Reviewer #2: *The meteorological data continuity is crucial for climate and climate change areas. The paper focuses on the discontinuity of the wind speed datasets across China and quantifies the possible impacts of anemograph changes, data logging methods, and site relocations on long-term wind speed trends. The authors found that the use of advanced anemographs can increase the observation frequency and improve the instrument sensitivity, thereby enhancing data accuracy. Additionally, the paper checks station relocations by examining the altitude, latitude, and longitude information of all observation stations, identifying approximately 90 stations in China that are affected by relocation and exhibit an excessive increase in wind speed trends. Based on the discontinuity analysis, problematic stations are recognized and excluded. The wind speed data series is reconstructed and a new wind speed trend is also given in this paper.*

The topic of the paper is suitable for Atmospheric Measurement Techniques. The authors' careful and comprehensive work in examining the wind data series across China is appreciated, and I also agree with their call for the improvement of data quality based on user feedback.

This paper requires some minor revisions before publication.

[Response]

Thank you for your time and valuable input. We appreciate your recognition of the importance of our study on wind speed data continuity in climate research. We are encouraged by your positive comments regarding our analysis of wind speed dataset discontinuity, impacts of instrumentation changes, and site relocations. We share your commitment to improving data quality through user feedback collaboration. We have addressed the minor revisions you've suggested.

[Reviewer #1 Major comment 1]

Line 101: To maintain consistency in Table S1, the "(3)" should be added before the third criterion.

[Response]

Thank you for your comment. We have added "(3)" before the third criterion in the main text: "(1) <11 missing daily values in a month; (2) <5 consecutive missing daily values in a month; (3) Complete monthly values for every month during the study period." (Line 106-108 in the clean version of the revised manuscript)

[Reviewer #1 Major comment 2]

Line 169: What do the "EL" and "EC" stand for?

[Response]

The expression of "EL" and "EC" are only seen in Chinese literatures. Even though they are widely used in research papers and instrument documentations, we didn't find any explicit expression about what "EL" and "EC" stands for. From reading those literatures, we think "EL" possibly refers to "Electric Logging" which describe how this type of anemometer record wind speed: logging the times of electronic contact (200 meters rotation distance per contact) in 10 mins in a paper. "EC" refers to "Electronic Code" which means it use Grey Code to record more accurate wind speed. (Hu et al., 2009; Xin et al., 2012; Yang 1986).

Reference:

Hu, W., Kong, L., Zhu, X., & Xue, W. (2009). Accurancy analysis on contact anemometer self – recording records digitization processing system. *Jounal of Arid Meteorology*, **27**, 168-171. [In Chinese]

Xin, Y., Chen, H., & Li, Y. (2012). Homogeneity adjustment of annual mean wind speed and elementary calculation of fundamental wind pressure over Xinjiang meteorological stations. *Climatic and Environmental Research*, **17**(2), 184-196. [In Chinese]

Yang, Jihua. (1986). The repair and maintenance of EL anemometer. *Meteorology of Xinjiang*, **8**, 46-47. [In Chinese]

[Reviewer #1 Major comment 3]

Line 284: More detailed information about the "Thiessen Polygon" method should be given.

[Response]

Thank you for your suggestions. We added: "The Thiessen Polygon method, also known as the Voronoi Diagram, is a spatial analysis technique often employed in hydrology and climatology. It involves tessellating a region into polygons based on point data, such that each polygon encompasses only one data point, and every location within a polygon is closer to its associated point than any other. This method is particularly useful for interpolating values across a region when the exact nature of change between points is unknown or when changes are

abrupt. By drawing perpendicular bisectors between adjacent data points, the entire area is divided, with each polygon assuming the value of its associated data point. While straightforward and clear in its delineation, the Thiessen Polygon method assumes uniform variation within each polygon." (Line 306-315) to further explain the "Thiessen Polygon" method.

[Reviewer #1 Major comment 4]

Line 285-287: Large weights of the wind speed were given in Northwestern China and the Tibetan Plateau, but these regions are also complex terrains compared to Eastern China. How does the author consider the problem of station representation?

