

General comment: **Revision**

By integrating Latin Hypercube Sampling (LHS), adaptive regression-based surrogate modeling, and the NSGA-III multi-objective optimization algorithm, this manuscript presents and validates a multi-parameter optimization framework for typhoon wave simulations with WW3 and the ST6 source terms. The AI-based technique described in the manuscript seems useful, making the paper an interesting and relevant contribution. However, some details of the optimization procedure and of the paper were not clearly described yet, which will need to be further revised and corrected. Please see my comments below.

1. Eq. (1) includes five source terms in RHS. However, only four are explained in the subsequent text, and the description of the bottom friction term is incorrect. In addition, the swell dissipation source term is introduced in Line 150 without being included in Eq. (1). Please clarify and ensure consistency.
2. It would be helpful if the authors could clarify the relationship between the growth rate γ and the wind speed projection factor W (e.g., Line 142). More importantly, Eq. (4) is not correct and should be that W_1 is proportional to the square of the max function shown and W_2 is proportional to the square of the min function shown. Check the WW3 manual for example.
3. Eq. (7) is not correct as for ST6 in WW3 (version 6.07), C_d is actually given as

$$C_d = \text{FAC} \times (8.058 + 0.967U_{10} - 0.016U_{10}^2) \times 10^{-4}.$$

4. The authors applied a linear correction based on Eq. (10) to address the underestimation of ERA5 wind speeds under strong wind conditions. At the end of Page 9, “Wu et al. (2025)” is cited to justify the threshold and empirical correction coefficients; however, this reference is missing from the reference list. Moreover, are these correction coefficients specifically calibrated for the Taiwan region, or are they more generally applicable? The implementation procedure should also be clarified. As far as I know, WW3 includes a switch named WCOR designed for this purpose.
5. Please clarify where and when the wind observations used in Fig. 3 were obtained. In addition, the scatter plot in Fig. 3 shows only one data point with wind speed exceeding 30 m/s. Is this sufficient to validate the correction under typhoon conditions, especially considering that the maximum wind speed discussed in Lines 85–105 exceeds 55 m/s?
6. Fig. 1 and Tab. 1 indicate that eight buoys were used in this study. However, results from all eight buoys are not consistently presented in the subsequent figures and tables, and some buoy results appear to be missing in different sections. In particular, Lines 348–355 discuss the Nearshore 2 buoy in detail, but the corresponding results are not shown in

corresponding figures or tables (e.g., Tabs. 3, 4, 6, and 7, and Fig. 6). The authors are asked to further clarify this issue.

7. The authors are suggested to briefly describe the selected optimal model configurations listed in Table 3. It is not clear to me what “Poly3_Ridge”, “Poly2_Ridge” or “SVR_RBF” really represent.
8. Line 300: Eq. (15) is not properly shown.
9. What does N_s represent in Eq. (18)? I assume it refers to the number of buoy stations, but its value should be explicitly stated.
10. Are the results shown in Tab. 6 and Fig. 6 both derived from the training typhoon cases? In addition, the authors are advised to clarify why the time durations shown in Fig. 6 differ among panels.
11. Please clarify the statement in Line 350: “At the Offshore 3 station, RMSE decreases from 0.38 m (default) and 0.31 m (literature optimal) to 0.30 m, yielding the best overall performance among all parameter schemes.” The meaning of “best overall performance” is currently unclear. In addition, although Tab. 6 presents statistical results for two validation typhoons, Lines 348–360 seems discuss only a single typhoon event without specifying which case is being analyzed or explaining the underlying reasons. More importantly, the key results for the Nearshore 2 buoy are not included in Tab. 6.
12. Please clarify which station and typhoon case are shown in Fig. 8. In addition, if available, it would be helpful to include the corresponding performance of the Literature scheme for comparison.
13. In Section 4.2, the authors further applied a secondary correction based on the relationship between wind speed and significant wave height, resulting in the “Corrected Wave Height Optimal Parameters” listed in Tab. 5. It is however unclear whether this revised scheme should be regarded as the final recommended parameter set for typhoon wave simulations in the waters adjacent to Taiwan. In addition, it is not clear to me when $H_{s,corrected}$ was used. Was it used in the Part II step: surrogate model construction? Please clarify these details, which are quite important for understanding these discussions.