ScenarioMIP

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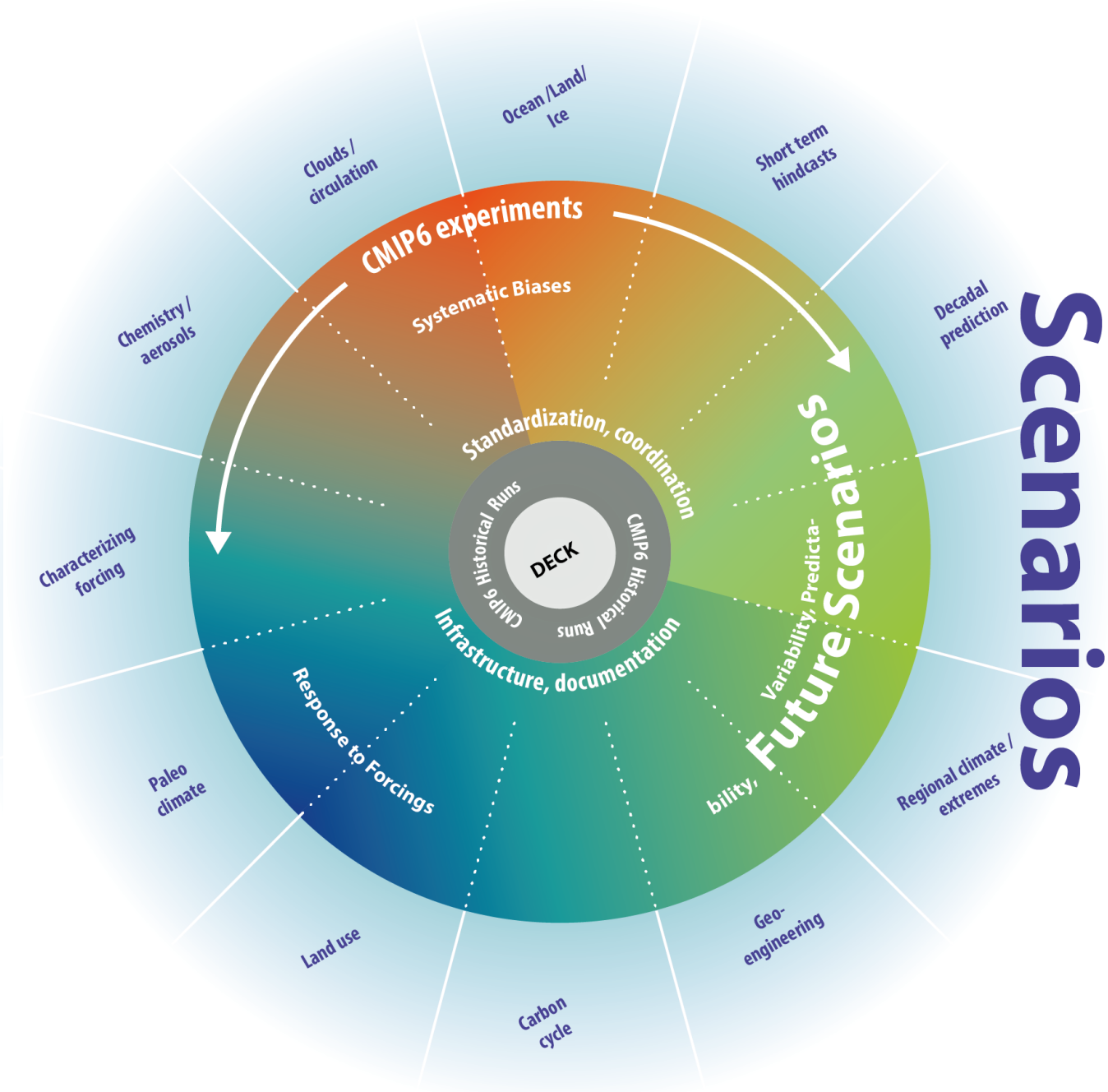

Ocean /Land/ Ice
Short term hindcasts
Clouds / circulation
Decadal prediction
Chemistry / aerosols
CMIP6 experiments
Systematic Biases
Standardization, coordination
Infrastructure, documentation
DECK
CMIP6 Historical Runs
CMIP6 Historical Runs
Characterizing forcing
Variability, Predictability, Future Scenarios
Response to Forcings
Paleo climate
Regional climate / extremes
Land use
Geo-engineering
Carbon cycle
Scenarios

