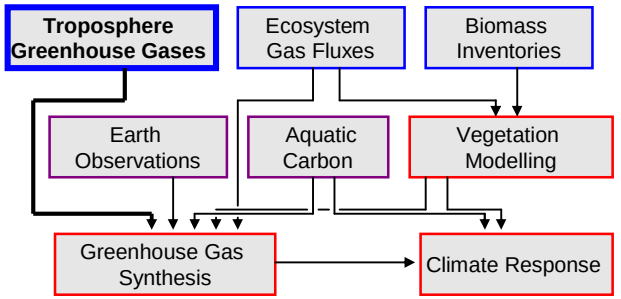
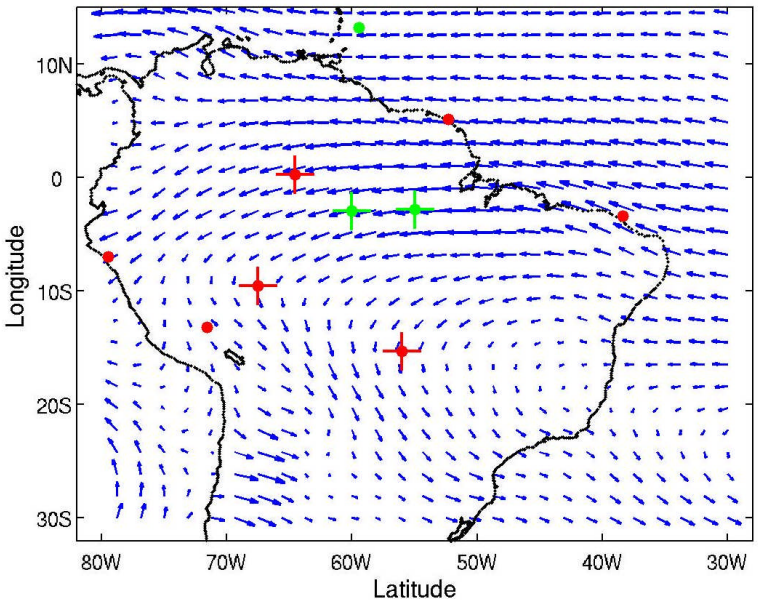
AMAZONICA is divided into eight work-packages:

- ***WP1. Lower Troposphere Greenhouse Gas Distribution:*** Atmospheric CO2, CH4, CO, SF6, N2O, 13CO2, and H2O will be sampled along the main air-stream across Amazonia to provide a top-down constraint on cycling of carbon and C-cycle related compounds across the basin.
- ***WP2. Ecosystem flux measurements:*** Response to climate variation and differentiation of ecosystem fluxes along soil, climate and hydrological gradients will be achieved mostly using flux data from existing sites. The current bias towards tower measurements on only low-fertility soils will be addressed by initiating measurements above a high fertility forest in south-west Brazil. CH4 fluxes will also be measured at terra firma and seasonally flooded sites. Newly integrated into the analysis network will be an ENSO- and climate change- sensitive site in French Guiana.
- ***WP3. Terrestrial carbon dynamics:*** Censuses at selected existing and new forest sites across six countries will provide above-ground biomass change estimates stratified by the main environmental and edaphic controls. To link with atmospheric measurements in time, annual censuses in drought-sensitive locations will permit quantification of short-term climate sensitivity.
- ***WP4. Earth observations of land use change and fire occurrence:*** A range of remote sensing data, methods and on-ground observations will be pursued to allow fluxes of CO2, CH4 and CO associated with land use change and fires to be estimated bottom-up. Remote sensing data and on-ground data will be combined to provide estimates of above ground carbon stocks.
- ***WP5. Aquatic carbon dynamics:*** Targeted catchment scale measurements will determine ecosystem-derived and minerogenic carbon flows from high fertility, varzea and recent forest-to-pasture converted areas. A Basin-wide predictive model of carbon input to rivers from land will be formulated using catchment characteristics as predictors and tested against trans-basin riverine carbon measurements. Improved estimates of carbon effluxes to atmosphere and ocean will thus be derived.
- ***WP6. Spatial extrapolation of forest ecosystem climate response using a dynamic vegetation model:*** New and existing plant and soil data (WP2, 3) will be utilized to narrow parameter ranges underlying the coupled land surface (JULES) and Ecosystem Demography model (ED). The model will be used to estimate carbon exchange with the atmosphere during the duration of the project and for calculating future projections of the state of the system (WP8).
- ***WP7. Synthesis of Amazon Carbon and Methane budget:*** Top-down large-scale greenhouse gas fluxes from atmospheric concentrations and atmospheric transport inverse modeling, and bottom-up components of the project will be produced, analysed and synthesised to obtain a mutually consistent process-based picture of the carbon and methane budgets of the Amazon basin.
- ***WP8. Response to future Climate:*** New and better predictions of the future carbon, energy and water balance of the Amazon Basin as a whole will be achieved by forcing the spatially explicit surface and ecosystem demography models, river carbon models and climate dependent human-activity model with GCM climate predictions covering a representative range of global change scenarios.

