Dear Reviewers:

Thank you for your kind revisions and comments, in the revised version of the manuscript, we took into account all the comments of the reviewers and made the manuscript corrections as they suggested. In the revision submission, we provided two documents, one marked-up manuscript version (Xiaoyue_Zhou_REV. doc) showing the changes made, and the other final version of the manuscript (Xiaoyue_Zhou_DEF. doc). Thanks to the reviewers' kind suggestions, the structure of the paper was restructured in the revised manuscript, the discussion of seismic methods was reorganized in the introduction to ensure paragraph coherence, a detailed elaboration of the research objectives was added at the end of the introduction, the graphical questions raised were revised, the misuse of words and grammatical errors were carefully corrected, and the title of the manuscript was changed to "A empirical model for mean river discharge calculation: from riverside seismic monitoring experiments in a low-flow river, China" to better reflect the main content of the paper. In the REV file, corrections addressing the comments from Reviewer, are reported in red. All your suggestions are replied to as follows on a point-by-point basis.

Comments (checklist) by the reviewers:

1.The manuscript, in its current form, lacks a clear motivation. Throughout the text, the authors' objectives are not sufficiently articulated. What is the main purpose of the project? Why were the experiments conducted? What was the rationale behind the choice of station locations? Additionally, why was the monitoring period limited to just one day? Please also refer to the last paragraph, after point (5).

Response: Thank you for your questions. The main purpose of this study is to explore the application of seismic methods in river monitoring, and whether it is possible to monitor the discharge of rivers through seismic methods.

This experiment was conducted in a low-flow, remote mountainous river, which is far from busy traffic routes and residential areas, and has minimal human activity. Despite its remote location, it is easily accessible. Conducting the experiment in such a location helps to reduce the noise interference caused by human activities. The implementation of this project is primarily aimed at exploring the application of seismic monitoring technology in river flow monitoring. It involves obtaining seismic monitoring signals corresponding to different river discharge, analyzing their interrelationships, and constructing an empirical model for inferring river flow from seismic monitoring data.

Under the research objectives of this study, we conducted multiple different flow cross-section experiments within a single day, totaling four river seismic monitoring experiments. The experimental content fully meets the needs of this study. In addition, with the support of this research project, we also carried out long-term seismic monitoring experiments in another similar river, and more studies will be presented in the future.

2.The structure of the paper is not well organized, which distracts the reading process. This may be partly due to an insufficient definition of the paper's scope (see my above point 1). The Introduction section lacks clear organization, with discussions of seismic methods interspersed throughout and paragraphs lacking coherence. Additionally, the focus on the actual flow

phenomena is insufficient and should be given more emphasis (see my comments on the first paragraph of the introduction). Moreover, many methodological details are only introduced in the Results and Discussion sections. I recommend a thorough reorganization of the manuscript, beginning with an introduction to flow phenomena and possibly a brief discussion on sediment transport. The authors can then identify research gaps and explain how environmental seismology can address these gaps. The research gaps must be then connected to the authors' current work.

Response: Thank you for your suggestions. The structure of the paper was reorganized in the manuscript, with the introduction strengthening the coherence between paragraphs and focusing on the actual flow of the river, and the specific introductory revisions are shown in detail in the introduction section of the manuscript. The first paragraph of the introduction introduces the importance of river monitoring and the key phenomena of river flow, the second paragraph introduces the advantages of using seismic methods to monitor river processes, briefly mentions the key research in the field of river seismology, the third paragraph cites the specific research of scholars using seismic methods to monitor river processes to provide theoretical support for subsequent discussions, and the fourth paragraph introduces the purpose of this study and the contribution of current research to the field of river seismology. More details have been presented in the section "Introduction" to the manuscript.

3.The figures are not evenly distributed throughout the manuscript and require revision. For example, the first three figures could be combined into a single, more cohesive figure. They should also better support the main text by helping the reader understand the rationale behind the seismic experiments. Additionally, schematic representations should be replaced with aerial or field photos (see my specific comments below).

Response: Thank you for your suggestions. The figures mentioned by the reviewer in the manuscript that needs to be modified have been modified, the first three figures combined into a single, more cohesive figure. The schematic representations have been replaced with a field photos and using an aerial or satellite image to display the experimental sites along the river, as shown in Figure 1 in the manuscript. This restructuring improve the figure's effectiveness and enhance the manuscript's clarity.

