LPX-Bern-DYPTOP-CH4 data set description

Citation of data set:

LPX-Bern-DYPTOP-CH4, LPX-Bern: Simulated dynamics of global wetlands and peatlands with associated CH4 fluxes, data set available at www.climate.unibe.ch, Sep 2015.

Citation of describing papers for areas and CH4 emissions:

Stocker, B. D., R. Spahni, F. Joos, "DYPTOP: a cost-efficient TOPMODEL implementation to simulate sub-grid spatio-temporal dynamics of global wetlands and peatlands", Geoscientific Model Development, 7/6, 3089-3110, 2014

Spahni, R., R. Wania, L. Neef, M. van Weele, I. Pison, P. Bousquet, C. Frankenberg, P. N. Foster, F. Joos, I. C. Prentice, P. van Velthoven, "Constraining global methane emissions and uptake by ecosystems", Biogeosciences, 8/6, 1643-1665, 2011

General Information:

Format: NetCDF 4, gridded

Model: LPX-Bern, version 1.2 with DYPTOP, rev3093

Resolution: 1°x1° lat/lon global

Time: Monthly from Jan 1901 to Dec 2014

Climate: CRU TS 3.23, www.cru.uea.ac.uk/cru/data/hrg/cru_ts_3.23/Release_Notes_CRU_TS3.23.txt

CO2: Record from GCP2014, www.globalcarbonproject.org

Landuse: Setup defined by GCP2014, www.globalcarbonproject.org

Wetland/ecosystem area fractions for CH4 emissions:

From global wetland fractions calculated by DYPTOP (Stocker et al., 2014) we subtract different ecosystems suitable for CH4 emissions:

Peatlands: Wetland fraction suitable for peat growth using DYPTOP (Stocker et al., 2014).

Rice paddies: Wetland fraction coinciding with croplands (GCP2014) and the presence of rice paddies (Spahni et al., 2011).

Inundated wetlands: Wetland fraction that are not peatlands nor rice paddy areas.

Wet mineral soils: Fractional areas that are not wetlands, peatlands, rice paddies, permanent freshwater bodies, or ice/sea water covered areas, but are “wet” occasionally.

Dry mineral soils: Areas identical to “wet mineral soils”, but that are “dry” in general.

CH4 emissions by category:
(as in netcdf file)

General: Fluxes are in g CH4 /yr and /m2 of grid cell area, i.e. fluxes can be added for total emissions. You can divide the flux by the associated fractional area in order to get the flux in g CH4 /yr and /m2 of wetland area. In general, all emissions are scalable by category for global optimization. Global net emissions are 191 Tg CH4 /yr in 2004.

ch4peat: Boreal and tropical peatland CH4 emissions with a global total of 57 Tg CH4 /yr in 2004.

ch4rice: Global CH4 emissions from rice paddies are 38 Tg CH4 /yr in 2004.

ch4inund: Global CH4 emissions from inundated wetlands are 100 Tg CH4 /yr in 2004.

ch4wetsoil: Global CH4 emissions from wet mineral soils are 45 Tg CH4 /yr in 2004.

ch4consum: Global CH4 consumption from dry mineral soils are 49 Tg CH4 /yr in 2004. We use a constant atmospheric CH4 concentration of 1800 ppb at soil surface, which can be scaled in space and time (Spahni et al., 2011).
Note: units are in mg CH4 /yr /m2.

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