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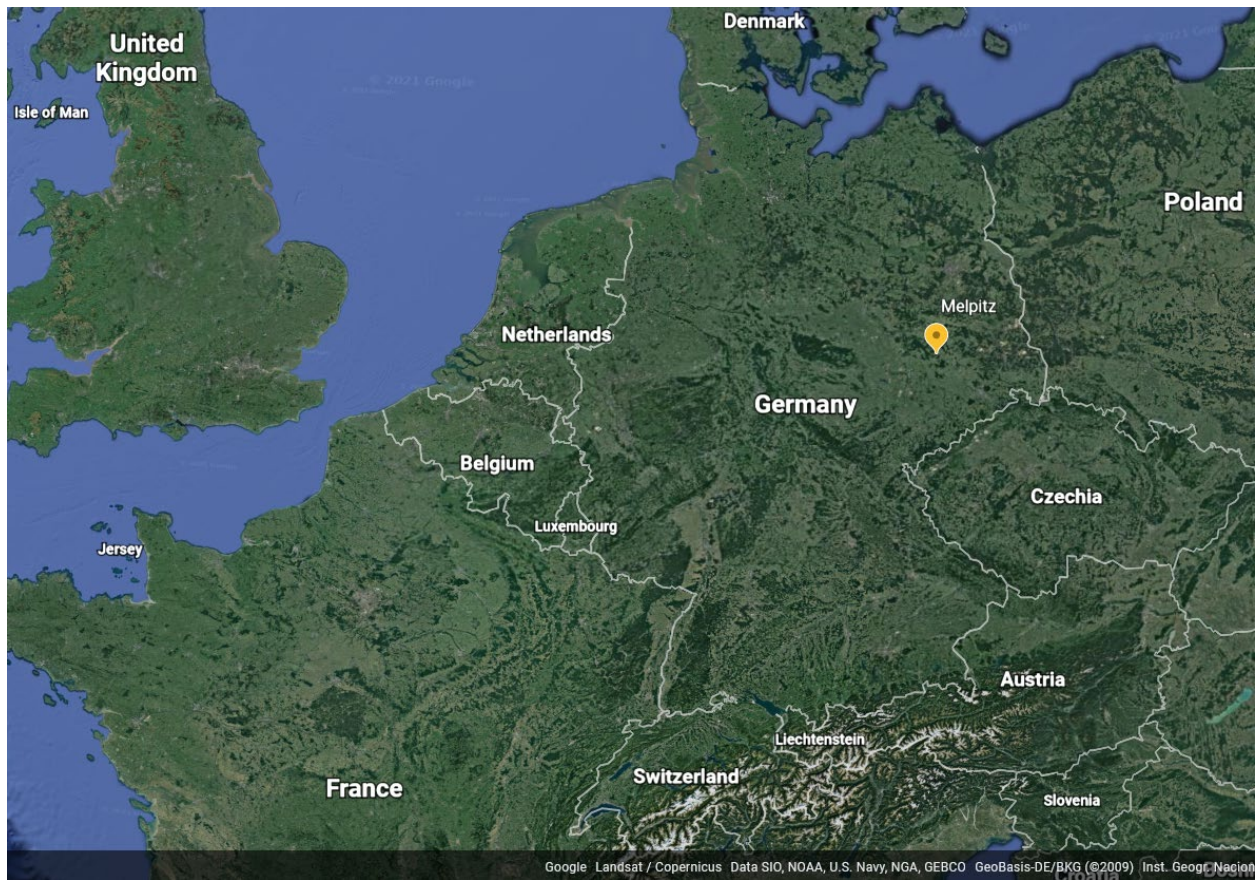
Supplement of

Climatology of aerosol pH and its controlling factors at the Melpitz continental background site in Central Europe
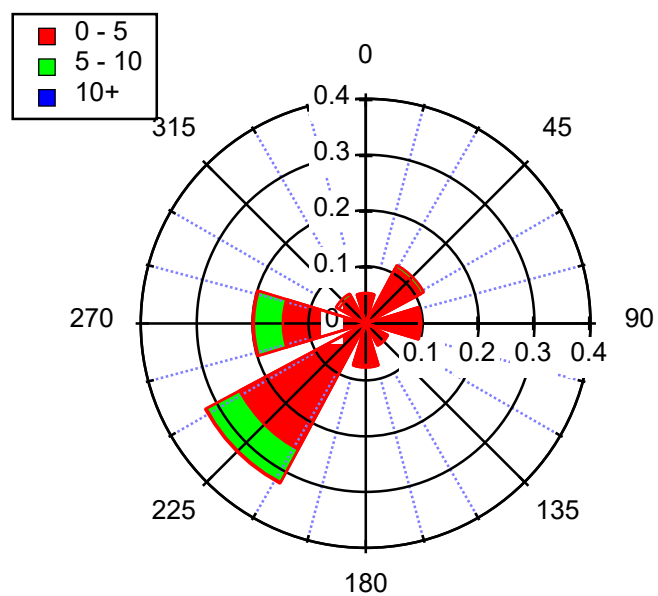
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Fig. S1: Location of the Melpitz measurement site in eastern Germany (source: © Google Maps).

