GENERAL COMMENTS

The manuscript offers an evaluation of daily total precipitation, maximum daily temperature, and minimum daily temperature variables simulated by the WRF-SAAG convective-permitting numerical model for hydrological applications. It compares these outputs with meteorological station measurements and simulations from the CR2MET and RF-MET products in the conterminous Chile. Furthermore, these variables are used as input data in a conceptual hydrological model (HBV-like) in order to assess the performance of the simulated daily streamflow against observed series in pristine catchments with low glacier cover.

The work addresses a fundamental topic in mountain regions, which is the use of numerical models to supplement the lack of meteorological measurements, especially for precipitation. However, the article has certain **structural deficiencies** that require manuscript **major revisions**,

1. The title and the body of the text do not specify which hydrological applications are being adressed to (e.g., flood risk, rain-on-snow events, water supply projections, among others - see a non-exhaustive list in Table 1 of Dominguez et al., 2024). The associated temporal scale and hydrological processes are also not defined.
2. In line with the previous point, if by hydrological application the authors mean "hydrological models", thus: Which models are they? at what scales? representing which physical processes?
3. The scientific advancement is not made clear. This is also reflected in the poorly developed Conclusions section. What new facets does this work offer? What are the hydrological novelties? Where does this leave us?
4. There is an aporia (a logical contradiction) in the methodology that the authors themselves present. If, according to the manuscript under review, the WRF-SAAG model was not designed to simulate singular events but rather hydroclimatic features in South America (lines 111, 214, and 402), why does the article evaluate the performance of the simulations against daily events of precipitation, maximum temperature, and minimum temperature?
5. Following the same line of reasoning, according to Dominguez et al. (2024), the WRF-SAAG runs use a reanalysis product (ERA5) as their initial and boundary conditions, which by definition represents the best snapshot of weather conditions at a specific place and time (Kalnay et al., 1996). Furthermore, Dominguez et al. (2024 - see Fig. 4) present an evaluation of singular events (peak precipitation hour), comparing simulations (Nov. 2018 to Mar. 2019) with station measurements, GPM-IMERG, and ERA5.

SPECIFIC COMMENTS

Title

It should reflect which hydrological application the authors aim to address, ideally indicating the process and its temporal scale. I recommend incorporating the study area (i.e., continental Chile).

Abstract

L6. State explicitly that you will evaluate daily maximum and minimum temperature. This should be made clear in the abstract.

L18. If you are going to use a hydrological model, please declare this in the sentence where you reference the methodology used.

Introduction

L37. You use the expression "Satellite-based products," which, for example, is not the case for CR2MET or RF-MET. Change to "Gridded products."

L62/63. The sentence should conclude with at least one citation.

L72. The authors state that there is "little" information on the performance of the CR2MET and RF-MET products; however, in L78 (in the same paragraph), they provide some numbers and cite an article that has already evaluated their performance. There is a logical contradiction in the writing of this paragraph.

Study domain

Fig. 1. Where does the precipitation for the catchments used to calculate the runoff coefficient come from? A gridded product? Which one?

L140. Same comment.

Methods

General Comments

If both CR2MET and RF-MET were constructed using station measurements, does it make sense to compare their performance at those same locations? I agree that the reported errors can be used as a reference for the performance of WRF-SAAG, but many lines of text are wasted on the analysis of these two products. It would be more fruitful to calculate the difference between the grids (WRF-SAAG vs. CR2MET and RF-MET) to visualize substantial differences. Furthermore, the introduction emphasizes the lack of measurements in high-mountain areas, which further highlights the importance of performing this grid-to-grid comparison; otherwise, the potential of WRF-SAAG remains very limited.

The hydrological application referred to by the authors in the title is hydrological modeling. Even so, this is very general and therefore weak. Models are subject to multiple sources of uncertainty, and parameter calibration can, in turn, yield correct results for the wrong reasons, especially when the only facet being evaluated is the catchment streamflow (Beven 2006; Kirchner 2006).
If the authors decide to incorporate the broad area of hydrological models as their application in a revised version, they should define the working scales, processes, and model types from the beginning (this must be reflected in the methodology). Using a numerical model for the sole purpose of running it does not reveal new advancements in hydrology. For example, does it make sense to apply a temperature-index model, like the TUWmodel, in the Near-North and Far-North macrozones where sublimation can account for more than 70% of the seasonal snowpack (e.g., Ayala et al. 2023)?

Regarding the Subsections
Section 4.1 should be entitled "Evaluation of daily precipitation and maximum and minimum temperatures."
In the introduction, the authors emphasize that in mountain areas (e.g., Chile), most stations are located at low altitudes and are scarce, which leverages the use of high-resolution dynamic models (e.g., WRF-SAAG) to capture total precipitation patterns along mountain ranges like the Andes. However, in the proposed methodology, they evaluate the performance of WRF-SAAG using station measurements, the majority of which are located below 3000 m a.s.l. and with a low-density network in the Cordillera.
Perhaps it would be more interesting, given that CR2MET and RF-MET are built with station measurements, to conduct an analysis of the differences (quarterly?) between grids so that the reader can visualize latitudinal and altitudinal discrepancies. In which quarter are the differences smaller (larger)? Why?
In Figure 1.d, the authors show the reference runoff coefficient for each catchment. After clarifying the source of the precipitation, what values does this coefficient yield when using precipitation simulated by WRF-SAAG? CR2MET? RF-MET? How do the time series and the climatological value for each catchment compare? Given the hydroclimatic regime of each catchment, what values would be logical to expect? Are the absolute values of total precipitation reasonable?

After the general comments, if you still wish to incorporate the hydrological model, the following lines should be taken into account,

+ In section 4.2, the hydrological model is poorly presented. TUWmodel is one of the many versions of the original HBV. First, present and cite HBV, then TUWmodel.

+ What daily temperature value do you use as input data for the model? Minimum and maximum? Daily mean? Up to this section, you have stated that you are evaluating the daily maximum and minimum temperatures.

+ Figure 6.c. Except for the river in the Southern macrozone, the model is incapable of simulating the observed annual cycle of the rivers. Is this because WRF-SAAG does not capture the seasonality of precipitation? Could it be that the model does not adequately simulate the dominant physical processes?

Final suggestion

After these comments are addressed, I look forward to revisiting the Methods, Results, Discussion, and a richer, more substantive Conclusions section.

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