

ISIMIP coastal infrastructure sector

An overview

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Global Climate Forum

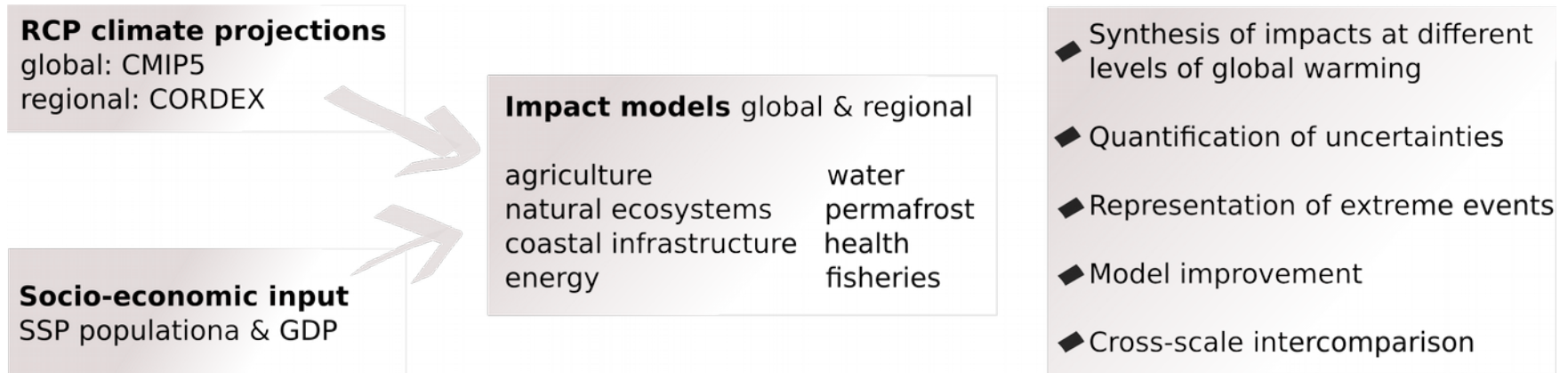
ISIMIP2 Workshop June 22nd, 2016
Potsdam, Germany