Fig. S2: Wind rose showing the overall distribution of wind speeds and directions for the Melpitz site.
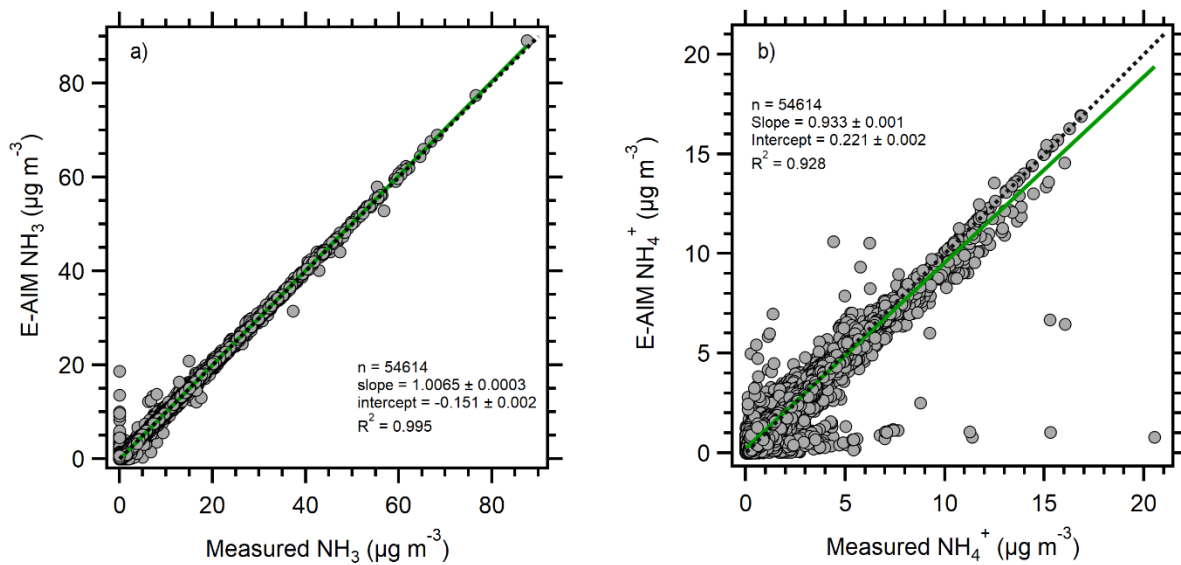
Fig. S3: Comparison of NH_3 (a) and NH_4^+ (b) MARGA measurements with model results from E-AIM. The black dotted line in each figure is the 1:1 line, shown for comparison, while the solid green line is the linear least squares fit, with regression parameters given in each panel. The strong linear relationship between measured and modeled results with slopes ~1 suggests the acceptable accuracy of the model for the Melpitz dataset.
