The Intersectoral Impact Model Intercomparison Project (ISI-MIP)

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(ISI-MIP core team)

P I K

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IIASA

www.isi-mip.org

Bundesministerium für Bildung und Forschung

Leading questions

Why should we pay a lot of money for achieving a 2°C instead of 3°C world?

How good are we at telling the difference between a 2°C and a 3°C world ?

What are the related uncertainties?

Are there essential deficiencies in our process understanding or the way proccesses are represented in impact models?

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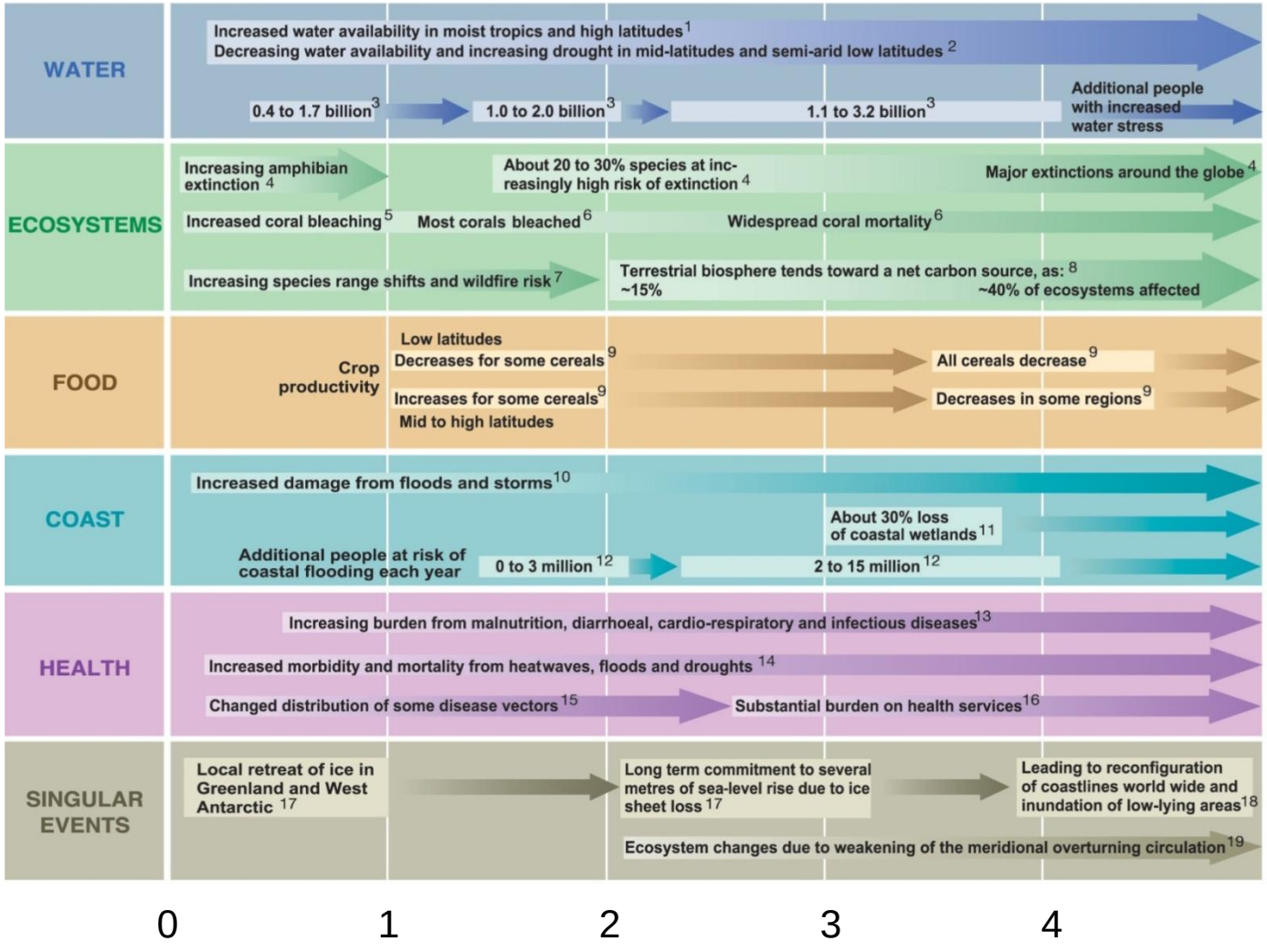
Current status of impact studies



