Table 1. Process descriptions in participating ecosystem or forward models

	BEPS	Can-IBIS	CASA-GFEDv2	CASA (Trans com)	CLM-CASA'	CLM-CN	DLEM	EC-LUE	EC-MOD	ISAM	LPJmL	MC1	MOD17_Tomelleri	NASA-CASA	ORCHIDEE	SiB3	TEM6	VEGAS2
Shortest time step	hourly	30min	monthly	monthly	20min	20min	daily	daily	weekly	weekly	daily	monthly	daily	daily	30min	hourly	monthly	daily
Simulation period covered	2000-2004	2000-2005	2000-2005	2002-2003	1990-2004	1990-2004	2000-2005	2004-2005	2000-2006	2000-2007	2000-2006	2000-2007	2000-2004	2001-2004	2001-2008	2000-2005	2000-2006	2000-2007
Photosynthesis	Enzyme kinetic	Enzyme kinetic	LUE	LUE	Enzyme kinetic	Enzyme kinetic	Enzyme kinetic	LUE	Stastical	Statistical	Enzyme kinetic	Statistical	LUE	LUE	Enzyme kinetic	Enzyme kinetic	Enzyme kinetic	LUE
Autotroph respiration	Tair, GPP, VegC	Tair, Tsoil, VegC	N/A	N/A	Portion of GPP	Tair, LeafN, VegC	Tair	N/A	N/A	N/A	Tair, Tsoil, VegC	Tair, LeafN, VegC	N/A, Reco	N/A	Tair, Tsoil, VegC, LeafN	Portion of GPP	Tair, VegC	Tair, VegC
Evapotranspiration	Ball et al. (1987)	Ball et al. (1987) Collatz et al. (1992)	Priestly and Taylor (1972)	Priestly and Taylor (1972)	Full land surface model	Full land surface model	Penmon-Montieth Montieth, (1965; 1981)	N/A	N/A	N/A	Ball et al. (1987) ??	Modified Linacre (1994)	N/A	Priestly and Taylor (1972)	Ball et al. (1987)	Ball et al. (1987)	Thornthwaite & Mather (1957)	Penmon-Montieth ??
Phenology	Prescribed, MODIS LAI	Prognistic	Prescribed, GIMMS NDVI	Precribed, GIMMS NDVI	prognostic	prognostic	prognostic	Prescribed MODIS NDVI	Prescribed, LAI, EVI	N/A	Prognostic, Tair	Prognistic, soil water	Prescribed MODIS LAI	Prescribed, EVI	Prognistic,T, Soil Moist.	Prescribed, MODIS LAI	Prognistic, AET	Prognistic, NPP, Ra
Decomposition	Tair, Tsoil, Moist, SoilC, SoilN	Tsoil, Moist, SoilC	Tsoil, Moist, SoilC, C:N and Lignin	Tsoil, Moist, SoilC	Tsoil, Moist, SoilC	Tsoil, Moist, SoilC, SoilN	Tsoil, Moist, SoilC, SoilN	N/A	N/A	Tsoil, Moist, SoilC, SoilN	Tsoil, Moist, SoilC	Tsoil, Moist, SoilC, SoilN	N/A, Reco, LAI, GPP, Tair,P	Tsoil, Moist, SoilC, SoilN	Tsoil, Moist, SoilC, SoilN	Tsoil, Moist, 0-order, scaled to NPP	Tsoil, Moist, SoilC, SoilN	Tair, VegC, Tsoil, SoilC
Number of PFTs	6?	12	3	11	15	15	14	1	6 natural 1 crop	12 natural 1 crop	10	6	10	3 natural? 8 crop	10 natural, 2 crop	14	21 natural, 2 crop	4
Dynamic vegetation	no	yes	no	no	no	no	no	no	no	no	yes	yes	no	no	yes	no	no	yes
Fluxes reported (or calculated from reported)	GPP, NEE, NEP, NPP, Rh	GPP, NEE, NEP, NPP, Ra,Rh	GPP, NEE, Reco, CFire, NEEF	NEE (includes fire emissions)	GPP, NPP, Rh, NEE, NEP	GPP, NPP, Rh, NEE, NEP	GPP, NEE, NPP, Ra,Rh	GPP	GPP, NEE	NEE, Rh, NEE	GPP, Ra, NPP, Rh, NEE, ACFire, ANEEF	NPP, Rh, NEE, BioCons, NEEF	GPP, Reco, NEE	NPP, Rh, NEE, NEP	GPP, NPP, Rh, NEE, CO2FLUX	NEE	GPP, NPP, Rh, NEE, CFire, NCE, NECB	GPP, Ra, NPP, Rh, NEE, CFire,
Carbon pools used (includes litter, wood)	4veg 9soil	3veg 7soil	3veg 5soil	3veg 5soil	3veg 5soil	4veg 7soil	6veg 3soil	0veg 0soil	0veg 0soil	5veg 8soil	3veg 2soil	7veg 6soil	0veg 0soil	3veg 5soil	8veg 8soil	1veg 0soil	1veg 3soil	3veg 6soil
Hydrological variables (ET, Runoff)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes

