Potsdam Institute for Climate Impact Research

ISIMIP Steering Committee Meeting

23 February 2026

Towards ISIMIP4 Fast Track, ISIMIP4a, ISIMIP4b

ISIMIP Cross-Sectoral Science Team

ISIMIP Scientific Advisory Board

ISIMIP Sector Coordinators

Leibniz Association

comments and additions in italics

The missing link

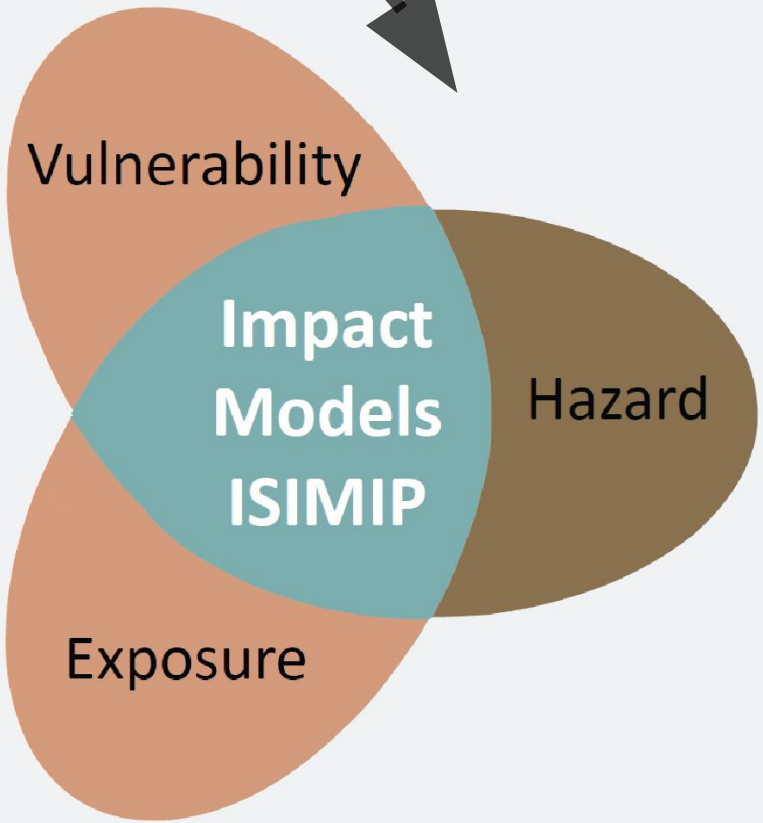
Climate forcings

Earth System Models CMIP (CORDEX)

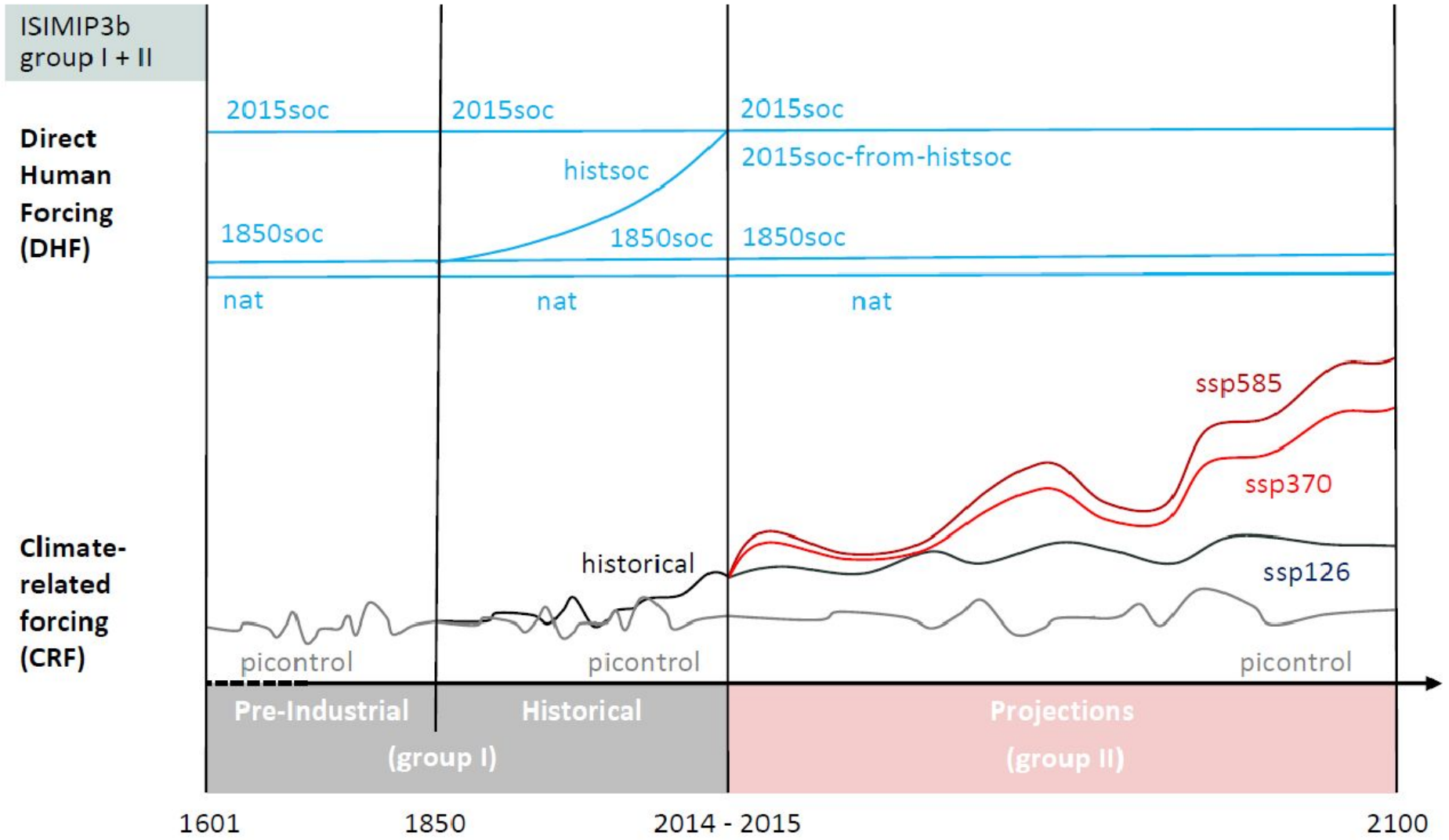
Climate-Related Forcings (CRF)