Global Mean Annual Temperature Change Relative to 1980-1999

IPCC AR4, WGII, Table 20.8

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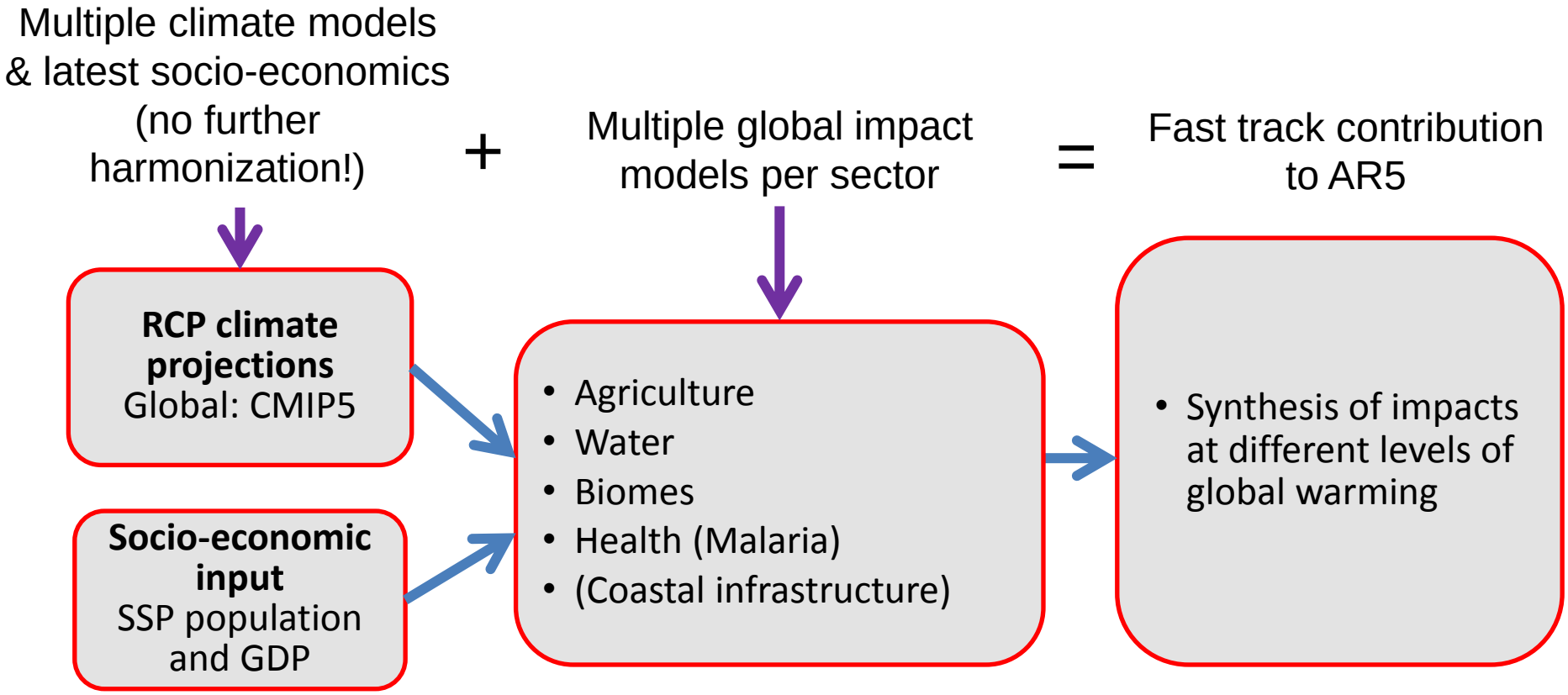
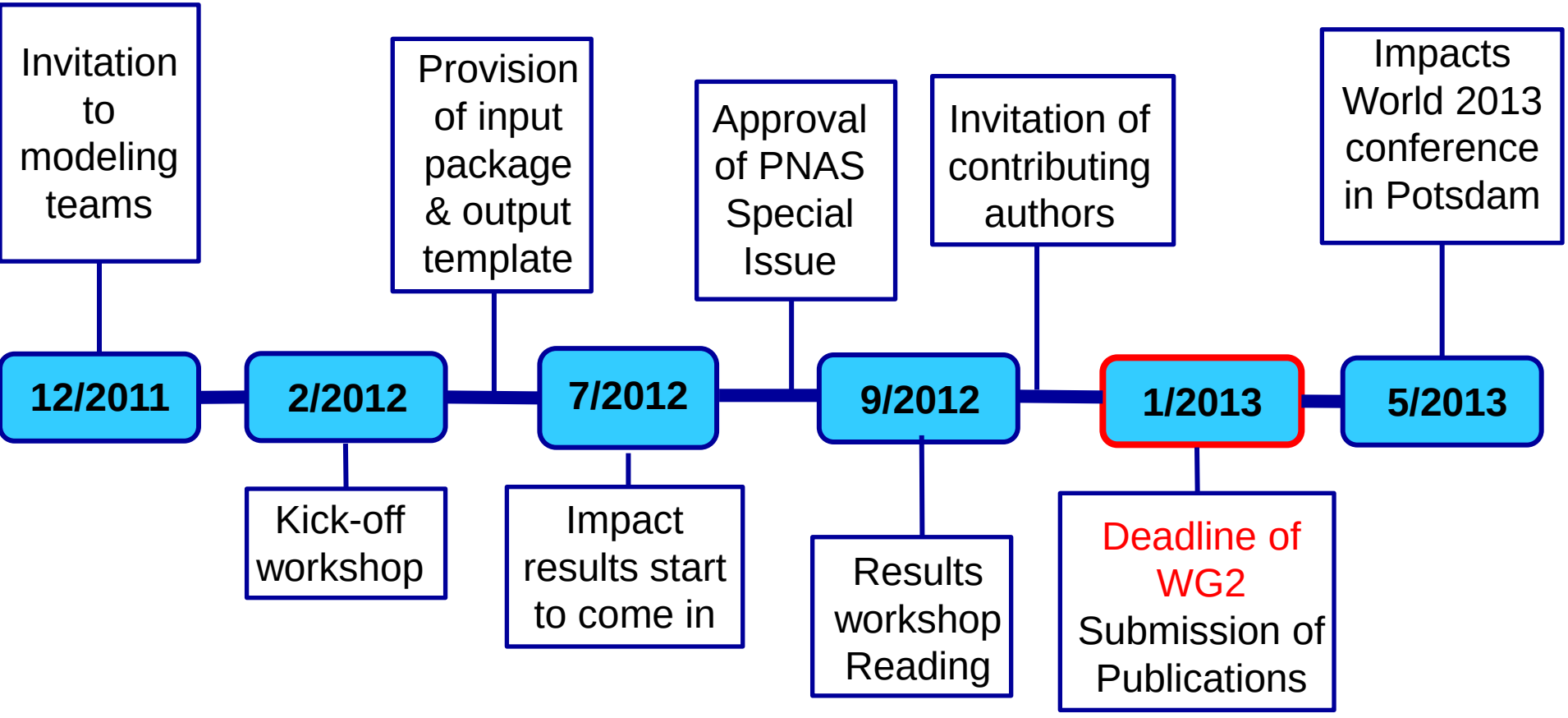
What is ISI-MIP?