Atmospheric top-down constraint (WP1)

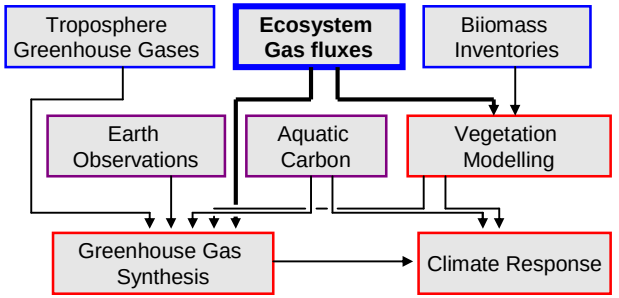


Output:
monthly Amazon greenhouse gas distributions

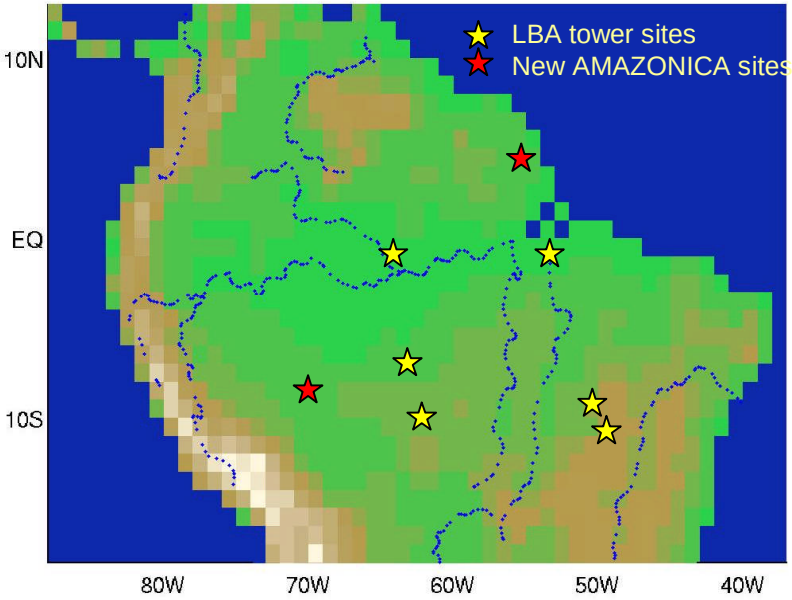


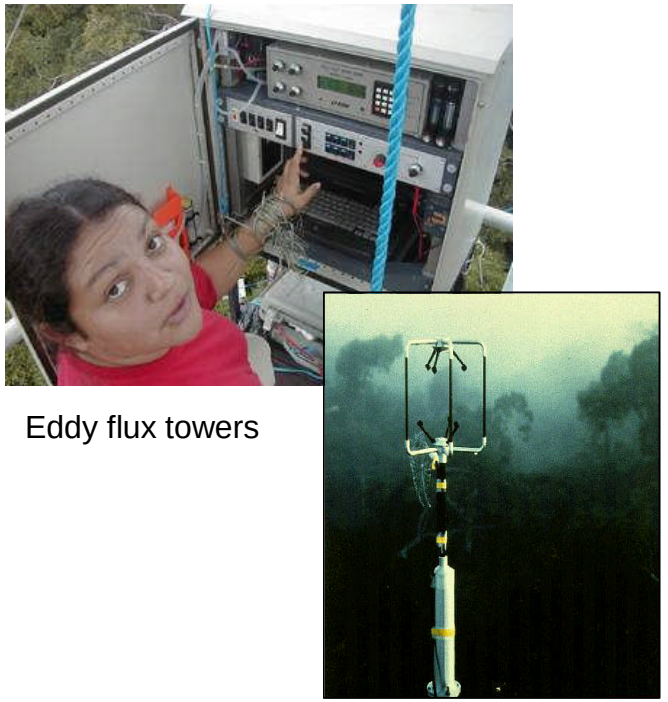
Gas analyses lab, partner Sao Paulo

Ecosystem fluxes (WP2)