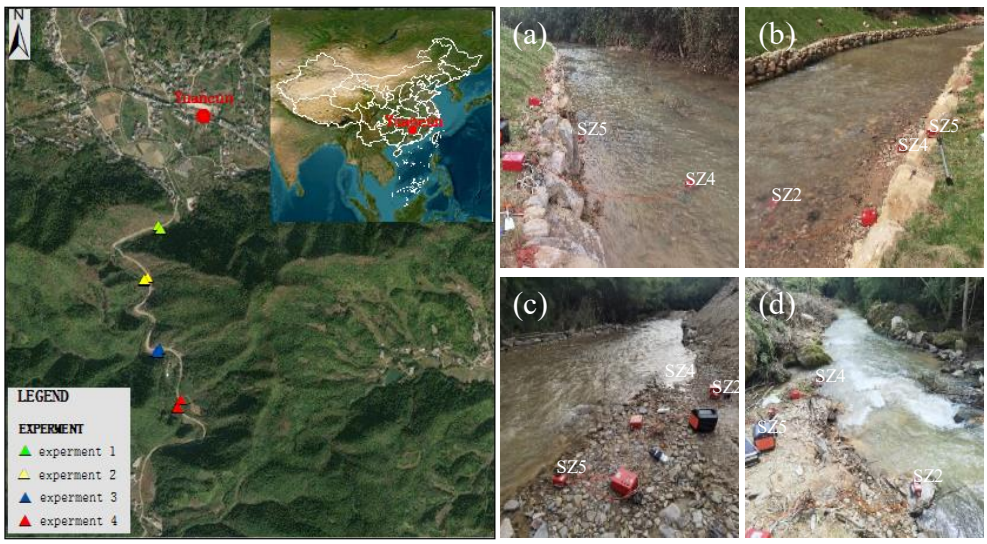

Figure 1. The geophones at the four experimental sites. The red triangles represent the three base stations in test experiment 1, the green triangles represent the four stations in experiment 2, the blue triangles represent the four stations in experiment 3, and the yellow triangles represent the four stations in experiment 4.

4.The empirical model used by the authors (Equation 8) closely resembles the one proposed by Roth et al. (2016), and this should be acknowledged. Additionally, the main title ("A physical model for...") does not align with the empirical nature of Equation 8. The authors should either provide a justification for why this model can be considered physical, or revise the title to more accurately reflect the empirical nature of the model and the main message of the paper.

Response: Thank you for your suggestions. The model is indeed an empirical model, different from the physical model. Based on the research findings of Roth et al. (2016) and the hydrological and seismic data we obtained from the four experiments, modifications have been made to the model proposed by Roth et al. (2016). The new empirical model more directly and succinctly inverts the seismic data for calculation and is suitable for monitoring low-flow rivers. We have changed the title of the paper to "An empirical model for mean river discharge calculation: from riverside seismic monitoring experiments in a low-flow river, China," which better aligns with the research content of the paper and reflects the applicability of the empirical model. Thank you very much.

5. The justification for the hydrological perspective needs to be strengthened. The authors introduce the field settings and describe the low-discharge regime during the survey period. They then calibrate their empirical model (Eq. 8) and apply it for discharge predictions. However, they should explicitly present the range of discharge values measured (or estimated using their approach) on the survey day. Specifically, what was the observed discharge range during the seismic and hydrological survey? If the fluctuations remain within a narrow range (e.g., within a factor of 1, meaning no substantial deviation from the average), then applying the model within the same range, even to unseen data, may have limited value. To address this, the authors should first present their discharge time series and then assess whether their model is applicable over that range. This clarification is crucial for strengthening the manuscript's narrative and overall scientific rigor.

Response: Thank you for your suggestions. A description of the average annual rainfall at the study site and the range of river flow measured during the experiment were added to the overview of the experimental site to enhance the hydrological rationality. When the experiment was conducted on the same day, the measured river flow range was between 0.248 m^3/s and 1.05 m^3/s. The empirical model used in this study obtained the flow range value within the actual measured range value, and the average absolute error was between 0.03 and 0.2. Although there are still errors with the actual measured results, a more refined inversion model can be built in the future. More detailed have been presented in Line 126-128 in Section 2.1 "Experiment sites" in the Xiaoyue_Zhou_ REV file. Thank you very much.

Specific comments

Introduction

I suggest restructuring the introduction, e.g., as follows:

1.First paragraph: Introduce the key phenomena of river flow and bedload transport, emphasizing their importance and the need for improved understanding.2. Second paragraph: Introduce environmental seismology as a remote sensing technique that mitigates risks associated with direct measurements of these processes. Briefly mention the key studies published in the realm of fluvial seismology, categorizing them by their focus (e.g., studies on flow, studies on bedload transport).3. Third paragraph: Use specific examples (e.g., Schmandt et al., 2013; Burtin et al., 2011; Roth et al., 2016) to provide a foundation for later discussions in the manuscript.4. Fourth paragraph: Identify the key research gaps that remain in the field and explain how the current study contributes to addressing these gaps. Emphasize how the manuscript provides a scientific evaluation of the proposed approach and its implications for advancing the understanding of river dynamics. This restructuring will improve the logical flow and strengthen the manuscript's narrative.

