bc3 BASQUE CENTRE FOR CLIMATE CHANGE
Klima Aldaketa Ikergai
Sustainability, that's it!

Grantham Research Institute on Climate Change and the Environment

KLIMA-ALDAKETAREN ERAGINAK EUSKAL KOSTALDEAN

Elisa Sainz de Murieta
Ibon Galarraga
Luis Mari Abadie

eman ta zabal zazu

ueu

EDUKIAK

1. Kostaldea eta klima-aldaketa

   Esposizioa, itsas-mailaren igoera eta ziurgabetasuna

2. Ikerketaren helburuak

3. Kostaldea eta klima-aldaketa – *Hiri, herri eta ekosistema batzuetan*

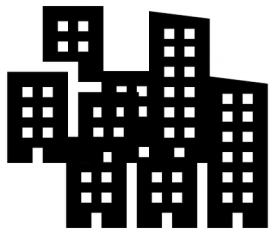
4. Kalte ekonomikoak

5. Ondorioak

1. KOSTALDEA ETA KLIM ALDAKETA

Azalera
%2

%10



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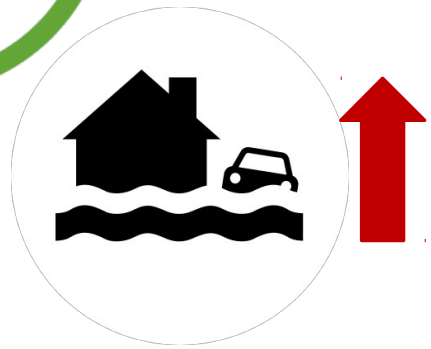
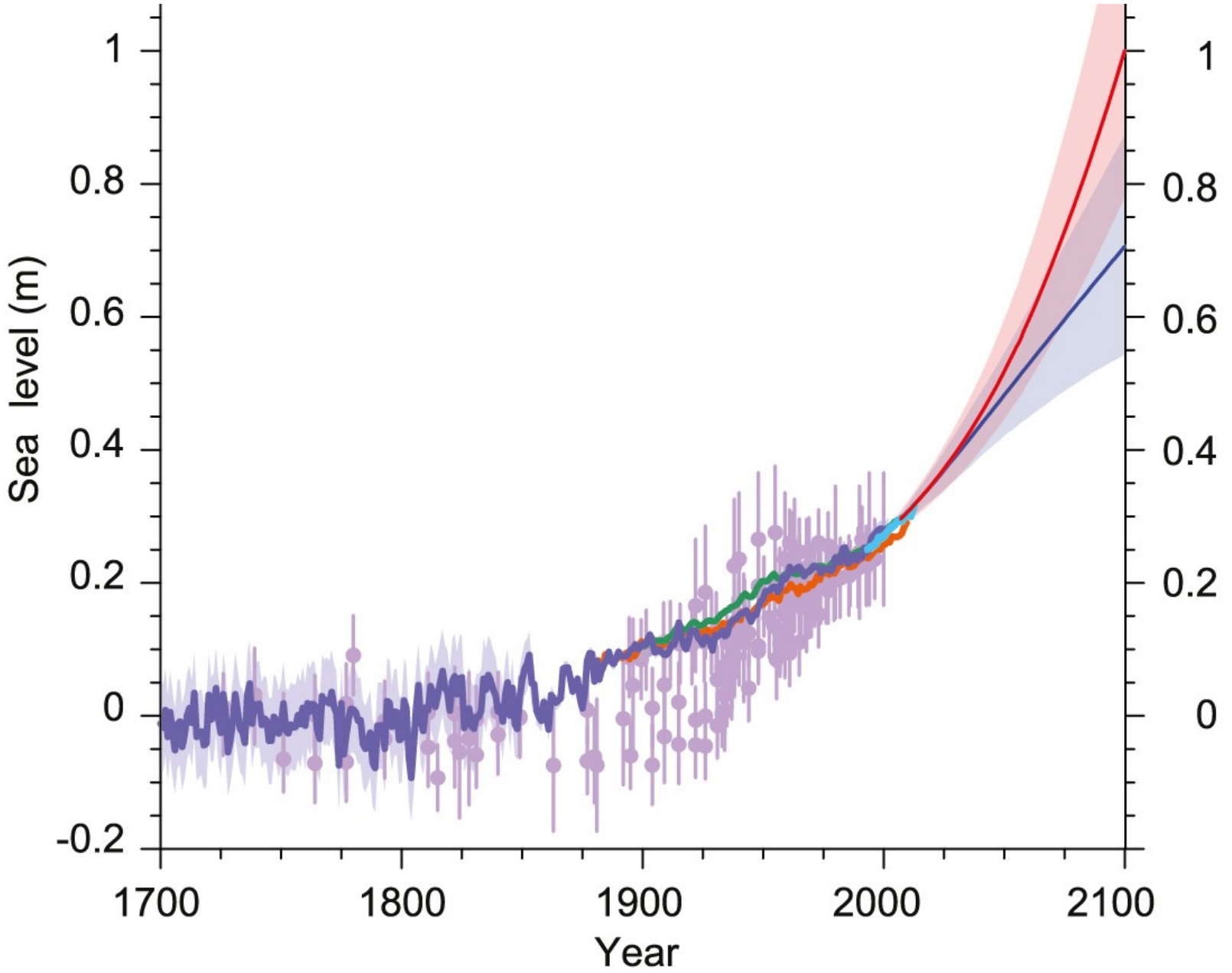