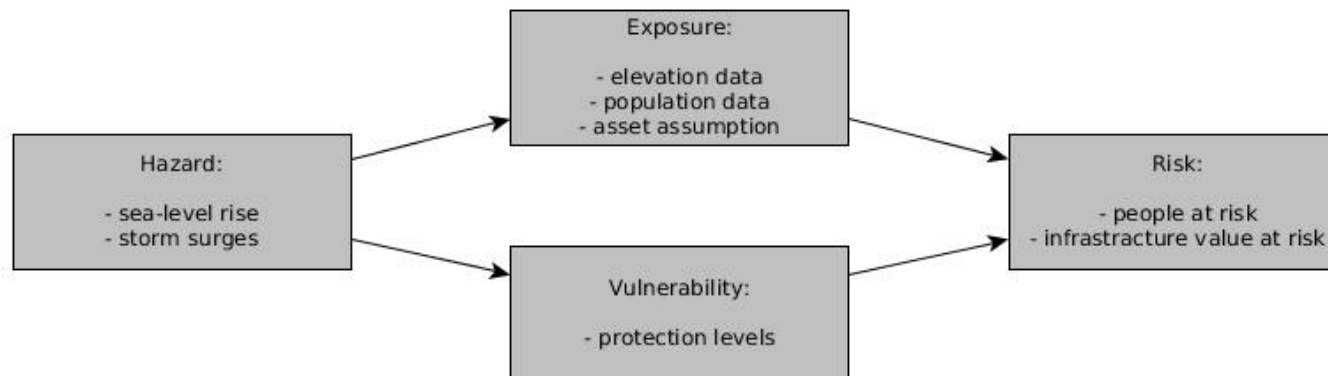
Global Climate Forum



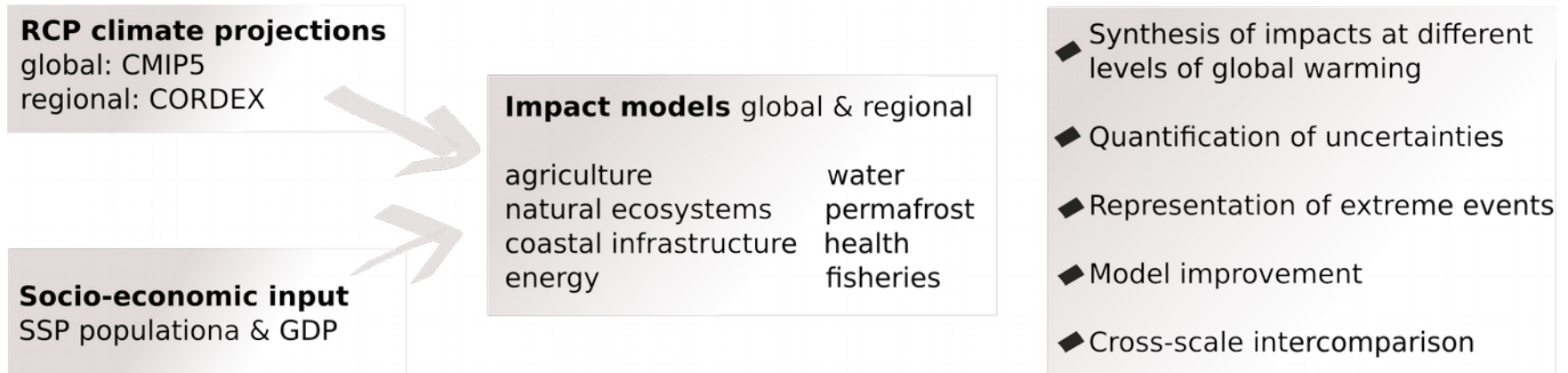
The ISIMIP approach



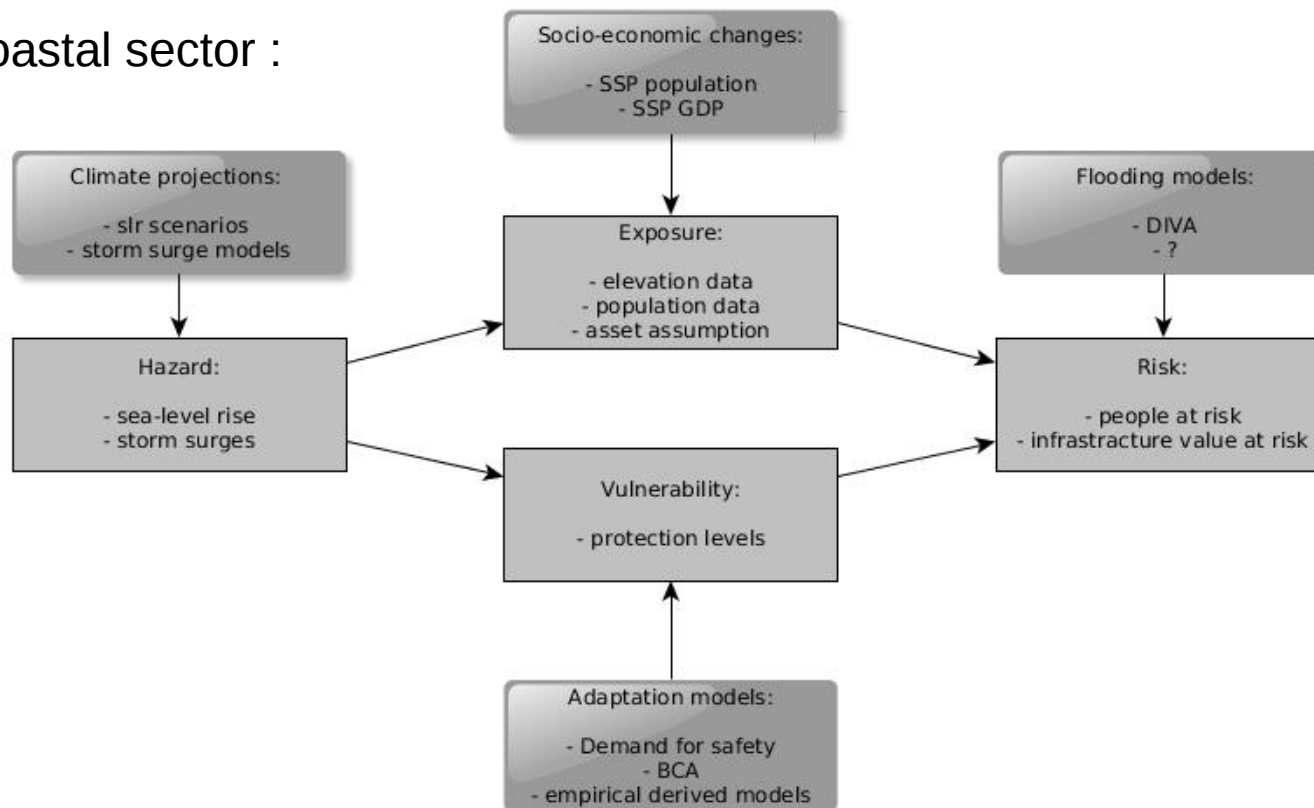
Adjusted to coastal sector :



The ISIMIP approach



Adjusted to coastal sector :



ISIMIP Fast Track

ISIMIP Fast Track looked at hazard and exposure :

Table 1: Global population and GDP in 2050 and 2100 under different SSPs

	Population [millions]		GDP [billion US\$/yr]	
	2050	2100	2050	2100
SSP1	8,400	7,200	295,000	771,000
SSP2	9,300	9,800	260,000	685,000
SSP3	10,300	14,100	334,000	667,000
SSP4	9,400	11,800	242,000	462,000
SSP5	8,500	7,700	348,000	1,207,000

Table 2: Global exposed area and population below 2, 4 and 8 m elevation in the base year (1995) for the different DEMs and population distribution models

Digital elevation model	Population distribution	Exposure below 2m		Exposure below 4m		Exposure below 8m	
		Area [10 ³ km ²]	Population [millions]	Area [10 ³ km ²]	Population [millions]	Area [10 ³ km ²]	Population [millions]
GLOBE	GRUMP	2,465	323	3,559	564	4,425	757
GLOBE	LANDSCAN	2,465	328	3,559	570	4,425	771
SRTM	GRUMP	1,270	123	2,269	352	3,220	542
SRTM	LANDSCAN	1,270	120	2,269	353	3,220	549

ISIMIP Fast Track

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Table 3: Sea level projections used as input for the DIVA model. Provided are the median as well as the 5% and 95% quantiles in parenthesis (see methods)