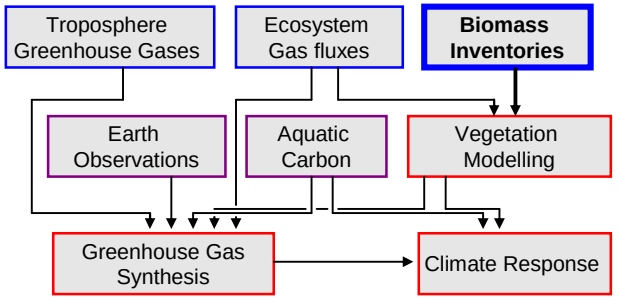
Output:
CO_2 and CH_4 fluxes along main axis of variation



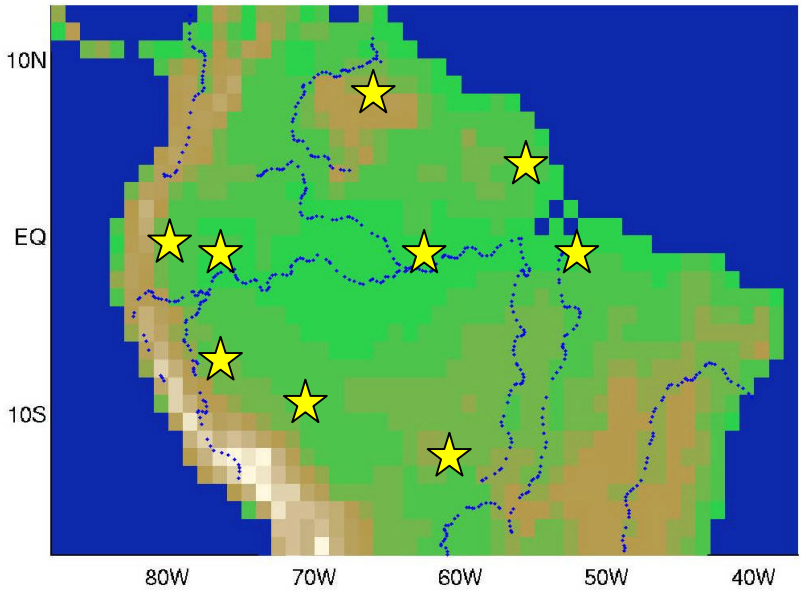


Eddy flux towers

Land biomass inventories (WP3)