Table 2. Boundary conditions and driver data used in participating ecosystem or forward models.

	BEPS	Can-IBIS	CASA-GFEDv2	CASA-Transcom	CLM-CASA'	CLM-CN	DLEM	EC-LUE	EC-MOD	ISAM	LPJmL	MC1	MOD17_Tomelleri	NASA-CASA	ORCHIDEE	SiB3	TEM6	VEGAS2
Soil Distribution, Properties	Canadian Soil Landscapes, STATSGO (US)	Canadian Soil Landscapes, STATSGO (Alaska) VEMAP 2 (continental	Batjes (2000) (C amount by depth)	Zobler /FAO (Zobler, 1986; 1999)	IGBP-DIS, Global Soil Data Task Group (2000)	IGBP-DIS, Global Soil Data Task Group (2000)	Zobler /FAO (Zobler, 1986; 1999)	N/A	N/A	Zobler /FAO (Zobler, 1986; 1999)	Zobler /FAO (Zobler, 1986; 1999)	STATSGO	N/A	STATSGO?	Zobler /FAO (Zobler, 1986; 1999)	IGBP-DIS, Global Soil Data Task Group (2000)	IGBP-DIS, Global Soil Data Task Group (2000)	Related to vegetation
Vegetation Distribution, Properties	GLC 2000 (EC JRC, 2000)	Dynamic	Vegetation Continuous Fields, Hansen et al., (2003), Wetlands, Matthews and Fung (1987)	DeFries and Townshend (1994)	Static, MODIS landcover	Static, MODIS landcover	IGBP (MOD12Q1), Friedl et al. (2000)	N/A	Static, MODIS landcover	Static, Loveland & Belward (1997) Haxeltine & Prentice (1996a, b)	Dynamic	Dynamic	SYNMAP, Jung et al. (2006)	MODIS 1-km land cover	Dynamic	IGBP (MOD12Q1), Friedl et al. (2000)	Loveland et al. (2000) Hurtt et al. (2006)	Dynamic
Temperature	NCEP reanalysis	CFS spatial data	IIASA and GISTEMP	Leemans and Cramer (1991) Hansen et al. (1999)	NCEP reanalysis	NCEP reanalysis	NARR, PRISM	GMAO /DAO	MODIS LST	Mitchell et al., (2004)	CRU05	PRISM	ERA-INTERIM	DAYMET 1982-2000, NCEP 2001-04	CRU/NCEP	NARR	CRU/NCEP	NASA/ GISSTEMP
Precipitation	NCEP reanalysis	CFS spatial data	GPCP version2	Leemans and Cramer (1991) Hansen et al. (1999)	NCEP reanalysis	NCEP reanalysis	NARR	GMAO /DAO	MODIS NDWI	Mitchell et al. (2004)	CRU05	PRISM	ERA-INTERIM	DAYMET 1982-2000, NCEP 2001-04	CRU/NCEP	NARR	CRU/NCEP	Combined Satellite/Gauge (CRU/CMAP/OPI)
Humidity	NCEP reanalysis	CFS spatial data	N/A	N/A	NCEP reanalysis	NCEP reanalysis	NARR	GMAO /DAO	N/A	N/A	N/A	PRISM	ERA-INTERIM	N/A	CRU/NCEP	NARR	N/A	N/A
WindSpeed	N/A	CFS spatial data	N/A	N/A	NCEP reanalysis	NCEP reanalysis	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CRU/NCEP	NARR	N/A	NCEP reanalysis

