

Multi-year Expert Meeting
on Transport, Trade Logistics and Trade
Facilitation:

**Trade Logistics and the 2030 Agenda for
Sustainable Development**

23-24 October 2017

by

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Institute for Environment and Sustainability
European Joint Research Centre

24 October 2017

The European Commission's
science and knowledge service

Joint Research Centre

Large scale Integrated Sea-level and Coastal Assessment Tool (LI SCoAsT):
Assisting sustainable maritime transport in the SIDS regions under a changing climate

Michalis Vousdoukas

UNCTAD: Multi-year Expert Meeting on Transport, Trade Logistics and Trade Facilitation
Geneva, 24 October 2017

European Commission

Disaster Risk Management Unit

Directorate E, Joint Research Centre, EC

Activity on river floods:

European/Global Flood Awareness System (EFAS/GLOFAS)

Climate change projections (Alfieri L., Feyen L)

Coastal floods group:

Michalis Vousdoukas, Lorenzo Mentaschi, Evangelos Voukouvalas, Dimitrios Bouziotas, Tomas Montblanc, Georgia Kakoulaki, Francesco Dottori, Luc Feyen

Presentation outline

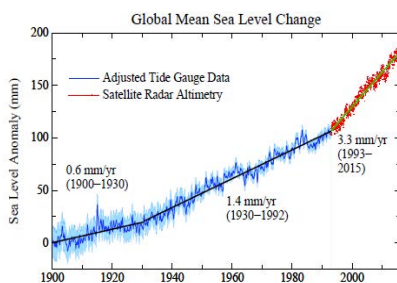
- Challenges for coastal resilience in view of climate change
- The LISCOAST framework
- Insights from our European and global studies
- Preliminary results for the SIDS domain
- The way forward

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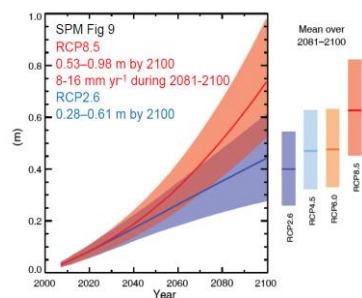


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Coastal risks and challenges: SLR



Hansen ACPD, 2015



IPCC 2013

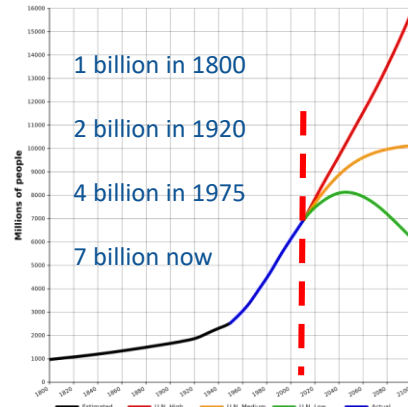
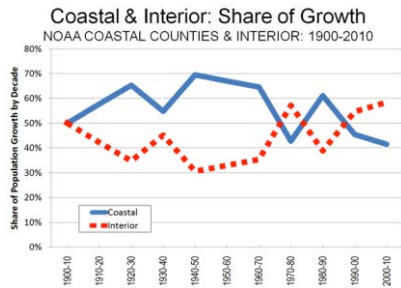
- The ocean absorbs >90% of the increase in incoming solar energy
- Past sea levels under 1.5–2°C warming conditions were 6–10 m higher than present
- Expansion of sea water per °C of warming is faster at higher temperature and higher pressure

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Coastal risks and challenges: Socio-economic development