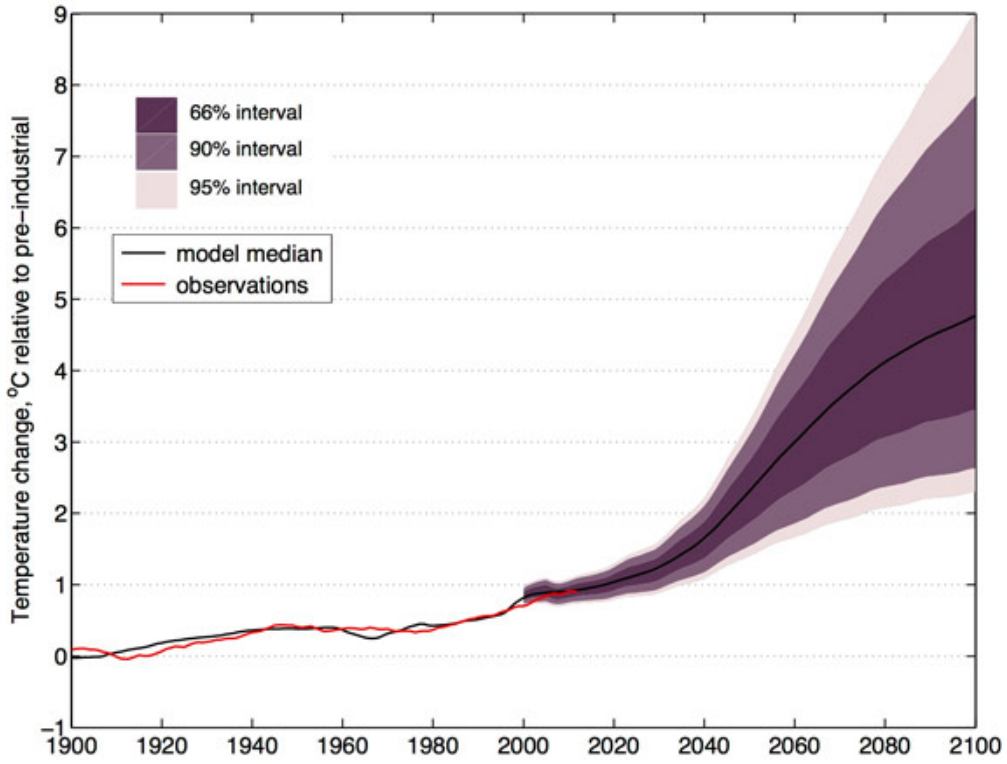
%95

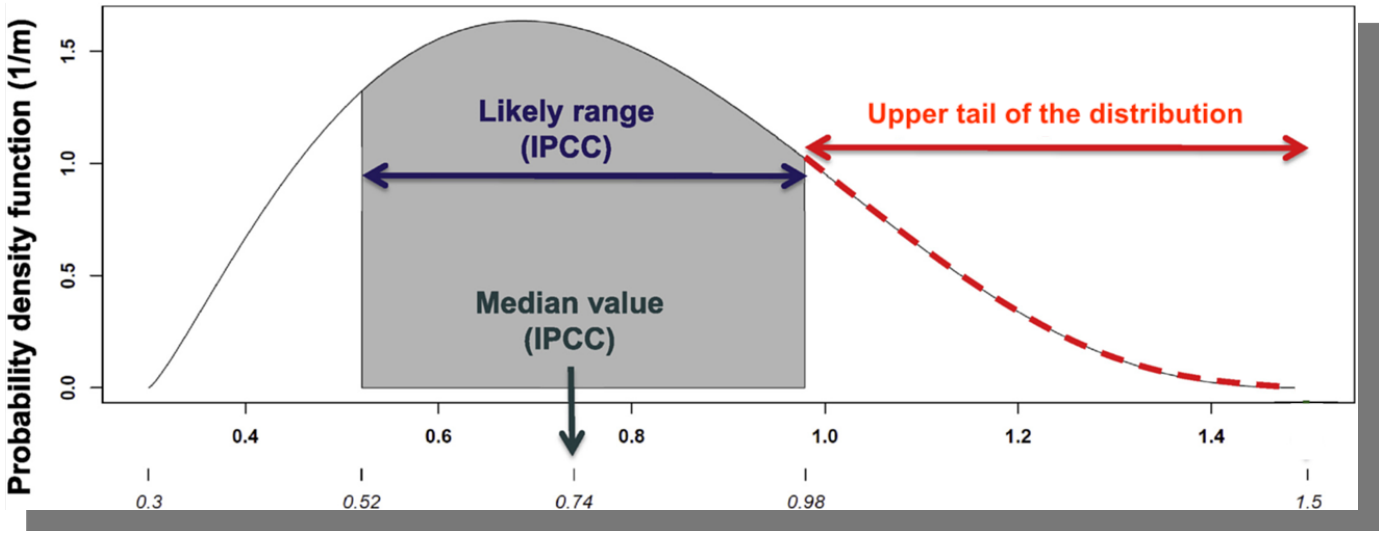
1. KOSTALDEA ETA KLIMA ALDAKETA



Iturria: IPCC 5AR, Church et al. (2014)

1. KOSTALDEA ETA KLIMA ALDAKETA





Adapted from Le Cozannet et al. (2015)

Ziurgabetasuna ✉ Arriskuan-oinarritutako metodoak

1. KOSTALDEA ETA KLIMA ALDAKETA

The devil is in the deep tail

Economic research is starting to pay increasing attention to the social impacts of significant (if less likely) climatic events.

In order to make informed, risk-based decisions, policymakers must have information not only on probable events, but also on the worst (if less probable) scenarios. The interconnectedness of climatic systems makes assessing the social impacts of those events tricky, however.

editorial

...ans and researchers are starting to eye

...by 2020.

The ball is already rolling. Fiji was the first to ratify in February, with Palau soon following suit. The Marshall Islands in March completed the Pacific Island vanguard. Perhaps most significantly, the US and China — making something of a habit of joint climate-related announcements — declared that they would both take steps to approve the Agreement "as early as possible

...recently argued that the request represents a legitimate opportunity for the IPCC to provide the best available scientific advice to policymakers, while at the same time working to reform the mechanisms of science–policy interaction. Reto Knutti and colleagues (*Nature Geosci.* **9**, 13–18, 2016) suggest that whether the world aims for 1.5 °C or 2 °C is something of a moot point, however, as the mitigation actions for both pathways look largely the same. Glen Peters (*Nature Clim. Change* http://doi.org/bd6v; 2016) argues that the utility of any special report lies in resolving fundamental uncertainties around the 1.5 °C 'aspiration', rather than fixating on unachievable mitigation pathways.

The IPCC met in April to discuss, among other things, how to handle the UNFCCC's request. Their decision on whether to proceed with the report is symbolically important, as it indicates what role the IPCC anticipates playing in the policymaking process.

That decision is just a starting point, however. Other avenues of research — from scrutinizing countries' intended nationally determined contributions, to investigations into overshoot and rebound, analysis of attribution relating to loss and damage, and many more — will continue to emerge from the Paris Agreement. *Nature Climate Change* hopes to represent each strand in the coming months and years.

The devil is in the deep tail

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...makes assessing the social impacts of those events tricky, however.

Two studies in this issue use the concept of 'tipping points' to assess optimal policy responses in the face of uncertainty around the nature and timing of extreme events, and the way they interact.

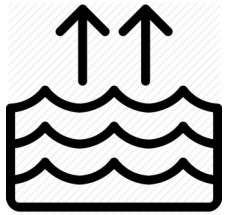
Derek Lemoine and Christian Traeger (see page 514) analyse the impact of three different tipping points occurring at unknown thresholds. They show that because the occurrence of one climatic tipping point affects the chances of another happening, this creates a 'domino effect', almost doubling today's optimal carbon price. Yongyang Cai, Timothy Lenton and Thomas Lontzek model the impact of five tipping points (see page 520), and suggest the interaction of these impacts means the social cost of carbon increases as much as eightfold.

