

Interactive comment on “Glacier detachments and rock-ice avalanches in the Petra Pervogo range, Tajikistan (1973–2019)” by Silvan Leinss et al.

Anonymous Referee #2

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General Comments

This study shows new insights into the detachment of glaciers and its processes in general. They discovered several detachments in the north-western Pamir and described them in detail. The authors provided many new information about the environments where this high number of detachments took place. Further, they used many different datasets to complete their research but missed more detailed description of their methods to detect the glacier dynamics because clear definitions are missing. Of course, it is difficult (similar to e.g. glacier surges) to explicitly define a glacier detachment and to distinguish from other mass movements.

Even though the variability of datasets is high, there might be more scenes of declassified data (KH-4a/b or KH-9) which have a high resolution up to ~2m and could give

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further insights into glacier states in the past (1960 - 1980). This data would also show glacier surface structures like crevasses. This could also improve the lack of high-quality data from early Landsat missions. Another idea to improve the variability of datasets is to analyse Russian topographic maps. The maps at least in 1:100.000 are available online and maybe it is possible to find 1:50.000 as well.

I like the idea of DEM differencing to detect glacier changes but how reliable are the DEM datasets? Especially in steeper regions (and that is one of your cases) the DEMs show quality issues. What about other DEMs? You would get more difference images to better investigate changes over shorter periods.

Your results section is very difficult to follow. Please make the structure clearer. Maybe it would make sense to combine the results and discussions section so that the reader can better connect the different cases.

Detailed comments

L18 subheading not necessary as there is no second heading within the introduction
L20 delete “and”
L35 two time “which” Fig1 credits of the background image are covered by the map insert. L61 “. . .with the run out of the two largest. . .”
L78 sandstone L85-89 it is not clear which numbers belong to which station. . .make it clearer, e.g. “respectively” L102 same as for L85 L110 KH-3 data? You do not mean KH-4/Corona data? There might be other datasets of Corona, especially KH-4B with resolutions up to 1.8m and Hexagon? L118 calculate L134 following L142 TDX might be a more common abbreviation for TanDEM-X L147 stations L149 temperature L161 delete “is” Fig3 maybe add glacier outlines, maybe mark the heavily crevassed areas L178 maybe show the two images from 2nd and 3rd August 2019? L188 Are you sure that it reached this height? Which type of baserock/sediment is situated there? Is it possible that just the slope slid down when the lowest parts were scratched off by the ice flow? L191 delete “until” L196 indicate L199 “. . .3d and are visible. . .” L246 make sure whether you use the term “run out” or “runout” in general L249 reported

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L270 how can the glacier be not existent but build up mass until 2019? Fig9 caption “. . .black bullets indicate earth quakes. . .” L299 “. . .there was a large number. . .” L314 delete “it” L355 delete “we” L379 add year for “Ibrohim et al.” L414 “. . .change has a direct impact. . .”

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