Scenario	Model	Steric [cm]		Land-ice [cm]			Total [cm]
			Glacier	Antarctica	Greenland	Sum	
RCP26	HadGEM2-ES	14	14 (14,15)	7 (2,23)	0 (0, 0)	21 (16,39)	35 (29,52)
	IPSL-CM5A-LR	12	12 (12,12)	7 (2,23)	0 (0, 0)	19 (13,36)	30 (25,47)
	MIROC-ESM-CHEM	19	13 (13,13)	7 (2,23)	0 (0, 0)	20 (14,36)	39 (34,56)
	NorESM1-M	15	11 (11,12)	7 (2,23)	0 (0, 0)	18 (13,35)	34 (28,50)
	ALL	15	13 (12,13)	7 (2,23)	0 (0, 0)	20 (14,36)	35 (29,51)
RCP45	HadGEM2-ES	18	17 (16,19)	8 (2,29)	7 (5, 8)	32 (23,56)	50 (41,75)
	IPSL-CM5A-LR	18	14 (14,15)	8 (2,29)	8 (7, 10)	30 (22,53)	48 (40,71)
	MIROC-ESM-CHEM	25	15 (14,16)	8 (2,29)	9 (7, 11)	32 (24,56)	57 (48,81)
	NorESM1-M	20	13 (13,14)	8 (2,29)	3 (2, 4)	24 (17,49)	44 (37,67)
	ALL	20	15 (14,16)	8 (2,29)	7 (5, 8)	29 (21,53)	50 (42,73)
RCP85	HadGEM2-ES	29	22 (20,26)	10 (2,41)	12 (10, 14)	44 (31,81)	72 (60,110)
	IPSL-CM5A-LR	30	18 (17,20)	10 (2,41)	15 (12, 18)	43 (31,79)	73 (61,109)
	MIROC-ESM-CHEM	38	19 (18,21)	10 (2,41)	19 (15, 23)	49 (36,85)	86 (74,123)
	NorESM1-M	32	16 (16,17)	10 (2,41)	6 (5, 8)	33 (23,66)	64 (55,97)
	ALL	32	19 (18,21)	10 (2,41)	13 (10, 16)	42 (30,78)	74 (62,110)

ISIMIP Fast Track

ISIMIP Fast Track looked at hazard and exposure :

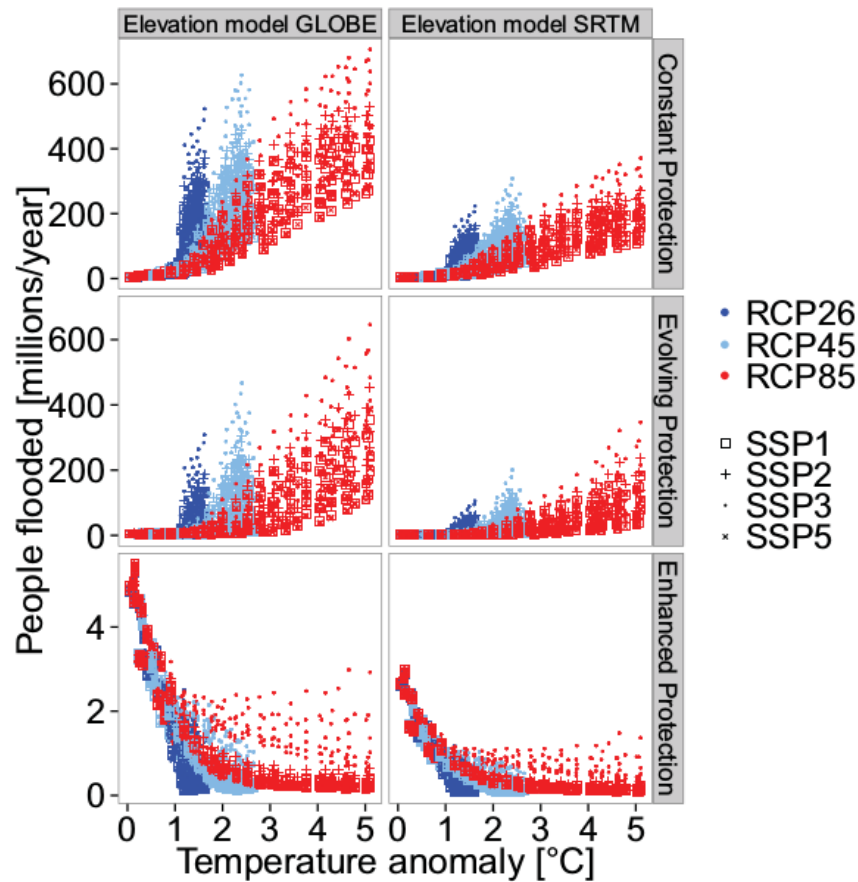


Fig. 1. Global expected number of people flooded versus global mean temperature anomaly with respect to 1985-2005.