Although not an entirely new endeavour — some leading integrated assessment models have already adjusted their calculations to account for the impact of such 'discontinuities' — both pieces of research suggest the same course of action: risk-averse policymakers should support efforts to significantly curb greenhouse gas emissions in the short term (see the News & Views by Frederick van der Ploeg on page 442).

Such a risk-averse strategy also emerges as a sensible option when looking at impacts beyond tipping points. Research by Simon Dietz and colleagues offers a first estimate of the potential impact of climate change on the value of financial assets (*Nature Clim. Change* http://doi.org/bd4s; 2016). They suggest that around 1.8% or US$2.5 trillion of the world's financial assets could be at risk from business-as-usual emissions. But the devil is in the detail (or the tail of the probability distribution, in this instance). At the 99th percentile, the value of assets at risk is closer to US$24 trillion, illustrating the potential scale of the risk.

This suggests not only that investors should see climate change as a serious threat to wealth (see S. Fuss, *Nature Clim. Change* http://doi.org/bd4t; 2016), but that they must decide exactly how much risk they are willing to bear. This holds for decision-makers across the board: whatever happens, they have been warned that it was at least a possibility, at a given probability.

2. IKERKETAREN HELBURUAK

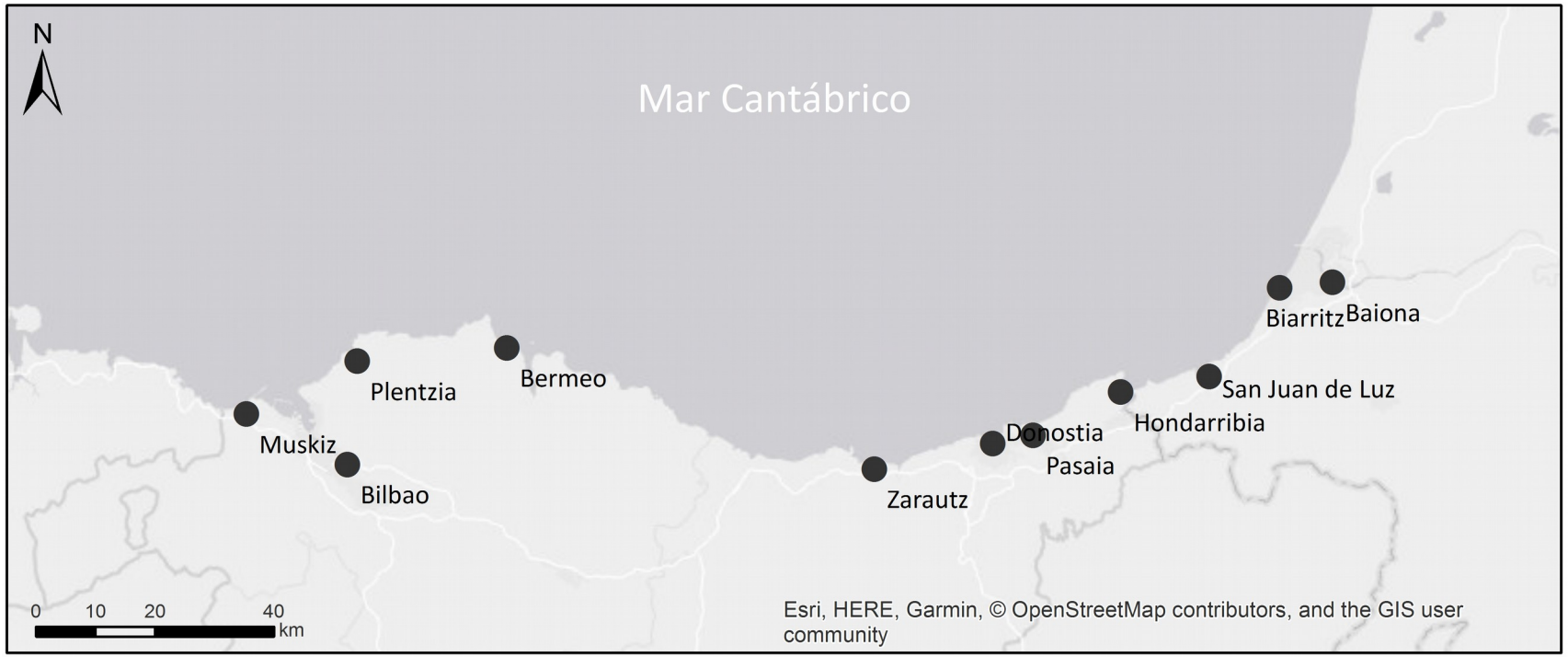


1. **Ziurgabetasuna** kontutan hartzen duen metodoa erabiliz, Euskal Herriko hainbat hiri eta herrietan **itsas-mailaren aldaketa** kalkulatzea isurpen agertoki desberdinen arabera.

2. Itsas-mailaren eragina **kostaldeko paduretan**, eta hauen erantzuna (potentziala) aztertzea.

3. Itsas-mailaren ondorioz sortu daitezkeen **batezbesteko eta muturreko kalte ekonomikoak neurtzea**, agertoki desberdinetarako.

