

Interactive comment on “No role for industrial black carbon in forcing 19th century glacier retreat in the Alps” by Michael Sigl et al.

Anonymous Referee #1

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This paper sets out to challenge the hypothesis that an increase in industrially-produced black carbon (refractory black carbon; rBC) is responsible for glacier retreat in the Alps during the latter half of the 20th century due to a decreasing albedo feedback mechanism. The authors use data acquired from 2 new ice cores from the Colle Gnifetti and to derive the timing of an increase in rBC deposition above preindustrial levels and compare it to the timing and rates of glacial retreat, finding that most of the glacier retreat in the Alps had occurred prior to the onset of higher rBC. Another notable finding of the study is a discrepancy in modelled and reported rBC emissions and what is actually reported in the ice cores.

I think that this is an excellent manuscript. The authors do a great job in tying their observations from a single site to observations from other rBC records in the region as

C1

a validation of the regional scope of their conclusions, and using a multi-proxy approach to documenting potential rBC source. The time of emergence analysis is novel for this application and was useful for deriving the emergence of “industrial” rBC as an aerosol.

I thought that Figure 7 was particularly effective because it showed how glacier advance/retreat was functioning independently of rBC concentration where glaciers retreated when rBC concentration is high and advance when it is low.

Minor editorial comments are as follows:

Abstract, line 19: should be “The basis...” Pg 1, line 7: why “already”? Pg 1, line 8: should it be “cloud forming processes”? Pg 1, line 26: “hampering to attribute” is awkward. Pg 4, line 18: why is it summer biased? Pg 7, line 9: missing a period Pg 11, line 26: “forced by the latter” is awkward Pg 12, line 8: “documentaries”? Pg 13, line 11: delete “towards” Pg 14, line 13: maybe change “Much understanding” to “Much of the understanding”?

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2018-22>, 2018.

C2