- Temperature
- Precipitation….

Integrated Assessment Models



The impact of climate change



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An active link

Climate forcings

Earth System Models CMIP (CORDEX)

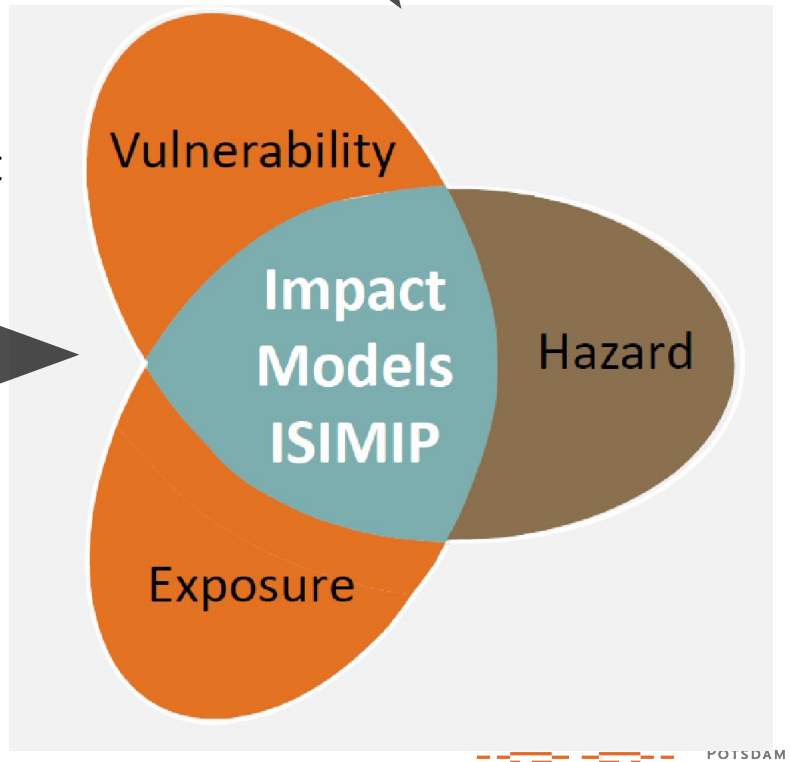
Climate-Related Forcings (CRF)