3. ITSAS-MAILAREN ALDAKETA EUSKAL KOSTALDEAN



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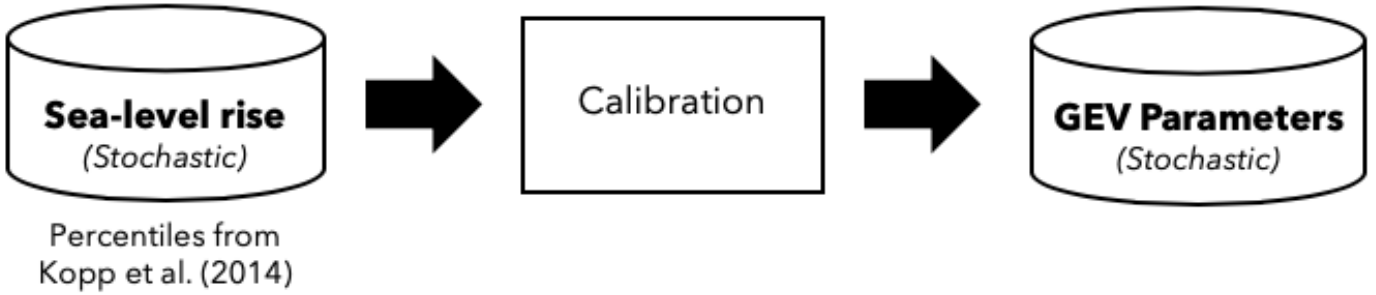
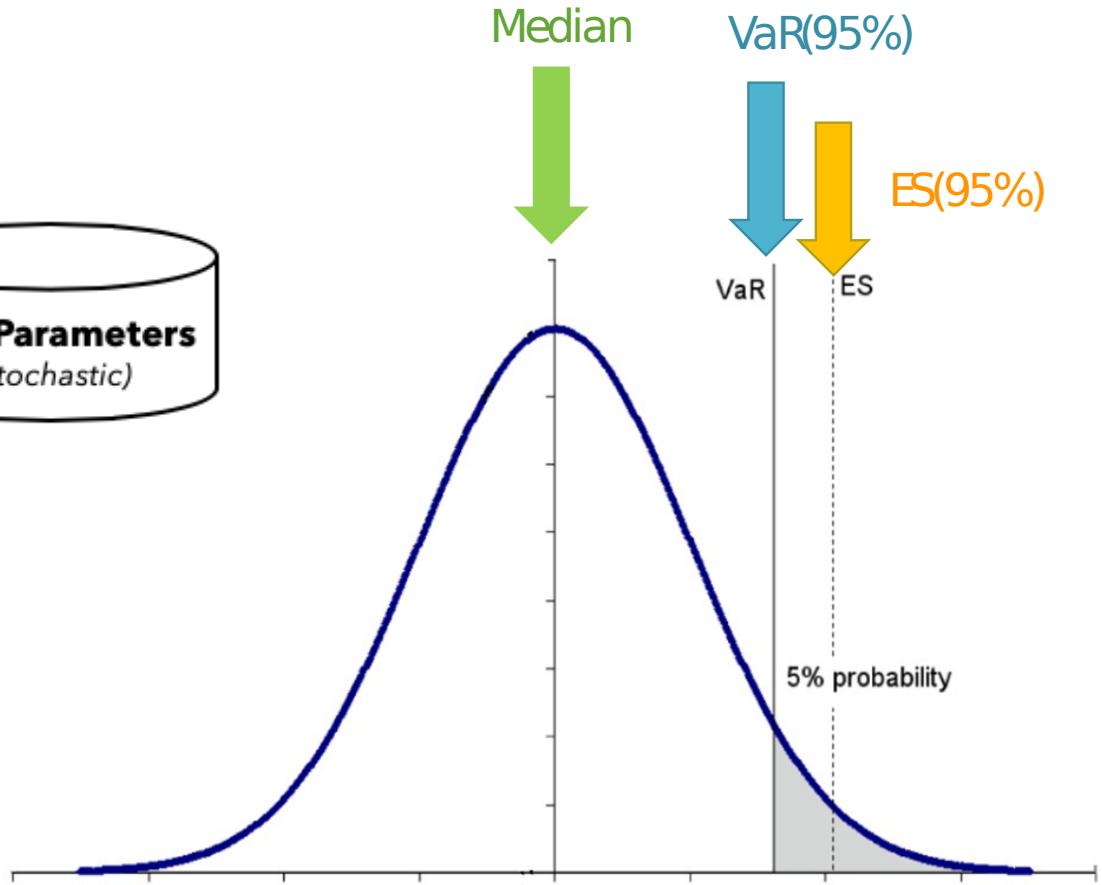
3. ITSAS-MAILAREN ALDAKETA EUSKAL KOSTALDEAN

Modeloa: Muturreko balio orokorra (GEV)





