Public justification (visible to the public if the article is accepted and published):

The reviewer has been largely satisfied with the revised version of the manuscript, but provided further comments and suggestions on 17 March that we believe the authors should further address. Therefore, a minor revision is requested, to be reviewed by the editor. The reviewer's second round of comments are pasted below for the authors' easier reference:

The authors have overall made rational responses to my comments and suggestions. There is just one more point to be clarified regarding this comment: "What kind of data were used in the CCM analysis? Daily averages? How are intercorrelations among meteorological factors considered within this methodology (e.g.: intercorrelation between RH， T and P)".

The authors responded that they used hourly averages, and as is commonly known T, RH and BLH especially are highly correlated on the hourly time scale. Therefore, when analyzing the impact of meteorology on NH3, false signals may arise, and nonsense correlations might be yielded. How do you deal with these issues?

Thank you for this insightful comment. We chose hourly resolution for the CCM analysis based on the following considerations:

1. NH_3 concentrations are governed by rapid processes, including temperature-dependent volatilization, gas-to-particle partitioning (e.g., NH_4NO_3 formation), and boundary layer evolution. These processes exhibit intense diurnal fluctuations. Since meteorological drivers (T, RH, and BLH) vary significantly within a single day, hourly data is essential to resolve the real-time causal forcing of these variables on NH_3 spikes.

2. Daily averaging acts as a low-pass filter that eliminates high-frequency atmospheric signals. In a nonlinear dynamical system like the atmosphere, such smoothing can mask the rapid causal interactions or even create artificial correlations. Hourly data preserves the temporal granularity necessary to distinguish true mechanistic coupling from background noise.

3. Despite the inherent correlations between meteorological factors, our CCM results demonstrate distinct seasonal sensitivities. Specifically, BLH was identified as a consistently significant driver across all seasons, which aligns perfectly with our subsequent analysis of regional transport. This consistency validates that the hourly resolution successfully captured the dominant physical mechanisms.

4. CCM is a state-space reconstruction method that requires capturing the continuous evolution of a system's dynamics. Hourly data provides a significantly larger library length (L) compared to daily averages (e.g., ~8,760 points vs. 365 points per year). This density is crucial for the "convergence" of the correlation coefficient (ρ), ensuring that the reconstructed attractor

manifold is complete and preventing spurious causality conclusions derived from insufficient sample sizes.

5. The use of hourly data for identifying nonlinear causality in atmospheric chemistry is well-supported in recent literature (Rawat et al., 2024), where high-resolution datasets were preferred to resolve complex mountain meteorology and pollutant coupling.

References:

Rawat, V., Singh, N., Singh, J., Rajput, A., Dhaka, S. K., Matsumi, Y., Nakayama, T., and Hayashida, S.: Assessing the high-resolution $PM_{2.5}$ measurements over a Central Himalayan site: impact of mountain meteorology and episodic events, Air Quality, Atmosphere & Health, 17, 51-70, 10.1007/s11869-023-01429-7, 2024.