

GCP- Land trends: modelling protocol

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Deadline for submission of simulations: 21th Nov 2011

Goal: To investigate the trends in NBP over the period 1980-2010

Participating models

Hyland, JULES, LPJ, LPJ-GUESS, NCAR-CLM4, ORCHIDEE, OCN, SDVGM, VEGAS

Model simulations

Models can have dynamic vegetation but all will use observed cropland and pasture distribution S2 and S3 (supplied). The models will be forced over the 1860-2009 period with changing CO₂, climate and land use according to the following simulations.

S1: CO₂ only (time-invariant present-day land use mask)

S2: CO₂ and climate (time-invariant present-day land use mask)

S3 (optional): CO₂, climate and land use

S4 (optional: see email David Frank): climate only (time-invariant present-day land use mask)

Dataset provided

- Climate forcing: CRU+NCEP historical forcing (1901-2010). Spatial resolution: 0.5°x0.5°, time resolution: 6hours
- Global atmospheric CO₂ from ice core+NOAA annual resolution (1860-2010)
- Land use change from the Hyde database or Hurtt et al. (1860-2005). Spatial resolution: 0.5°x0.5°, annual resolution (1860-2005). For S1 & S2, groups are free to use their own time-invariant present-day land use mask, or one derived from the Hyde/Hurtt database. In S3, no further land use change is considered after 2005.

CRU-NCEPv4 can be accessed from: <http://dods.extra.cea.fr/data/p529viov/cruncep/>

The coarse resolution (3.75 x 2.5) climatologies area available from Chris Huntingford, chg@ceh.ac.uk

Each group will use its own data source for soil properties, and ignition events (if used), etc.

Experiment protocol

- Model spin up
 - 1860 CO₂ concentration (287.14ppm)
 - recycling climate mean and variability from the early decades of the 20th century (eg 1901-1920).

- For simulations S1 and S2, constant present-day crops and pasture distribution.
- For simulations S3, constant 1860 crops and pasture distribution.
- 1861-1900 transient simulation:
 - varying CO₂,
 - continue recycling climate (as in spin up)
 - land use fixed in S1 and S2, varying in S3
- 1901-2010 transient simulation:
 - varying CO₂,
 - varying climate
 - land use fixed in S1 and S2, varying in S3

Required outputs

- List of variables: See companion Excel file.
 - Level 1 variables: essential
 - Level 2 variables: desirable for additional analysis/studies
 - Additional variables are required for David Frank's optional activity (see relevant email)
- Time period: 1901-2010
- Time resolution: as specified in the file
- Spatial resolution: 0.5x0.5 or degraded if needed
- Format netcdf (see Excel file)

Output file name convention

One file per variable, entire time-series

Model_Simulation_variable.nc (eg: JULES_S1_mrso.nc)