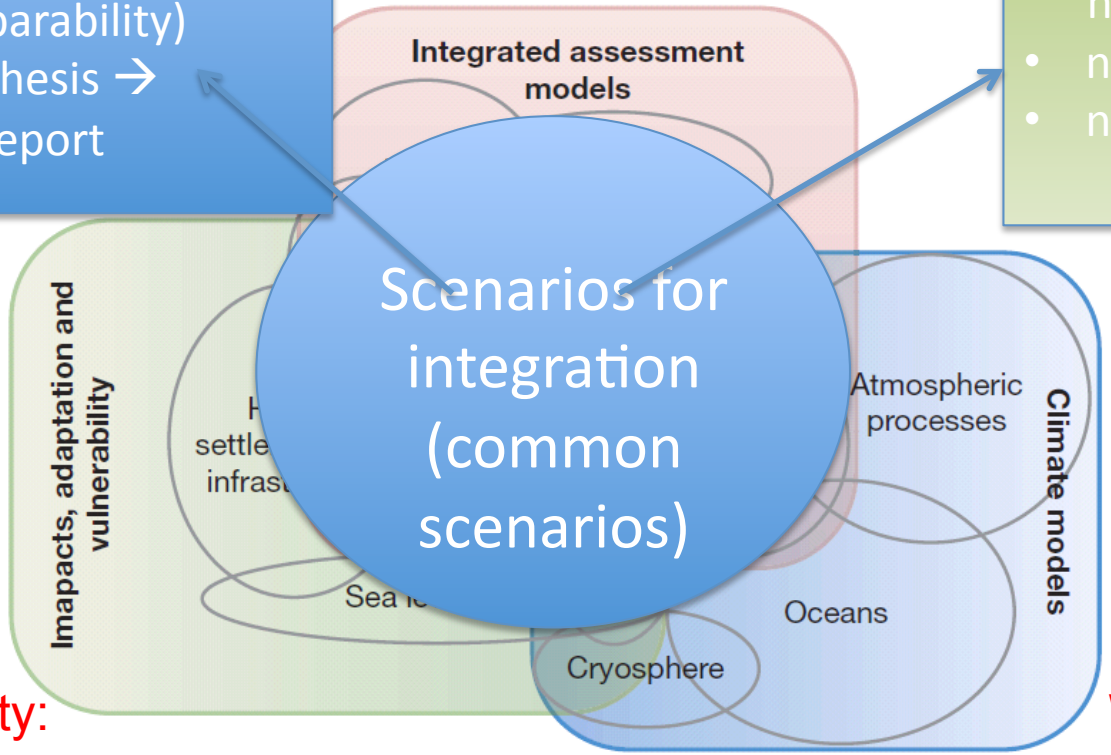
Scenarios of key importance as connection between research communities

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

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



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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?