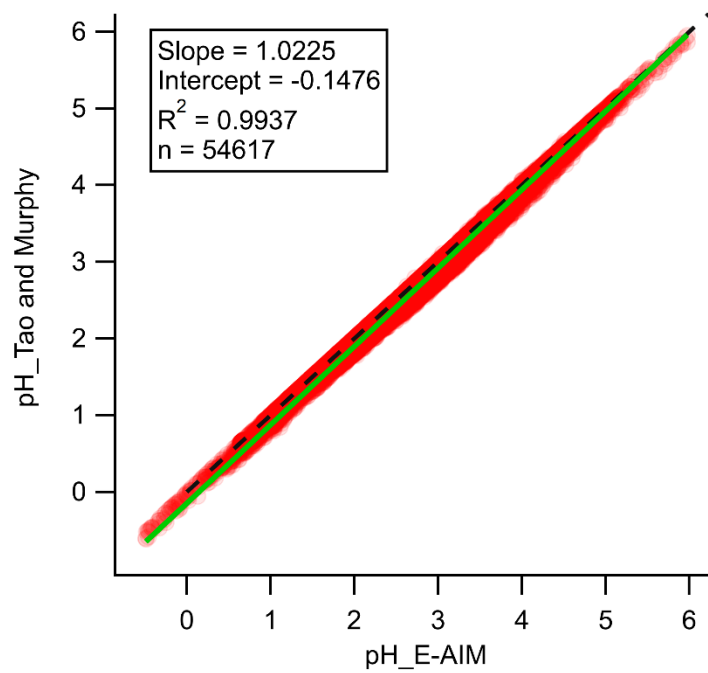
Fig. S4: Comparison of pH calculated by E-AIM with pH calculated according to Tao and Murphy (2021).
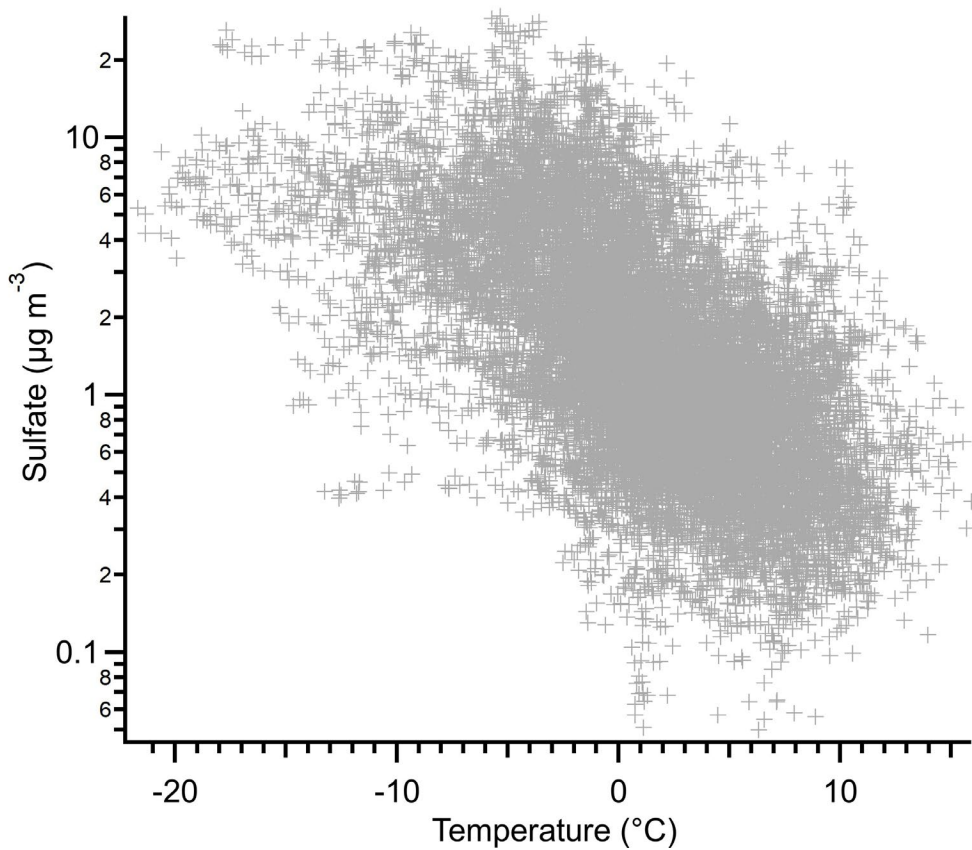
Fig. S5: Scatter plot of sulfate concentrations vs. temperature in winter (DJF). Note the highest sulfate concentrations correspond to colder temperatures, likely due to increased coal combustion for heating and shallower boundary layer heights under colder conditions.