Response: Thank you for your suggestions. The first paragraph of the introduction introduces the importance of river monitoring and the key phenomena of river flow, the second paragraph introduces the advantages of using seismic methods to monitor river processes, briefly mentions the key research in the field of river seismology, the third paragraph cites the specific research of scholars using seismic methods to monitor river processes to provide theoretical support for subsequent discussions, and the fourth paragraph introduces the purpose of this study and the contribution of current research to the field of river seismology. More detailed have been presented in Line 34-117 in Section 1 "Introduction" in the Xiaoyue_Zhou_ REV file. Thank you very much.

Line 33-35: I suggest to include an opening sentence which can then be used to argue for the importance of river monitoring.

Response: Done. An opening sentence which can then be used to argue for the importance of river monitoring has been added. 'Flood disaster is a common natural disaster, which occurs frequently in summer and autumn, and brings great harm to people's production and life. Therefore, it is of great practical significance to monitor rivers, strengthen flood control early warning and realize flood control and disaster reduction.'

Line 34-35: there is also an empirical approach, where equations are used (e.g., for bedload transport and flow velocity).

Response: Done. 'there is also an empirical approach, where equations are used'.

Line 38-39: For the purpose of your argument, I would change the references of Roth, Cook and Larose, since these are directly Environmental Seismology studies, while your opening paragraph discusses river monitoring.

Response: Thanks. The cited references have been changed." Both methods require the establishment of hydrological stations and the installation of measuring instruments, which makes the monitoring process complex, time-consuming, and resource-intensive (Hsu et al., 2011; Picozzi et al.,2023)." References have been adjusted.

Line 40-42: The introduction of the seismic methods comes without a scope and I think you should first establish the reasoning for the use of seismic signals to infer river activity.

Response: Thank you for your suggestions. As mentioned above, the impact of flood disaster on

human society requires monitoring of river process to avoid flood invasion. Compared with other river monitoring means, seismic method is more time-saving and labor saving. Therefore, this paper applies seismic method to river process monitoring.

Line 43-36: Sentence is redundant, and I don't see how it contributes to your arguments in this paragraph. Either reformulate or emit.
Response: Done. The sentence has been emitted.

Line 46: "microseismic" – since this term repeats in your manuscript, and since it is used differently in most (if not all) the environmental seismology-related papers, I propose to either change it to "seismic signals" or to define what is "microseismic signal" (as opposed to a "seismic signal").
Response: Done. I have changed "microseismic signal" to "seismic signals".

Line 49: "water surface".
Response: Thanks. Changed "water and the atmosphere" to "water surface".

Line 52: what do you refer to by using "This"? be specific. I also find that your reasoning here lacks a strong argument, that is, "This demonstrated that … can not only aid in studying….", but the above sentence is not convincing enough. I propose to revise the sentences between lines 46 and 52 to better present the arguments (using the studies you mentioned – Schmandt and Diaz) leading to the motivation of using seismic instruments to understand river flow.
Response: Thank you for this suggestion. The sentence you mentioned has been revised. The research of the above two scholars demonstrates that seismic monitoring can not only aid in studying the hydrological characteristics of rivers but also has significant potential in assessing hydrological hazards.

Line 71-78: The entire paragraph reads detached from the rest. You begin with "warning systems…", then you go on discussing the general method of analysis ("by analyzing the time-frequency…"). but it feels a more general description of the method, so it needs to come earlier, where you introduce environmental seismology.
Response: Done. The paragraph order has been adjusted.

Line 80: "This study focuses on the monitoring…" – I am lacking a motivation description to your study. This should come in the above paragraph. In what way does your experiment adds on previous experiments that conducted field experiments with flow and seismic measurements? Is it related to the flow regime in your study sites? Is it related to the number of your monitoring sites? Explain.
Response: Thank you for your suggestion, the statement of the research objectives may not be clear enough. The last paragraph introduces the research objectives. Seismic methods are used to monitor river processes, and river flow inversion models are constructed based on seismic data and flow data, so as to provide references for river flood monitoring and early warning in this region and downstream river flow changes.

2 Experiments

Line 89: I propose to change the title from "Experiments" to "Methods".

Response: Done.