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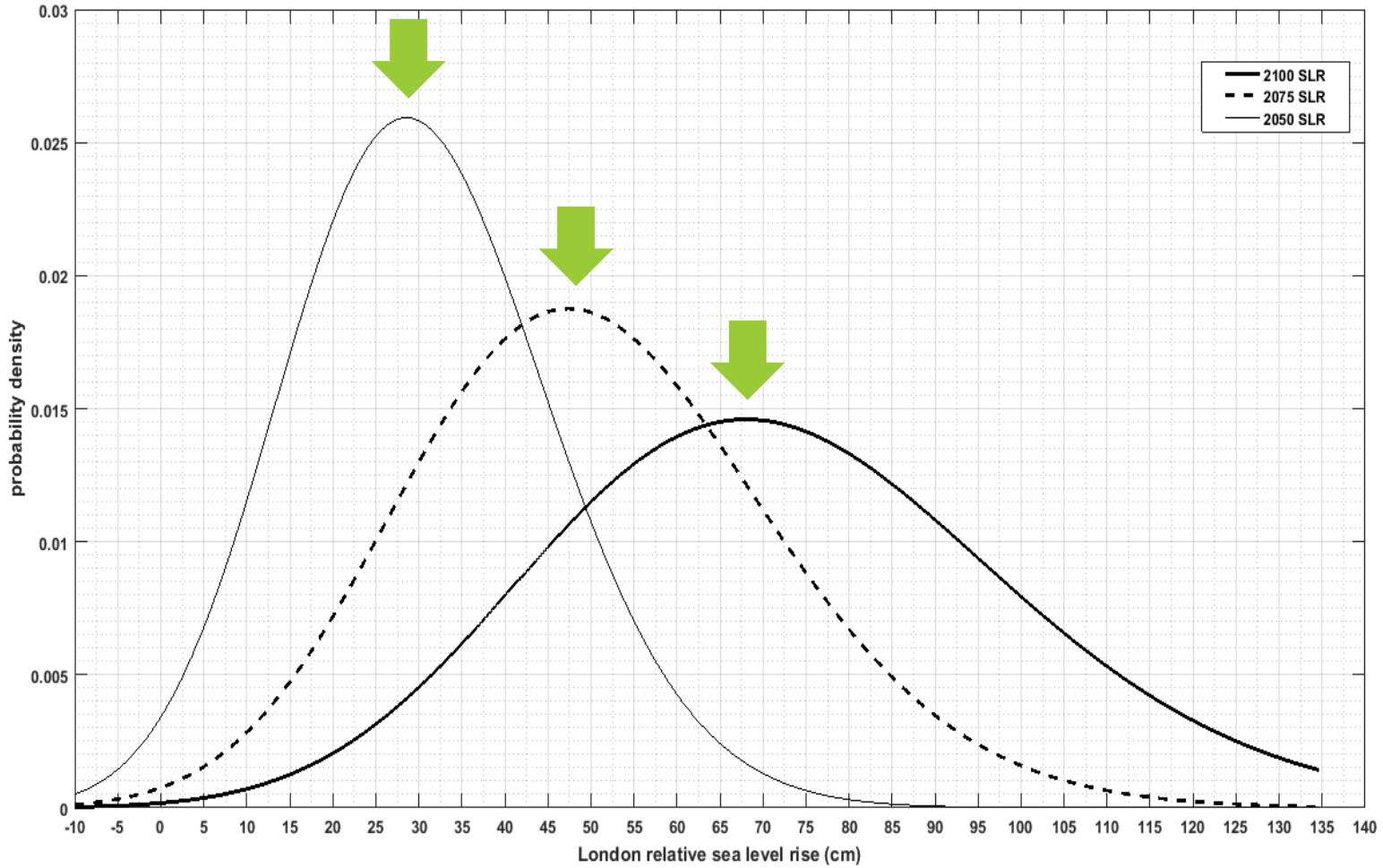
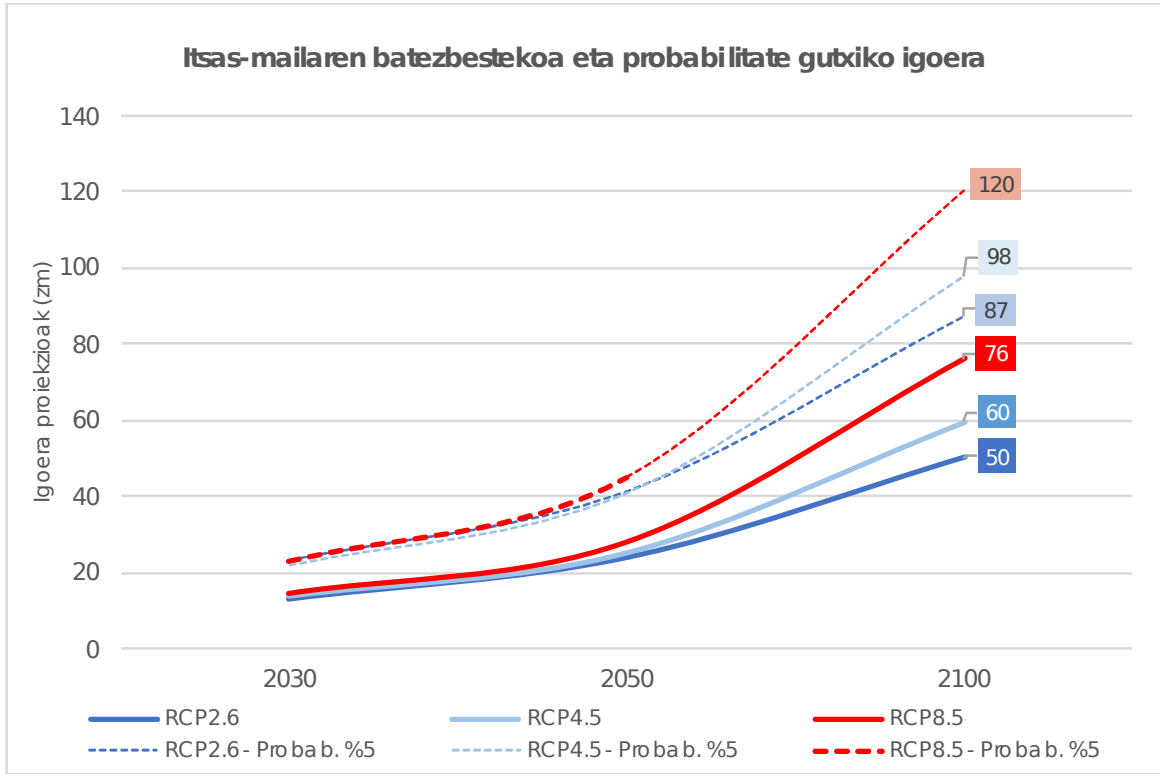
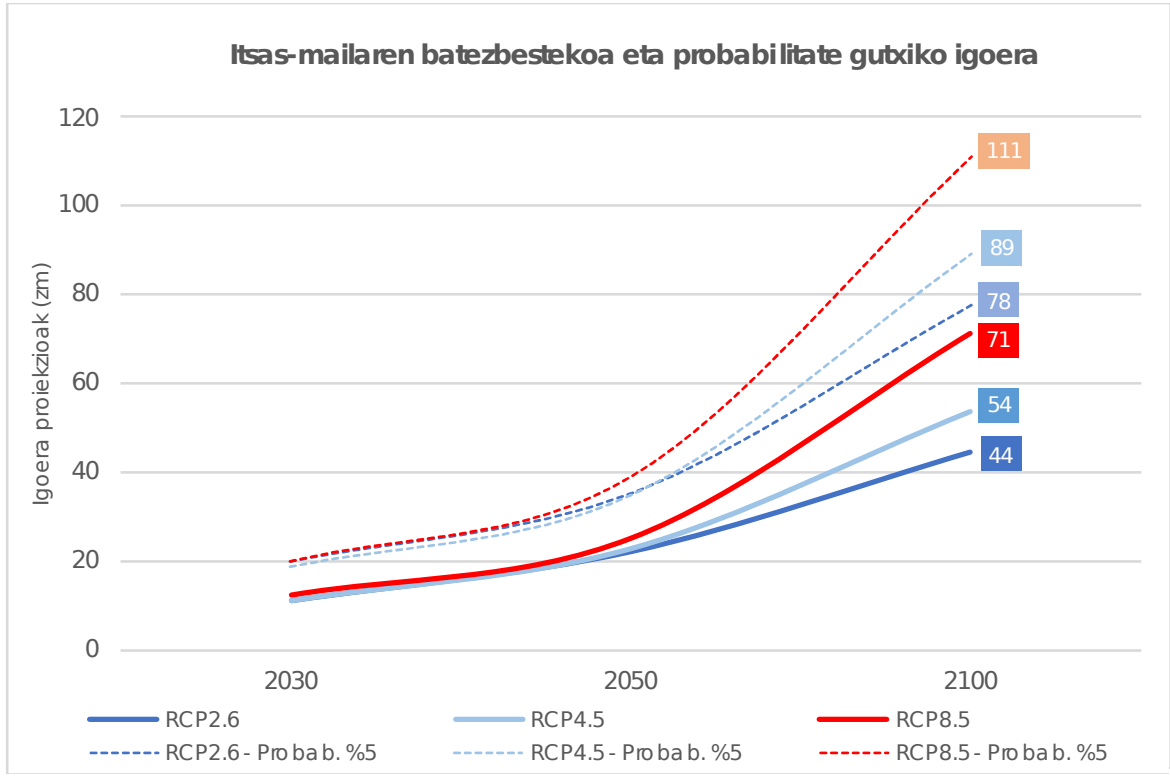


Abadie et al. (2016)

