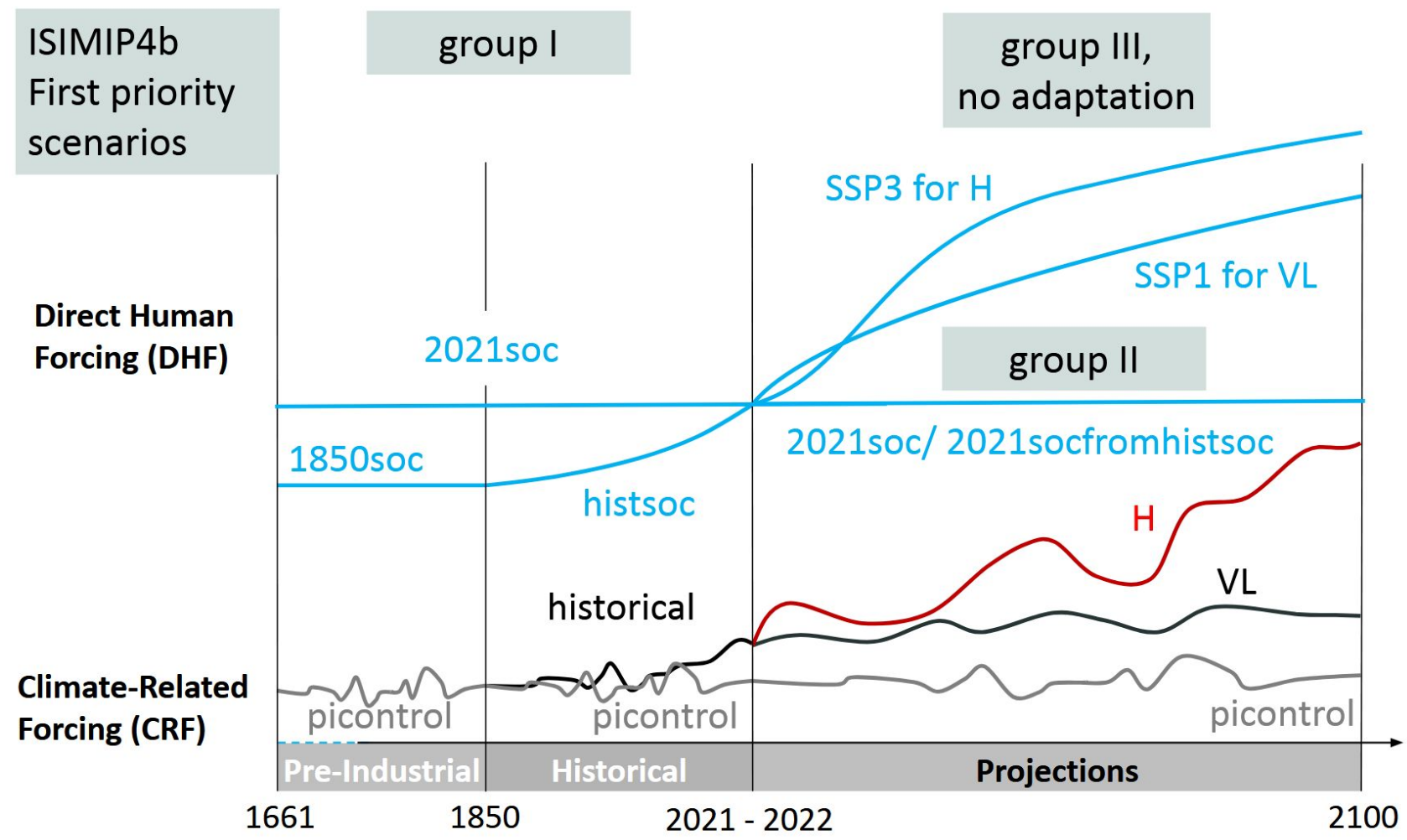


ISIMIP4 Kick-Off Webinar

21 September 2026

**Availability of forcing data to generate the high-priority
CMIP/-ScenarioMIP-based
ISIMIP4b has started in August 2026**

Core impact simulations for high-priority CMIP7-ScenarioMIP climate projection (ISIMIP4b)



Sectoral protocols available at protocol4.isimip.org

Table 2.1: Experiment set-up. Each experiment is specified by the climate related forcing (top row) and the direct human forcing (bottom row). Sensitivity labels indicate deviations from the default settings. Experiments are colored by group: group I (grey), group II (red) and group III (blue). The subtitles in the first row indicate how the experiment is defined in filenames.