Line 91: "We studied the Jiuqu River, a tributary of…"Lines 92-93: Instead of refereeing to "Meishui town", refer to either the river or the catchment itself.

Response: Done. It has been revised." The river studied in this study, the Jiuqu River, located in the territory of Meishui Township in Shangyou County, China (Figure 1)."

Line 93: what is a relative height? Do you mean Relief?

Response: Thanks, I have changed "relative height" to "Relief".

Line 94-95: Is the description of lithology important to your scientific work presented here? If it does not serve an important information, I propose to remove it.

Response: Done." description of lithology" has been removed.

Line 97: either "four field monitoring experiments", or "four field experiments"

Response: Thanks." In this study, four field monitoring experiments were conducted at four sections of the Jiuqu River with different discharge."

Line 98: what are current meters? How do these measure flow velocity of the flow when situated o the banks?

Response: Thanks, "current meters" is "Flowmeters".

Line 99: "for this experiment", what do you mean by "this?"

Response: Thanks, Mistranslated, "this" refers to the entire study. It has been revised in the manuscript.

Line 102: I am unclear what is a drainage canal.

Response: Mistranslated, I have changed "drainage canal" to "braided river".

Line 104: when describing grain size, please refer to standard jargon, for example, using its axis (axis a, b and c). Line 105: I think you would benefit from reporting the average length of axis b itself, rather than the volume.

Response: Done. I revised it in the manuscript." The axes a, b and c of the maximum gravel are 50,36 and 20cm respectively, the average length of axis b is 10cm."

Line 106: Was your sediment concentration meant for the purpose of evaluating sediments travelling in suspension? Clarify? From what elevation above the bed were these measurements conducted?

Response: Thank you for your questions. I removed the sediment concentration.

Line 108: "which classifies it as a low-flow river" – according to what standards? Please give reference, or revise\emit.

Response: Done. I emitted it.

Line 119: "seismic ambient noise was collected" – the noise was not collected. Measurements were taken, or seismic noise was monitored. Please revise. Lines 119:121: "Seismic instruments offer a variety of…" – delete this sentence.
Response: Done. It has been revised." Seismic ambient noise was monitored from both the river sections and the nearby road areas."

Line 134: not seismic stations, but seismic instruments.
Response: Done." seismic stations" was changed "seismic instruments".

Line 150: "Match 17" – the monitoring period was for one day? What was your purpose in conducting an experiment for one day? How long within that day did your experiment last?
Response: The study lasted for one day because this experiment was a preliminary exploration of the application of seismic methods to monitor the river process. Four river sections were selected in this river, and the monitoring time of each section was 20 minutes. Long-term monitoring experiments will be conducted in the future for more detailed analysis.

Lines 150-151: move this to the beginning of the Method section to emphasize your objectives.
Response: Thank you for this suggestion. I moved this sentence to the beginning of the Method section.

Line 158: what is the second experiment? I find it a little bit challenging to find my way within the introduction of your method section structure. For example, when you write "For the second experiment…" would imply for a reader that there are a few experiments. In such a case, you need to introduce them properly, before you delve into explaining them in detail.
Response: Thank you for this suggestion. This study selected a total of four river segments, each corresponding to a small experiment, these four river segments of the small experiment constituted an experiment of this study.

Line 163: Why did you use four stations? In Figure 3, it seems that the stations are very close to each other. What were your aims in deploying for, and not only one stations? This needs to be justified.
Response: Thanks. Four stations are used to better monitor the seismic signals generated by the river and the noise generated by the traffic, one station is used to monitor the noise signal of the vehicle, and the remaining three are used to monitor the seismic signal generated by the river.

Lines 163 – 169: I find this paragraph more suitable for the Results section.
Response: Thanks. I revised it in manuscript.

Line 180: "calculating river flow" – what is river flow? Please specify, is that discharge (e.g., in units of m3/s) or is it flow velocity (e.g., in units of m/s)? Line 186: again, I think you mean here "discharge" rather than "river flow".
Response: Done. "river flow" is "discharge".

Line 193: the title feels detached. Revise to make clear what you are doing.
Response: Done. I changed "River flow velocity measurement and discharge calculation" to "Discharge calculation"

Line 218: "tests" – do you mean experiments? Please be consistent with the terms you use.
Response: Done. I changed "tests" to "experiments".

3 Seismic ambient noise
Line 220: change title to "Results". It was not clear from the title that this is the results section, and I was reading a substantial part of this section believing it is still the methods (see comments below).
Response: Thank you for this suggestion. The structure and logic were reorganized in the manuscript and this section was moved to the methods section.