- What is the difference between a 2°, 3° and 4°C world?
- How good are we at telling this difference?
- Are there essential deficiencies in our process understanding or the way proccesses are represented in impact models?
- Are these deficiences persistent across different impact models?

Time line



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Participating models: 5 sectors, > 30 models, 11 countries

- 9 **water** models: VIC, H08, WaterGAP, MacPDM, WBM, MPI-HM, PCR-GLOBWB, DBH, MATSIRO
- 5 **biomes** models: Hybrid, Sheffield DGVM, JeDi, ANTHRO-BGC, VISIT
- 8+2 **agriculture** models: GEPIC, EPIC, pDSSAT, DAYCENT, IMAGE, PEGASUS, LPJ-GUESS, MCWLA + MAgPIE, GLOBIOM, ...
- 3 **cross-sectoral** models: LPJmL, ORCHIDEE, JULES
- 5 **health** models (= malaria): MIASMA, MARA, VECTRI, WHO CCRA Malaria, LMM 2005
- 1 **infrastructure** model: DIVA

- Collaboration with AgMIP The Agricultural Model Intercomparison and Improvement Project

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WATCH Water and Global Change

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Input data & setup

- „ISI-MIP Project Design and Simulation Protocol“
- Database for input & output data → DKRZ/ Climate Service Center Hamburg & mirror at Earth System Grid

  → to be transformed into a public database after fast track

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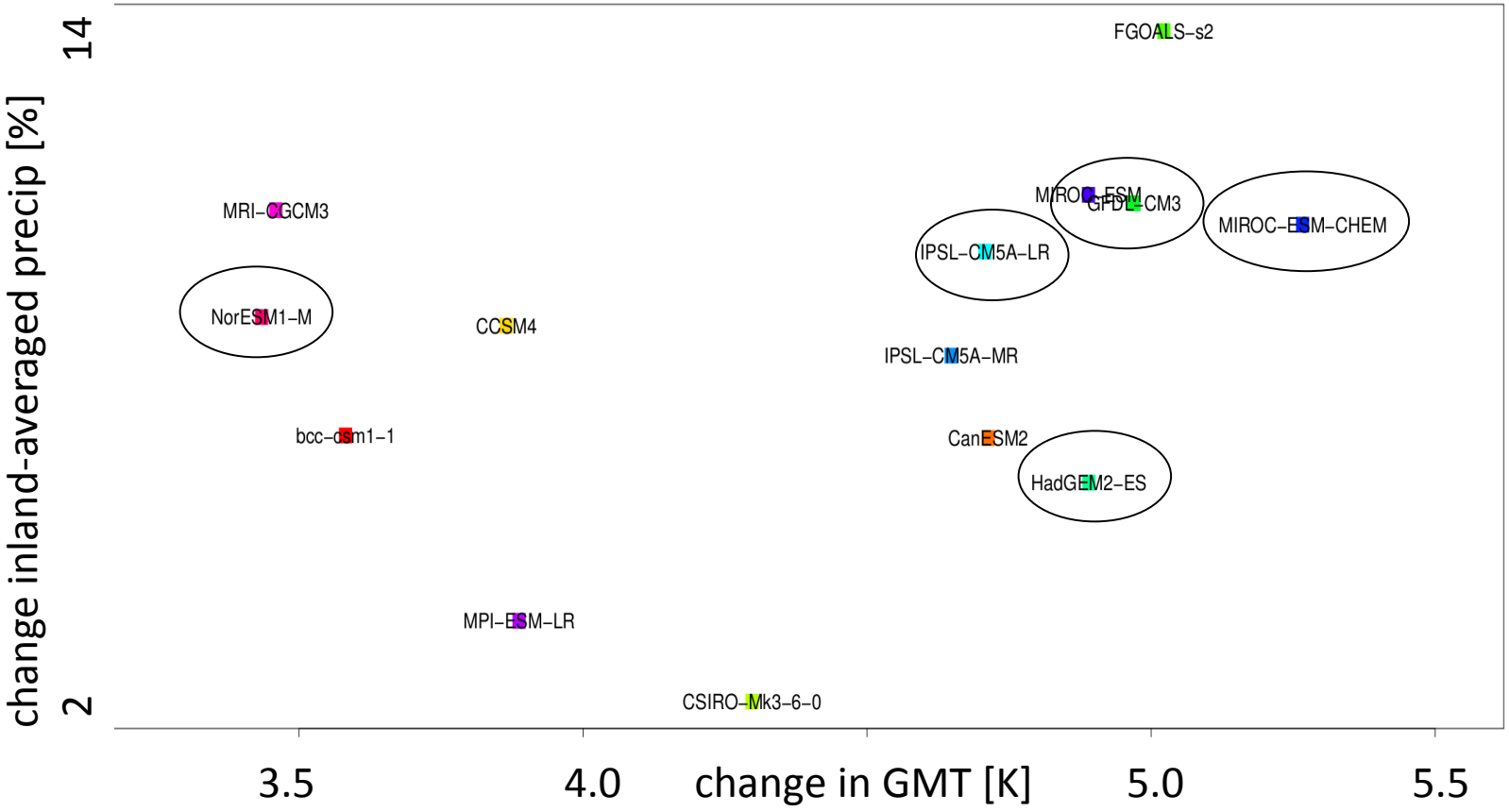
Input data & setup: GCMs [HadGEM2-ES, MIROC-ESM-CHEM, IPSL-CM5A-LR,GFDL-ESM-2M, NorESM1-M]