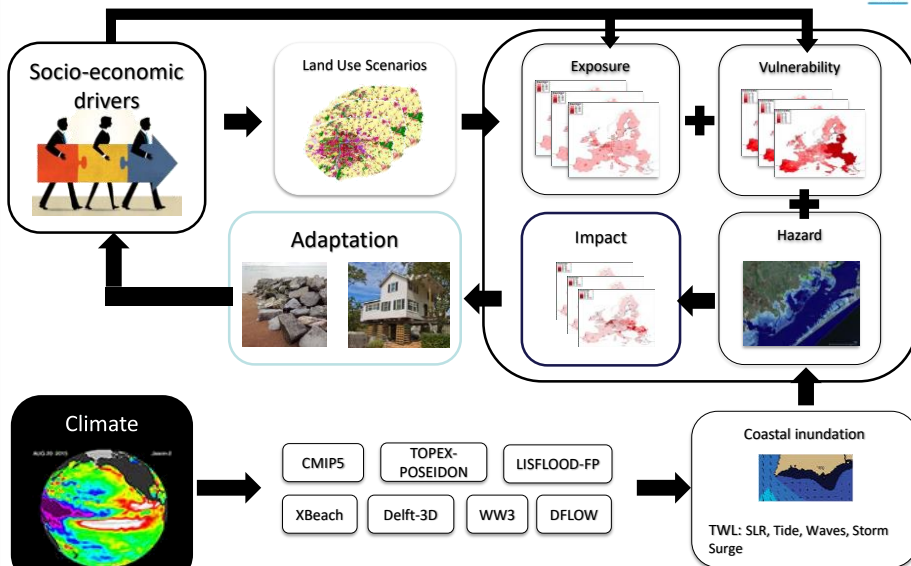
- 44% of global population lives within 100 km of the coast (UN Atlas 2010)
- A great proportion below 10 m elevation
- Population in Jamaica is increasing by 0.2%



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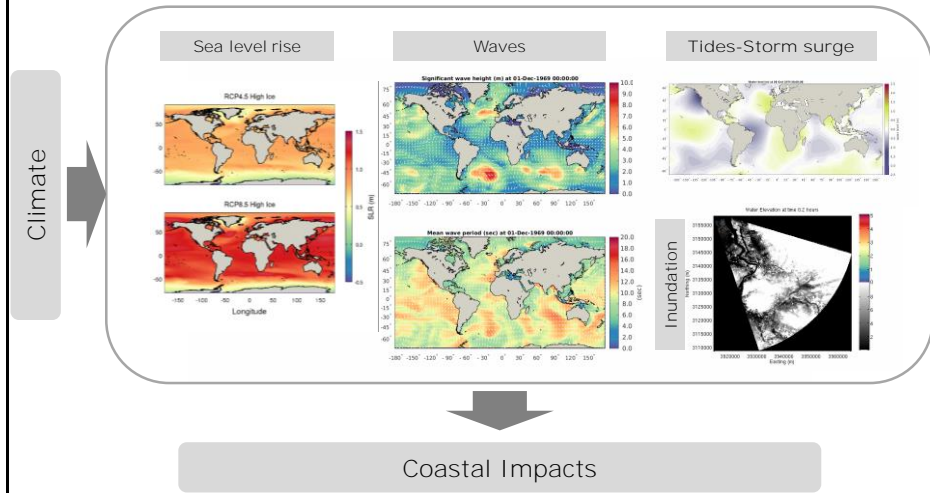
The LISCoAsT approach



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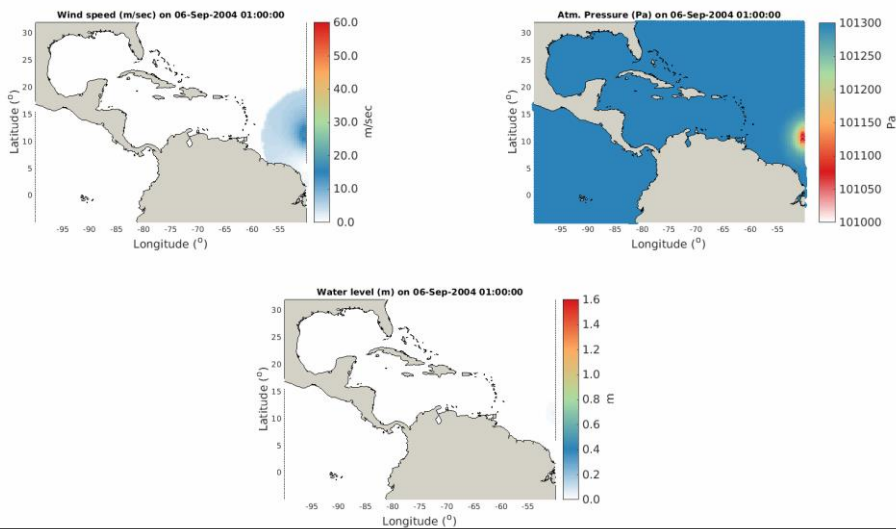
State of the art hazard assessment