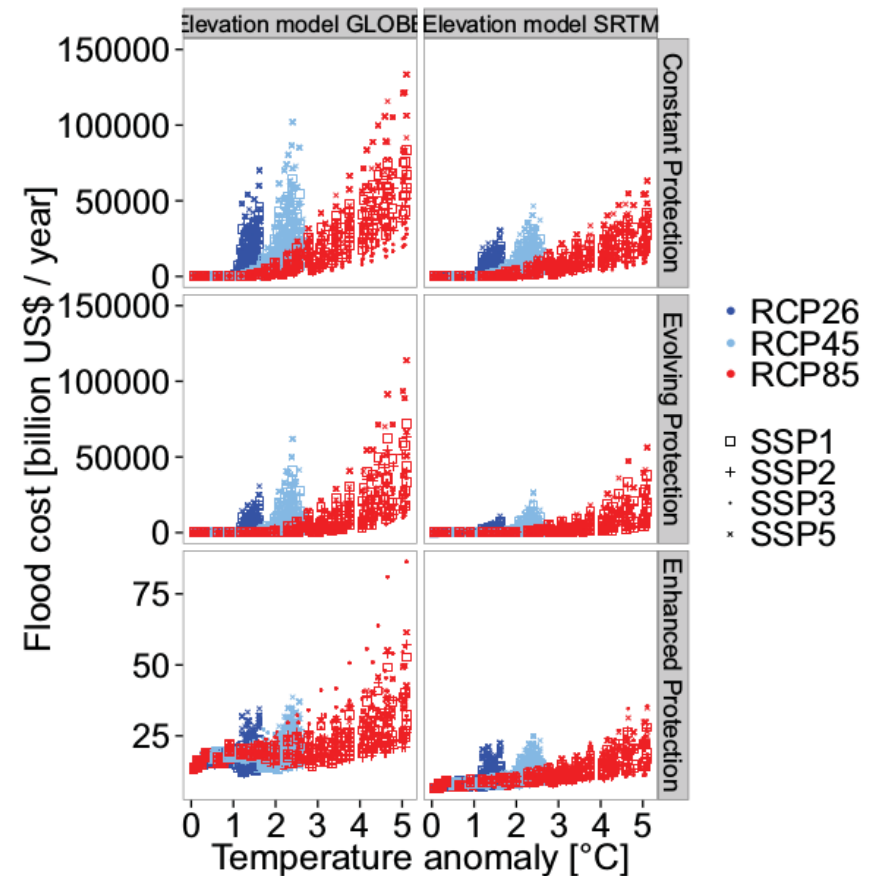
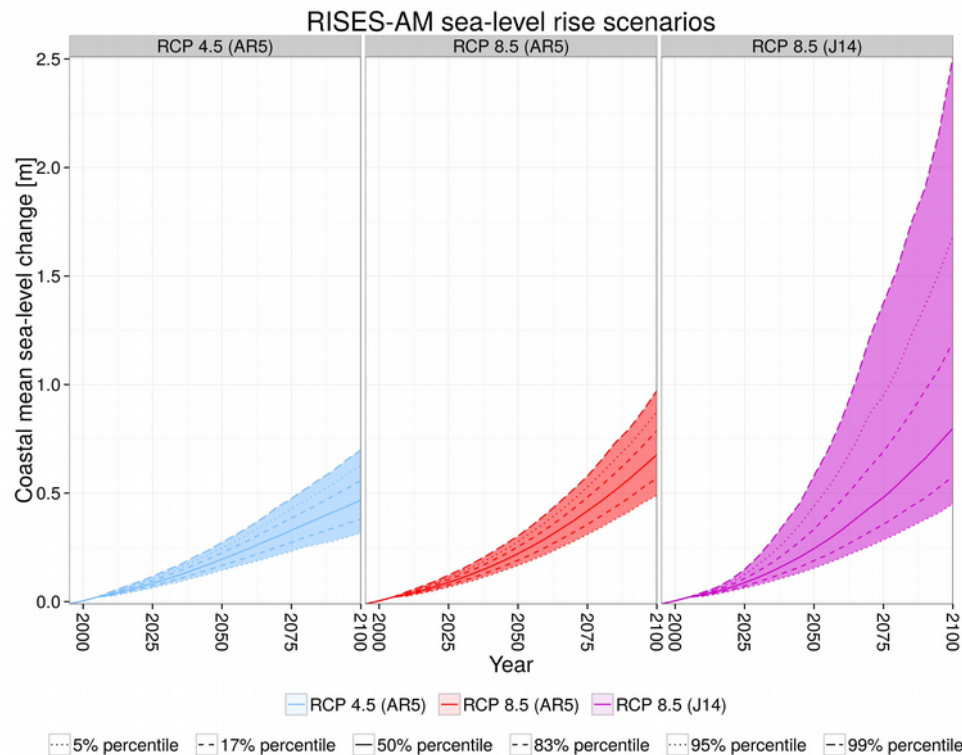


Fig. 2. Global expected sea flood cost versus global mean temperature anomaly with respect to 1985-2005.

