This study presents a highly valuable global GNSS climate data record derived from long-term GPS observations. The manuscript is well-structured, and the dataset is of substantial relevance to the meteorological, climate, and even geodetic communities. However, several aspects would benefit from clarification and technical refinement to enhance reproducibility and overall clarity. I would like to recommend the manuscript for publication after minor revisions addressing the following points:

(1) The current title, "A comprehensive 22-year global GNSS climate data record from 5085 stations," may lead readers to assume that each of the 5085 stations have a continuous 22-year time series. To better reflect the actual structure of the dataset, I would like to suggest refining the title by including a phrase such as "covering up to 22 years" or "spanning up to 22 years". Similarly, the first sentence of the abstract and other related statements should be revised to accurately characterize the temporal extent and variability of the dataset across stations.

(2) Line 11: The acronym GPAC is introduced in the manuscript without explanation. Please define this acronym upon its first use, whether it refers to your team, processing framework, or another entity, to ensure clarity for readers. Also, consider removing those unnecessary abbreviations in the abstract to maintain focus and readability.

(3) Line 50: Given the importance of this methodological transition in the context of GNSS atmospheric monitoring, I suggest introducing a paragraph break. This will improve the logical flow by separating the historical context from the introduction of GNSS techniques.

(4) Line 62: The current categorization of detection models may be misleading. AI-empowered methods, while modern, are still broadly encompassed within statistical methodologies. I recommend grouping the models into two categories of statistical and numerical and mentioning AI-empowered methods as a subcategory under statistical models for clarity and conceptual consistency.

(5) Line 145: The manuscript indicates the use of the Bernese GNSS Software (V5.2) for data processing, but no reference is provided. Please include an or a few appropriate citations to support reproducibility.

(6) Table 1: Considering that the newer VMF3 has been released and is widely reported to offer improved accuracy over VMF1, please clarify the rationale for using VMF1 in this study.

(7) Table 1: The study relies on reprocessed orbit and clock products from the CODE analysis center. Given that several other IGS analysis centers also produce high-quality reprocessed solutions, it would strengthen the manuscript to briefly explain why CODE products were preferred for this work.

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(9) How did you handle the station coordinates in your processing? Were the coordinates estimated simultaneously along with the tropospheric parameters and other parameters, or were a priori coordinates introduced and kept fixed during the GNSS data processing?

(10) Lines 177 and 190: Some units for physical constants are presented in a format inconsistent with SI or typographic standards. Please carefully review the entire manuscript to ensure uniformity in unit notation, including consistent use of spaces between values and units.

(11) Figures 7, 12 and 14: While the figures in the manuscript are generally informative and diverse, the legends and axis labels in Figures 7, 12, and 14 are too small and difficult to
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read. Please consider increasing font sizes and improving color contrasts to enhance readability, especially for printed versions.

(12) Line 521: When discussing monthly variations in PWV, it would be helpful to mention the number of hourly samples per month (e.g., range from A to B), as the number of days in a month varies and this affects statistical interpretations.

(13) Figure 19: The current subfigure titles in Figure 19 are somewhat generic, with panels (a) and (c) and panels (b) and (d) labeled identically. I would like to suggest updating the titles to more clearly differentiate between metrics and highlight their specific content.

(14) Line 624: As a gentle reminder, if the DOI for the dataset deposited in the PANGAEA data repository is available, please directly include it in the revised version. This will improve accessibility and ensure the completeness of your data publication.