ScenarioMIP

Co-chairs:
Brian O’Neill; Claudia Tebaldi; Detlef van Vuuren

Scientific Steering Committee:
Pierre Friedlingstein; George Hurtt; Reto Knutti; Jean-Francois Lamarque; Jason Lowe; Jerry Meehl; Richard Moss; Ben Sanderson; Veronica Eyring
Scenarios of key importance as connection between research communities

Facilitates large research community by:
- Providing input to scientific papers (comparability)
- Enabling synthesis → assessment report

Scenario for integration (common scenarios)

WG3 Community:
Scenarios provide insight into... socio-economic development, emissions, climate targets in order to determine mitigation effort

Updates needed:
- new insights into historic/near term forcers.
- new requirements models
- new questions

WG2 Community:
Scenarios provide insight into... socio-economic development (vulnerability) and climate change (impacts)

WG1 community –
Scenario provide insight into... plausible development of forcers and plausible climate futures
Scientific Questions

• How does the Earth System respond to future forcing?
  – Changes are qualified as driven by a plausible range of forcings, relevant to IAM/IAV/policies.
  – Sensitivity to plausible changes in land-use and SLCF
  – Sensitivity to plausible “shapes” of forcing pathways (overshoots)
  – Do constraints to future changes emerge from the multi-model ensemble?
  – Forcing bounded by estimates of plausible forcing

• How can we assess future climate changes given climate variability, predictability and uncertainties in scenarios?

Goal ScenarioMIP: Simulate future climate outcomes based on alternative plausible future scenarios

1. Facilitating integrated research across climate science, IAM and IAV communities.
2. Anchoring targeted experiments (e.g. land-use change/air chemistry) to answer questions about specific forcings.
The Scenario Matrix Architecture

- Useful as design for IAV and IAM work
- Columns are different futures for population, economics, land-use, air pollution
- Rows represent climate situations
• Useful as design for IAV and IAM work / overall integration. But not specifically ScenarioMIP → Too many runs / problems with resolution

• How to design ScenarioMIP so that it can contribute to this scheme?
  – Options considered: Statistical sampling, pattern scaling, selected runs

• At this point selected runs still found to be most useful

Considerations in selection:
• Represent the full range and intermediate levels
• Be useful for specific questions in other MIPs
• Add new scenarios for specific policy questions (gap)
Exact selection complex and depends on unanswered questions:
- Relationships with other MIPs
- Finalisation of IAM scenarios
- DECK
- Choices to be made together with relevant research communities
- Expected sensitivity of ESM models to land-use and forcing differences

Therefore decision now to present basic idea – and further fill in early 2015.
Tier1 -> High/Medium/Low 3 SSP-based "RCP levels": new versions of RCPs based on forcings derived from the newly developed Shared Socio-Economic Pathways

Tier2 -> High/Medium/Low 2 Gap scenarios+1 SSP-based RCP: new pathways falling in between the RCPs, also based on the new SSPs + ensembles member for 1 tier-1
Characteristics:

- **Small number** (3 in Tier 1)
- **In each tier** a High, Medium and Low by 2100
  - Tier 1 still spans a plausible high/low(2°C) range; 6.0 is seen as what would come from current policies
  - Tier 2: 7.0 important for impact assessment; 3.7 considered an important mitigation target; updates 4.5.
- **Updated drivers** support IAM/IAV research into the 2020’s through not only new IAM and climate models but new socio-economic assumptions.
- **Variants of the same scenarios** can be used to explore targeted questions about sensitivity to LUC, SLCF and overshoot.
Additional Issues

- We recommend concentration driven (better constraining forcing levels and thus making integrated research easier to compare and summarize across studies)
- We recommend concentrating IC ensemble members for one scenario only (RCP8.5? RCP4.5? Depending possibly on other MIPs recommended experiments)
- We are interested in long-term extensions, TBD
Time-line

2014
- ScenarioMIP proposal / Garmisch

2015
- IAM model runs open review
- Finalisation IAM model runs, IPCC conference
- Decisions on scenarios

2016
- Data available after harmonisation, downscaling etc