- Temperature
- Precipitation…

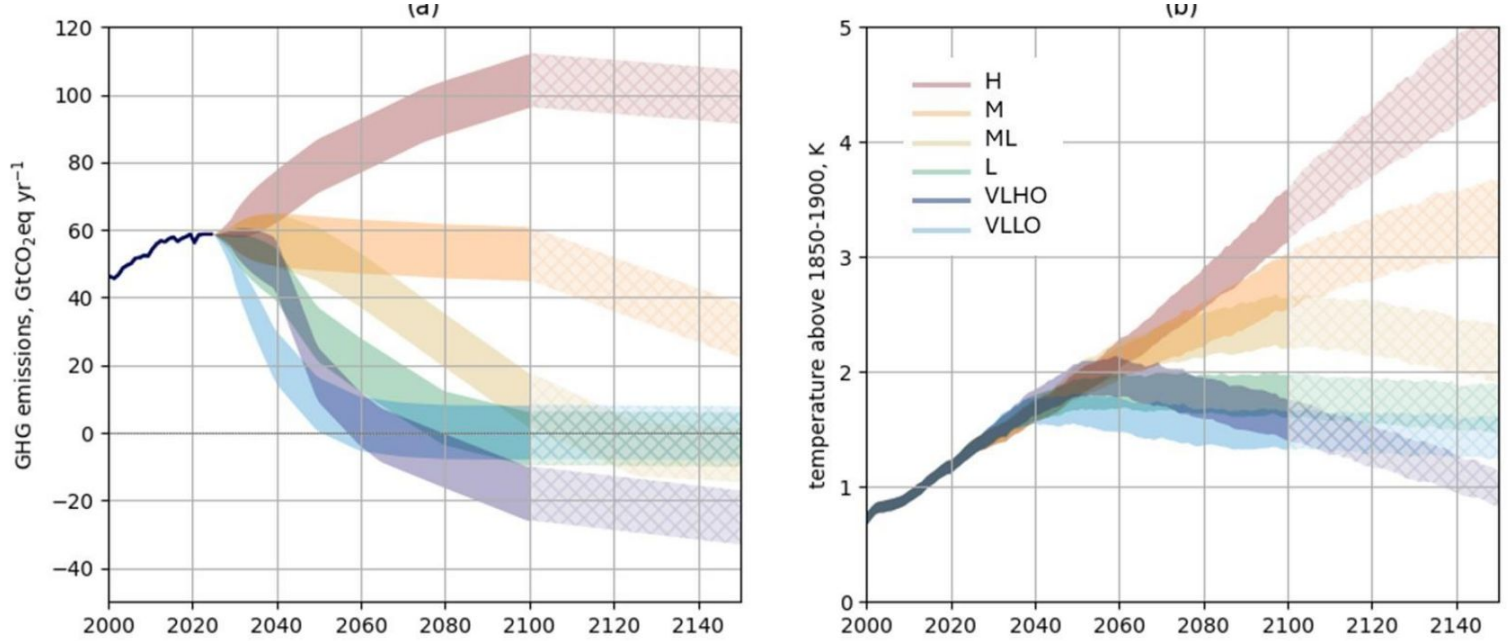
Direct Human Forcings (DHF)

- Population, GDP
- Land use patterns, fertilizer input
- Water use
- Hydropower demand

Integrated Assessment Models



Selection process: ScenarioMIP scenarios for ISIMIP4b-FT



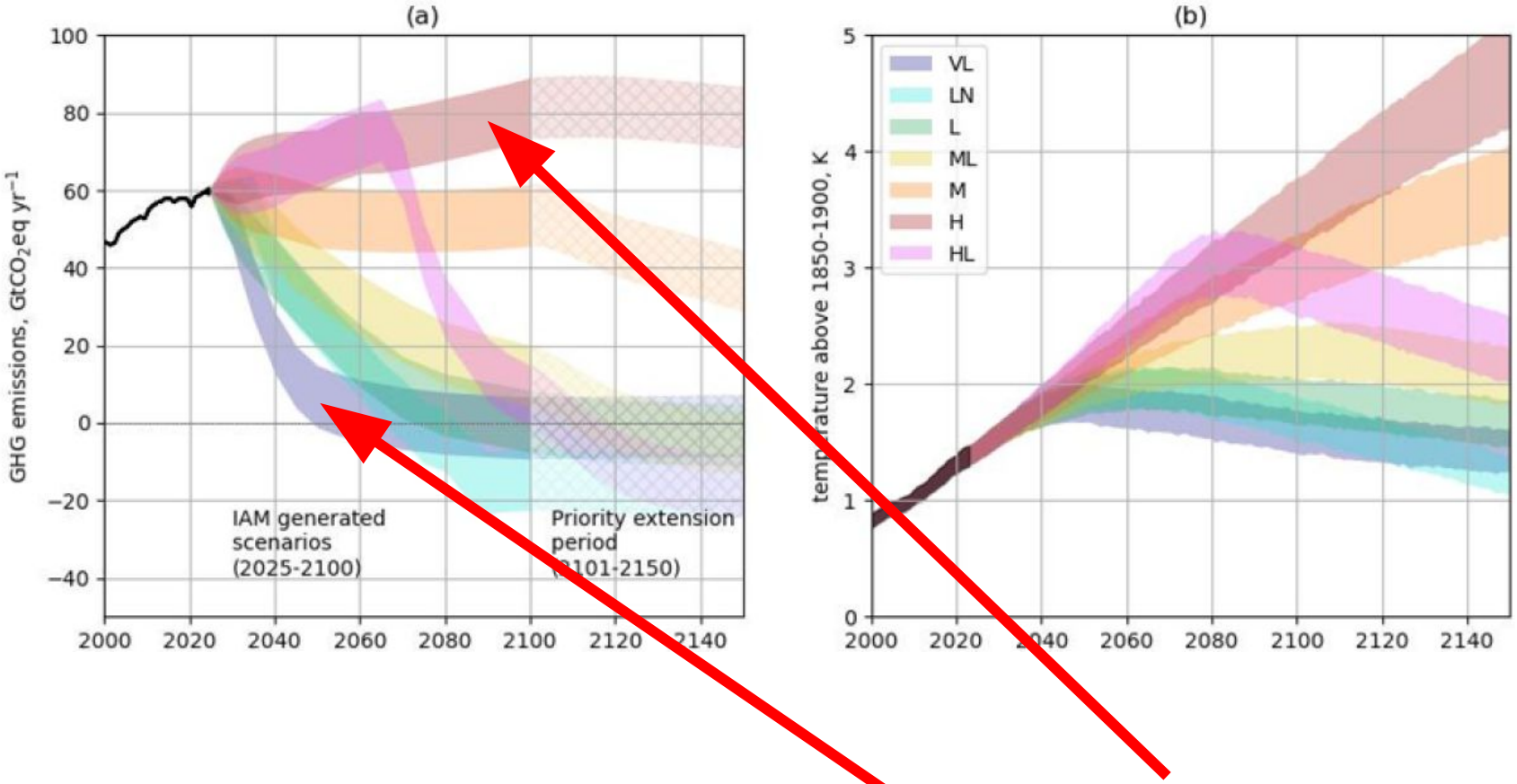
Beginning of 2025: Survey on selection of two high priority ScenarioMIP scenarios to be considered by CMIP in advance of the IPCC-AR7 submission deadlines
Results: Unclear preference for upper scenario (about equal votes for **H**igh and **M**edium), preference for **L**ow as lower end scenario

