

Interactive comment on “Integrated hydrometeorological – snow – frozen ground observations in the alpine region of the Heihe River Basin, China” by Tao Che et al.

Anonymous Referee #1

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Summary: This communication provides an interesting and highly suitable contribution to Earth System Science Data (ESSD). The paper describes an extensive hydrometeorological dataset collected in the upper reaches of the Heihe River Basin in China since the early 2010s. The paper is generally well-written and figures are very clear and entirely appropriate to illustrate key aspects of the dataset. This report provides guidance that the authors should consider in revising their manuscript.

General Comments:

1) One requirement for publication in ESSD is the inclusion of clear statements on the limitations of the datasets, which are lacking in the paper. For instance, what are

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the operating range, accuracy and precision of the instrumentation used? Are there gaps in the datasets and was in-filling performed on these gaps (if any)? Was there any quality control/analysis performed on the data? In any case, information on the limitations of the observational data should be included in a revised paper.

2) As one example of possible data limitations, some of the precipitation gauges were not sheltered by Alter shields or DFIRs. As such, were precipitation data corrected for wind undercatch or provided in raw format without corrections?

3) How unique is this dataset relative to other hydrometeorological networks in operation in the Heihe River Basin? Are these the only hydrometeorological stations in the study area or do they complement an existing array of stations?

4) The journal requires statements on the author contributions and competing interests, as well as a special issue statement, prior to the Acknowledgements. This information should be added in a revised version of the manuscript.

Specific and Technical Comments:

1) P. 1, line 29: Change to “cryospheric science”.

2) P. 1, line 34: The terminology here should be modified here as “regulated” headwaters suggest a human influence or interference on water resources, which I do not think is the intent of the statement here.

3) P. 1, line 35: Replace “reformed” by “altered” or “modified”.

4) P. 1, line 37: Revise “impact factors” to just “impacts”.

5) P. 2, line 46: Delete “the” before “observations”.

6) P. 2, line 55: Replace “manipulate” with “control” or “influence”.

7) P. 2, line 76: Should the abbreviation for “Global Terrestrial Observing Network” be “GTON”, and not “GTOS”?

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- 8) P. 2, line 82: Pluralize the following words: “alpine meadows, forests, irrigated crops, riparian ecosystems, and deserts”. At the end of this line, do you mean “distributed along an altitudinal gradient”?
- 9) P. 3, line 86: Replace “great” with “marked”.
- 10) P. 3, line 87: Revise “the mountainous region” to “mountainous regions”.
- 11) P. 3, line 112: Insert the units for the altitudes.
- 12) P. 3, line 116: Use a word other than “fascinating”.
- 13) P. 3, line 119: Rather than “west wind circulation” do you mean “mid-latitude west-erlies”?
- 14) P. 3, line 122: What is meant by “hydrothermal”?
- 15) P. 3, lines 122-123: Pluralize the words so that it reads “alpine grasslands (dominant), alpine shrubs, alpine meadows, tundra, deserts and forest steppes.”
- 16) P. 3, line 124: Pluralize “grasses and forests”.
- 17) p. 4, line 131: Replace “fast” with “rapid”.
- 18) P. 4, line 152: Change to: “at each”.
- 19) P. 4, line 153: Change to “AMS installed at”.
- 20) P. 5, line 168: Given the abbreviation “AMSs” has already been defined, use it here only and delete “Automatic Meteorological Stations”.
- 21) P. 5, line 183: Replace “sophisticated” with “detailed”.
- 22) P. 5, lines 195 and 197: Date format may need to change to that used by the journal.
- 23) P. 6, lines 213, 225, 226 and 236: Same comment.

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- 24) P. 6, line 234: Should this read “Campbell Scientific”?
- 25) P. 6, line 242: Delete the attribution of recent changes in snow depth to climate change, this could just be due to interannual variability, changes in snow redistribution by wind, etc.
- 26) P. 7, lines 247-248 and 267: Date format may need to change.
- 27) P. 7, line 250: Write as “50-100 m²”.
- 28) P. 7, line 262: Pluralize “Qilian Mountains”.
- 29) P. 7, line 263: Change to “redistribution”.
- 30) P. 7, line 269: Change to “which show that the blowing snow fluxes”.
- 31) P. 8, line 283: Do you mean “during spring” or “after spring”?
- 32) P. 8, line 293: Again, do not attribute recent changes necessarily to climate change.
- 33) P. 8, line 297: Change to “cryospheric science”.
- 34) P. 8, lines 298-299: Replace “with specific respect to” with “with a focus on”.
- 35) P. 8, line 302: What is meant by “alter fundamental processes”?
- 36) P. 9, line 320: Change to “CALM”.
- 37) p. 10, line 366: Change to “(PUB) – a review”.
- 38) P. 11, line 406: Change to “Col de Porte, France” and correct the remainder of the title, it appears the units for elevation are missing.
- 39) p. 19, Table 1: Insert “(°E)” and “(°N)” for longitude and latitude, respectively. For the observation period, consider adding the starting and ending month as well.

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