

Table S1. Pearson correlations matrix of ionic concentrations in precipitation at five remote sites in the TP. N indicates the number of precipitation samples at each site. Only statistically significant correlation coefficient are shown ($P < 0.05$).

| Sites | | Na ⁺ | NH ₄ ⁺ | K ⁺ | Mg ²⁺ | Ca ²⁺ | Cl ⁻ | NO ₃ ⁻ | SO ₄ ²⁻ |
|---------------------------------|-------------------------------|-----------------|------------------------------|----------------|------------------|------------------|-----------------|------------------------------|-------------------------------|
| Southeast Tibet ($N = 53$) | Na ⁺ | 1 | | | | | | | |
| | NH ₄ ⁺ | 0.45 | 1 | | | | | | |
| | K ⁺ | 0.89 | 0.57 | 1 | | | | | |
| | Mg ²⁺ | 0.81 | 0.55 | 0.77 | 1 | | | | |
| | Ca ²⁺ | 0.69 | 0.41 | 0.64 | 0.82 | 1 | | | |
| | Cl ⁻ | 0.8 | – | 0.83 | 0.68 | 0.48 | 1 | | |
| | NO ₃ ⁻ | – | 0.31 | – | 0.44 | 0.42 | – | 1 | |
| | SO ₄ ²⁻ | – | 0.43 | 0.4 | 0.61 | 0.53 | 0.35 | 0.81 | 1 |
| Nam Co ($N = 27$) | Na ⁺ | 1 | | | | | | | |
| | NH ₄ ⁺ | – | 1 | | | | | | |
| | K ⁺ | 0.69 | – | 1 | | | | | |
| | Mg ²⁺ | 0.69 | 0.69 | – | 1 | | | | |
| | Ca ²⁺ | 0.52 | 0.75 | – | 0.91 | 1 | | | |
| | Cl ⁻ | 0.74 | – | 0.84 | – | – | 1 | | |
| | NO ₃ ⁻ | – | 0.91 | – | 0.67 | 0.8 | – | 1 | |
| | SO ₄ ²⁻ | 0.55 | 0.77 | – | 0.9 | 0.88 | – | 0.71 | 1 |
| Qomolangma ($N = 30$) | Na ⁺ | 1 | | | | | | | |
| | NH ₄ ⁺ | 0.45 | 1 | | | | | | |
| | K ⁺ | 0.83 | 0.63 | 1 | | | | | |
| | Mg ²⁺ | 0.61 | – | 0.69 | 1 | | | | |
| | Ca ²⁺ | – | – | – | 0.85 | 1 | | | |
| | Cl ⁻ | 1 | 0.47 | 0.83 | 0.58 | – | 1 | | |
| | NO ₃ ⁻ | 0.42 | – | 0.5 | 0.41 | – | 0.42 | 1 | |
| | SO ₄ ²⁻ | 0.8 | – | 0.82 | 0.84 | 0.57 | 0.78 | 0.55 | 1 |
| Ngari ($N = 39$) | Na ⁺ | 1 | | | | | | | |
| | NH ₄ ⁺ | 0.35 | 1 | | | | | | |
| | K ⁺ | 0.7 | 0.77 | 1 | | | | | |
| | Mg ²⁺ | 0.89 | 0.28 | 0.54 | 1 | | | | |
| | Ca ²⁺ | 0.56 | – | 0.44 | 0.59 | 1 | | | |
| | Cl ⁻ | 0.81 | 0.37 | 0.68 | 0.65 | 0.39 | 1 | | |
| | NO ₃ ⁻ | 0.32 | 0.47 | – | 0.38 | – | – | 1 | |
| | SO ₄ ²⁻ | 0.72 | – | 0.4 | 0.63 | 0.84 | 0.52 | 0.4 | 1 |
| Muztagh Ata ($N = 19$) | Na ⁺ | 1 | | | | | | | |
| | NH ₄ ⁺ | – | 1 | | | | | | |
| | K ⁺ | 0.82 | – | 1 | | | | | |
| | Mg ²⁺ | 0.56 | – | 0.71 | 1 | | | | |
| | Ca ²⁺ | 0.49 | – | 0.74 | 0.92 | 1 | | | |
| | Cl ⁻ | 0.96 | – | 0.74 | 0.56 | – | 1 | | |
| | NO ₃ ⁻ | – | – | 0.51 | 0.88 | 0.77 | – | 1 | |
| | SO ₄ ²⁻ | 0.5 | – | 0.6 | 0.9 | 0.81 | 0.56 | 0.68 | 1 |