Discussion at the ISIMIP Workshop May 2025: Decision for **H**igh scenario as upper scenario and **V**ery **L**ow **L**imited **O**vershoot scenario as lower end scenario

ScenarioMIP scenarios for ISIMIP4b Fast Track

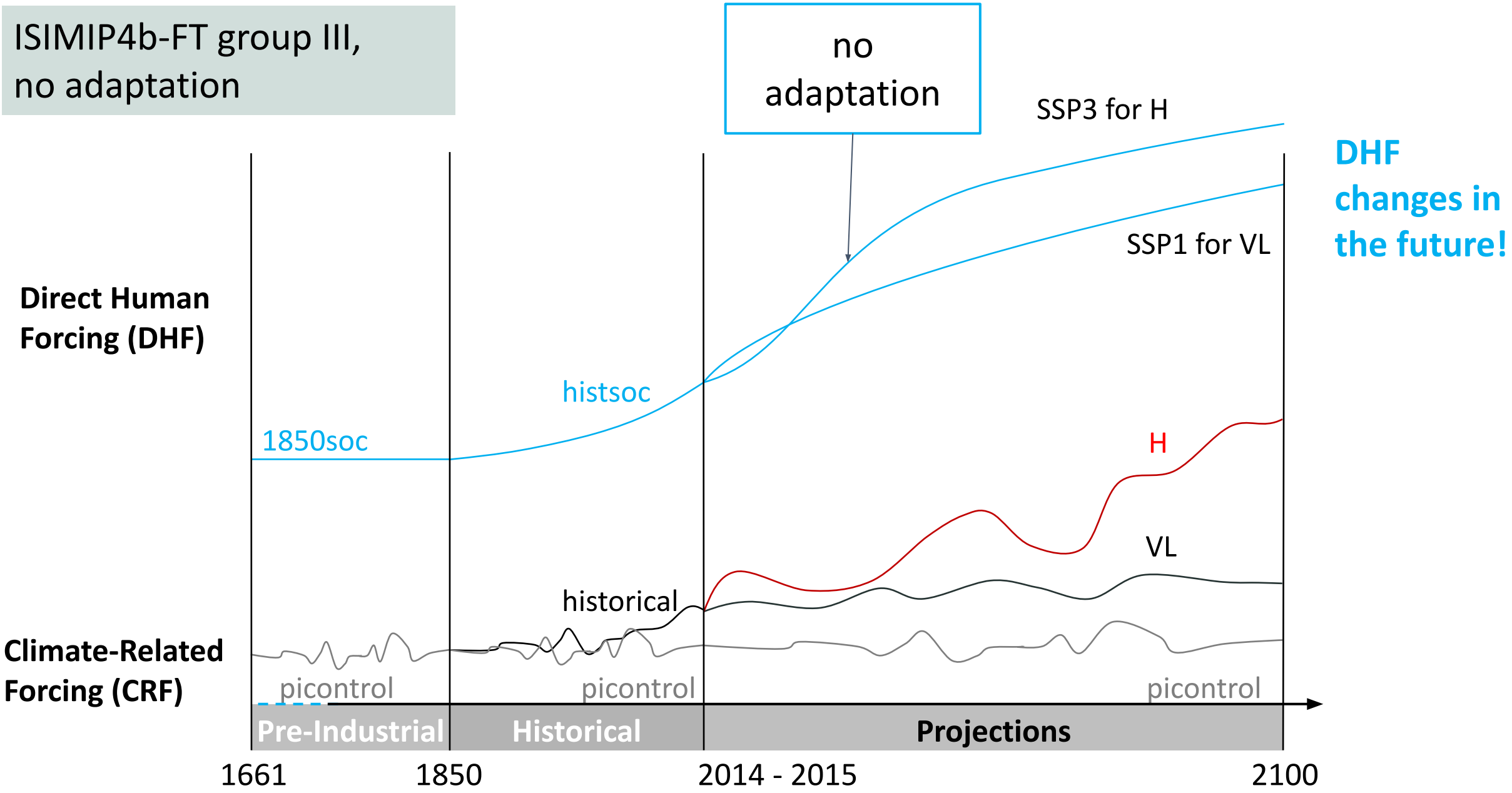
Meanwhile: Scenario names have been changed and one has been added:

H High,
HL High-to-Low,
M Medium,
ML Medium-to-Low,
L Low,
LN Low-to-Negative (VLHO)
VL Very Low (VLLO).



