



*Supplement of*

**Impact of occurrence conditions on  $\text{NO}_3^-$ -N source apportionment in groundwater: insights from PCA-APCS-MLR and MixSIAR methods**

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**Section S1.** The results of the  $\delta^{15}\text{N}$  and  $\delta^{18}\text{O}$  values for the potential pollution sources.

**Table S1**  $\delta^{15}\text{N}$  values for the potential pollution sources.

| Pollution sources      | $\delta^{15}\text{N}$ (‰) |         |                  |
|------------------------|---------------------------|---------|------------------|
|                        | Minimum                   | Maximum | Mean $\pm$ sd    |
| Atmospheric deposition | -3.9                      | -1.9    | -2.9 $\pm$ 0.5   |
| Soil nitrogen          | -4.6                      | 3.8     | -0.9 $\pm$ 0.27  |
| Chemical fertilizer    | -2.51                     | 3.36    | -0.29 $\pm$ 0.09 |
| Manure and sewage      | -9.8                      | 2.7     | -2.4 $\pm$ 0.8   |

**Table S2**  $\delta^{18}\text{O}$  values for the potential pollution sources.

| Pollution sources      | $\delta^{18}\text{O}$ (‰) |         |                 |
|------------------------|---------------------------|---------|-----------------|
|                        | Minimum                   | Maximum | Mean $\pm$ sd   |
| Atmospheric deposition | 68                        | 70.6    | 69.3 $\pm$ 1.3  |
| Soil nitrogen          | -3.3                      | 21.9    | 4.8 $\pm$ 0.84  |
| Chemical fertilizer    | 2.71                      | 3.12    | 2.85 $\pm$ 0.16 |
| Manure and sewage      | 15.5                      | 22.3    | 18.1 $\pm$ 2.1  |

**Section S2.** The fractionation coefficients for  $\delta^{15}\text{N}$  and  $\delta^{18}\text{O}$  of different pollution sources.

**Table S3** The fractionation coefficients of different potential pollution sources.

| Pollution sources (%)      | Atmospheric deposition | Soil nitrogen   | Chemical fertilizer | Manure and sewage |
|----------------------------|------------------------|-----------------|---------------------|-------------------|
| Fractionation coefficients | 0                      | $-20.0 \pm 2.7$ | $-20.0 \pm 2.7$     | $16.8 \pm 2.8$    |