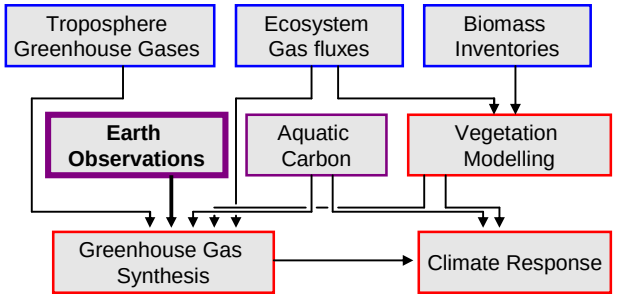


Output:
biomass changes in primary forests



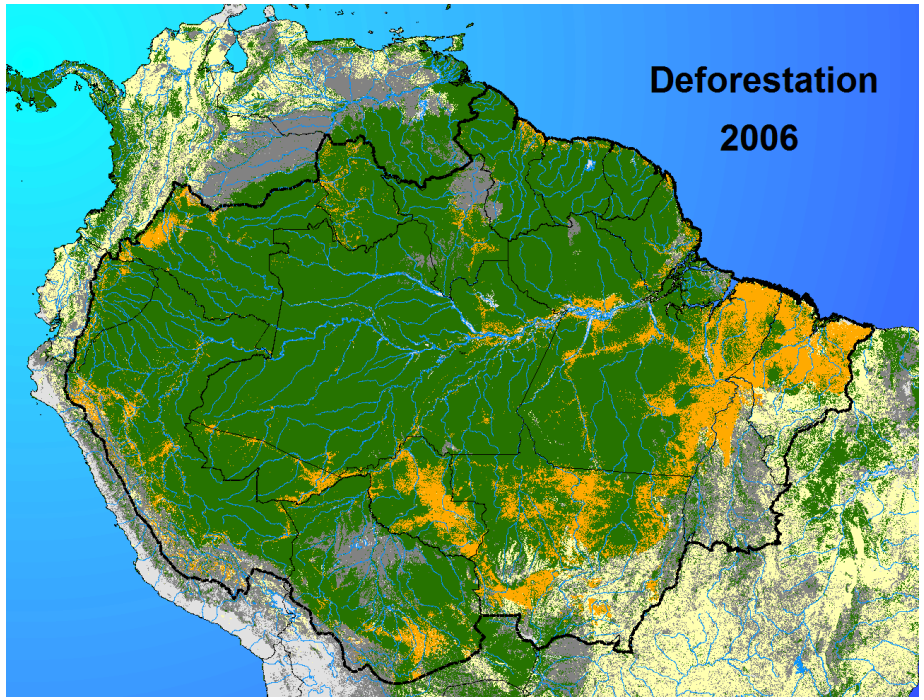
Forest census, Peru

Earth observations & human activity (WP4)



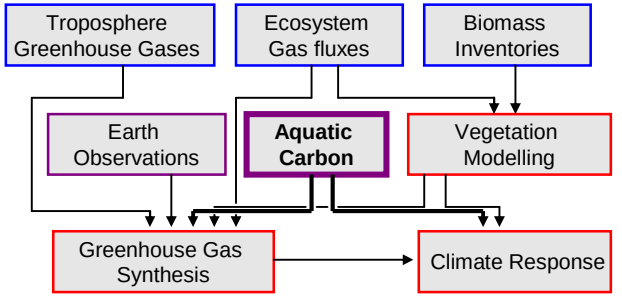
Outputs:
CO_2 and CO fluxes from land-use and fires

Land-use model with climate feedback



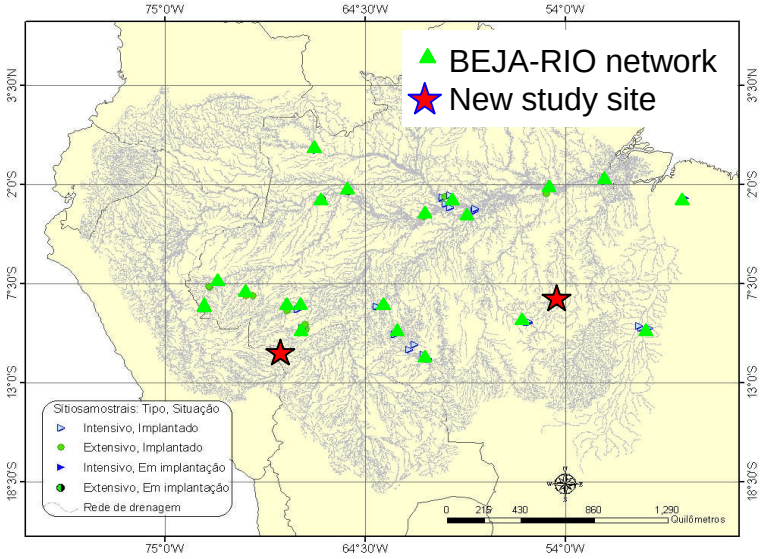
Prediction of deforestation until 2050

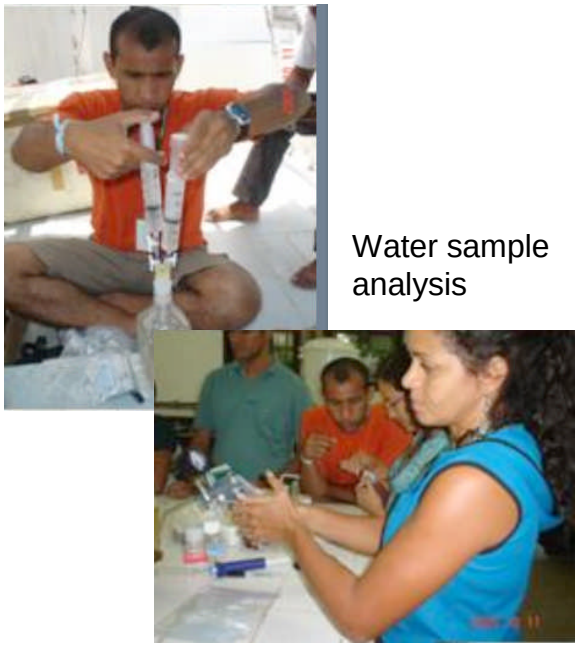
Riverine carbon fluxes (WP5)