Experiment	Period: Pre-industrial 1601-1849	Period: Historical 1850-2021	Period: Future 2022-2100
Pre-industrial control 1st priority ISIMIP4b agriculture biomes coastal diarrhea fire forestry groundwater health fs-n labour lakes_global lakes_local marine-fishery_global marine-fishery_regional peat permafrost water_global water_regional water_quality	picontrol, esm-picontrol	picontrol, esm-picontrol	picontrol, esm-picontrol
	1850soc	histsoc	2021soc-from-histsoc
Pre-industrial control 1st priority ISIMIP4b agriculture biomes coastal diarrhea energy_demand fire health fs-n groundwater labour lakes_global lakes_local peat permafrost water_global water_regional water_quality	Does not have to be simulated, spin-up should be based on the 2021 DHF (see note below the table).	picontrol, esm-picontrol	picontrol, esm-picontrol
		2021soc	2021soc

Phase 1: Available Climate-Related Forcing

Modell	emission driven	prescribed CH4	O3 available	ECS	TCR	Institute
EC-EARTH	yes	yes	no	3,82	2,08	EC-Earth-Consortium
UKESM1-3-LL	yes	no	yes	5,35		UKNCSP
CanESM5-1	yes	unknown	unknown			CCCma
ACCESS-ESM1.6	yes	unknown	unknown	3,6	1,8	CSIRO
ACCESS-ESM1.6	no	unknown	unknown	3,6	1,8	CSIRO

 bias-corrected data available in ISIMIP repository

EC-Earth data has already been sent to Kerry Emanuel who offered to generate associated samples of potential realisations of tropical cyclone tracks
UKESM1-3-LL about to follow

Phase 1: Core impact simulations for high-priority CMIP7-ScenarioMIP climate projection

Variable	time period, Resolution
Bias-adjusted atmospheric forcing (usual ISIMIP climate variables) from CMIP7 (picontrol, historical, H, and VL)	1850 to 2100, 0.5° x 0.5°, daily data Bias-adjusted to ERA5 (reference period: 1979 to 2014)
Not bias-adjusted oceanic forcing (usual ISIMIP variables) from CMIP7 (picontrol, historical, H, and VL)	1850 to 2100, 1° x 1°, monthly data
CO ₂ concentrations	1850 to 2100, annual + monthly <i>For concentration driven runs:</i> 1850 to 2021: Input from CMIP7-DECK (CR-CMIP-1-0-0) 2022 to 2100: Input from CMIP7 input4MIPs (CR-vl-1-1-0 and CR-h-1-1-0).
CH ₄ concentrations	1850 to 2100, annual + monthly <i>Input for concentrations driven runs:</i> 1850 to 2021: Input from CMIP7-DECK (CR-CMIP-1-0-0) 2022 to 2100: Input from CMIP7 input4MIPs (CR-vl-1-1-0 and CR-h-1-1-0)
Lightning	monthly climatology identical to ISIMIP4a

Direct Human Forcings for high-priority CMIP7-ScenarioMIP climate projection

Variables	Time period, resolution
Population data (national, gridded) (for all SSPs)	1850 - 2100, national, 1 arcmin, 5 arcmin, 6 arcmin, 15 arcmin und 30 arcmin; annual
GDP (national gridded), GDP per capita (for all SSPs)	1850 - 2025, national, 1 arcmin, 5 arcmin, 6 arcmin, 15 arcmin und 30 arcmin; annual
Assets (national, gridded) (for all SSPs)	1850 - 2100, national, 1 arcmin, 5 arcmin, 6 arcmin, 15 arcmin und 30 arcmin; annual
Total crop land (rainfed vs. irrigated)	1850 - 2100, 0.25° x 0.25° and 0.5° x 0.5°, annual
pastures and rangeland	1850 - 2100, 0.25° x 0.25° and 0.5° x 0.5°, annual
forests and natural vegetation	1850 - 2100, 0.25° x 0.25° and 0.5° x 0.5°, annual
crop land divided into 5 crop groups (rainfed vs irrigated)	1850 - 2100, 0.25° x 0.25° and 0.5° x 0.5°, annual
Crop land, 15 crop groups (rainfed vs. irrigated)	1850 - 2100, 0.25° x 0.25° and 0.5° x 0.5°, annual
Seasonal sub-splits of wheat and rice	1850 - 2100, 0.25° x 0.25° and 0.5° x 0.5°, annual
urban areas	1850 - 2100, 0.25° x 0.25° and 0.5° x 0.5°, annual
land transformation	1850 - 2099, 0.25° x 0.25° and 0.5° x 0.5°, annual
wood harvest	1850 - 2099, national, 0.25° x 0.25° and 0.5° x 0.5°, annual
synthetic N fertilizer for 5 crop groups	1850 - 2100, 0.25° x 0.25°, 0.5° x 0.5°, annual
synthetic N fertilizer for 15 crop groups	1850 - 2100, 0.25° x 0.25°, 0.5° x 0.5°, annual
N deposition	1850 to 2100, 0.5° x 0.5°, monthly
Hydropower dam locations	starting from first dam finished in 284 up to 2100