[Response]

Thank you for highlighting the complexities of terrain, especially in Northwestern China and the Tibetan Plateau, and its potential impact on station representation.

In our study, we've operated under the assumption that the wind speed at a given location is best represented by its nearest station, an approach we believe offers improvement over previous direct averaging and grid methods. However, we acknowledge the limitations of this method, especially in regions with complex terrains where both driving forces (air motion) and resisting forces (friction and terrain) introduce intricate wind variability.

While it's feasible to develop a model that integrates these factors for a more nuanced interpolation, the inherent uncertainties due to limited data availability remain a challenge. For regions with intricate terrains like Northwestern China and the Tibetan Plateau, a more robust interpolation model would benefit from increased observational data.

We have incorporated this discussion into our manuscript, emphasizing the need for enhanced observational data in complex terrains to refine interpolation models and better capture the spatial variability of wind speed: "Despite the Thiessen polygon approach already utilizing the nearest station observation to represent wind speed in locations lacking direct observations, it remains unsatisfactory due to the intricate spatial variability of wind speed attributed to complex terrains. To enhance the accuracy of wind speed interpolation, a more comprehensive model necessitates additional observations within areas characterized by complex terrain." (Line 326-331)

[Reviewer #1 Major comment 5]

Line 295-297: The phenomenon of the increasing trend in wind speed across China in recent decades after using the Thiessen Polygon should be further explained.

It is suggested that the author DO MORE WORK TO CLARIFY the wind speed trends in different regions of China, at least over eastern China.

[Response]

We appreciate your feedback on the observed increasing trend in wind speed across China. Indeed, even without employing the Thiessen Polygon, an increasing trend in wind speed is evident (as seen in Figure 5b), albeit less pronounced. The differentiation in trends across various regions of China, particularly the underrepresentation of areas like the North West and South West due to sparser station distribution, plays a significant role in this observation. When we transitioned to an area-based average rather than a station count-based one, the influence of regions like the North West and South West became more pronounced, given their strong increasing wind speed trends.

To address your suggestion, we've incorporated a regional analysis, presented in supplementary figure 7 and discussed in the main text: "This is because the weights of stations in North West and South West are increased when calculating the average and those area has strong increasing wind speed trend (Figure S7)." (Line 324-326)

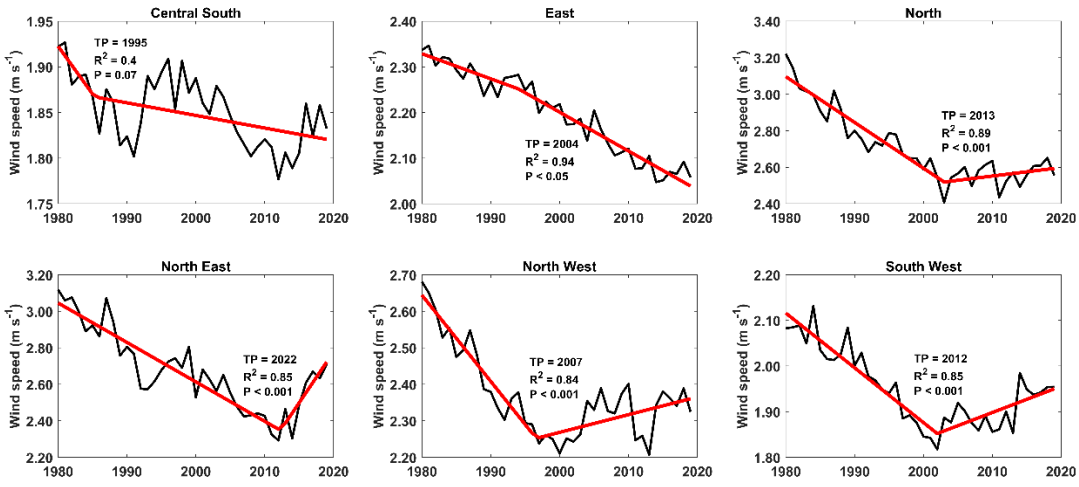

Figure S7. Regional wind speed trends. The regional division is consistent with Figure 2a in Liu et al 2022.