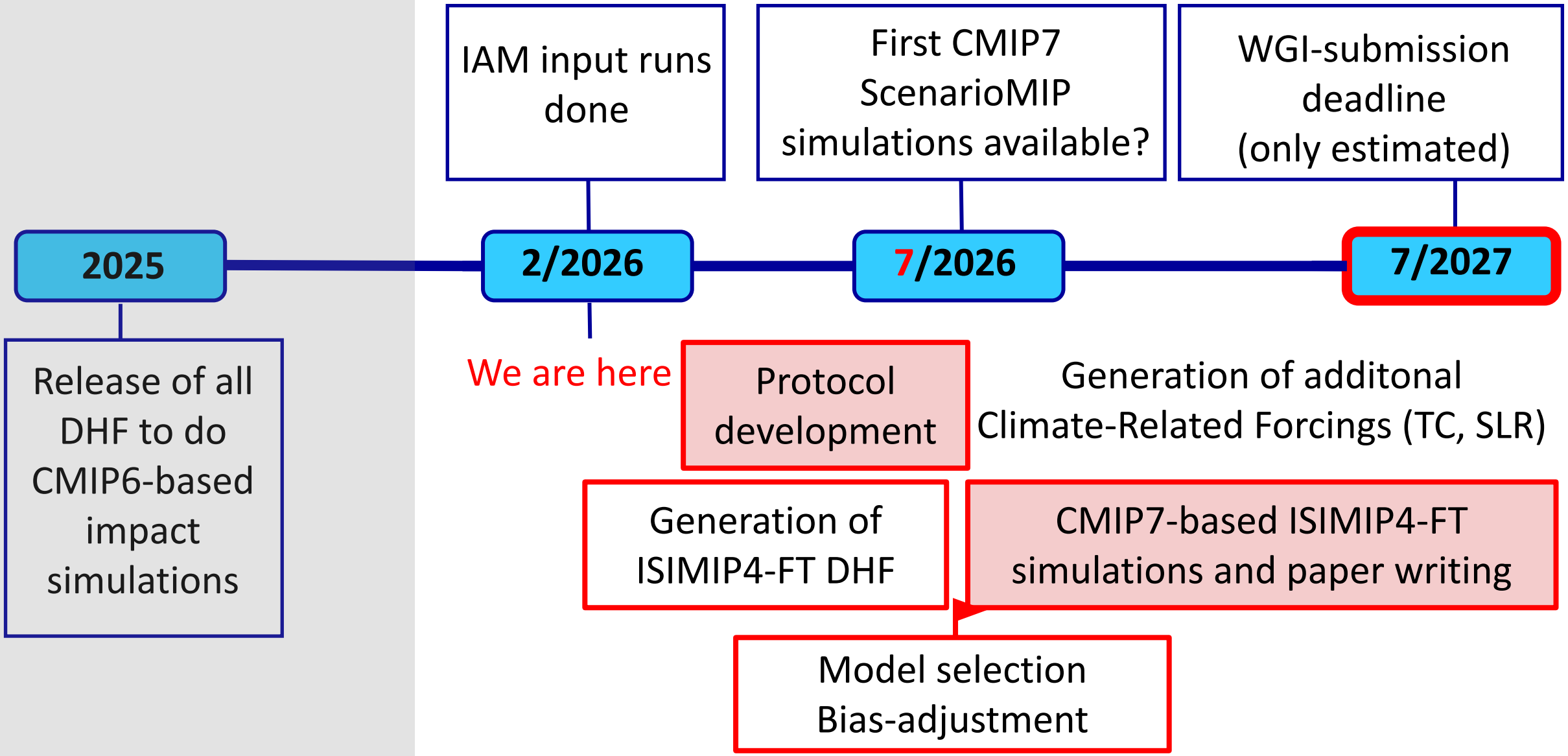
Discussion with CMIP, CORDEX, and ISMIP: High priority scenarios VL (VLLO) and H.
-> this refers to the ISIMIP4b Fast Track; for ISIMIP4b, there will most likely be an overshoot scenario selected in addition.

ISIMIP4b-FT group III,
no adaptation



DHF changes in the future!

Providing CMIP7-based input for the AR7?



Current state of the CMIP7 ScenarioMIP simulations

Pre-industrial and historical period:

- All required forcings (emissions, concentrations, LU patterns, populations, ozone) available

Future period:

- IAM teams have finished their simulations (emissions and land use patterns)
- Land use patterns still have to be harmonized to observational historical data
- Delay in tropospheric ozone data that will only be provided by March 11
- By then most of the CMIP models will start their simulations hopefully providing H and VL simulations by first of July

Upcoming – not in time for the IPCC AR7

- Projections of relative coastal water levels accounting for sea level rise
- High-resolution atmospheric forcing (0.1° x 0.1°) derived by dynamical downscaling within CORDEX for Europe (ISIMIP-Europe)
- Adaptation runs accounting for the effects of climate change on DHF (e.g. adjustments of LU pattern in response to impacts of climate change on crop yields)

… but supported by FUTURA

Additionally, we aim to provide high-resolution forcing data (0.1° x 0.1°) for Africa, and ideally on the global scale, to cover highly vulnerable regions, in particular.