5 GCMs with 4 RCPs each – 2 criteria:

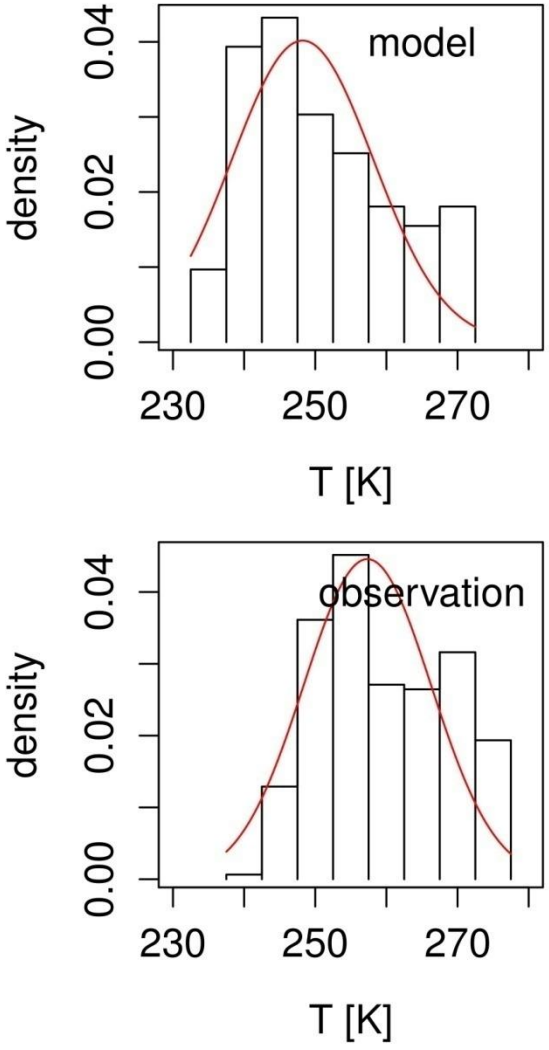
→ Variable availability

→ Predicted temperature and precipitation

Input data & setup: bias correction

- applied within impact studies to correct AOGCMs and regional models for systematic deviations from observations due to systematic errors

- 2 steps (based on Piani et al. 2010, Watch Forcing Data): correction of monthly mean & adjustment of daily variability - trend of temporally interpolated data is preserved with respect to the monthly mean!