Lines 221-222: This comment applies specifically to the mentioned sentence but can be generalized to similar instances throughout the manuscript. It is crucial to maintain a clear distinction between the Introduction, where you present the state of the science, previous studies, and relevant fields, and the Methods, where you concisely describe the techniques used, ensuring they are theoretically reproducible. For example, in this case, rather than directly explaining the seismic ambient noise method, lines 221–231 primarily serve to justify the approach. However, such rationale belongs in the Introduction rather than the Methods section. Ensuring this distinction throughout the manuscript will improve clarity and logical structure.
Response: Thank you for this suggestion, throughout the manuscript, the structure has been rearranged according to the suggestions, improving the clarity and logical structure of the manuscript, and the specific corrections are shown in detail throughout the manuscript.

Line 239: please specify the distance of the road from the experimental sites.
Response: Done. This part has already been added to the manuscript. "The river section studied in this experiment is located next to a road. The distance between the road and the experiment site is 200m."

Figures 1, 2 and 3: I believe the manuscript would benefit from a more integrated and visually informative representation of the experimental sites. Instead of separate schematic cross-sections and contour- like maps, I suggest merging Figures 1, 2, and 3 into a single figure with multiple panels. This would provide a more comprehensive overview of the study area by: (1) including a small inset map to show the study location within a broader China map for georaphic context, (2) using an aerial or satellite image to display the experimental sites along the river, (3) incorporating photos of the different study sites to highlight their distinct morphological characteristics, and (4) ensuring a clearer depiction of station locations within the field setting, as the current photo in Figure 3 does not make their placement evident. Additionally, the sensors in Figure 3 appear wired to cables - are these temporary? More details on the station setup, location, and monitoring period would improve clarity. Lastly, the red sensor between S2 and S4 lacks a label— - please clarify its designation. This restructuring

will improve the figure's effectiveness and enhance the manuscript's clarity.

Response: Thank you for this suggestion. In the manuscript, Figure 1, Figure 2 and Figure 3 were removed, and satellite maps and field experiment photos were used to show the experimental site setting for this study.

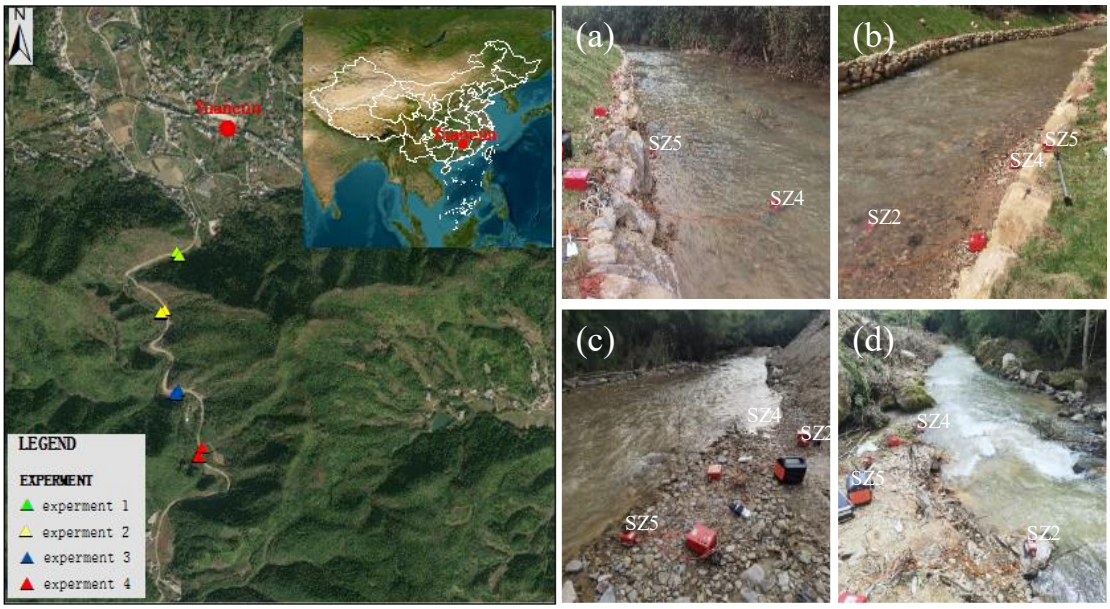

Figure 1. The geophones at the four experimental sites. The red triangles represent the three base stations in test experiment 1, the green triangles represent the four stations in experiment 2, the blue triangles represent the four stations in experiment 3, and the yellow triangles represent the four stations in experiment 4.

Figure 5: In the figure's caption, please explain all the variables you mention in the figure.

Response: Done. The variables have been explained in the diagram.