Climate-Related Forcings (CRF) in two steps

Core set of CRFs:

- Global bias-adjusted and downscaled atmospheric forcings based on ESM simulations (0.5° x 0.5°)
- Non-bias-adjusted oceanic forcing from ESM runs
- Lightning climatology
- TC tracks

Extended CRFs:

- Global bias-adjusted oceanic forcing based on ESM simulations
- TC induced storm surge levels
- Bias-adjusted high-resolution atmospheric forcing for Europe derived from regional climate models using boundary conditions from ISIMIP-ESMs (0.1° x 0.1°)
- Lightning data from ESMs?

Direct Human Forcings (DHF) in two steps

Core set of DHFs:

- Harmonized land use and irrigation patterns, synthetic N fertilizer inputs for 15 crop groups, wood harvesting,
- N-deposition,
- Hydropower Dam locations,
- Gridded population,
- Gridded GDP, asset distributions
- Crop calendar,
- Water management

Extended DHFs as e.g. required by the water quality sector:

- phosphorus fertilizer inputs,
- waste water treatment,
- livestock numbers etc.
- *high-resolution data with regional/global coverage, any support is highly welcome*

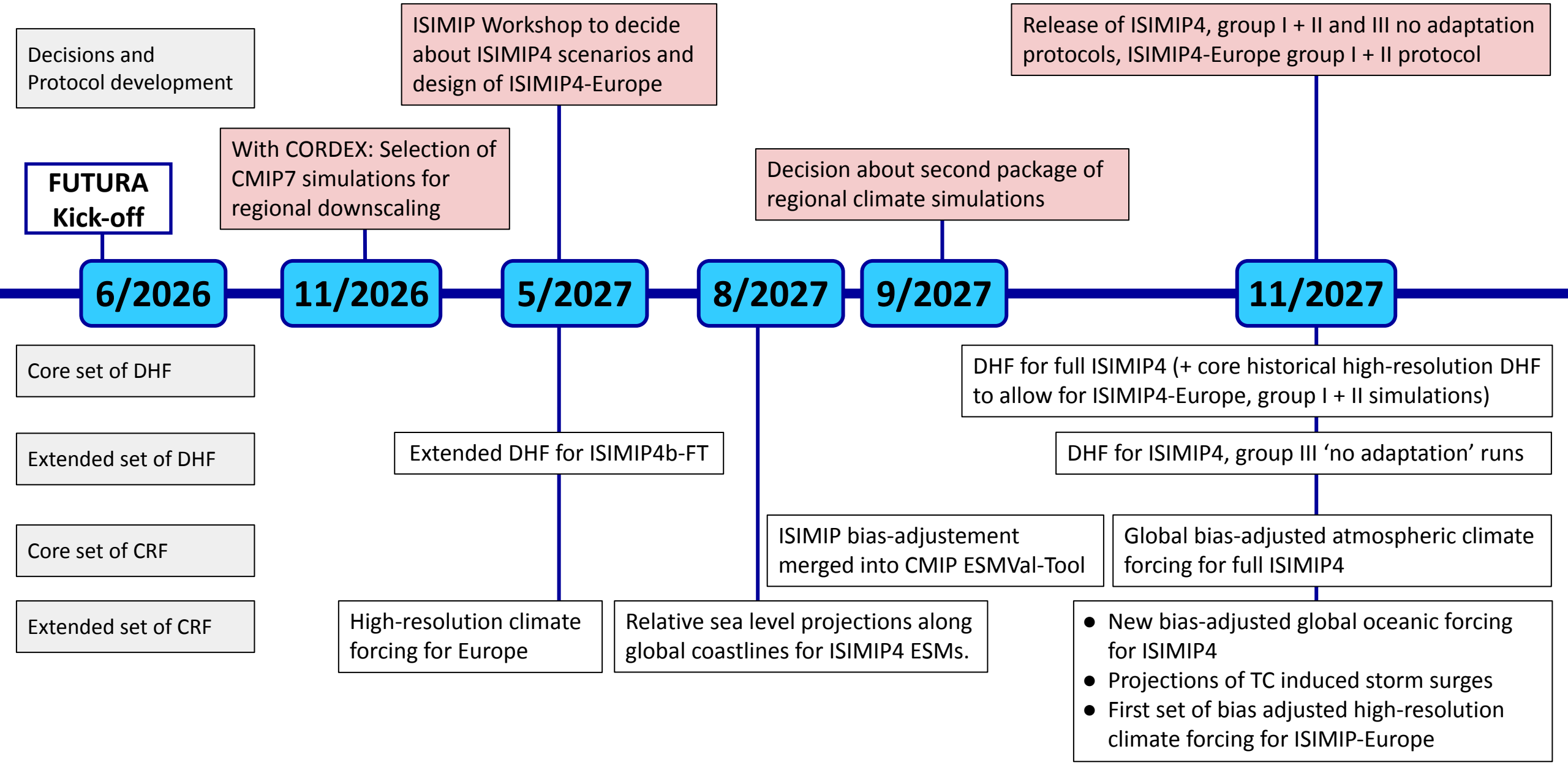
Towards the full ISIMIP4 simulation round: key topics