3. ITSAS-MAILAREN ALDAKETA EUSKAL KOSTALDEAN

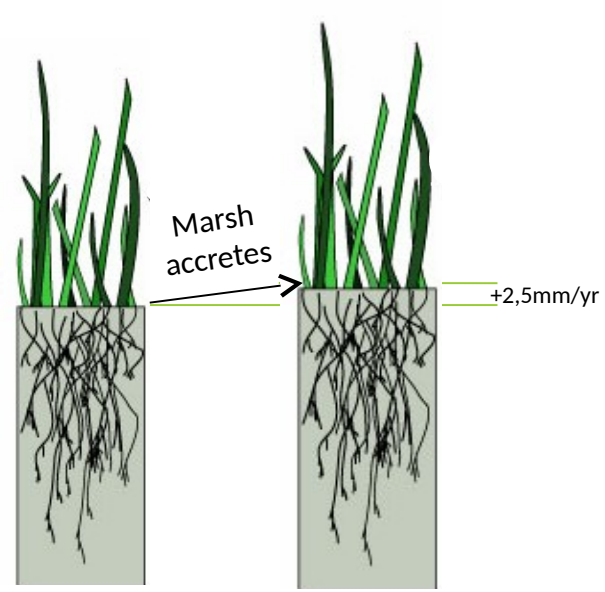




Data: Sainz de Murieta et al. (2018)

3. ITSAS-MAILAREN ALDAKETA EUSKAL KOSTALDEAN

Historical (1957) and modern (2008) photographs of Baraizpe marsh (Urdaibai).



Ondo garatutako padura:

Akrezio abiadura: + 2,5mm/yr

Padura birsortze prozesuan

Akrezio abiadura: + 16mm/yr

Birsortze prozesu azkarra: <10 yrs

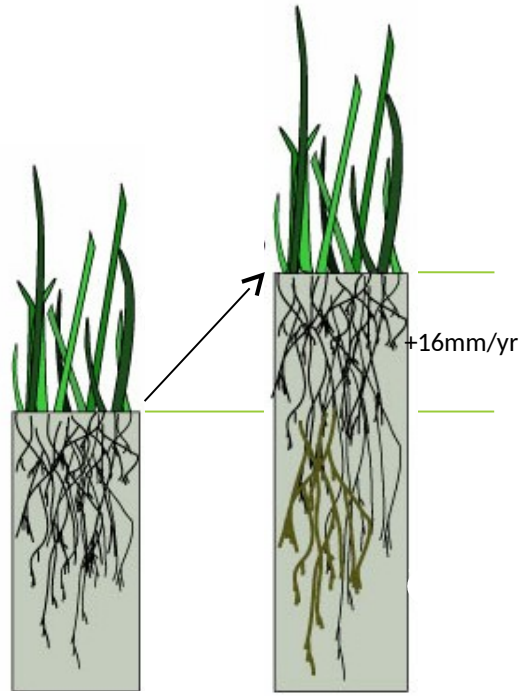


Figure adapted from http://www.geos.ed.ac.uk/homes/smudd

Data: Urdaibaiko paduren birsorikuntza Urdaibaien (Cearreta et al., 2011; García-Artola, 2013)

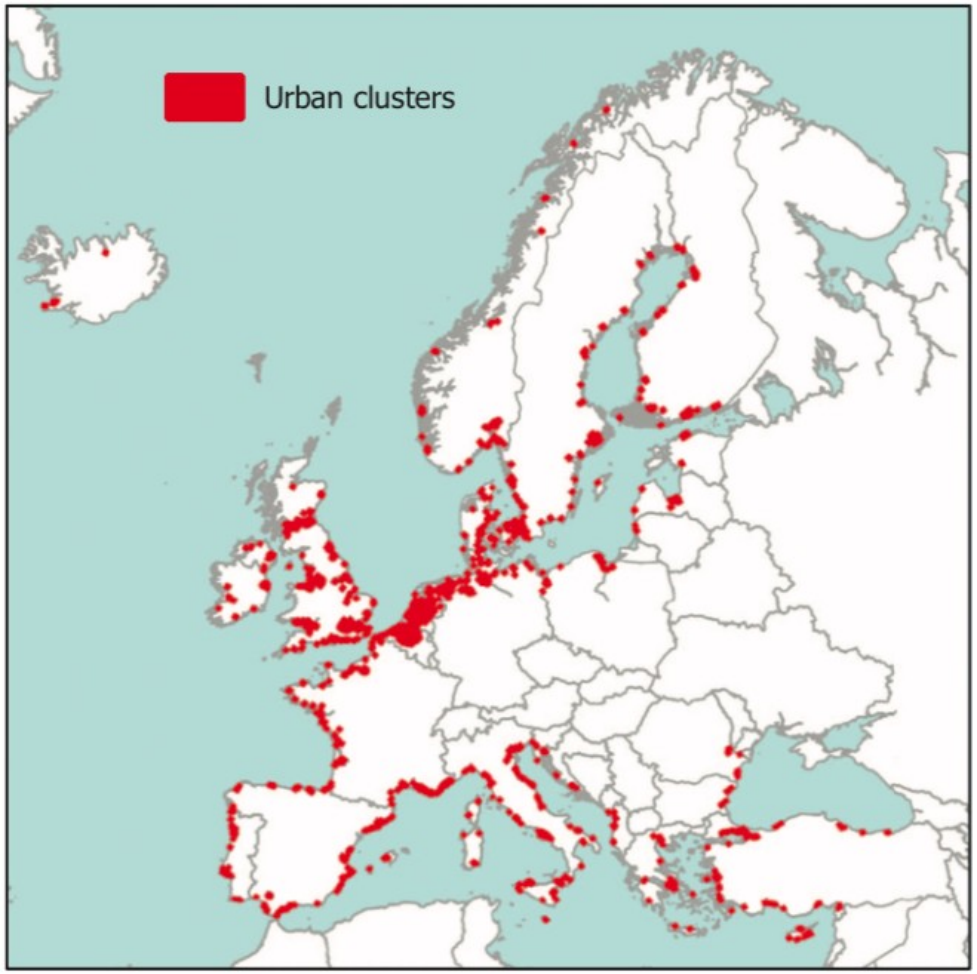
3. ITSAS-MAILAREN ALDAKETA EUSKAL KOSTALDEAN

Urdaibai	2030	2050	2080	2100	TOTAL
(A) Salt marsh surface no CC, hectares	332.7	332.7	332.7	332.7	-
(B) Salt marsh surface with CC (GBSLR Scenario 3), hectares	332.2	332.2	331.8	330.8	-
(A-B) Salt marsh surface loss, accumulated	*0.48*	*0.53*	*0.88*	*1.87*	-

Plentzia	2030	2050	2080	2100	TOTAL
(A) Salt marsh surface no CC, hectares	16.58	16.58	16.58	16.58	-
(B) Salt marsh surface with CC (GBSLR Scenario 3), hectares	16.58	16.58	16.31	13.61	-
(A-B) Salt marsh surface loss, accumulated	*0.00*	*0.00*	*0.27*	*2.97*	**18 %**

Data: Sainz de Murieta (2016)