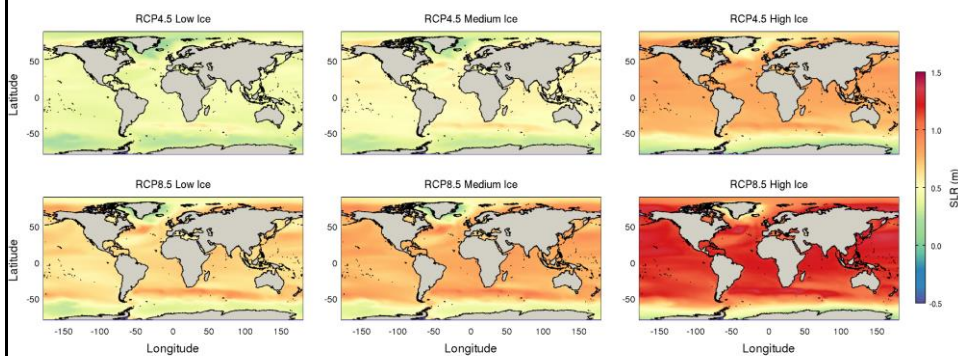
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Sea level extremes: Tropical cyclones



SLR projections

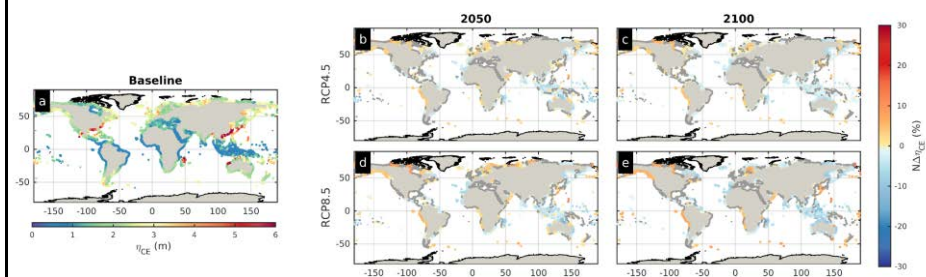


Jevrejeva et al. (2016)

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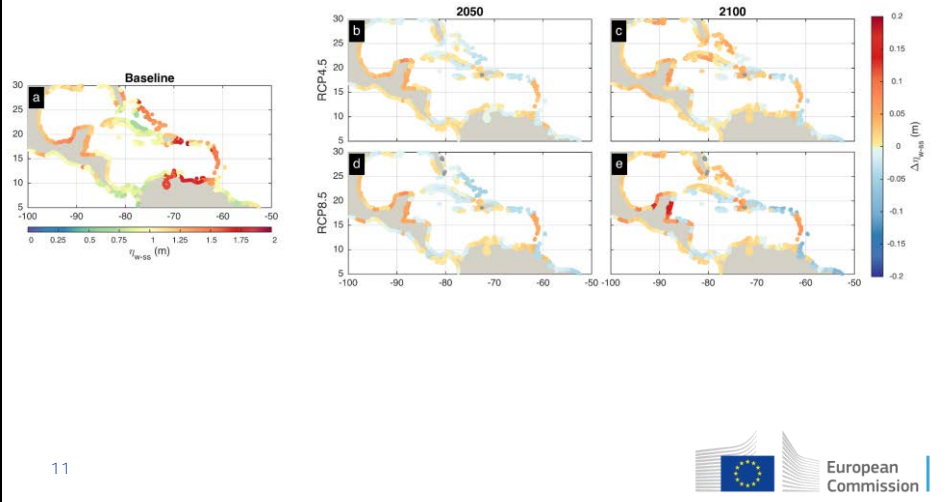
Global TWL projections: Climate extremes