Output:
ecosystem carbon input into rivers

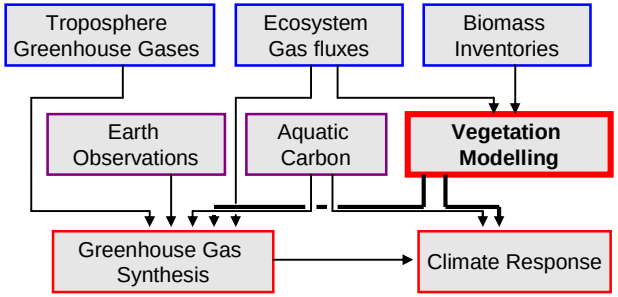
river CO_2 fluxes





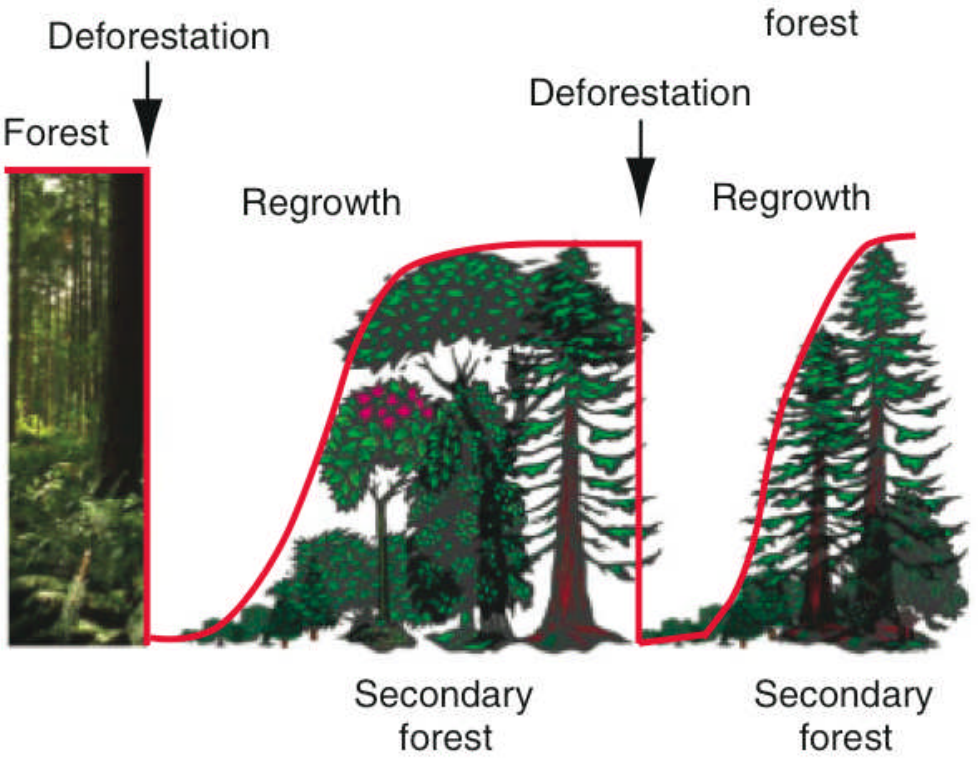
Water sample analysis

Modelling forest ecosystem climate response (WP6)