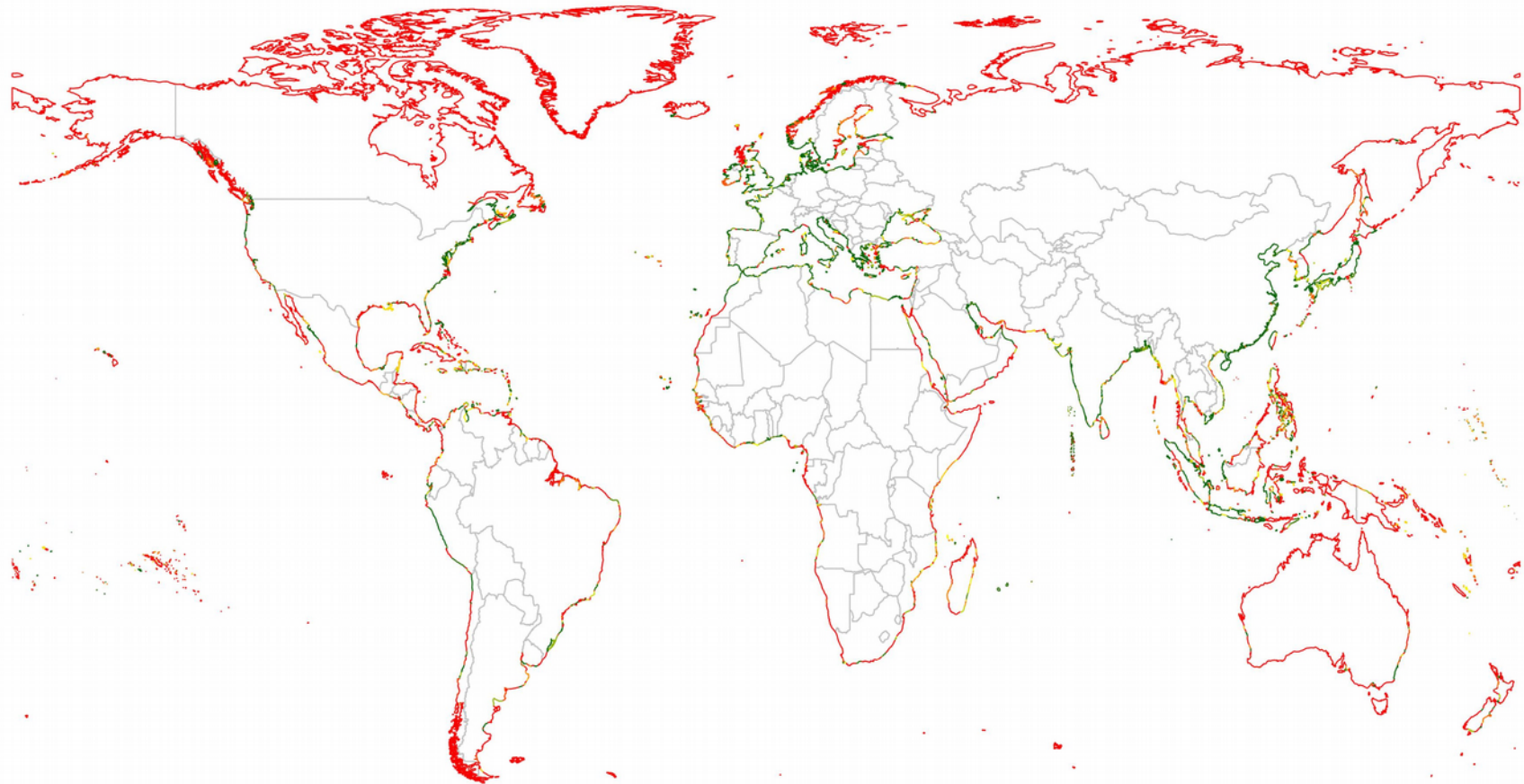
Activities after ISIMIP Fast Track

RISES-AM:

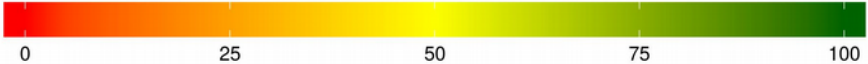
- High-end sea-level rise: models versus expert judgement (Jevrejeva et al., 2014)
- Coastal adaptation descriptive (demand function for safety) versus prescriptive approaches (BCA) (Lincke and Hinkel, forthcoming)
- Comparison of extreme water level models (tide/surge): DINAS-COAST versus GTSR (Muis et al. (2016))