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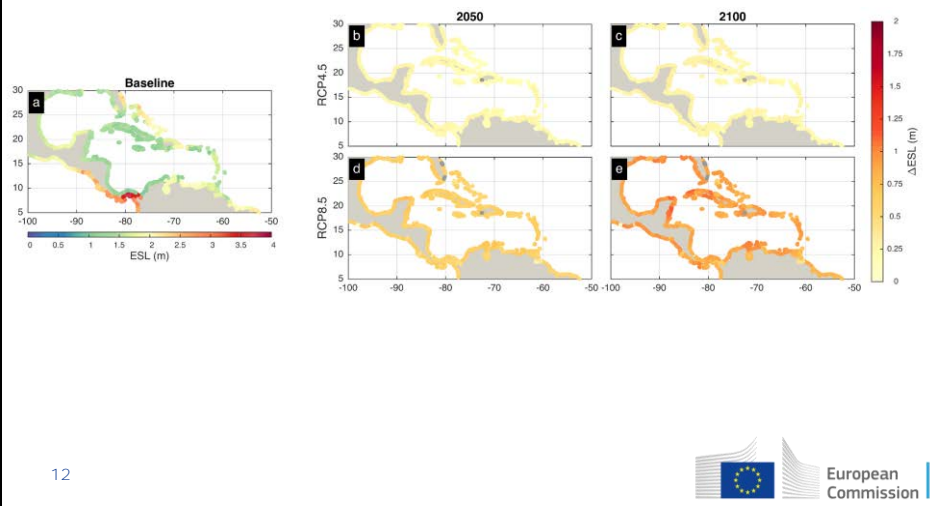


Caribbean TWL projections: Waves and storm surge



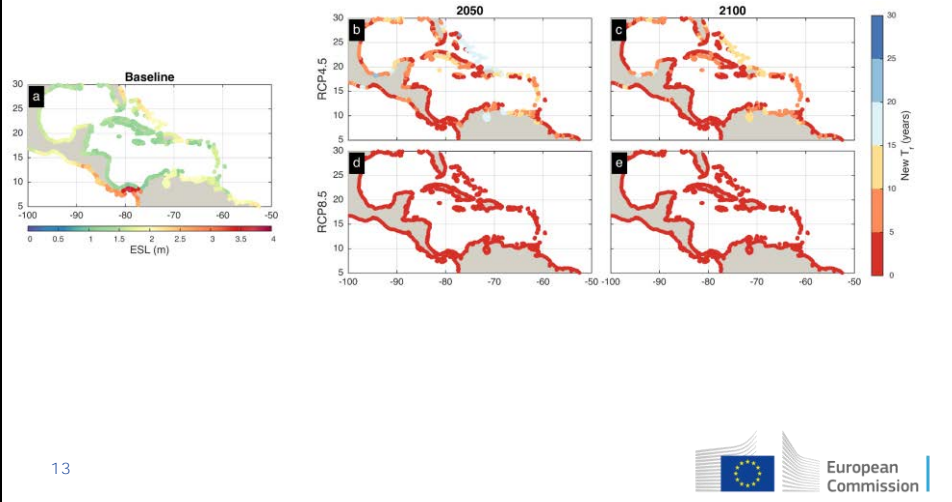
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Caribbean TWL projections: All components