Core Scenario MIP

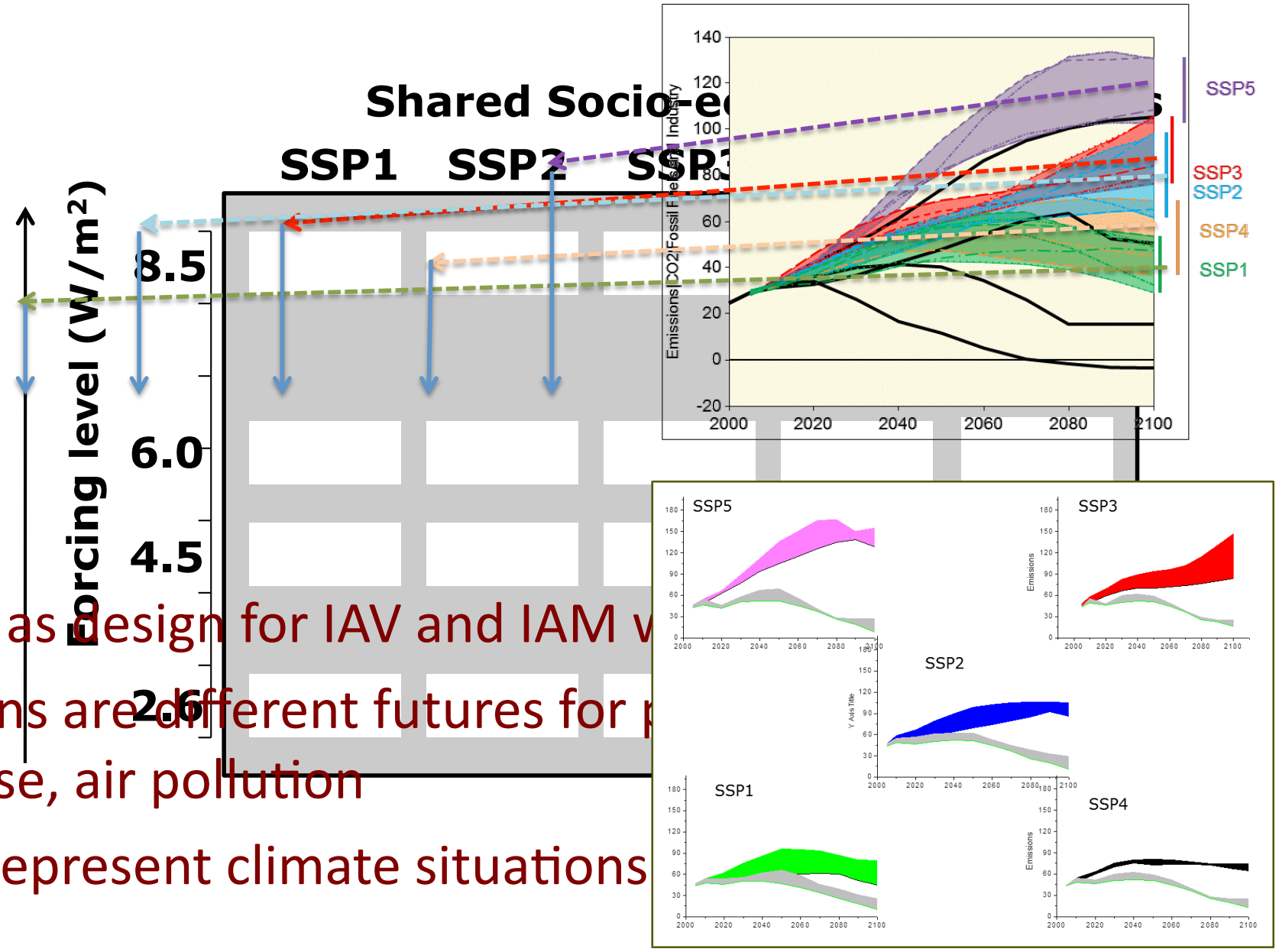
Together with LUMIP, CMIP etc

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

1. Facilitating integrated research across climate science, IAM and IAV communities.

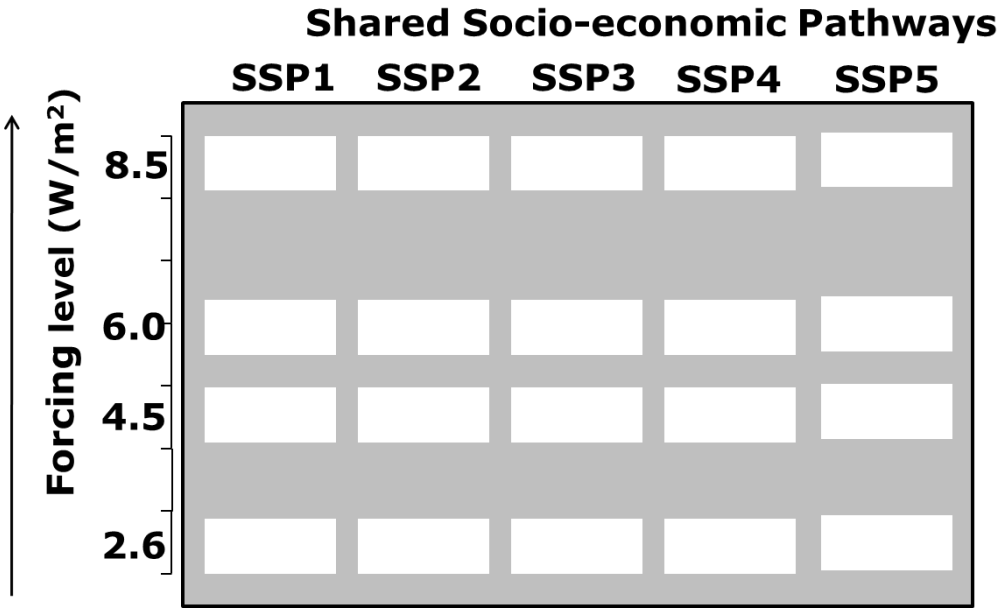
2. Anchoring targeted experiments (e.g land-use change/air chemistry) to answer questions about specific forcings.