Figure 6: I believe this figure is redundant in the main text as it is secondary to your main analysis. Therefore, I propose to move it to the supplementary information.

Response: Thank you for this suggestion. This figure has been removed from the body of the manuscript.

Line 255: What is "still water flow"?

Response: "still water flow" is "transient flow".

Lines 256-257: please specify "experiment" and "test". Are there differences between these terms? Are these the same?

Response: Thank you for your questions. These two represent the same meaning and have been revised in the manuscript.

Lines 257-260: This sentence is redundant. Delete.

Response: Thanks. It has been deleted.

Line 260: "A clear broadband seismic response" – in what way it is clear? That is subjective.

I would try to reformulate the sentence to a more objective one.
Response: Thank you for your suggestion. A more objective formulation of this phrase is given in the manuscript.

Lines 272-280: This entire paragraph in an interpretation, not a result. Please move it to the discussion if needed.
Response: Done. The order of the paragraphs in this sentence has been adjusted to the discussion section.

Figure 8: "Acceleration power spectral" – why do you use acceleration rather than velocity? "PSD plots" – I think these plots would be better called "seismic spectra". Why do you choose to exhibit three curves and not all of the curves that you have as data sets?
Response: Thanks. The title of this graph was changed to "seismic spectra", and the E-channel data with the highest signal-to-noise ratio among the three stations monitoring the water flow signal was selected, which was displayed more clearly.

Lines 293-299: Again, this paragraph belongs to the introduction. Remember that you are now introducing your results, so at this stage the reader should already be informative of the fact that "geophones can detect elastic waves generated by processes…". In fact, you already wrote this previously, so it is a repetition. In this manner, the allocation of Figure (9) is not well suited
Response: Thank you to the reviewers for their careful review. After careful consideration, this passage has been removed from the manuscript and Figure 9 has been deleted.

Lines 300-302: You are mixing pure results (e.g., the measurement showed that…) with discussion, which is meant to bring forth your interpretation of the results (e.g., "the deployed microseismic stations can receive these signals and record them as").
Response: Thanks. This question has been revised in the manuscript and the language has been reorganized to present the results part.

Lines 310-312: You introduce the fourth experiment, but this should already have been done previously in the methods section.
Response: Thank you for this suggestion. The presentation of this fourth experiment has been adapted to the methods section.

4 Seismic interpretation and river discharge calculation
Line 340: please change this title to "Discussion.
Response: Done. I changed this title to "Discussion.

Lines 356-364: Same comment as above. This paragraph should be deleted. The information is interesting, but it is not related with your specific work. The focus should be on interpreting the results, not the methods, which are probably massively discussed elsewhere in the literature.
Response: Thanks. This passage has been removed from the manuscript.

Lines 367-368: The sentence is superfluous.
Response: Thanks. It has been deleted.

Lines 368-370: It is too early to state that. You should begin with you aim, proceed with what you did as a test (as you begin in line 370, "for verification"), then conclude with something in the form of "as a result, we propose that the frequency range within 2 and 10 Hz records seismic signals generated form turbulence…". Alternatively, you could write something along the lines of: "We hypothesize that the low- frequency… in the experimental … is related to flow turbulence within the stream". To validate our hypothesis, we plot…".
Response: Thank you for this suggestion. This sentence has been rephrased, specifically as follows: "We hypothesize that the low-frequency band of 2~10 Hz in the experimental is related to flow turbulence within the stream to validate our hypothesis, for verification, we selected data from the third experiment."

Figure 11: This figure should be within the results, not discussion. The discussion n can pick this up by discussing in what ways does this plot reinforces (or not) your hypothesis that turbulence dominates the < 10 Hz frequency band.
Response: Thank you very much for this suggestion. Moving Figure 11 to the results section, the river flow in Figure 11 is obtained by the seismic frequency inversion of 2-7 Hz, and it can be seen from the figure that the inverted flow rate is in good agreement with the actual measured flow, indicating that the dominant frequency of the river seismic signal in this study is less than 10 Hz.

5 Results and discussion
Line 394: it does not make much rationale to include both results and discussion in the same section. Logic would say to include them as separate sections.
Response: Done. The results have been separated from the discussions, and the concrete presentation is reflected in the manuscript.

Lines 395-396: "a linear test.." – this belongs to the method section.Line 397: what do you mean by "mechanical effect"? The entire paragraph starting from line 395 and ending at422 needs to be moved to the methods section.
Response: Thank you for this suggestion. This section on linear models has been moved to the Methods section 2.3, which can be found in lines 253-280 of the manuscript

Line 402: in what way it is "inverted"? please specify this term within the scope of your methods.
Response: Thank you. Phrase usage error, I changed"inverted"to"inversed"。

Lines 406-407: what is the difference between passing vehicles (Pv) and environmental noise (PN)?
Response: "PN" refers to the noise signal in the environment when there is no vehicle noise, and "PN" has been annotated in the manuscript.