Radiation	NCEP reanalysis	CFS spatial data	ISCCP and NCEP R2		NCEP reanalysis	NCEP reanalysis	NARR	GMAO /DAO	N/A	N/A	CRU05	N/A	MOD15PAR	CRU	CRU/NCEP	NARR	CRU/NCEP	NCEP reanalysis
InitialPools	Spin-up using INTEC	Steady state spin-up, 1901	? Prescribed?		Steady state spin-up, 1795 land use, 1940 climate	Steady state spin-up, 1795 land use, 1940 climate	Steady state spin-up, 1901	N/A	N/A	Steady state spin-up, 1765	1000 year spin-up, 1901	Steady state spin-up, 1895	N/A	Steady state spin-up, 1981	1000 year spin-up using 1901-1910, 1901	N/A	6,000 year spinup to 1001-01-01	Spinup steady state at 1901
Disturbances included	Not included	Prescribed fire	Prescribed fire			Prognostic Fire	PrescribeFire, land-use, harvest, disaster		Prescribed fire, land-use	Prescribed land-use Ramakutty & Foley (1999)	Prognostic fire,	Prognostic fire, Prescribed land-use Prognostic harvest		Prescribed land-use	Prscribed land-use (Ramankutty & Hyde), prognostic harvest	Prescribed crops, Prognostic harvest	Prescribed land-use, Forest harvest (Hurtt et al. 2006), Prescribed fire (Balshi et al. 2007)	Prognostic fire

References

Ball, J.T., I.E. Woodrow, and J.A. Berry. 1987. A model predicting stomatal conductance and its contribution to the control of photosynthesis under different environmental conditions. Progress in Photosynthesis Research 4(5): 221–224.

Balshi, M.S., A.D. McGuire, Q. Zhuang, J. Melillo, D.W. Kicklighter, E. Kasischke, C. Wirth, M. Flannigan, J. Harden, J.S. Clein, T.J. Burnside, J. McAllister, W.A. Kurz, M. Apps, and A. Shvidenko. *2007. The role of historical fire disturbance in the carbon dynamics of the pan-boreal region: A process-based analysis. J. Geophys. Research: Biogeosciences 112*: G02029. doi:10.1029/2006JG000380

Batjes, N. H. (ed.). 2000. Global Data Set of Derived Soil Properties, 0.5-Degree Grid (ISRIC-WISE). [Global Data Set of Derived Soil Properties, 0.5-Degree Grid (International Soil Reference and Information Centre - World Inventory of Soil Emission Potentials)]. 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/546

Centre for Land and Biological Resources Research. 1996. Soil Landscapes of Canada, v.2.2, Research Branch, Agriculture and Agri-Food Canada. Ottawa.

Collatz, G.J., M. Ribas-Carbo, and J.A. Berry. 1992. Coupled photosynthesis-stomatal conductance model for leaves of C_4 plants. Aust. J. Plant Physiol. 19: 519–538. doi:10.1071/PP9920519

DeFries, R.S. and J.R.G. Townshend. 1994. 1 Degree Global Land Cover Data Set Derived from AVHRR. Available online at [http://glcf.umiacs.umd.edu/data/landcover/] from the Global Land Cover Facility, University of Maryland Institute for Advanced Computer Studies, College Park, Maryland, USA.

European Commission, Joint Research Centre. 2000. Global and Regional Land Cover Maps (GLC 2000). Available for download at [http://bioval.jrc.ec.europa.eu/products/glc2000/glc2000.php] from the European Commission, Joint Research Centre, Space Applications Institute, Global Environmental Monitoring Unit, Ispra (VA), Italy.

Friedl, M., A. Strahler, C. Schaaf, J.C.F. Hodges, and J. Salomon. 2000. Binary MODIS MOD12Q1 1 km Land Cover Product, Global and Continental Mosaics. Available at [http://duckwater.bu.edu/lc/] from the Department of Geography, Boston University, Boston, Massachusetts, USA.

Global Soil Data Task Group. 2000. Global Gridded Surfaces of Selected Soil Characteristics (IGBP-DIS). [Global Gridded Surfaces of Selected Soil Characteristics (International Geosphere-Biosphere Programme - Data and Information System)]. 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/569

Goldewijk, K.K. 2001. Estimating global land use change over the past 300 years: the HYDE database. Global Biogeochemical Cycles 15(2): 417-433. doi:10.1029/1999GB001232

Hansen, M., R. DeFries, J.R. Townshend, M. Carroll, C. Dimiceli, and R. Sohlberg. 2003. MODIS 500 m Global Vegetation Continuous Fields Percent Tree Cover. Available online at [http://www.landcover.org/data/vcf/] from the Department of Geography, Global Land Cover Facility, University of Maryland, College Park, Maryland, USA.