Forcings

Biophysical impact models

Model evaluation and attribution

Update of evaluation and attribution framework (ISIMIP4a)

Climate data

Observational
(GSWP3-ERA5
up to 2025)
Counterfactual

Direct Human Forcing

LU and irrigation
pattern, water and
agricultural
management, dams,
reservoirs, population
pattern, GDP...

Observational

Impact Models

Water
Agriculture
Biomes
Coastal
systems
Fisheries
Health
Biodiversity
Energy
....



Biophysical impact indicators

Runoff
Crop yields
Vegetation
distribution
Wildfires
Fish distribution
Heat-related mortality
Energy supply
...

Counterfactuals will be
based on improved
de-trending approach

To allow for extended
attribution including all
years up to 2025 ISIMIP3a
forcing data are extended

The tour has started....



remember some of the categories...

- maillot jaune: first complete submission of 'no adaptation' runs
- maillot vert: fastest passing of quality check
- maillot a pois rouge: heaviest data processing task
- maillot blanc: early-career investigators
- ...

Technical note

Changes to Upload and OutputData area at DKRZ in ISIMIP4

Filesystem Structure

- One directory per model in both UploadArea and OutputData — no sector-based duplication.
- Sector assignment via **sectors.txt** in each model directory, with primary and secondary sectors.
To be edited by modellers in UploadArea!
Information ends up machine-readable for later use in data publication.
- Sector-based view in OutputData using symlinks for backward compatibility.
- No duplicated files or symlinks in the actual data structure — easier maintenance and updates.
- UploadArea/data instead of _tmp — clearer naming for uploaded, not-yet-tested data.

```
OutputData/  
├── EXAMPLE-MODEL-1  
├── EXAMPLE-MODEL-2  
└── sectors  
    ├── biomes  
    │   └── EXAMPLE-MODEL-1 -> ../../EXAMPLE-MODEL-1  
    ├── fire  
    ├── permafrost  
    │   └── EXAMPLE-MODEL-1 -> ../../EXAMPLE-MODEL-1  
    ├── water_global  
    │   ├── EXAMPLE-MODEL-1 -> ../../EXAMPLE-MODEL-1  
    │   └── EXAMPLE-MODEL-2 -> ../../EXAMPLE-MODEL-2  
    └── water-use  
        └── EXAMPLE-MODEL-2 -> ../../EXAMPLE-MODEL-2
```

What is still doable in time for the AR7?

Please reach out to info@isimip.org if you would like to contribute ISIMIP4-, or ISIMIP3b group III simulations to a paper in time for the AR7

Next steps supported by FUTURA

Expansion of impact simulations to

- i) include additional CMIP7-ScenarioMIP scenarios (potential focus on overshoot),
- ii) high-resolution simulations for Europe,
- iii) additional impacts (water quality, marine ecosystems and fisheries)

Next steps supported by FUTURA

1 Decision about additional ISIMIP4b scenarios and high-resolution set-up for Europe

by May 2027: ISIMIP workshop held to **decide on full ISIMIP4b scenario set-up** (e.g. inclusion of overshoot scenario?) and the **design of ISIMIP4-Europe**

2 Additional Climate-Related Forcings becoming available

by August 2027: Release of **relative sea level projections** along the global coastlines for first priority ISIMIP4b scenarios and selected ESMs

by November 2027: **Dataset on bias-adjusted atmospheric climate-related forcings for the full set of ISIMIP4b scenarios** and selected ESMs publicly accessible via ISIMIP repository

Dataset of bias-adjusted oceanic climate-related forcings for ISIMIP4 scenarios and selected ESMs publicly accessible via ISIMIP repository

Dataset on CORDEX-based bias-adjusted high-resolution climate model simulations for ISIMIP4 scenarios and underlying ESMs publicly accessible via ISIMIP repository