Scenario setup – minimal setting

- 1 GCM (HadGEM2-ES) with all RCPs
- GCM 2-5 with RCP 2.6 & 8.5
- Sensitivity tests with GCM1 & RCP8.5: no CO_2 fertilization, irrigation, human influence (water)
- Socio-economics: SSP2 GDP and population - mostly post-processing

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Analysis Workshop, September 6-9, Reading (UK)

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PNAS Special Issue on ISI-MIP results

Dead-line of WG2

1/2013

Submission of Publications

- **2 cross-sectoral papers:**
  - ➢ feedbacks and interlinkages between sectors
  - ➢ impact hotspots and vulnerability
- **6 sectoral overview papers:** water, biomes, biophysical crop models, agro-economic models, malaria, coastal infrastructure
- **Other topics (8 invited papers):**
  - Extreme events
  - Water supply vs. water demand
  - Gaps in current impact modeling
  - Effects of CO_2 fertilization
  - Regional focus China → bridge to regional models

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PNAS
Proceedings of the National Academy of Sciences of the United States of America www.pnas.org

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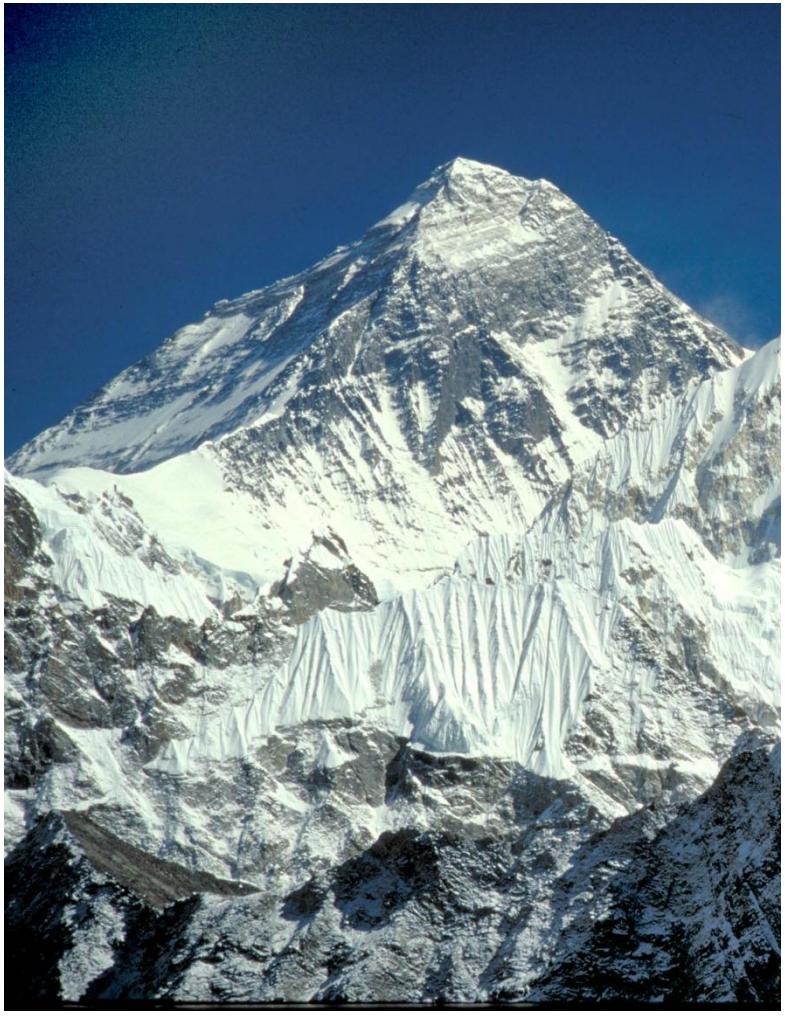
Publications

- 36 proposed paper ideas
- Longer-term Special Issue in Earth System Dynamics
- Many other exciting papers