Activities after ISIMIP Fast Track



Protection in percent of the cases



0 25 50 75 100

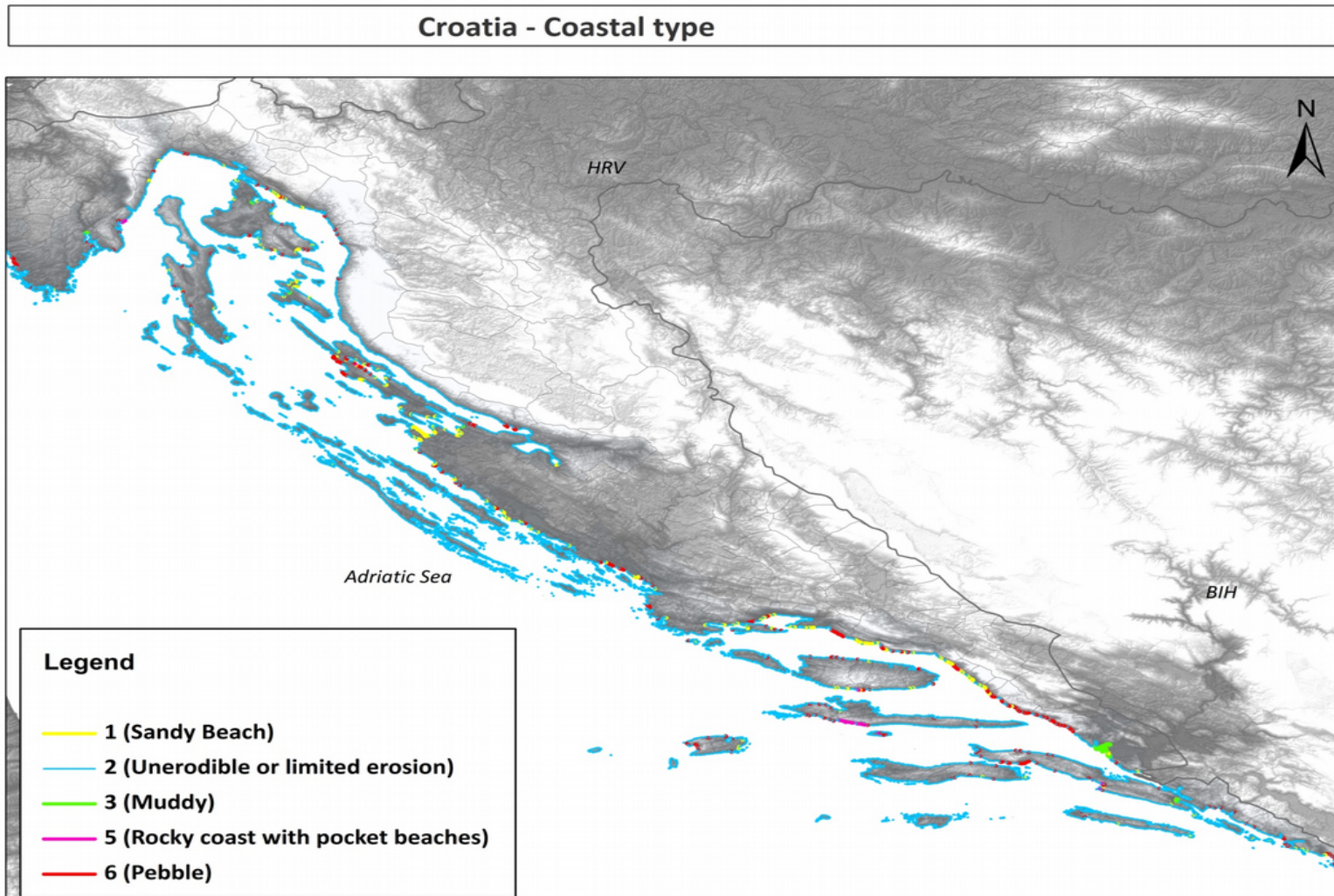
Activities after ISIMIP Fast Track



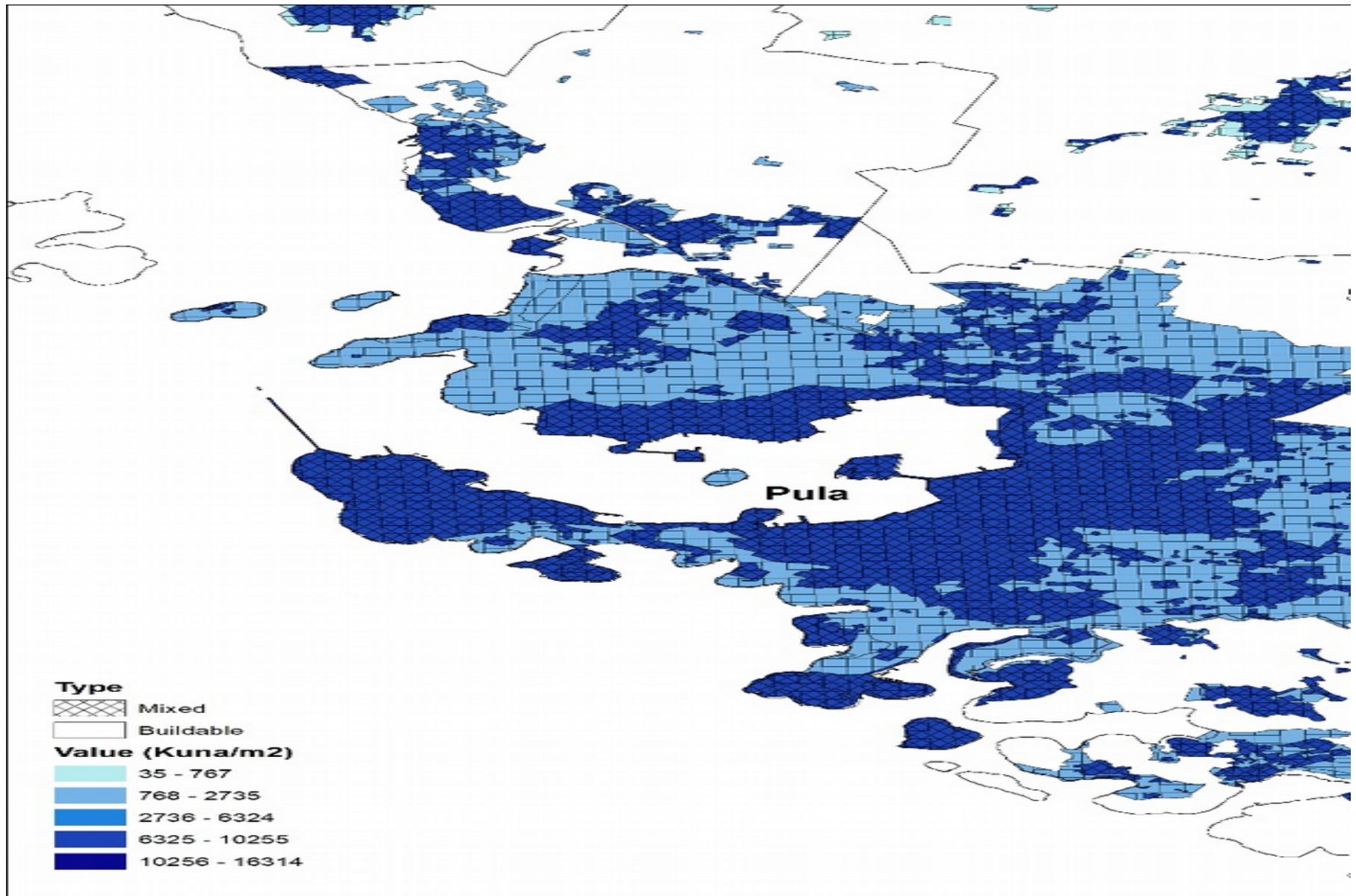
Activities after ISIMIP Fast Track



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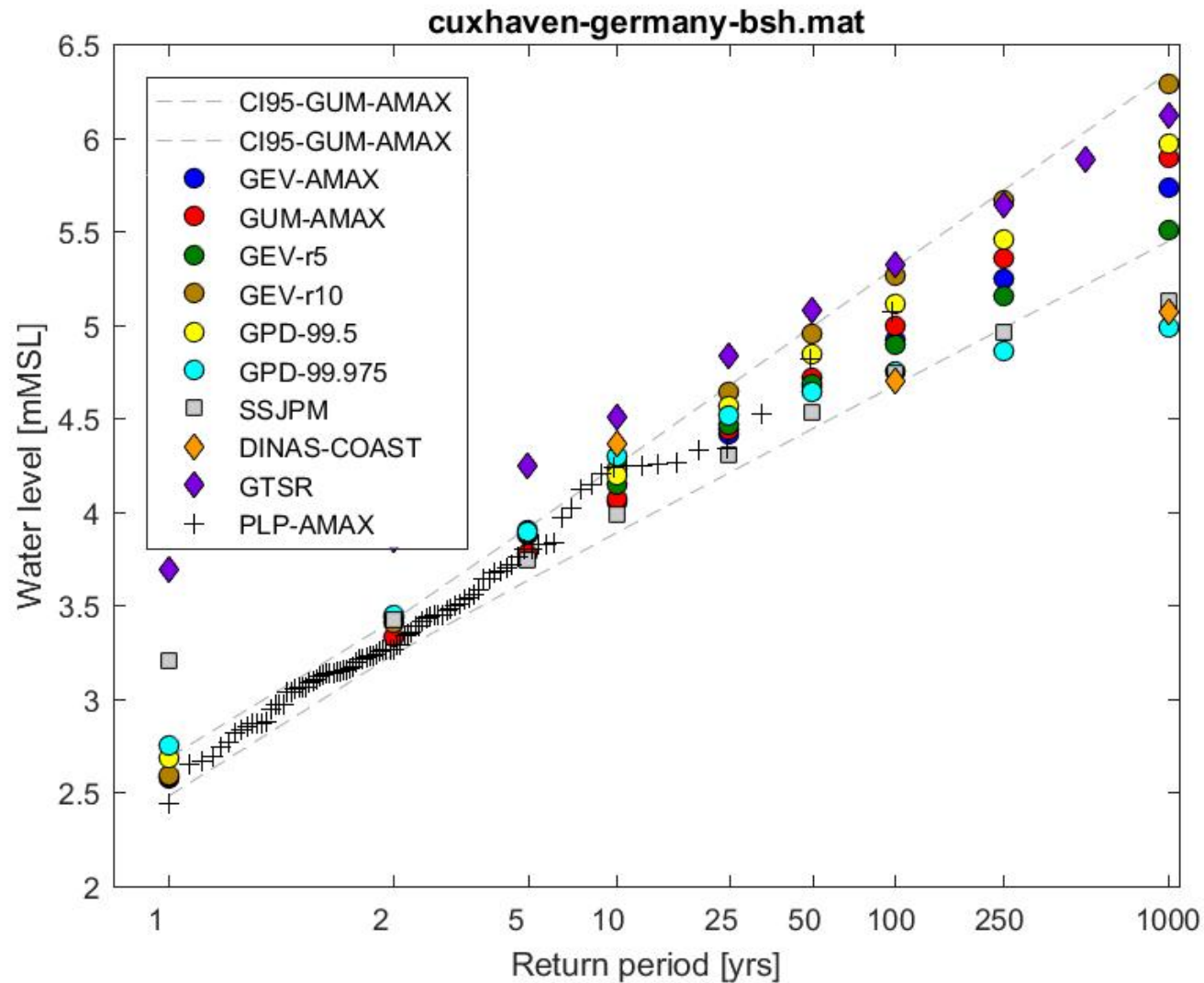


Future ISIMIP work?

Dimension	ISIMIP Fast Track (Hinkel et al., 2014)	ISIMIP2-global	ISIMIP2-Europe
Geographical coverage	Global	Global	Europe
Socio-economic scenarios	- All SSPs	- SSP2	
Mean sea-level scenarios	- Process-model-based	- Process-model-based - Land ice contribution from expert judgement	
Extreme sea-levels	- DINAS-COAST	- Muis et al. (2016) - DINAS-COAST	- Muis et al. (2016) - Wahl et al. (forthcoming) - (Vousdoukas et al., 2016a)