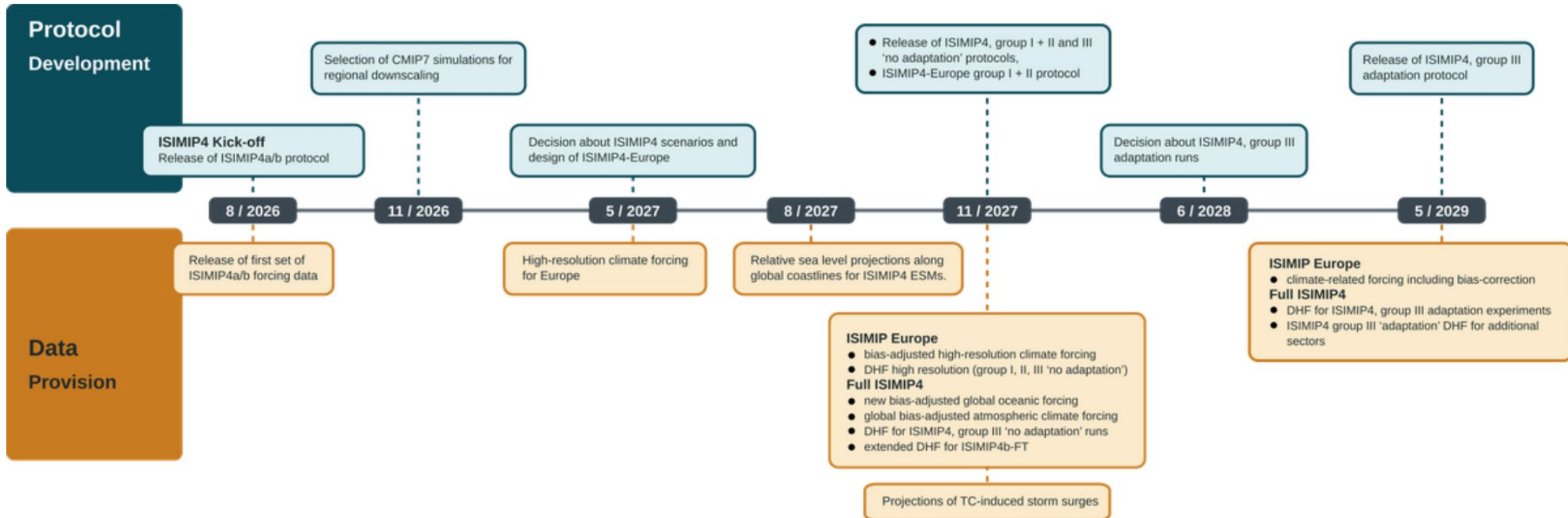
Report on global TC-induced storm surges based on GTSM hydrodynamic simulations accounting for tides and sea level rise

Next steps supported by FUTURA

3 Additional Direct Human Forcings

By November 2027: Extended set of global DHF to

- i) enable the full set of ISIMIP4b 'no adaptation' impact model simulations (particularly required by the water quality sector) and
- ii) allow for the high-resolution simulations for Europe (will include land use, population, GDP and fixed assets)



Direct Human Forcing for water quality sector (part of FUTURA)

Dataset	Comment
Applied synthetic fertilizers (P) on cropland & grassland	IMAGE-GNM, gridded data (rice legumes, rest; kg P2O5 per gridcell per year)
Livestock numbers	IMAGE (regional data + national data potentially), cattle, dairy, poultry, pigs, sheep+ goats, buffaloes, horses
Animal manure N	MagPIE (national data, kg/ha, gridded national data for c3ann, c3nfx, c3per, c4ann und c4per), IMAGE-GNM (separated for crop and grassland, gridded national data (kg N per gridcell per year))
Animal manure P	IMAGE-GNM (separated for crop and grassland, gridded national data (kg P2O5 per gridcell per year))
Crop uptake, N	MAGPIE (gridded data on 0.25° x 0.25°), IMAGE-GNM (kg N per gridcell per year) (rice, legumes, rest)
Crop uptake, P	IMAGE-GNM (kg P ₂ O ₅ per gridcell per year) (rice, legumes, rest)
Grassland uptake, N	MAGPIE (gridded data on 0.25° x 0.25°), IMAGE-GNM (0.5° x 0.5° kg N per gridcell per year)
Grassland uptake, P	IMAGE-GNM (0.5° x 0.5°, kg P ₂ O ₅ per gridcell per year)
Biological fixation, N (cropland / grassland / natural)	MagPIE (gridded data on 0.25° x 0.25°) ,IMAGE-GNM (kg N per grid cell per year, 0.5°x0.5°)
Anthropogenic point sources N (total affluent) & P	IMAGE-GNM (kg N/P per grid cell per year, 0.5°x0.5°)
Sewage connections of urban & rural population (0-1)	IMAGE-GNM, national data
Treatment removal fractions (0-1)	IMAGE-GNM, national data
Waste water treatment	IMAGE-GNM (affluent of all systems of industry and humans), gridded data