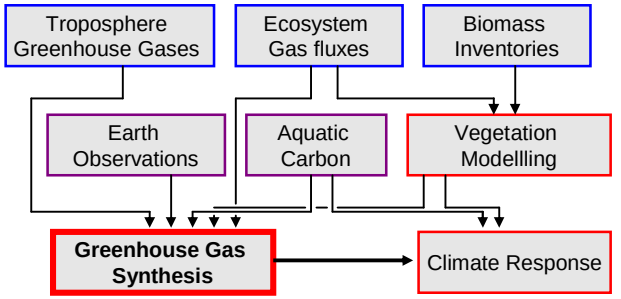


Output:
data-constrained ecosystem model

vegetation CO_2 and CH_4 fluxes



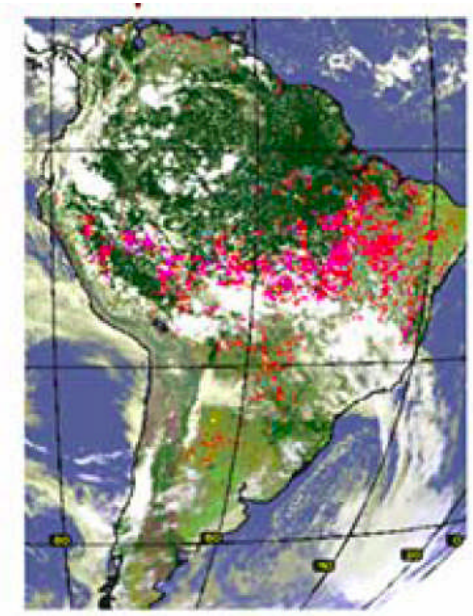
Synthesis of carbon and methane balances (WP7)



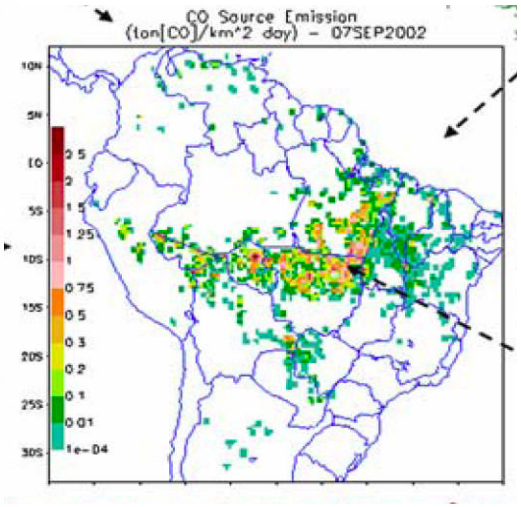
Output:
identification of dominant processes

greenhouse gas balances

Fire from space

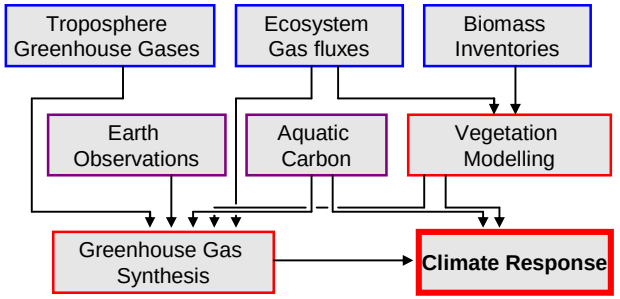


Predicted CO



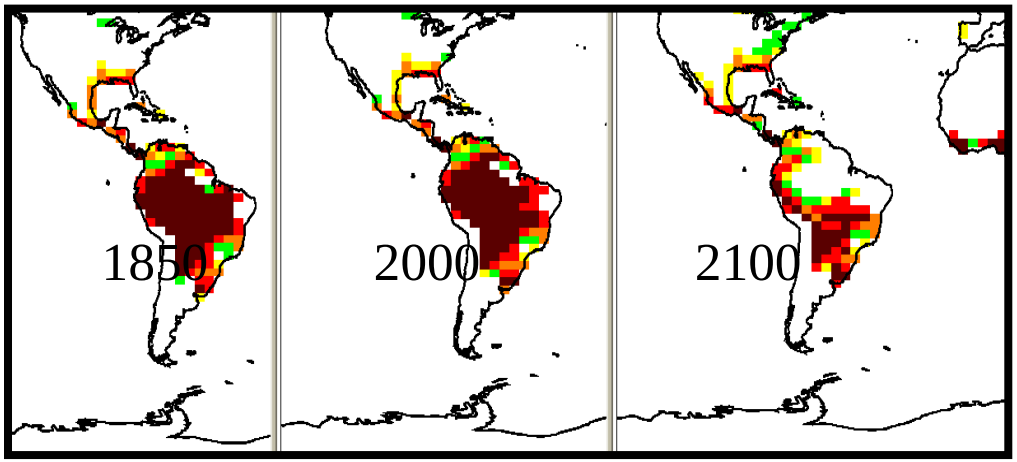
Freitas et al. 2007, Atm. Chem. Phys.

Amazonian response to climate change (WP8)



Output:
predictions of

- land vegetation
- river carbon
- land-use



Cox et al., Theor. Appl. Clim., 2004