Dear reviewers and editors,

Thank you for your time and thoughtful review of this manuscript.

We have compiled the reviewers' comments and our responses into the following tables.

We thank the reviewers again for their comments, which improved the robustness of the analysis and clarity of the manuscript.

Best regards,

Matthew Tippett-Vannini, on behalf of all co-authors

Reviewer 1's Comments:

Reviewer's Comment	Response
Technical note vs. full scientific article	We acknowledge the reviewers' concern and ultimately leave this decision up to the editors.
Section 4.7: Specify temporal resolution used for field calibration and bucket tip counts.	Logging intervals were added to the methods and calibration times were added to the results of the field calibration tests.
Details on how the ATMOS 41 is adjusted after calibration.	The ATMOS 41 is a drip counter gauge and cannot be adjusted *in situ*. We added a brief description of a drip counter gauge, as well as an explanation that the AR3D, for a drip counting gauge, is a diagnostic tool, not a recalibration tool. Recalibration can be achieved for the ATMOS 41 with software in data post-processing.
Section 4.7: Test well-maintained, calibrated gauges under multiple predefined flow rates to establish performance range under ideal conditions.	We have improved the clarity of this section. Tests on well-maintained gauges under ideal conditions using predefined flows were addressed in Sections 3.1-3.6 (Now merged into Section 3.1)
Demonstrating tested devices worked well in Kenya but didn't in the USA doesn't provide robust field validation of AR3D.	We appreciate the concern about the strength of field evidence. The AR3D was tested on four independent devices under field conditions and successfully diagnosed three functioning stations and one station that was out of calibration. We would suggest that this demonstrates the AR3D's function under field conditions.
Section 4.7: Extending tests to other low-cost gauges could also yield useful insights	Extending tests explicitly to other devices is an excellent idea, and we have added

	that to the future work part of the discussion.
Sections 2 and 3: Combine short subsections and/or paragraphs.	Combined small sections for 2,3, and 4
Section 3.6 “Pyranometer cover” does not require a separate subsection	Removed as a separate section
Move Tables 1 and 2 to Appendix	Tables have been moved to the appendix
Check bibliographic entries	References have been cleaned.
p.1, line 13: Convert flow rates (ml min^{-1}) to equivalent rainfall rates	Equivalent rainfall rate was added, but flow rate was also left, because flow rate is independent of gauge diameter.
p.3, line1: Replace “document” with “article” or “manuscript”	Corrected
p.6, line 141: Use SI units Consistently	Corrected

Reviewer 2’s Comments:

Reviewer’s Comment	Response
Flow rate drift Reviewer states that discussion should more explicitly acknowledge the implications of bubble induced flow rate drift for calibration accuracy and elaborate the proposed mitigation	Discussion now includes the explicit implications of bubble entrapment (slower rates due to smaller effective area) and elaborates the mitigation possibilities.
Temperature sensitivity Analysis of the effects of temperature on the performance of the AR3D is missing and must be included. Authors should provide correction factors, an operational temperature range, or at least characterize the device’s sensitivity to temperature	Added a temperature sensitivity analysis to Appendix G. Described the temperature-dependent effects on flow rate in the testing section and in the discussion and described the need to adjust flow rate to field temperature conditions before calibration. Also included that an advantage of the AR3D is the ability to adjust the flow to adapt to variable field conditions. Eq. 1 and Appendix G allow an operator to apply a correction to flow rate, assuming no adjustments are made;

	however, we recommend adjusting flow rate to field conditions.
Depth of validation Reviewer suggests a stronger validation would test against multiple, independently calibrated reference gauges at multiple predefined flow rates	We agree that testing against multiple independently calibrated gauges at predefined flow rates would be informative and would be the natural extension to this manuscript. We have added that to the future work part of the discussion. We offer two points for limiting the current scope. First, the volumetric accuracy of the AR3D is determined against two traceable methods: 1) gravimetrically with a 0.01 g balance and 2) from the volumetric flask with a ±0.3 % tolerance. Flow rate constancy, single device repeatability and device-to-device equivalence were characterized. These establish the performance of the calibrator itself, which is the claim this manuscript makes. Our second point is that a test across multiple reference gauges characterizes the response of the gauges as much as the performance of the calibrator. The interpretation of any disagreement would require independent knowledge of each gauge's state of calibration and methods of adjustment. Such a study would be a valuable contribution but would address gauge performance more than calibrator performance and we consider it beyond the scope of this study. The field deployment we describe in the manuscript demonstrates the AR3D's intended use: to determine if a low-cost gauge is functioning correctly.
Engineering rationale for hole diameters Include rationale for the dimensions of the air and water holes	Engineering rationale added to section 2.2. Flow rate, even the maximum, was determined by the set screw, not the water hole. Water hole size was chosen such that when the set screw was backed out to the maximum non-leaking state, the flow rate would be ~16 mL min^{-1}, near the 3D.1's minimum rate. The Hagen-Poiseuille equation was included to explain the

	constant head “Mariotte bottle” effect; it was not actually used for the calculation of the water outlet hole.
Fragmented subsections Small subsections should be consolidated	Condensed the fragmented subsections.
Tables 1 and 2 Tables should be reorganized into broader categories or moved to an appendix Table 1 would be improved by more information relating dimensions to Hagen–Poiseuille-derived target flow rate.	Moved the tables to the appendices. The relationship to the Hagen-Poiseuille flow was addressed in the above section about engineering rationale for hole diameters.
Unit conversions Reported flow rates should be consistently accompanied by equivalent rainfall intensities.	Added rainfall intensities to all appropriate flow rates.
Generalization figure Add a chart to visualize the relationship between funnel diameter and rainfall rate, across flow rate range.	Added a figure detailing the relationship between funnel diameter size and equivalent rainfall rate.
Technical note vs. full scientific article	We acknowledge the reviewers’ concern and ultimately leave this decision up to the editors.

Additional Changes Added by the authors	
Eq 1 Missing density and gravitational acceleration.	These were added to the equation.
Table 1 Table incorrectly contained “Water outlet capillary tube diameter” from a previous version. The current version does not contain capillary tubes	Incorrect specification of the water capillary tube was removed.