So close

… and yet so far



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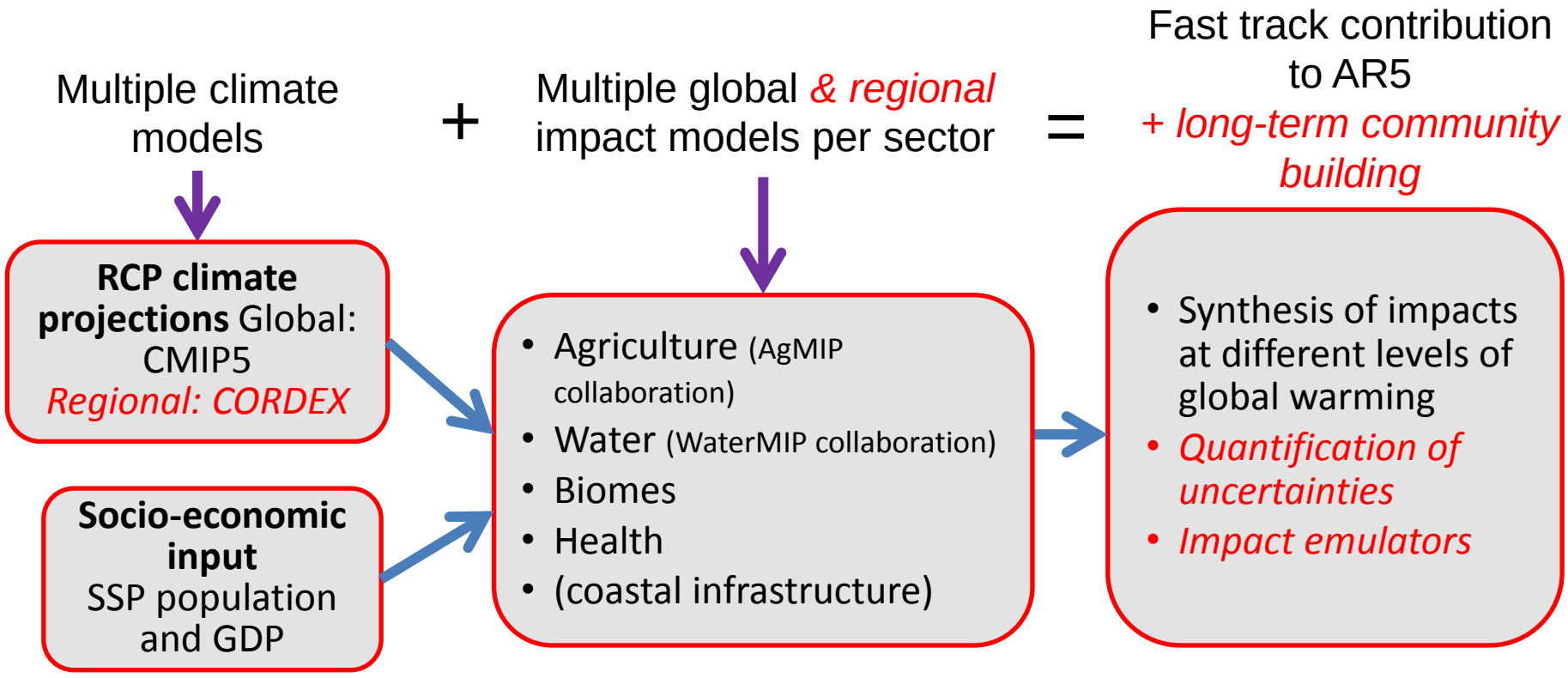
What is ISI-MIP after the fast track?



➢ Regular, consistent and quantitative assessment of impacts

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- Cross-sectoral integration
- Bridging the global-regional divide
- What is missing?
- Quantifying uncertainty
- Stakeholder communication

- Discussion-based interactive format, not just reporting results
- Agenda setting for coordinated, community-driven future research

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www.climate-impacts-2013.org

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