- *ISIMIP4b: Integration of adaptation and mitigation measures*
- *ISIMIP4a: Attribution including annual updates*
- *Further suggestions: hotspot analyses (e.g. layering), overshoot scenarios, Cascading impacts that propagate through systems and across borders*

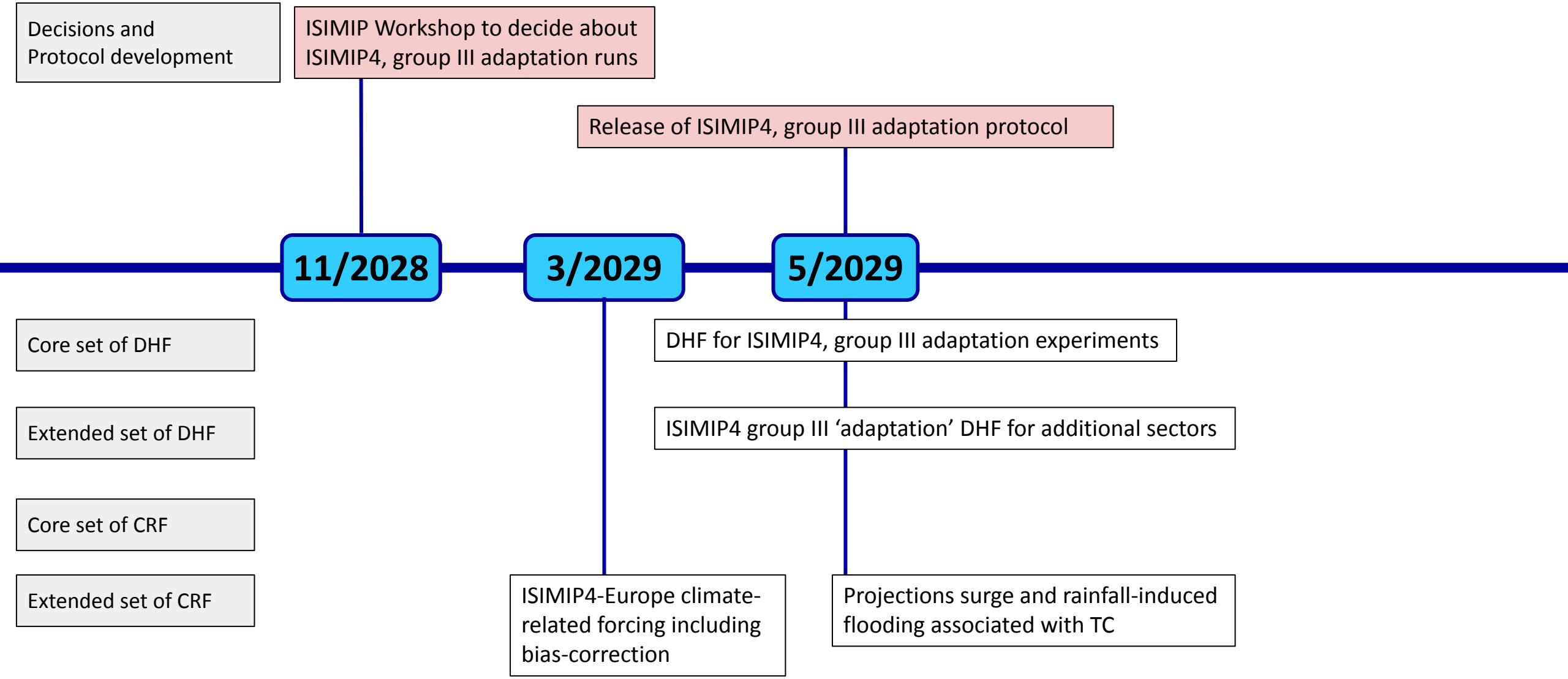
-> Initiating related special issues is encouraged to motivate collaboration within and across sectors

-> Suggestions for related activities are invited for the upcoming ISIMIP-CROSS-CASCADE workshop 8-12 June 2026 at PIK