4. KALTE EKONOMIKOA



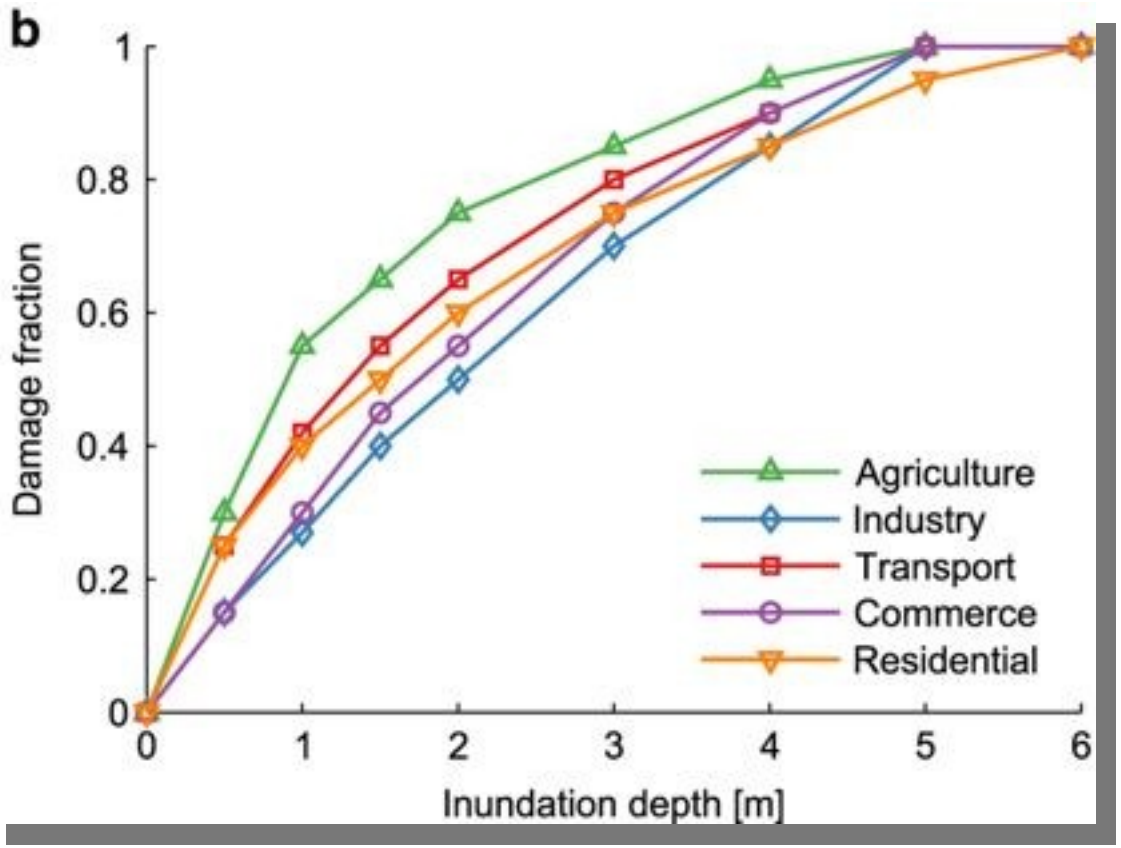
SCIENTIFIC DATA

OPEN

Data Descriptor: Damage and protection cost curves for coastal floods within the 600 largest European cities

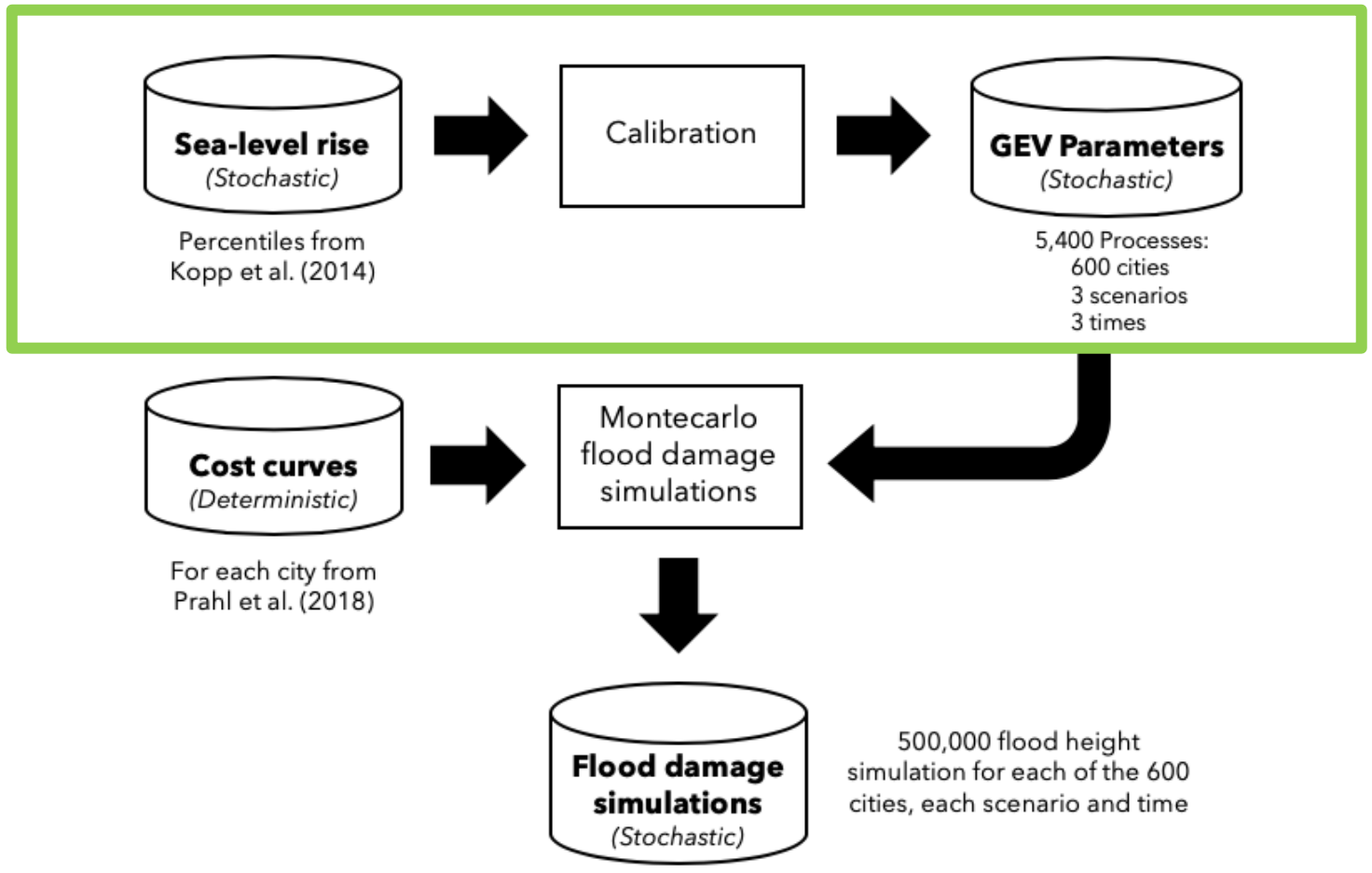
Received: 21 August 2017
Accepted: 5 January 2018