Line 418: grammar is incorrect, please revise sentence.

Response: Done. Modifications have been made. Specific modifications such as: “The flow regression coefficients for geophones with the highest turbulence signal-to-noise ratios, corresponding to each component (E, N, and Z) and each experiment site (Experiment 1, 2, and 4), calculated using the first 10 minutes of seismic data, are shown in Figure 12.”

Line 420-421: you mention the Green’s function, but you assume that your audience is familiar with it, while it comes with no introduction. Introduce it, or delete.
Response: Done. “Green’s function” was emitted.

Line 432: in what way do the flow velocity measurements integrate into this part of your analysis? I do not seem to be able to follow your reasoning. Figure 13: Panel b: The 3-dimensional representation of the results is unclear and may be difficult for readers to interpret effectively. I recommend replacing it with a 2D plot, which would likely provide a clearer and more straightforward visualization of the data.
Response: Thank you for this suggestion. Figure has been modified as follows:

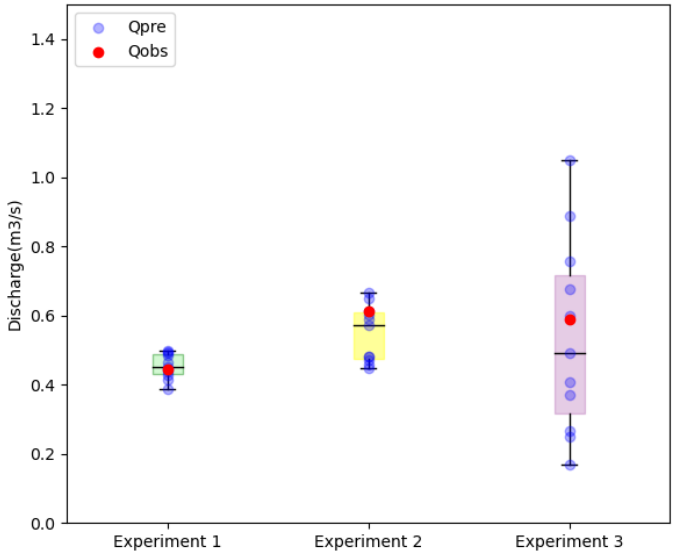

Figure 11. The plot of measured flow values against inverted flow predictions, (a). The scatter plot of mean absolute error between flow predictions and measured values, (b). In figure (b), red represents measured values and purple represents predicted values.

Figure 12: I propose to switch the axes, so that frequency is at the horizontal, while the coefficient is the vertical. What is the meaning of the three panels? What is the difference between them and what do they represent in your scientific context?
Response: Done.