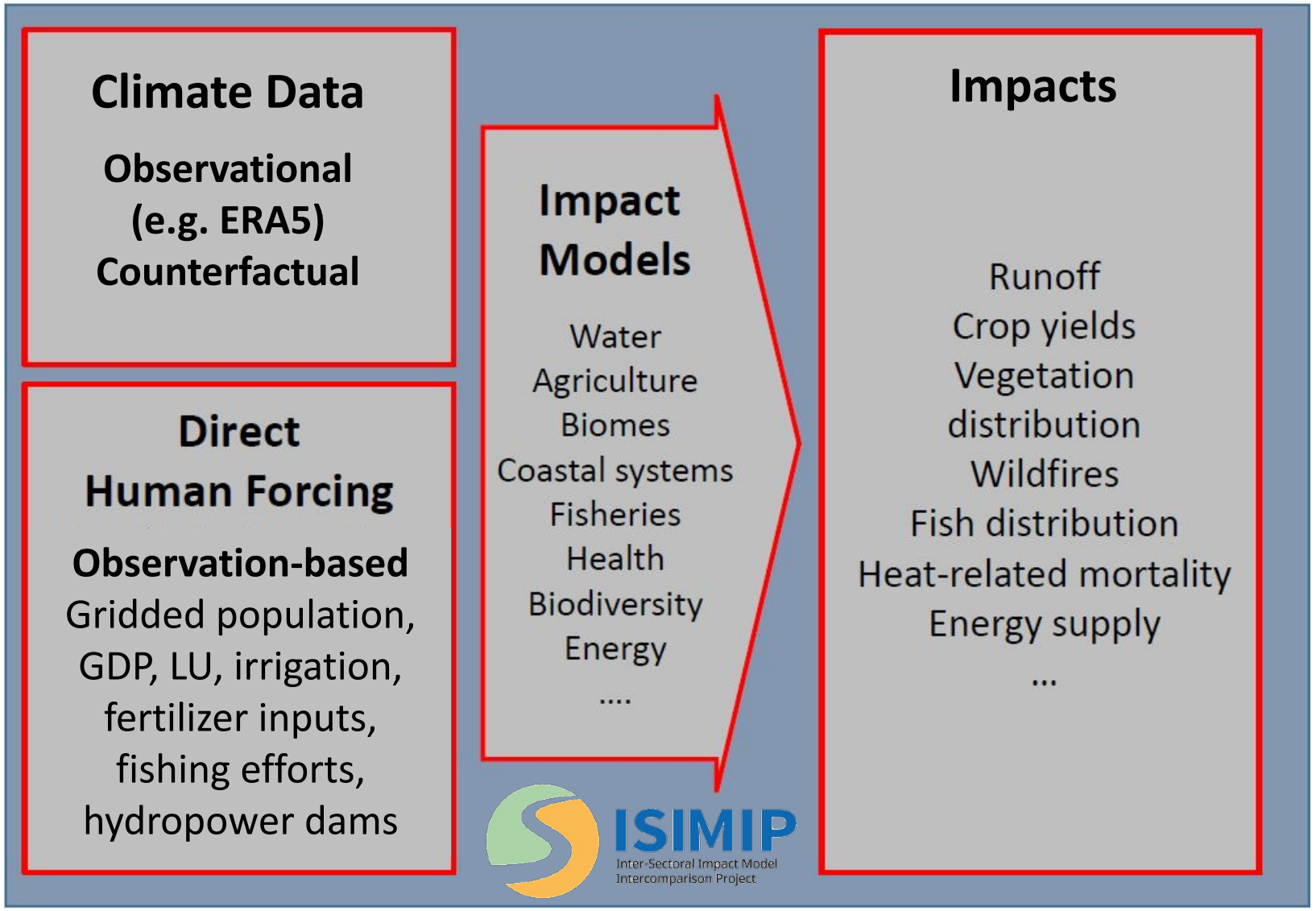
Towards the full ISIMIP4 simulation round - FUTURA Phase 1



Towards the full ISIMIP4 simulation round - FUTURA Phase 2



ISIMIP4a: Impact Model Evaluation and Impact Attribution



Updated forcing data for ISIMIP4a

Climate-Related Forcings

- We plan to extend the factual CRF (from ERA5 and W5E5) to 2025
- *Additionally, we aim to generate CRF based on ERA6*
- Counterfactual data will be derived by removing trends newly estimated from the extended data sets; *we aim to improve the current detrending method and in addition aim to develop DAMIP-based founterfactual forcing, though this is will depend on available capacities*
- *We aim for annual updates of both datasets, this will also depend on available capacities*

Direct Human Forcing

- Extended population data from CMIP7 process
- Extended gridded GDP and asset data from CMIP7 process
- Extended land use, irrigation and fertilizer data from CMIP7 process

Further supporting activities

FUTURA also supports the ISIMIP data management to

- achieve a timely curation and publication of ISIMIP4b data throughout the project (one full position)
- create an overarching CMIP-CORDEX-ISIMIP catalogue to enable cross-project searches

COST Action CROSS-CASCADE supports

- meetings and workshops (paper writing workshops!)
- Research Exchanges of individuals (Short-Term Scientific Missions)

Upcoming priorities and key tasks

- *Motivate modelers in the sectors to run models and produce papers for the AR7 submission deadline, presumably around 7/2027*
- *Highlight cross-sectoral idea and encourage also ISIMIP3-based papers, as CMIP7 data - and thus ISIMIP4 Fast Track - may be delayed*
- *Bring in further ideas for the upcoming ISIMIP-CROSS-CASCADE workshop in 8-12 June 2026, e.g. initiate special issue*