Flood propagation	- Hydrological connected bathtub	- Hydrological connected bathtub - Water level attenuation slopes	Hydrological connected bathtub - Water level attenuation slopes - JRC Model? (Vousdoukas et al., 2016b)
Exposure	- 2 DEMs: GLOBE and SRTM - 2 population datasets: GRUMP and LANDSCAN	- SRTM and GRUMP	- SRTM and GRUMP
Vulnerability	- Depth-damage function	- Depth-damage function	- Depth-damage function
Adaptation model	- Protection: descriptive (demand-for-safety)	- Protection: descriptive - Protection: prescriptive (BCA)	- Protection: descriptive - Protection: prescriptive (BCA)

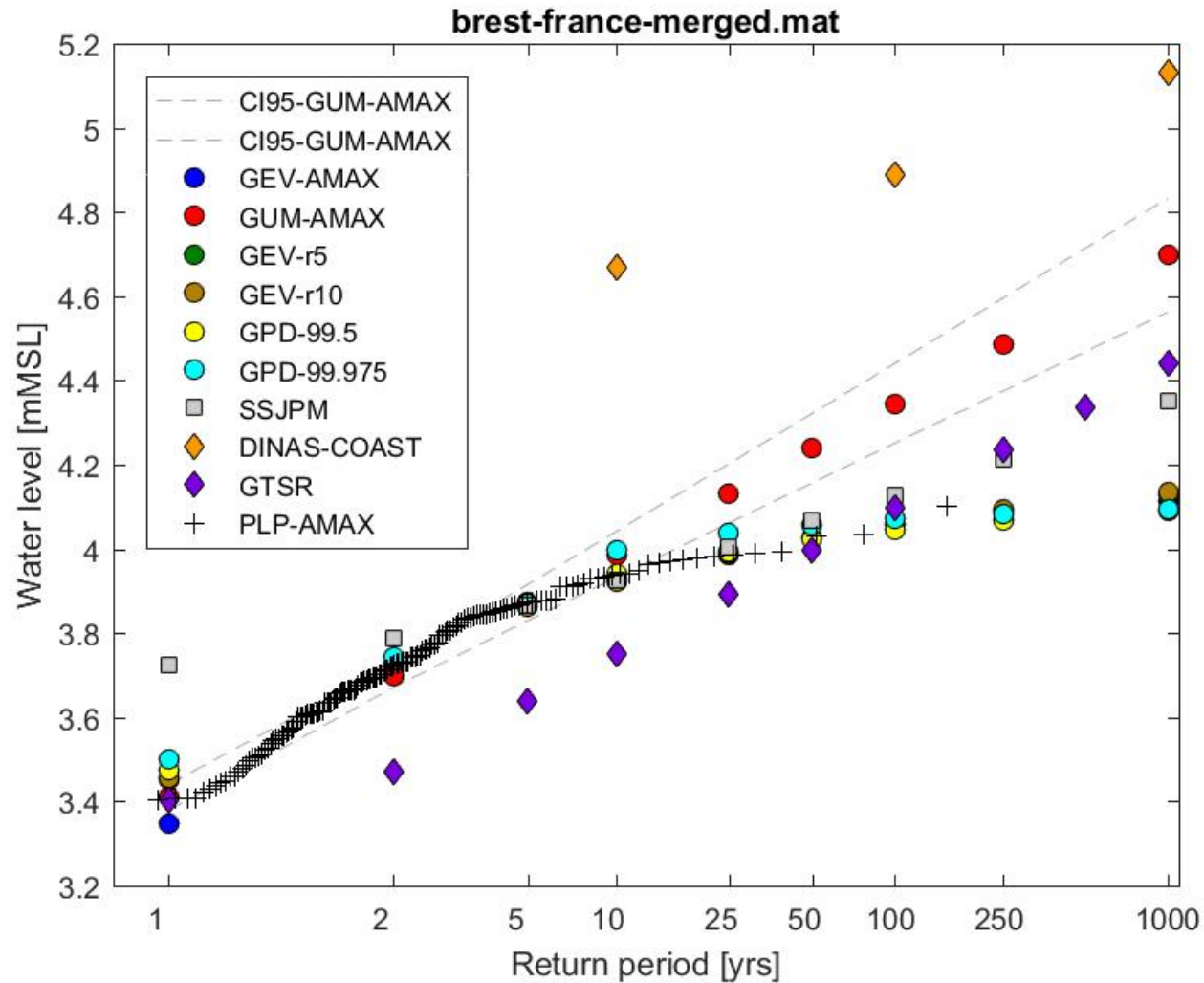
Future ISIMIP work?