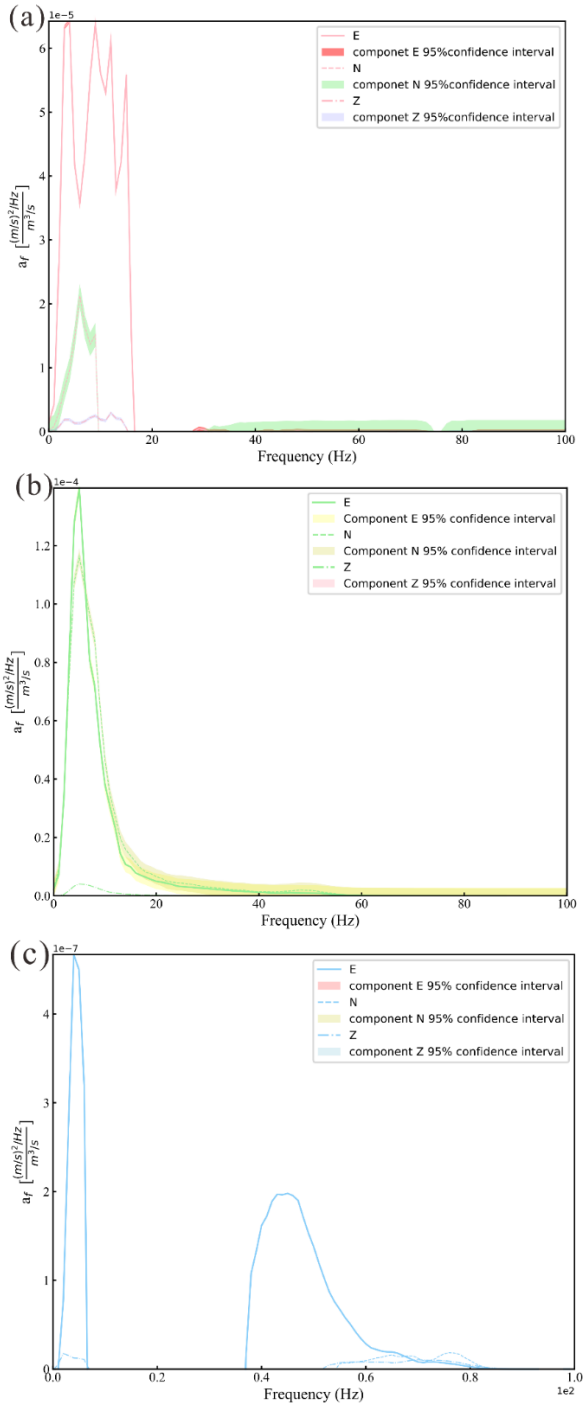

Figure 10. The flow regression coefficients and 95% confidence intervals for the river processes. (a), (b), and (c) show the flow regression coefficients and 95% confidence intervals for the river processes on the E, N, and Z components of the ground motion at base stations SZ4, SZ2, and SZ4 at experiment 1, 2, and 4, respectively.

Line 429: "After regressing… the first 10 minutes of..." I find the description of the monitoring period unclear at this stage of the manuscript. By this point, the reader should have a comprehensive understanding of the monitoring timeline, but that is currently not the case. I believe this issue stems from how the experiments were introduced earlier in the text. Please revisit and address my comments in the Methods section to provide a more detailed and

transparent explanation of the experimental setup and monitoring period.

Response: Thank you for this suggestion. The experimental part of the method section has been described in more detail based on your opinion. "In this study, four field monitoring experiments were conducted at four sections of the Jiuqu River with different discharge. Flowmeters and seismic stations were installed on the riverbank to measure the flow velocity and seismic ambient noise in each segment. Four seismic monitoring devices were utilized for this study. The station deployment protocol was as follows: During each experiment, the S3 (Station 3) unit was consistently deployed near roadsides with frequent human activity. The remaining three sensors were distributed in different hydrological environments - one installed in the river channel, another along the riverbank, and a third positioned approximately 50 meters offshore for ambient environmental noise comparison monitoring. (Note: The offshore deployment was omitted during the fourth experiment due to site constraints.). Each experiment lasted for 20 minutes. Therefore, in all four experiments, the S3 (Station 3) was placed about 1 meter from the riverbank, near the road. This configuration aimed to record seismic signals generated by river activities while minimizing interference from human activities. The flow velocity was continuously measured at a sampling frequency of once per minute."

Line 479: "We cannot establish a correlation…" On what analysis is this statement based? Please refer explicitly to the relevant analysis or figure. If you are referring to Figure 11, I would argue that the measured discharge somewhat resembles the North component of the seismic power. However, this observation lacks a statistical criterion that would allow for an objective evaluation and support such a judgment.

Response: Thank you for this suggestion. This part has been revised in the manuscript, and the specific changes are shown in the manuscript. "We found that the signals generated by the river flow have a very wide frequency range (2~50Hz). The recorded seismic signals in the 2~10 Hz band have a strong connection with river flow, approximately exhibiting a linear relationship."

Lines 483-485: "Real-time monitoring of the turbulence process…" This statement feels somewhat overstated in relation to your findings. While you have successfully established a quantitative correlation between a hydrodynamic parameter and seismic data, I believe it is not fully justified to claim that this enables "real-time monitoring" of the turbulence process. Based on the evidence presented, it seems that your work has not yet revealed specific features of the turbulence phenomena itself. I suggest revising this claim to better reflect the current scope and implications of your results.

Response: Thank you for this suggestion. This sentence has been rephrased. "Even when the river flow is low, the correlation between seismic signals and turbulent processes can be discovered through analysis."

Lines 487-501: This paragraph currently serves as a summary of the analysis and findings. However, I recommend revising it to go beyond summarizing and focus on highlighting the broader implications of your research. Specifically, you could emphasize the new avenues this work opens for further exploration, as well as its potential relevance and applications beyond the context of your specific local findings. This would help underline the significance of your work and its contribution to the field.

Response: Thank you for this suggestion. The contribution of this study to this field is added to the

conclusion. e.g. "This discovery is conducive to further exploration of the use of seismic methods for monitoring river processes, establishing a more complete river flow inversion model, and better realizing the real-time monitoring of river processes through seismic methods."

References

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