November 18, 2011 10:10am

BioEarth WG I Group Meeting

Location: Sloan 33

Call-In: 509-335-4700 8359#

Agenda: To go over land cover information needed for each of the terrestrial BioEarth models and discuss our approach for making these consistent in our integrated modeling efforts.
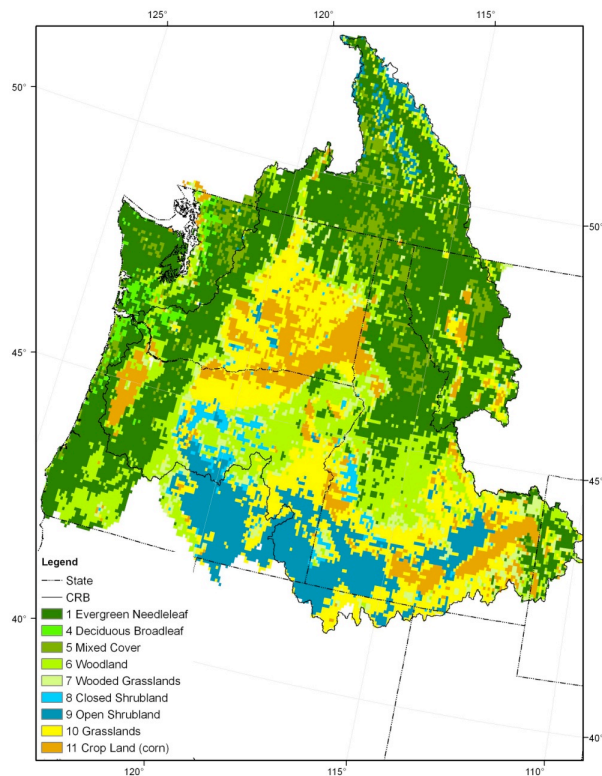
VIC Description:

VIC vegetation:
Maximum vegetation type:12 (in CRB, there are 9 types). In each grid, the land cover is represented as fractional area of different vegetation types.
1 Evergreen Needleleaf
2 Evergreen Broadleaf
3 Deciduous Needleleaf
4 Deciduous Broadleaf
5 Mixed Cover
6 Woodland
7 Wooded Grasslands
8 Closed Shrubland
9 Open Shrubland
10 Grasslands
11 Crop Land (corn)

Figure 1 Dominant vegetation cover in the CRB
(VIC input data)

RHESSys Description

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A couple of preliminary thoughts on land-cover RHESSys is fairly flexible in
terms of what land cover information/products are required At minimum - you need
vegetation type map (for our small watersheds we've usually used local land cover
type maps - sometimes for larger areas NLCD maps) RHESSys will work with very
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simple classification e.g conifer, decid, grass, non-veg or more specific types
(douglas fir, alder) - one of things Jun will do for the test watersheds is
explore sensitivity of N-cycling fluxes to species differences (so is species
type important)
- but we won't have for Friday :)

the other question is amount of vegetation - if we spinup that is a potential
type (ignoring disturbance etc) - in that case all we need is vegetation type -
but it often improves model estimates to include something about actually biomass
(this gets at historic disturbance effect but also finer scale soil
characteristics that might not be caught by input soil layers - for example rock
crops in mountain
environments) - we often use TM (or MODIS) imagery for this
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VIC-CropSyst Description:

The only parameters that were generated on the VIC side for the VIC-Crop, were the crop fraction related ones.

- a- Crop code (From WSDA and we made up for others such as winter and spring wheat)
- b- Crop fraction (from a mixture of USDA and WSDA)
- c- Whether they are irrigated or not (again from WSDA and a list of crops outside WA that were always irrigated)

We also have the irrigation efficiency table as a function of irrigation method used. This was compiled with Claudio and Troy's help

(Also see attached spreadsheet for Crop parameters for CropSyst)

MEGAN Description:

1) Leaf Area Index: using MODIS version 5, 1-km spatial, 8-day or monthly for specific years. This is used to estimate total foliar amount and changes in LAI are used to estimate leaf age fractions (new, expanding, mature, old leaves)
2) Soil characteristics: Chen and Dudhia 1-km spatial soil type map. This is used to get the wilting point for vegetation emissions.
3) Plant functional type and Emission type (a subcategory of PFT): We use the CESM/CLM 15 PFT scheme and then further categorize each of the CLM PFTs into emission types based on plant species composition. We have developed a 30-m dataset for the contiguous U.S.
For everywhere else we use the CESM/CLM 10' (~30 km) data and a 1-km resolution database for emission type. The data used to develop the contiguous U.S. database includes the following:

- Cropland Data Layer (CDL, see http://nassgeodata.gmu.edu/CropScape/) to classify as cropland, urban or wildland. If cropland then CDL is used to determine species composition.
- National Land Cover Dataset (NLCD, see www.mrlc.gov) to divide landscape into PFTs based on tree and impervious cover fractions and landcover type.
- USDA-USFS UFWU (urban forest work unit, see http://www.nrs.fs.fed.us/units/urban/) is used to adjust NLCD derived PFTs in urban areas and define tree species composition
- USDA-USFS Forest Inventory and Analysis (FIA, www.fia.fs.fed.us) is used to assign species composition to tree PFTs in wildlands
- USDA-NRCS data (see http://sdmdataaccess.nrcs.usda.gov/) is used to assign grass and shrub to non-tree PFTs in wildlands.
- U.S. ecoregion scheme (see http://www.epa.gov/wed/pages/ecoregions.htm) is used to average FIA and NRCS data over about 1000 ecoregion types.

CLM PFTs:
1) Needleleaf evergreen temperate tree
2) Needleleaf evergreen boreal tree
3) Needleleaf deciduous boreal tree
4) Broadleaf evergreen tropical tree
5) Broadleaf deciduous tropical tree
6) Broadleaf deciduous temperate tree
7) Broadleaf deciduous boreal tree
8) Broadleaf evergreen temperate shrub
9) Broadleaf deciduous temperate shrub
10) Broadleaf evergreen boreal shrub
11) Arctic C3 grass
12) Cool C3 grass
13) Warm C4 grass
14) Crop1
15) Crop2

CMAQ Description:

Currently CMAQ uses USGS 24-category land cover information that is passed through WRF, i.e., USGS Global Land Cover Characteristics (GLCC) 30-second land use data which were developed from 1-km AVHRR satellite images obtained in 1992 to 1993.

CMAQ uses LAI, fraction of grid cells that is vegetated, fraction of grid cells that is urban, surface roughness.