Hansen, J., R. Ruedy, J. Glascoe, and M. Sato. 1999. GISS analysis of surface temperature change. J. Geophys. Research: Atmospheres 104(D24): 30997-31022. doi:10.1029/1999JD900835

Haxeltine, A., and I.C. Prentice. 1996a. A general model for the light-use efficiency of primary production. Functional Ecology 10: 551-56. doi:10.2307/2390165

Haxeltine, A., and I.C. Prentice. 1996b. BIOME3: An equilibrium terrestrial biosphere model based on ecophysiological constraints, resource availability, and competition among plant functional types. Global Biogeochemical Cycles 10(4): 693-709. doi:10.1029/96GB02344

Hurtt, G.C., S. Frolking, M.G. Fearon, B. Moore, E. Shevliakova, S. Malyshev, S.W. Pacala, and R.A. Houghton. 2006. The underpinnings of land-use history: three centuries of global gridded land-use transitions, wood harvest activity, and resulting secondary lands. Global Change Biology: 12:1208-1229. doi:10.1111/j.1365-2486.2006.01150.x

Jung, M., K. Henkel, M. Herold, and G. Churkina. 2006. Exploiting synergies of global land cover products for carbon cycle modeling. Remote Sensing of Environment 101(4): 534-553. doi:10.1016/j.rse.2006.01.020

Leemans, R., and W.P. Cramer. 1991. The IIASA database for mean monthly values of temperature, precipitation, and cloudiness on a global terrestrial grid (Vol. 18). International Institute for Applied Systems Analysis. 62 pp.

Linacre, E.T. 1994. Estimating U.S. Class A pan evaporation from few climate data. Water International 19: 5-14. doi:10.1080/02508069408686189

Loveland, T.R., and A.S. Belward. 1997. The IGBP-DIS global 1km land cover data set, DISCover: First results. International Journal of Remote Sensing 17(15): 3289-3295. DOI:10.1080/014311697217099

Loveland, T.R., B.C. Reed, J.F. Brown, D.O. Ohlen, Z. Zhu, L.W.M.J. Yang, and J.W. Merchant. 2000. Development of a global land cover characteristics database and IGBP DISCover from 1 km AVHRR data. International Journal of Remote Sensing 21(6-7): 1303-1330. doi:10.1080/014311600210191

Matthews, E. and I. Fung. 1987. Global Distribution of Wetland Ecosystems at 1 Degree Resolution. Available online at [http://www.giss.nasa.gov/data/landuse/wetland.html] from the NASA Goddard Institute for Space Studies, New York, New York, USA.

Mitchell, T.D., T.R. Carter, P.D. Jones, M. Hulme, and M. New. 2004. A comprehensive set of high-resolution grids of monthly climate for Europe and the globe: the observed record (1901-2000) and 16 scenarios (2001-2100). Vol. 55. Tyndall Centre Working Paper. 30 pp. Data set available for download at [http://www.cru.uea.ac.uk/cru/data/hrg/].

Monteith, J.L. 1965. Evaporation and Environment. 19th Symposia of the Society for Experimental Biology, University Press, Cambridge, 19: 205-234.

Monteith, J.L. 1981. Evaporation and surface temperature. Quart. J. Roy, Meteorol. Soc. 107: 1-27. doi:10.1002/qj.49710745102

Priestley, C.H.B., and R.J. Taylor. 1972. On the assessment of surface heat flux and evaporation using large-scale parameters. Monthly Weather Review 100: 81-92. doi:10.1175/1520-0493(1972)100<0081:OTAOSH>2.3.CO;2

Ramankutty, N., and J.A. Foley. 1999. Estimating historical changes in global land cover: Croplands from 1700 to 1992. Global Biogeochemical Cycles 13(4): 997-1027. doi:10.1029/1999GB900046

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. U.S. General Soil Map (STATSGO2). Available online at [http://soils.usda.gov/survey/wss/index.html]. Accessed 08/2011.

Thornthwaite, C.W., and J.R. Mather. 1957. The Water Balance, Publications in Climatology VIII(1): 1-104, Drexel Institute of Climatology, Centerton, NJ.

VEMAP 2 http://daac.ornl.gov/VEMAP/vemap.shtml

Zobler, L. 1986. A World Soil File for Global Climate Modelling. NASA Technical Memorandum 87802. NASA Goddard Institute for Space Studies, New York, New York, U.S.A.

Zobler, L. 1999. Global Soil Types, 1-Degree Grid (Zobler). 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/418