

Supplementary clarification for "Universal Analytical Model for Watershed Hydrological Simulation (UAM-WHS)"

Dear Editor,

I am writing to submit a supplementary clarification document for my recently submitted manuscript entitled "Universal Analytical Model for Watershed Hydrological Simulation (UAM-WHS)" , After submission, I realized that the initial cover letter did not sufficiently articulate the **paradigm-shifting nature** of the proposed analytical framework, nor did it explicitly address the critical question of **parameter-physiography linkages** that reviewers typically prioritize. I have therefore prepared a brief supplementary note that elaborates on these two aspects without altering the core scientific content of the manuscript. **Specifically, I would like to highlight the following clarifications:**

1. **Paradigm Positioning:** The UAM-WHS is not an attempt to improve upon existing lumped or distributed models within the conventional empirical-fitting paradigm. Rather, it is a **deductive axiomatic system** that reconstructs the rainfall-runoff dynamics from first principles (mass conservation and orthogonal vector geometry), thereby removing the need for observation-driven calibration. This represents a fundamental departure from the classical hydrological modelling doctrine.

2 . Parameter Physiographic Interpretation: While the current manuscript presents fully explicit analytical solutions for all state variables, the closed-form mechanistic expressions linking core coefficients (α_1 , K , γ , $\cos\theta$, k , α) to catchment geomorphic attributes constitute an ongoing theoretical development. The current study provides rigorous **physically admissible ranges and sensitivity distributions** for these coefficients, which serve as the sole necessary prerequisite for subsequent geomorphic derivation. This is explicitly identified as an open but solvable extension, not an intrinsic limitation of the axiomatic system.

I sincerely hope that this supplementary note assists the editorial team and potential reviewers in recognizing the foundational nature of this contribution. I remain fully available for any further clarifications.

Thank you for your time and consideration.

Sincerely,

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