The Scenario Matrix Architecture



- Useful as design for IAV and IAM v
- Columns are different futures for p land-use, air pollution
- Rows represent climate situations

The Scenario Matrix Architecture

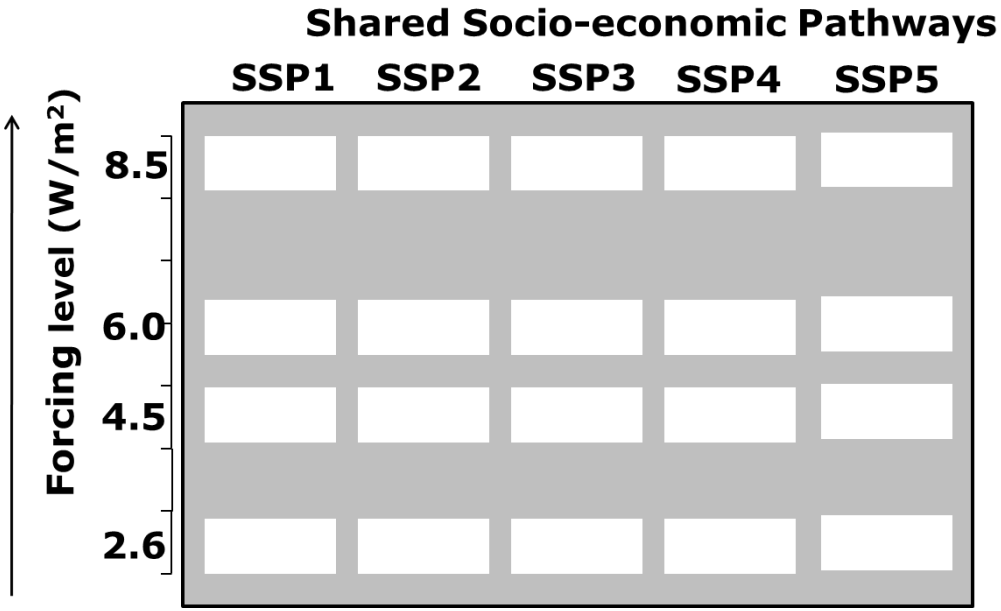


Considerations in selection:

- Represent the full range and intermediate levels
- Be useful for specific questions in other MIPs
- Add new scenarios for specific policy questions (gap)

- 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

ScenarioMIP Experimental Design

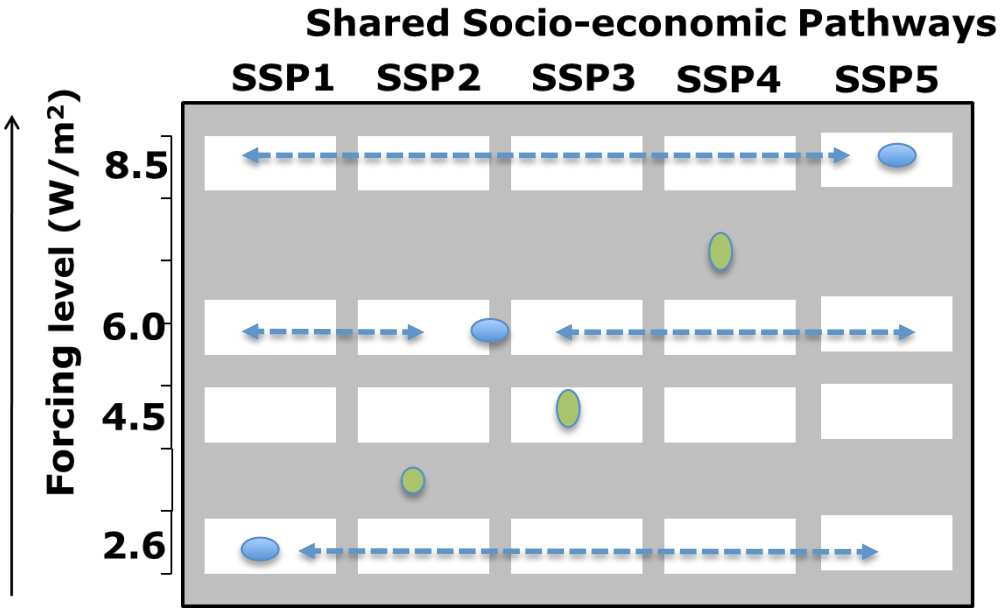


Exact selection complex and depends on unanswered questions:

- 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.