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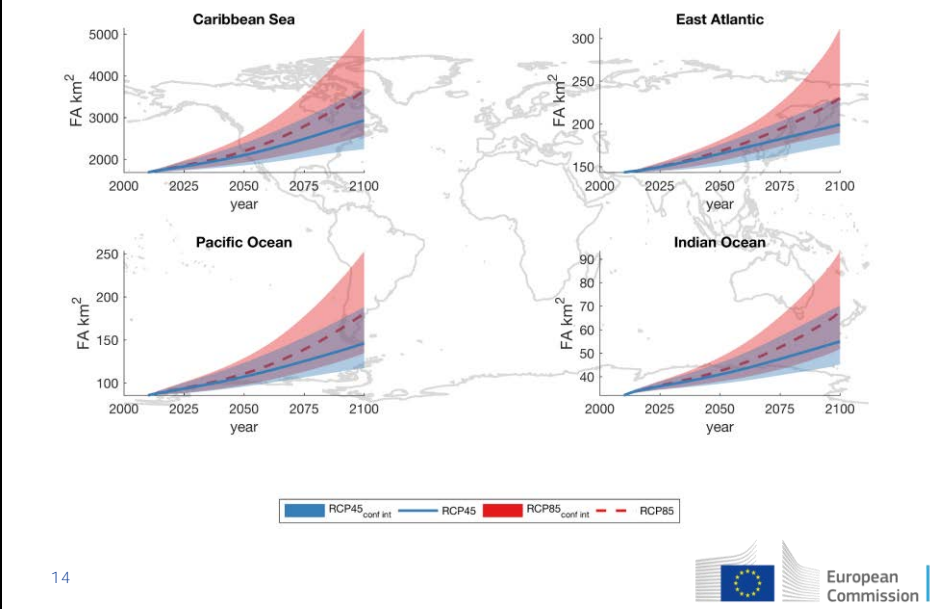
Caribbean TWL projections: Changes in frequency



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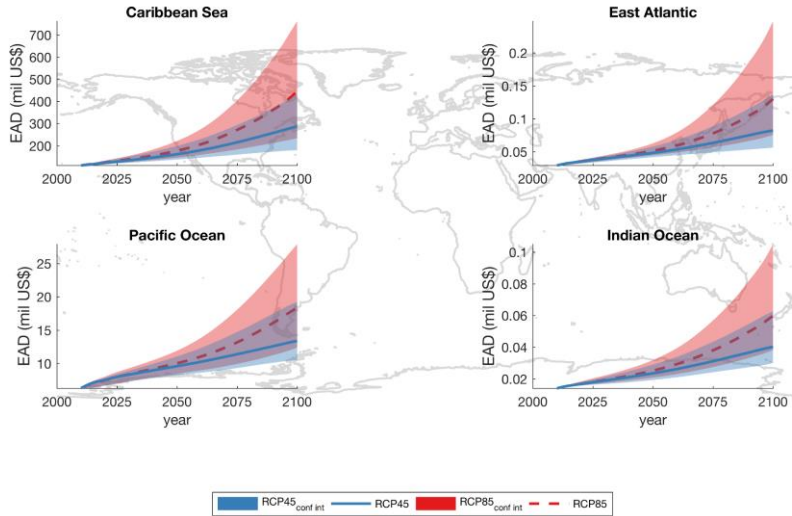
SI DS: projected impacts



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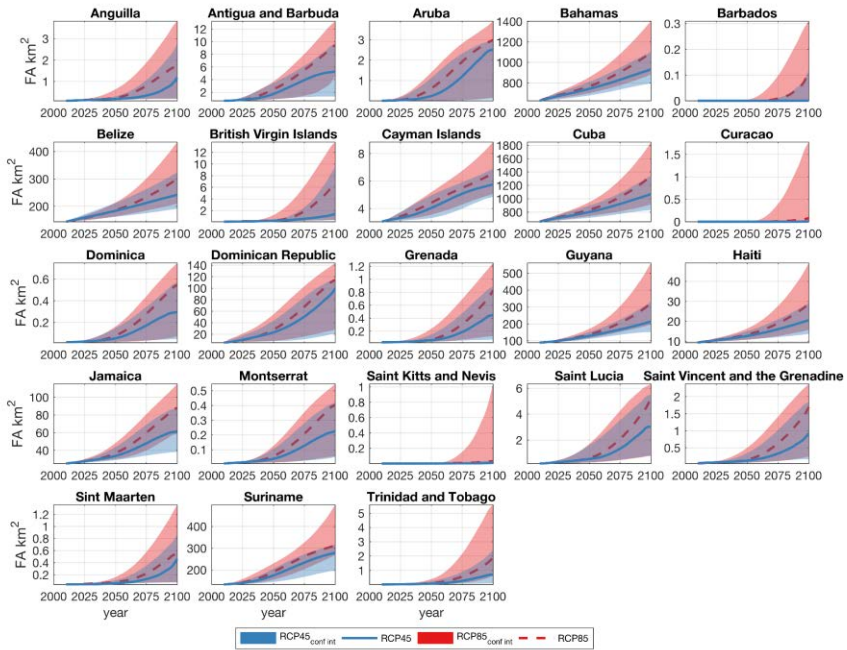
SIDS: projected impacts