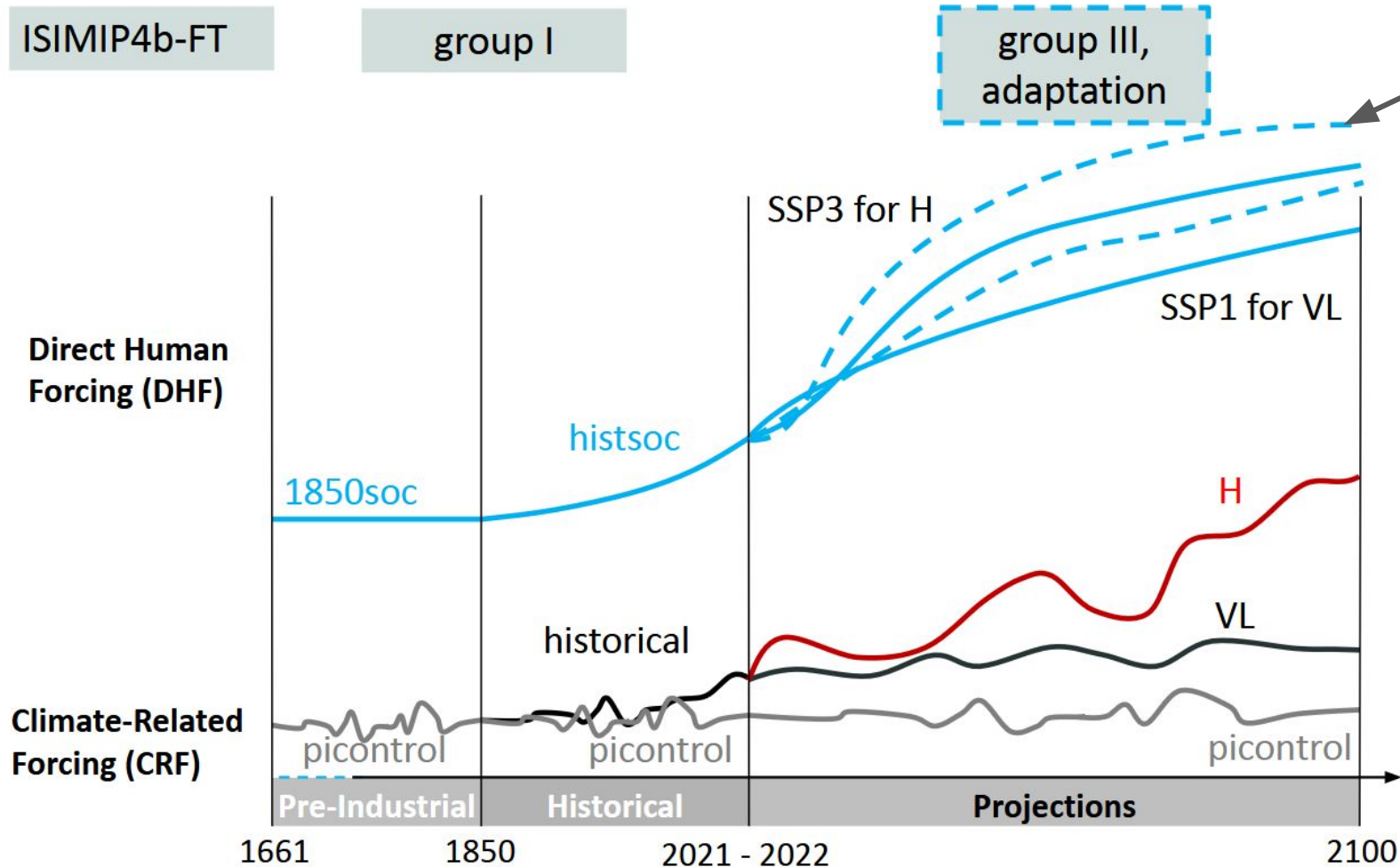
Direct Human Forcing for other sectors (optional in FUTURA)

Dataset	Comment
Health	
Gridded survival or mortality rates	
Gridded information on sex ratios	
Gridded information on age classes	
Water global	
Energy/electricity production	Needs downscaling to country level. -> IIASA?
Peat	
Fire	
HDI	
Energy	
Residential air conditioning (AC penetration)	
AC energy consumption	

Long term - perspective within FUTURA

Focus on Adaptation beginning in phase 3 of FUTURA: June 2029

Phase 3: Impact simulations for extended set of CMIP7-ScenarioMIP climate projections accounting for adaptation



Direct Human Forcing changes in response to impacts of climate change (e.g. agricultural land is extended due to negative impact of crop yields)