ScenarioMIP Experimental Design



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

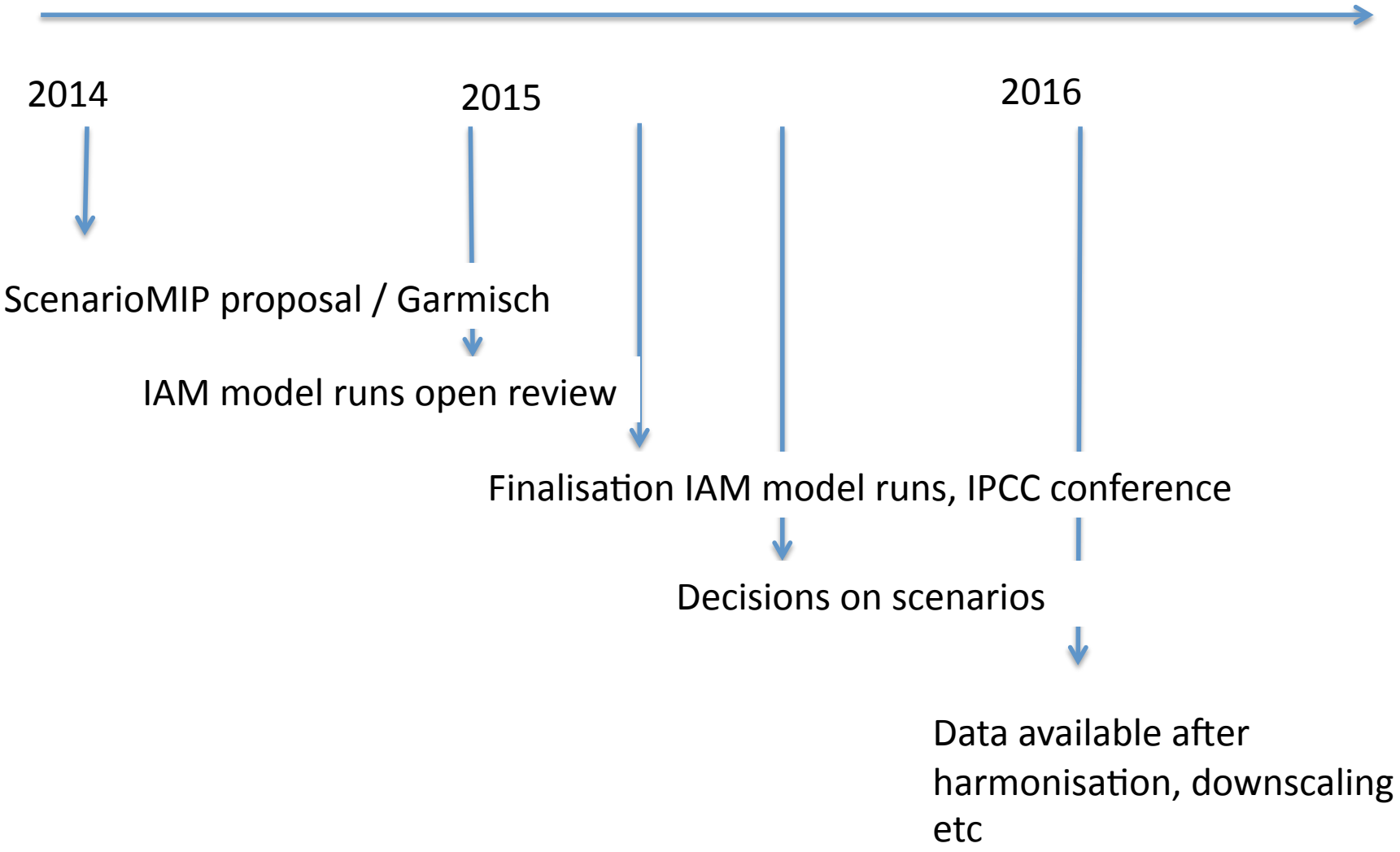
Characteristics:

- 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
2015
2016
ScenarioMIP proposal / Garmisch
IAM model runs open review
Finalisation IAM model runs, IPCC conference
Decisions on scenarios
Data available after harmonisation, downscaling etc