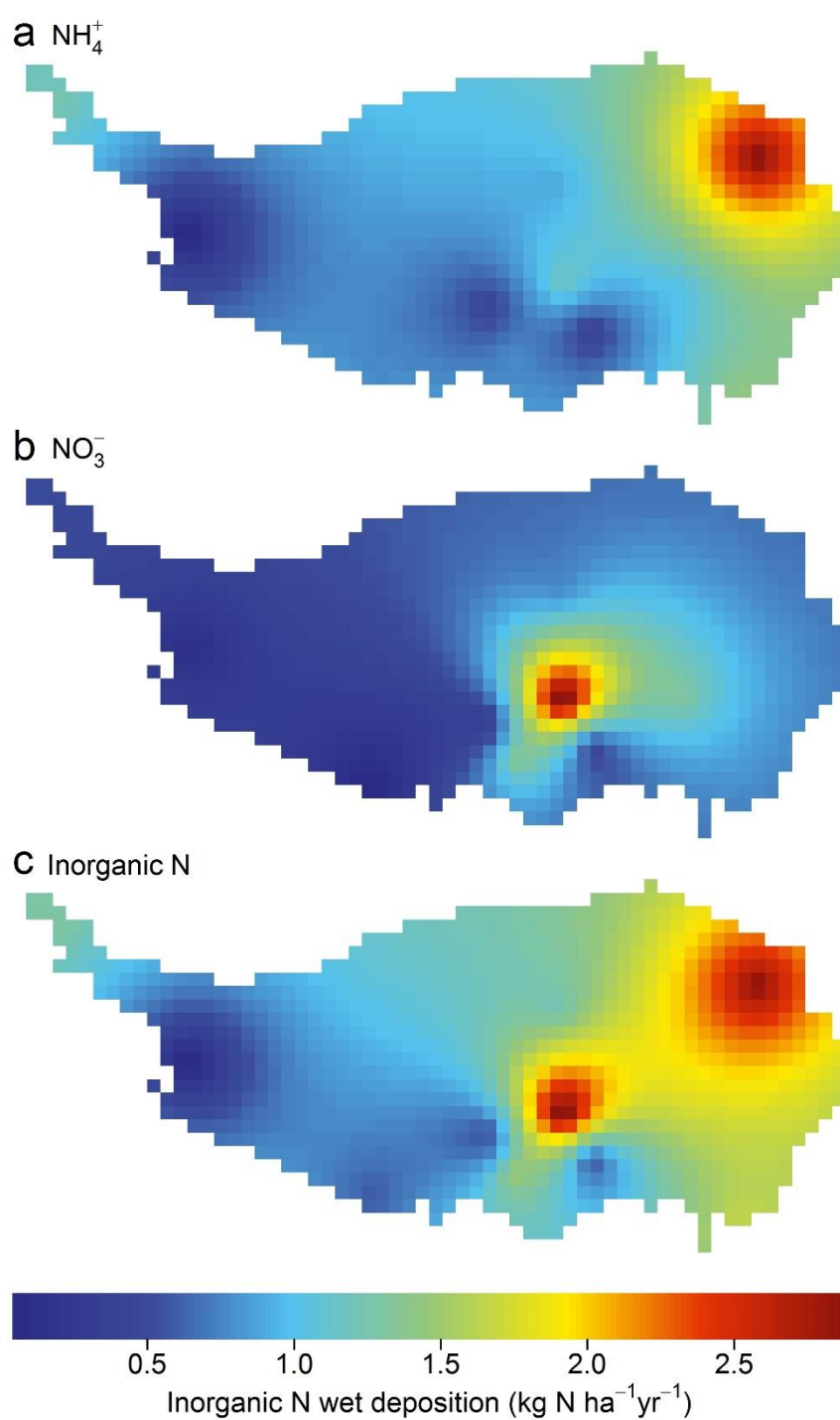


Figure S1. Spatial distribution of inorganic N wet deposition in the TP. Kriging interpolation technique was used based on *in situ* measurements at the 5 observation sites in this study and 7 observation sites in previous studies. The spatial data was provided as a NetCDF file in the supplementary material.