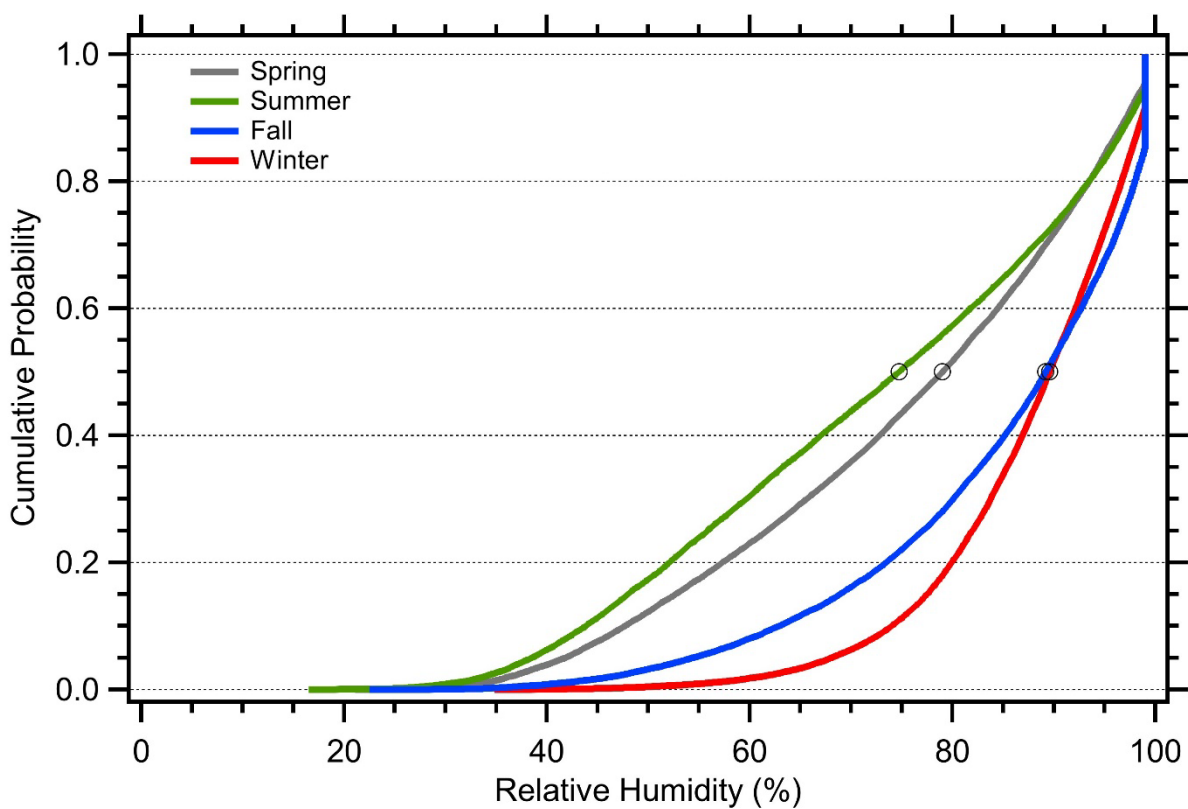
Fig. S6: Cumulative probability distribution of RH during each season in Melpitz. The circle shows the 50th percentile for each season, shown for visual purposes.
