



Societal Decision- Making and Model Integration

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Societal Decision-Making as in:

Global scale societal decisions,

influencing the evolution of societies and economies over the century,
described through Integrated Assessment Modeling (IAMs),

ultimately producing scenarios that climate models use to drive future
climate projections

Model Integration: IAMs within ESMs

Hardwire an IAM into an ESM to make emissions and land use (and climate impacts?) endogenous. Issues:

- Quantities and dynamics of **two very different types of model**.
- Deal with **increased complexity, additional sources of uncertainty, ever tighter trade-offs** with other sources of computational costs (e.g., ensembles).

Model Integration: ESM information within IAMs

Make IAMs use climate information and account for climate impacts, which in turn may affect GDP, Energy Use, Land Allocation and therefore emissions and LULCC. Issues:

- Need to decide **which impacts to model** (what's important to reflect in an IAM?); how to represent uncertainty.
- Need **emulators** to efficiently represent climate information consistent (in step) with the IAM emissions/RFs/GSAT evolution, and as they may be influenced by the ensuing impacts.

Emulators

Need **spatially resolved, multi-variable, high frequency information**.

We are developing an approach that builds on existing archives of ESM output and creates new trajectories of the entire climate by stitching together windows of existing trajectories. **STITCHES** soon to be found in **ESDD**.

That may change the type of scenarios we ask ESMs to run.