Earth System
Dynamics
Discussions

Interactive comment on "Mesoscale atmospheric circulation controls of local meteorological elevation gradients on Kersten Glacier near Kilimanjaro summit" *by* Thomas Mölg et al.

Anonymous Referee #1

Received and published: 19 January 2020

Comments on the "Mesoscale atmospheric circulation controls of local meteorological elevation gradients on Kersten Glacier near Kilimanjaro summit" by Mölg et al.

Using a subset of AWS data observed at 2 stations on Kersten Glacier, Kilimanjaro, and high spatial resolution simulation results, the authors produce estimates of vertical gradients of air temperature, humidity, and accumulation. With the added value of high spatial resolution simulation, the authors analyze the mesoscale circulation controls of meteorological vertical gradients. Based on that analysis, the authors make recommendations as to what gradient values are most appropriate for the glacier zone on Kilimanjaro. The manuscript has some strong points: the subject is relevant, some of

the methods are well established and, perhaps most importantly, the manuscript deals with a region where observations are relatively rare. Overall, the manuscript reads well and almost ready for publication, with a few technical aspects to correct and a few minor points to consider.

Minor comments:

Please provide more information about the configuration of atmospheric model experiments, for example, the name of the model, microphysics, convection schemes, land surface or glacier surface schemes. Just providing a reference is not convenient enough for readers.

Line 9: "who detail climatological signatures" → "who detailed climatological signatures".

Figure 3: How large is the "southern mountain slope" region or how many grid points?

Figure 5b: Please plot the simulated mean diurnal cycle of air temperature gradient in Fig 5b as well. The computation of the standard deviation may be overplotted in Fig 5b.

Line 368: "Figs. 5b and S2" → "Figs. 5b and S3".

Line 536: "the mountain's hydroclimate" → "the hydroclimate of the mountain".

Line 566: "the Kaser and Osmaston (2002) description" → "the Kaser and Osmaston (2002)'s description".