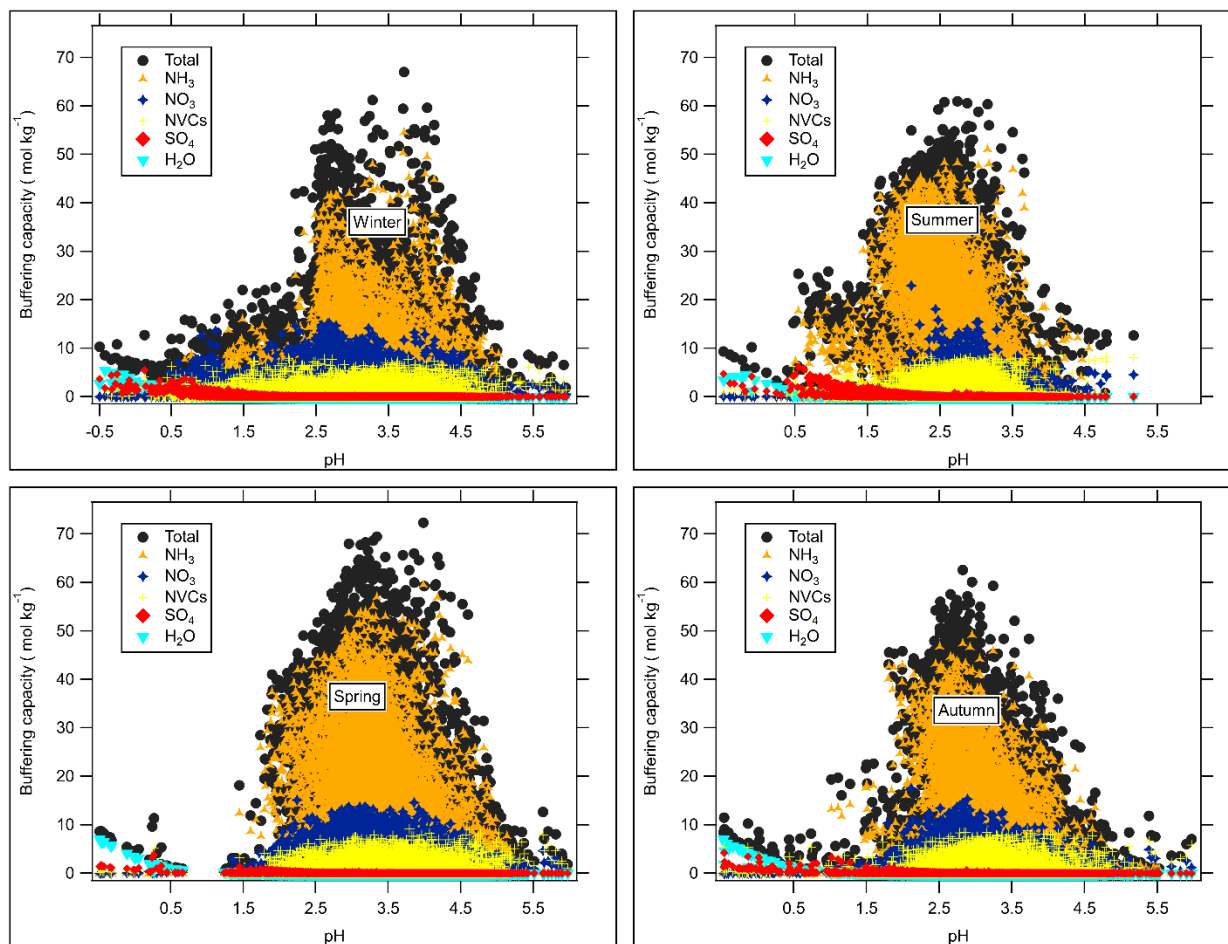
Fig. S7: Seasonal characterization of the aerosol pH buffering capacity contributed by different species in Melpitz. NH_3/NH_4^+ makes the most significant contribution to buffering capacity in each season.

References

Tao, Y., Murphy, J. G.: Simple Framework to Quantify the Contributions from Different Factors Influencing Aerosol pH Based on NHx Phase-Partitioning Equilibrium, *Environmental Science & Technology*, 55(15), 10310 – 10319, 2021.