Extreme water levels:

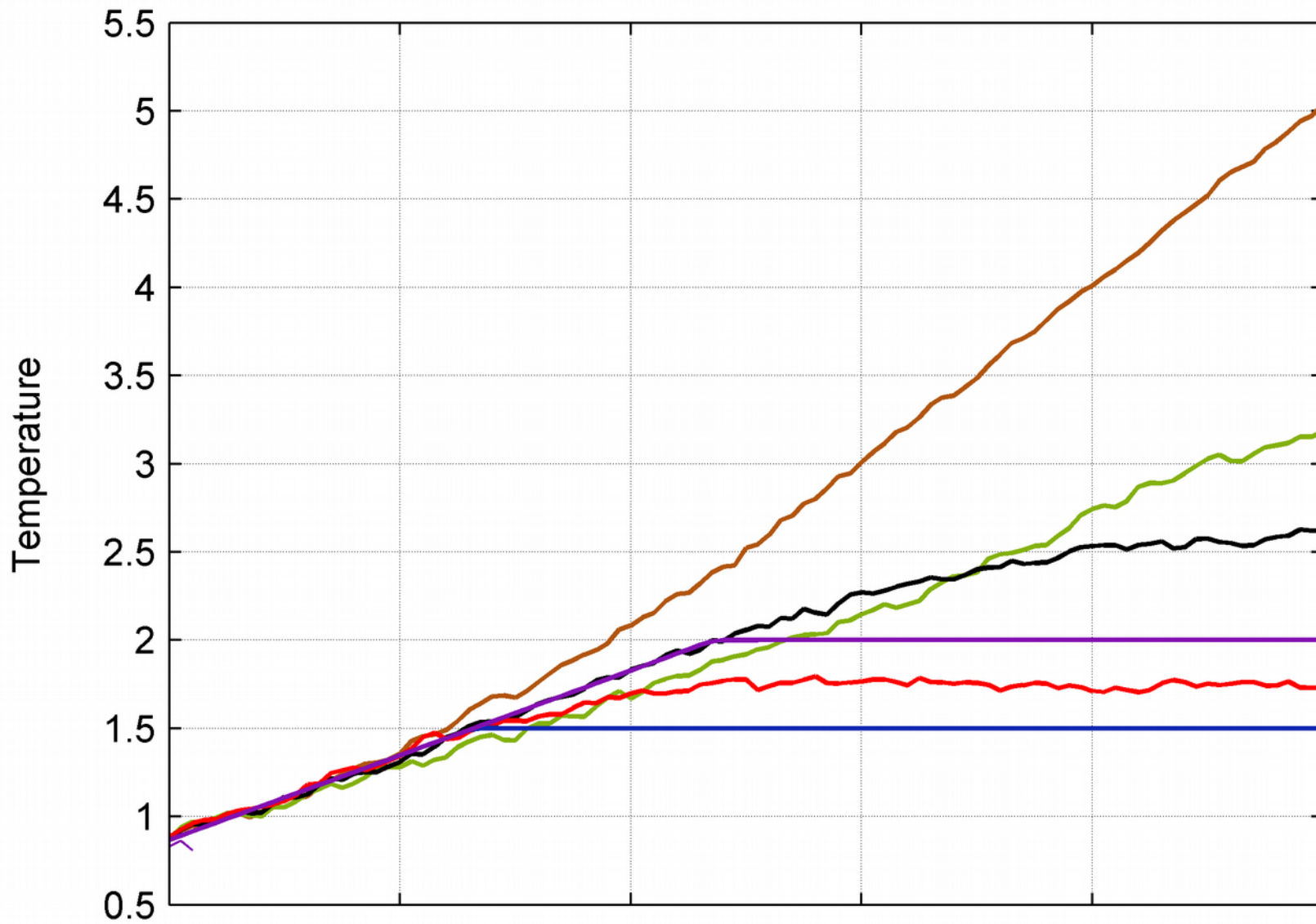


Future ISIMIP work?

Extreme water levels:



1.5°C?



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