

EC-MOD dataset for North America

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The EC-MOD dataset for North America (Xiao et al. 2014) consists of gridded gross primary productivity (GPP), ecosystem respiration (RE), net ecosystem exchange (NEE), and evapotranspiration (ET) at 1km spatial resolution and 8-day time steps over the period from February 2000 to December 2012. This dataset was derived from eddy covariance (EC) flux measurements and a variety of MODIS data streams using a data-driven approach (Xiao et al., 2008), and is referred to as EC-MOD (Xiao et al., 2010, 2011). The earlier version of EC-MOD consists of 1km GPP and NEE gridded estimates for temperate North America over the period 2000-2006, and was also aggregated to 1degree spatial resolution and monthly time steps for model intercomparison purposes.

Monthly fluxes:

The 8-day gridded flux estimates for North America are aggregated to monthly intervals:

File naming convention:

GPP: gpp1**m?.bsq, where ** and ?? stand for year and month.

RE: re1**m?.bsq, where ** and ?? stand for year and month.

NEE: nee1**m?.bsq, where ** and ?? stand for year and month.

ET: le1**m?.bsq, where ** and ?? stand for year and month.

The file format is generic binary, and the data type is unsigned int (4 bytes).

The projection type is sinusoidal, and the detailed projection and georeference information are available in the header file provided. The header file can be used to import the data to ArcMap as GRID.

For each pixel:

Monthly GPP (or RE, NEE) ($\text{g C m}^{-2} \text{ mo}^{-1}$) = $(\text{DN} - 3000,000) / 100.0$, where DN is the digital number.

Monthly ET (mm mo^{-1}) = $(\text{DN} - 3000,000) / 100.0$, where DN is the digital number.

Carbon and water fluxes were only estimated for vegetated pixels. The DNs of non-vegetated land (urban and built up, barren) and water pixels are 3000,000 and 0, respectively, and their actual values are 0 and -30,000, respectively.

Land cover map:

The 1km ODIS land cover map with University of Maryland (UMD) land cover classification scheme was used to specify the land cover (or vegetation) type of each pixel for the estimation of GPP and NEE. The look-up-table for the UMD scheme is as follows:

DN Land cover type

- 0 Water
- 1 Evergreen Needleleaf Forest
- 2 Evergreen Broadleaf Forest
- 3 Deciduous Needleleaf Forest
- 4 Deciduous Broadleaf Forest
- 5 Mixed Forests
- 6 Closed Shrublands
- 7 Open Shrubland
- 8 Woody Savannas
- 9 Savannas
- 10 Grasslands
- 12 Croplands
- 13 Urban and Built-Up
- 16 Barren or Sparsely Vegetated

The vegetation types were grouped into seven broader classes: evergreen forests, deciduous forests, mixed forests, shrublands, savannas, grasslands, and croplands for the estimation of carbon and water fluxes. The land cover map can be used to identify the land cover (or vegetation) type of each pixel.

References:

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