

## ***Interactive comment on “Evidence for elevation-dependent warming from the Chinese Tianshan Mountains” by Lu Gao et al.***

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We would like to thank Dr. Chen for the valuable comment. In the following, we try to address all comments point-by-point.

Climate change likely alters regional hydrologic regime and affects access to water resources. Using a unique high-resolution (1 km, 6-hourly) air temperature data set (CTMD) produced by previous studies, this work investigated the existence of the elevation-dependence warming (EDW) in the Chinese Tianshan Mountains (CTM) at the monthly, seasonal, and annual time scales, which is of significance for understanding glacier melting and water resources management in the vast arid area around CTM. The authors found that EDW was significant at different altitudes on different

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time scales. Overall, the present study is an interesting forward attempt to deepen our understanding of EDW phenomenon. Few queries to the authors, which might be helpful to improve this manuscript are given below:

1. In sections 3.1 and 3.2, the authors provided the significance of the linear regression models (equation (1)), it would also be helpful to report if the trends (coefficient  $\alpha$ ) were statistically different from zero (or to report the confidence intervals of the trends).

-Answer: Thanks a lot for Dr. Chen's suggestion. We provided the coefficients and confidence levels for figures (section 3.2 and 3.3), not for tables (section 3.1). We will add the regression coefficient information for Table 1 and 2 in the section 3.1 as well as the revised supplementary material.

2. Please explain the definition of seasons by grouping months in CTM region (this may be helpful for international readers).

-Answer: Thanks a lot for the comment. We are sorry for this unclear part. We defined the seasons as: December, January and February for winter, March to May for spring, June to August for summer, and September to November for autumn. We will add this definition in the subsequent revision.

3. Please elaborate a bit on how the trends for CTM (Table 1 & 2) and China were calculated. If my understanding were correct, the authors applied equation (1) to estimate the trend for each pixel, but I am not clear how they aggregated the pixel-scale trends to the trends for CTM.

-Answer: Thanks a lot for the comment. Dr. Chen is right that the calculation of the trends in Table 1 and Table 2 is not clear. We used the equation (2) for the trend calculation for each pixel (grid) for minimum temperature, maximum temperature, and mean temperature at monthly, seasonal and annual temporal scales. In order to compare the trends between CTMD and CMA05 for the whole region scale, we used the averaged

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trend values for these two data sets. We will add this information in the revision.

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