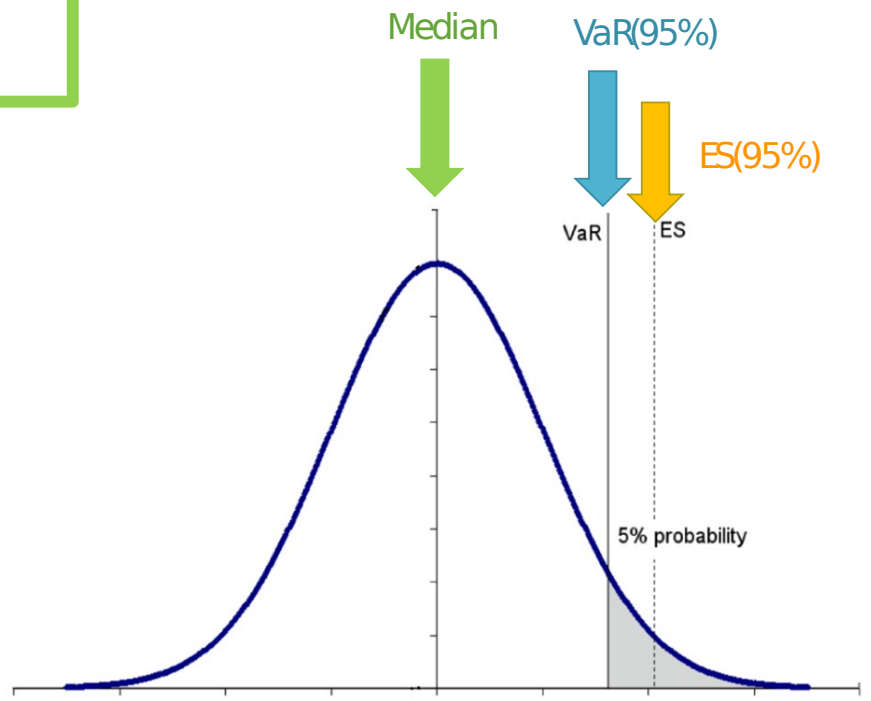
Boris F. Prahl[1], Markus Boettle[1], Luís Costa[1], Jürgen P. Kropp[1,2] & Diego Rybski[1]



Prahl et al.. (2018)

4. KALTE EKONOMIKOAK





Prahl et al.. (2018)

4. KALTE EKONOMIKOAK

Kalte ekonomikoak eta arriskuak, adaptaziorik gabe (milioi eurotan, 2016)

Hiria	Urtea	RCP2.6			RCP4.5			RCP8.5		
		Batezb.	VaR(95%)	ES(95%)	Batezb.	VaR(95%)	ES(95%)	Batezb.	VaR(95%)	ES(95%)
Bilbo	2030	21	35	39	21	34	38	22	35	39
	2050	37	63	71	38	63	71	43	69	77
	2100	76	127	166	90	142	178	113	174	213
Biarritz	2030	6	11	12	6	10	11	7	11	12
	2050	11	19	21	12	19	21	13	21	24
	2100	26	54	84	32	65	93	47	88	119
Donostia	2030	2	3	4	2	3	4	2	3	4
	2050	4	6	7	4	6	7	4	7	8
	2100	8	15	23	10	18	25	14	24	32

Iturria: Abadie et al. (2019), Suppl. Table S4.

4. KALTE EKONOMIKOAK

Paduren gaineko kalte ekonomikoak(milioi eurotan, 2015): balio transferentzia

$$ln(V_{Basque}) = a + b_{SM} ln(SM) + b_{Size} lnS + b_{GDP} ln(GDP) + b_P lnP + u_i$$

Padura	Urtea	DR %1.82	DR %0.44
Urdaibai	2030	42,196	47,709
	2050	78,175	110,104
	2080	101,745	203,916
	2100	87,748	250,479
	Guztira	309,865	612,208

Padura	Urtea	DR %2.41	DR %1.04
Plentzia	2030		
	2050		
	2080	54,859	107,045
	2100	233,141	648,636
	Guztira	288,000	755,682

Iturria: Sainz de Murieta (2016)

5. ONDORIOAK

1. Ziurgabetasuna aintzat hartzeko balio duen metodologia garatu dugu, itsas-mailaren igoera Euskal Herriko hainbat hiri eta herrietan kalkulatuz agertoki desberdinetan.
2. Itsas-mailak eragin nabarmenak izango ditu gure gune urbano eta naturaletan.
3. Batezbesteko kalteak soilik kalkultzeak, arriskua gutxietsi dezake.
4. Arrisku-neurriak egokiagoak dira arriskua neurtzeko orduan. Guk bi neurri erabili ditugu: VaR eta ES, biak oso erabiliak dira finantza-ekonomian.
5. Probabilitate txikia izanda ere, muturreko gertakariak kontutan hartu beharko lirateke egokitzapenaren plangintza egiterakoan. Tokiko neurri eta politiketan *estres-probak* egiteko erabili litezke, adibidez.
6. Ekosistemei dagokionez, hauen gaineko kalte (eta onura!) ekonomikoak ere kalkula ditzakegu eta hau baliagarria izan daiteke egokitzapen politika erabakitzerakoan.

Eskerrik asko!

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BASQUE CENTRE
FOR CLIMATE CHANGE
Klima Aldaketa Ikergai

1. KOSTALDEA ETA KLIMA ALDAKETA

Terms that have different meanings for scientists and the public		
Scientific term	**Public meaning**	**Better choice**
enhance	improve	intensify, increase
aerosol	spray can	tiny atmospheric particle
positive trend	good trend	upward trend
positive feedback	good response, praise	vicious cycle, self-reinforcing cycle
theory	hunch, speculation	scientific understanding
uncertainty	ignorance	range
error	mistake, wrong, incorrect	difference from exact true number
bias	distortion, political motive	offset from an observation
sign	indication, astrological sign	plus or minus sign
values	ethics, monetary value	numbers, quantity
manipulation	illicit tampering	scientific data processing
scheme	devious plot	systematic plan
anomaly	abnormal occurrence	change from long-term average

Hassol (2008)