

General comment:

This manuscript investigates the enhancement of nocturnal heterogeneous NO₂ uptake by chlorine in the coastal atmosphere of Xiamen under sea-land breeze circulation. The study addresses an important and timely topic in atmospheric multiphase chemistry, particularly the role of sea-salt-derived chlorine in reactive nitrogen cycling. The authors combine comprehensive field observations, machine-learning analysis, and a multiphase chemical box model to show that sea-land breeze periods are associated with elevated chlorine levels, enhanced NO₂ uptake rates, and increased formation of HONO and particulate nitrate. The manuscript is generally well organized, the scientific question is clearly motivated, and the results provide valuable observational evidence connecting laboratory-identified chlorine effects with real coastal atmospheric conditions. Overall, I find the work suitable for publication in ACP. The dataset is valuable, the analysis is relevant to coastal air quality and nocturnal chemistry, and the conclusions are broadly supported by the observations and modeling. I recommend publication after the authors address the following comments.

Specific comment:

1. In Section “2.3 Machine learning technique”, the use of Cl_{total} as a chlorine proxy should be explained more clearly. Since Cl_{total} includes both particulate Cl⁻ and gaseous HCl, please clarify whether the enhancement is mainly related to sea-salt chloride, chloride depletion, or their combined effect.
2. Please briefly discuss how general these findings may be. The observations were conducted at one coastal urban site in autumn/winter, so it would be useful to comment on whether similar chlorine-enhanced NO₂ uptake is expected in other seasons or other coastal regions.

Technical corrections:

1. Line 26: Use proper scientific notation: $9.70 \times 10^{-6} \text{ s}^{-1}$.
2. Line 63: “These findings suggests” should be “These findings suggest”.
3. Line 87: The degree symbol “24.61°N, 118.06°E” should be 24.61° N, 118.06° E.
4. Line 130: “set as a lower limit” could be revised to “used as a lower-limit estimate”.
5. Line 163: “Only nighttime data was trained in model” should be “Only nighttime data were used to train the model”.
6. Line 169: “accesses the interaction effects” should be “assess the interaction effects”.
7. Line 172: Add the subsection number.
8. Line 173: “Table. S1” should be “Table S1”; same for “Table. S2”.
9. Line 226: “defining as” should be “defined as”.
10. Line 316: “Fig. S9 show” should be “Fig. S9 shows”.
11. Line 319: “muti-fold” should be “multi-fold”.
12. Line 331: “Enhanced NO₂ uptake promote” should be “Enhanced NO₂ uptake promotes”.
13. Line 340: “Fig. 10” should be “Fig. S10”.

14. Line 397: “facilitate kNO_2 ” should be “increase kNO_2 ” or “facilitate NO_2 uptake”.
15. Line 404: Replace the comma before “Future investigations” with a period.
16. Line 415: “water molecular” should be “water molecules”.