

Global Annual Soil Respiration Data (Raich and Schlesinger 1992)

Summary:

This data set is a compilation of soil respiration rates ($\text{g C m}^{-2} \text{ yr}^{-1}$) from terrestrial and wetland ecosystems reported in the literature prior to 1992. These rates were measured in a variety of ecosystems to examine rates of microbial activity, nutrient turnover, carbon cycling, root dynamics, and a variety of other soil processes.

In this summary, only those data based on most or all of one full year of measurements were used so that annual rates of soil respiration could be estimated. Data from soil cores were excluded because the sample coring modifies root respiration.

Also included in the data set are biome type, vegetation type, locality, and geographic coordinates, based on information from the original paper. Mean annual temperature and precipitation were based on the original paper; where those data were not included, they were estimated from a gridded global climate database [0.5 degree resolution; Legates D.R. and C.J. Willmott. 1988. Global Air Temperature and Precipitation Data Archive. Department of Geography, University of Delaware, Newark, Delaware, USA).

Based on the data in this data set, the mean rates of soil respiration ($\text{g C m}^{-2} \text{ yr}^{-1}$) in different types of vegetation are as follows: tundra, 60 ± 6 ; boreal forests and woodlands, 322 ± 31 ; temperate grasslands, 442 ± 78 ; temperate coniferous forests, 681 ± 95 ; temperate deciduous forests (includes mixed broad-leaved and needle-leaved forests), 647 ± 51 ; Mediterranean woodland and heathland, 713 ± 88 ; croplands, fields, etc., 544 ± 80 ; desert scrub, 224 ± 38 ; tropical savannas and grasslands, 629 ± 53 ; tropical dry forests, 673 ± 134 ; tropical moist forests, 1260 ± 57 ; northern bogs and mires, 94 ± 16 ; and marshes, 413 ± 76 . The annual global CO_2 flux from soils is estimated to average $68 \pm 4 \text{ PgC/yr}$, based on extrapolations from biome land areas. On a global scale, soil respiration rates are positively correlated with mean annual air temperature and mean annual precipitation. For details, see Raich and Schlesinger (1992).

Data Citation:

Cite this data set as follows (citation revised on June 27, 2002):

Raich, J. W., and W. H. Schlesinger. 2001. Global Annual Soil Respiration Data (Raich and Schlesinger 1992). Data set. Available on-line [<http://www.daac.ornl.gov>] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A. [doi:10.3334/ORNLDAAC/622](https://doi.org/10.3334/ORNLDAAC/622).

References:

Raich, J. W., and W. H. Schlesinger. 1992. The global carbon dioxide flux in soil respiration and its relationship to vegetation and climate. *Tellus* 44 B: 81-99.

Data Format:

For information on data file formats, variable description/definition, and units of measurement, see this companion file:

[Global Soil Respiration Comp Doc.txt](#)

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