SUPPLEMENT

The N deposition values used in this paper originate from the EMEP atmospheric dispersion model(s) that provide results on a 150 km × 150 m grid (older model version) and a compatible 3×3 subdivision of 50 km × 50 km, both in a polar stereographic projection (see Fig. S1). For more information on the EMEP grid see www.emep.int/grid and Posch et al. (Calculation and mapping of critical thresholds in Europe: Status Report 1999, RIVM Bilthoven, 1999).

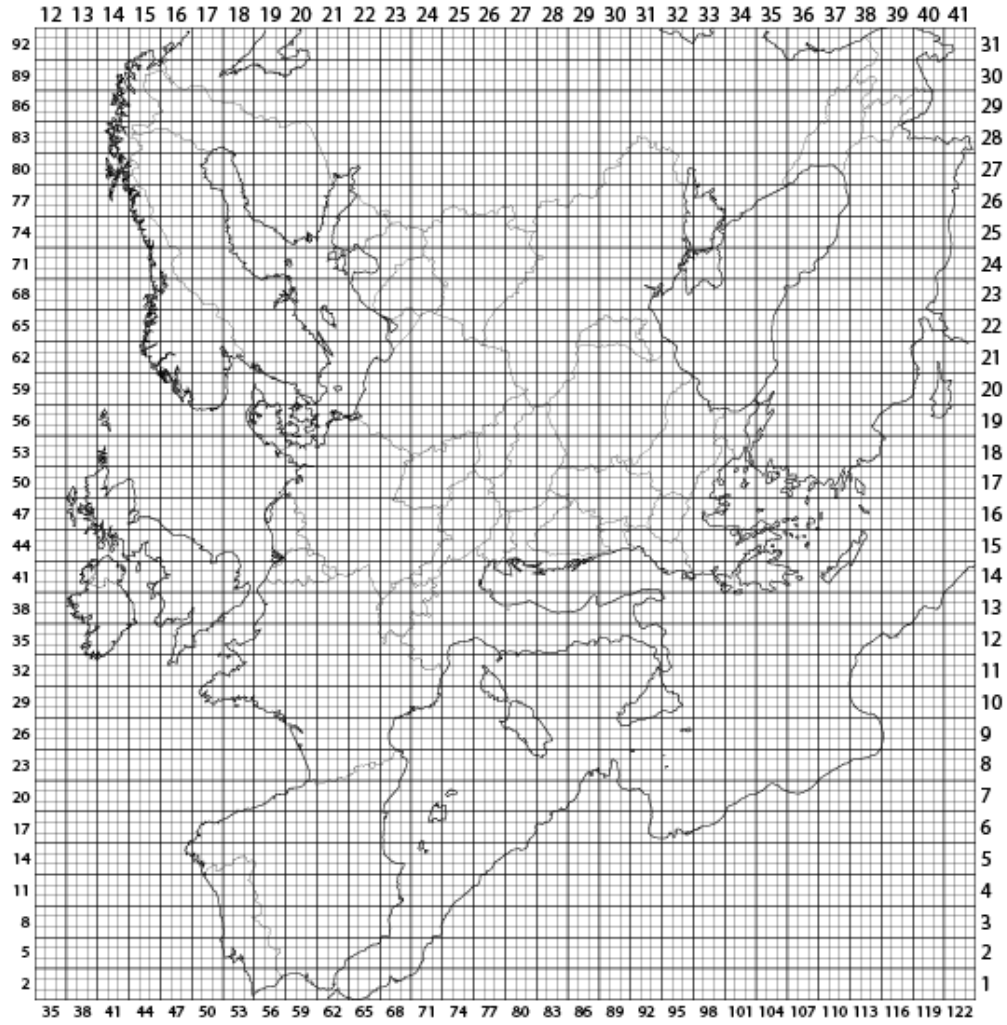

Fig. S1. The EMEP150 grid (thick lines) and the EMEP50 grid (additional thin lines). The labels at the bottom and at the left are the EMEP50 grid indices (every third cell labeled) and the labels at the top and at the right are the EMEP150 grid indices.

A bilinear interpolation is called that way because it is *the product of two linear functions*. To obtain the interpolation (i.e., the value of the deposition field) at an arbitrary point (x,y), when it is known at the four grid points (x_1,y_1), (x_2,y_1), (x_2,y_2) and (x_2,y_1) (see Fig. S2), we firstly interpolate linearly in the x-direction:

(1a) $f(x,y_1) \approx (1-\lambda)f(x_1,y_1) + \lambda f(x_2,y_1)$ and

(1b) $f(x,y_2) \approx (1-\lambda)f(x_1,y_2) + \lambda f(x_2,y_2)$ with $\lambda = \frac{x-x_1}{x_2-x_1}$

Then we interpolate linearly between these two values in the y-direction to obtain the desired estimate:

(2) $f(x,y) \approx (1-\mu)f(x,y_1) + \mu f(x,y_2)$ with $\mu = \frac{y-y_1}{y_2-y_1}$

Inserting eqs.1a,b into eq. 2, this results in the bilinear interpolation formula:

(3) $f(x,y) \approx (1-\lambda)(1-\mu)f(x_1,y_1) + \lambda(1-\mu)f(x_2,y_1) + (1-\lambda)\mu f(x_1,y_2) + \lambda\mu f(x_2,y_2)$

Note that the same result is obtained if the interpolation is firstly done along the *y*-direction and then along the *x*-direction.

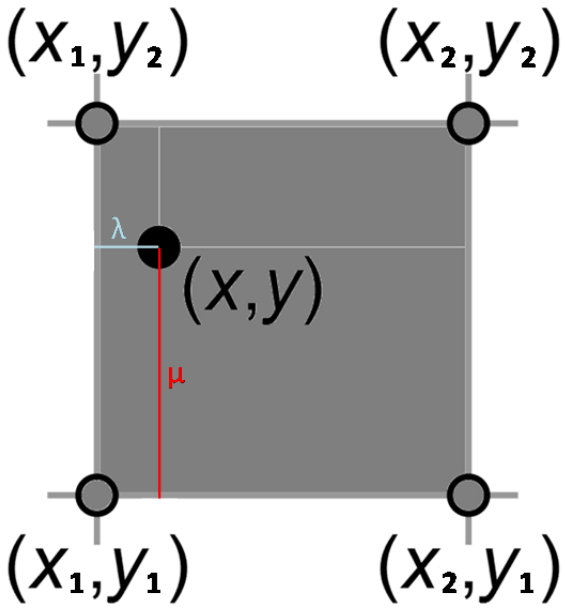

Fig. S2. Graphical representation of the notation used for the bilinear interpolation.