcing and pigment content of coastal Antarctic snow algae: approaches to spectrally discriminate red and green communities and their impact on snowmelt" published in The Cryosphere, 15, 133–148, 2021

Alia L. Khan[1,2], Heidi M. Dierssen[3], Ted A. Scambos[4], Juan Höfer[5,6], and Raul R. Cordero[7]

[1]Department of Environmental Sciences, Huxley College of the Environment, Western Washington University, Bellingham, WA, USA
[2]National Snow and Ice Data Center, Cooperative Institute for Research in Environmental Sciences, University of Colorado – Boulder, Boulder, CO, USA
[3]Department of Marine Sciences and Geography, University of Connecticut, Groton, CT, USA
[4]Earth Science and Observation Center, Cooperative Institute for Research in Environmental Sciences, University of Colorado – Boulder, Boulder, CO, USA
[5]Escuela de Ciencias del Mar, Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile
[6]Centro FONDAP de Investigación en Dinámica de Ecosistemas Marinos de Altas Latitudes (IDEAL), Valdivia, Chile
[7]Department of Physics, University of Santiago, Av. Bernardo O'Higgins 3363, Santiago, Chile

Correspondence: Alia L. Khan (alia.khan@wwu.edu)

Published: 9 July 2021

The prefix M for million was missing when reporting the values of snowmelt volume attributable to the presence of algae. The values are 3 orders of magnitude larger than what was reported originally. The calculations, which are described in the paper, are also provided below.

In the Abstract and Sect. 4 "Potential regional climate impacts", the amount of snow melted by green-colored snow algae (1.53 megatons (Mt)) and by red-colored snow algae (0.74 Mt) is equivalent to 2.52 and 1.22 million cubic meters (Mm^3) snowmelt, respectively. Therefore, the snowmelt volume is 3 orders of magnitude larger, 2522×10^3 and 1218×10^3 m^3, than what was initially reported, 2522 and 1218 m^3 snowmelt.

These numbers are discussed in Sect. 4 "Potential regional climate impacts". They are derived from a cursory calculation of the overall radiative forcing (RF) by red and green snow algae in the AP region by taking the Gray et al. (2020) green snow algae surface area estimate of 1.9 km^2 for the northern AP and our average daily RF calculation of 26 $W m^{-2}$ by green snow algae and 13 $W m^{-2}$ for red snow algae. This results in a total daily RF by green snow algae of 50 and 24 MJ by red algae. Although the timing and duration of snow algae blooms are not well-documented, if we assume a 118 d growing season from 18 December to 15 April, this translates to a seasonal increase in energy absorbed at the snow surface of 51×10^7 MJ per season by green snow algae and 25×10^7 MJ per season by red snow algae over the northern AP study region. Furthermore, if 334 000 J is needed to melt 1 kg of snow (Cohen, 1994), this results in roughly 1.53 Mt or 2522 Mm^3 of snow melted by green-colored algae and 0.74 Mt or 1218 Mm^3 of snow melted by red-colored algae, assuming a snow density of 610 $kg m^{-3}$ as described in the methods section. This results in a substantial impact on snowmelt in the algae-covered regions versus adjacent algae-free areas.

Published by Copernicus Publications on behalf of the European Geosciences Union.