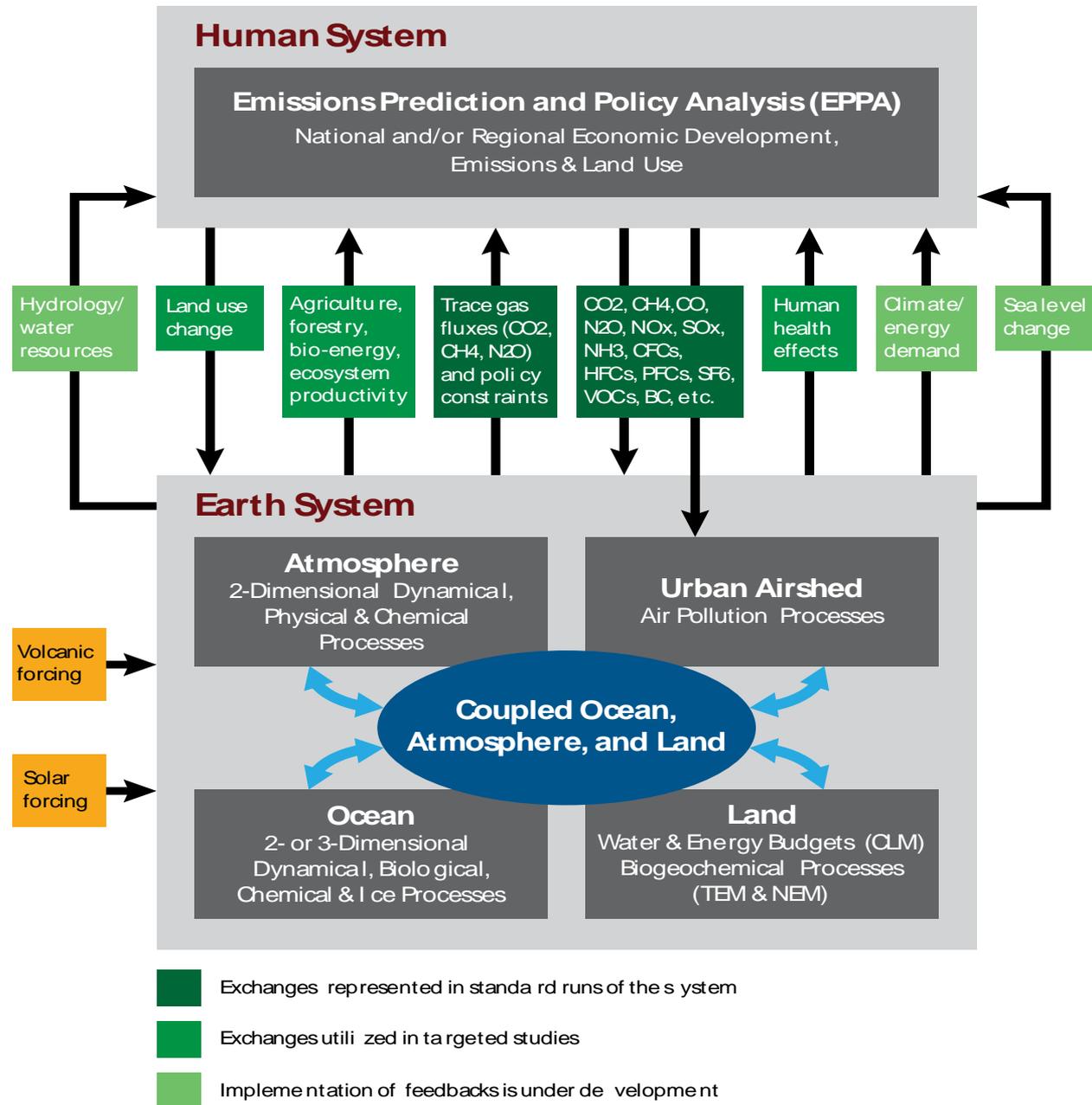


The MIT Integrated Global Systems Model (IGSM)

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(Other people, too many to mention, do the work)



Impacts

- Categories covered.
 - Crops, pasture, forestry, land use change, intermediate ind. and HH's.
 - Water & hydrology; major river sheds, allocation among uses (irrigation, energy, industrial, residential and in-stream—i.e. environmental constraints)
 - Human health—primarily air pollution and ensuing effects on health
 - Coastal impacts combining sea-level rise and tropical storm intensity.
 - Energy infrastructure—primarily as affected by water resources availability, river temperatures, coastal damage.
 - Terrestrial ecosystems-carbon and nitrogen cycle effects; Arctic system permafrost, methane and carbon feedbacks; plant migration.
 - Oceans: sea level rise, ocean circulation, temperature, acidity and effects on ocean biology
- Valuation—eventually direct links into sectors within the CGE—most developed for agriculture and human health.
- Regional and temporal scale—physical impacts at .5 x .5; 4 x 4; through 2100 but varies depending on application
- Treatment of Adaptation: yes, extensive and varied
- Uncertainty: yes, multiple methods of developing regional climate uncertainty

Policy Making Inputs

- Marginal Costs and Marginal Benefits
 - Not as an aggregate of all benefits, margins hard to estimate with real climate scenarios because of natural variability, initial condition dependence, etc.
 - Can, principle, develop multiple scenarios as estimate “discreet-margins” of moving from one to the other.
 - But these need to be done with explicit consideration of uncertainty
- Simulation—Not optimization
- Trade-off between mitigation and adaptation—this is a hard to define concept. We show interactions of mitigation and adaptation; E.g. energy important to agriculture, ag. emits CO₂, CH₄, N₂O and land use change; biofuels a mitigation option, but affected by climate; mitigation raises the cost of agriculture, reduces CO₂ fertilization benefits, ozone damage, and limits crop expansion poleward.
- What have organizers missed?
 - Oversimplified view of the system

Modeling Team's Future Strategy

Not in a hurry to create a simplified estimate of all impacts to provide the super cost-benefit assessment

Focus on complex interactions between human activity and the earth system: Mitigation and Adaptation are not separable.

Focus on physical links from GHGs to climate, to physical impacts, to adaptation options, and ultimately valuation.

Address uncertainty of climate and impacts and adaptation at regional level with focus on decisionmaking under uncertainty and effects on decisions/adaptation—what can we say about climate at adaptation-relevant time scales that can assist in adaptation.

Placing climate change squarely in the middle of multiple issues—broader issues of food, hunger, resources; water and growth of demand; economic development