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ERRATUM

Tans, P. P. 1998. Oxygen isotopic equilibrium between carbon dioxide and water in soils. *Tellus* **50B**, 163-178.

The term "Green's function" appeared erroneously as "Green function" throughout (publisher's error).

Eq. (32) should read:

$$F_{sa,18} = -F_{18} = \alpha_D F_{sa} R_{eq} + \frac{F_{sa} R_{eq}}{1 + (d_1/z_1)(\varepsilon_2 \kappa_2/\varepsilon_1 \kappa_1)} \times (z_1/z_o)(1-\alpha_D)(1-e^{-z_o/z_1}).$$

Finally, it was implicitly assumed that the rate of oxygen equilibration between CO_2 and liquid water equals the rate of hydration of CO_2 in water. This is incorrect. As was already pointed out by Mills and Urey (1940), the rate of oxygen isotopic equilibration is only one third as fast as the rate of hydration. The error is corrected if every occurrence of k_H in the original paper is replaced by $k_H/3$. This change makes the equilibration depth z_1 larger by a factor of $\sqrt{3}$, and slows down the "piston velocity" for atmosphere-soil oxygen exchange by the same factor of $\sqrt{3}$. The hydration equilibrium is

$$CO_2 + H_2O \Leftrightarrow H_2CO_3.$$

Isotopic equilibration occurs because apparently the oxygen atoms in carbonic acid, H_2CO_3, carry no "memory" of whether they originated from CO_2 or from H_2O. The reason for the slower isotopic equilibration is that of the three oxygen atoms in carbonic acid, only one originally came from a water molecule.