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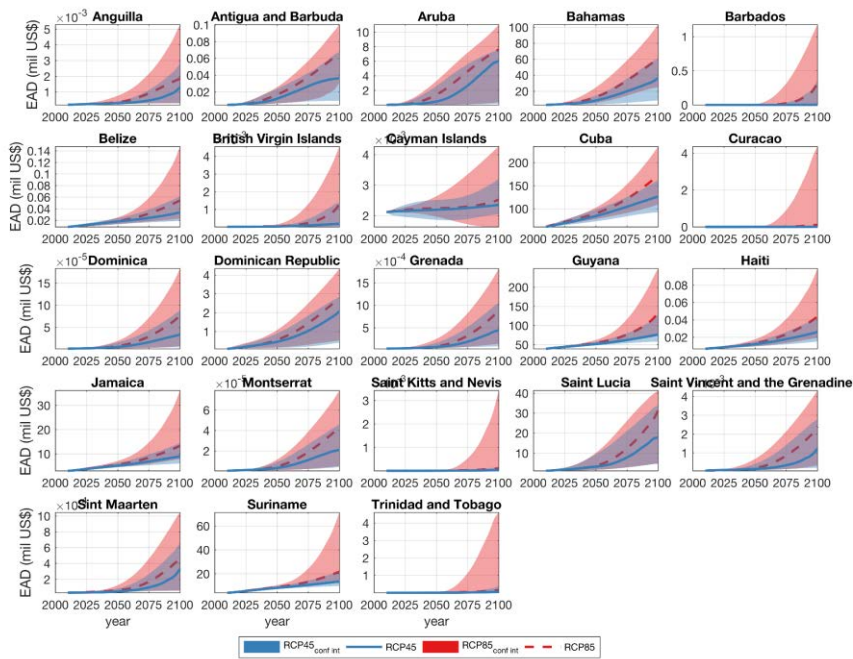


Caribbean SIDS: projected impacts



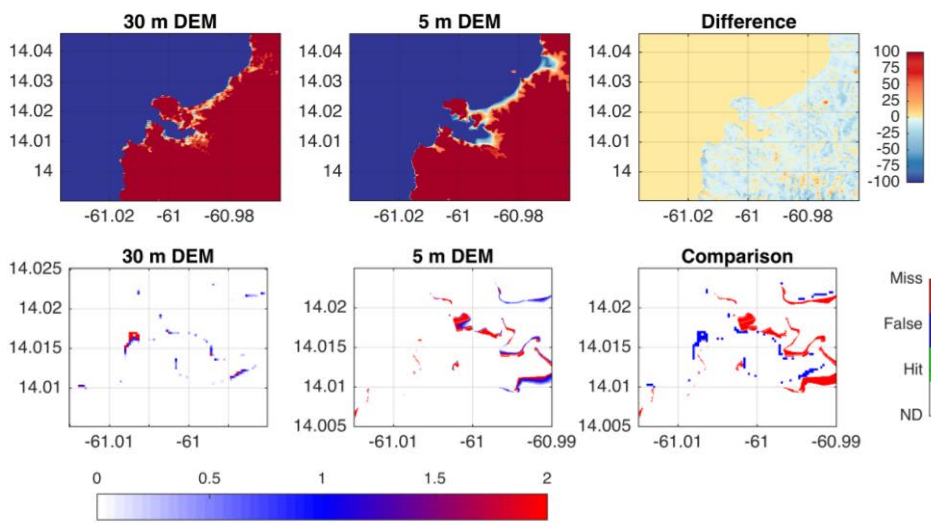
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Caribbean SIDS: projected impacts

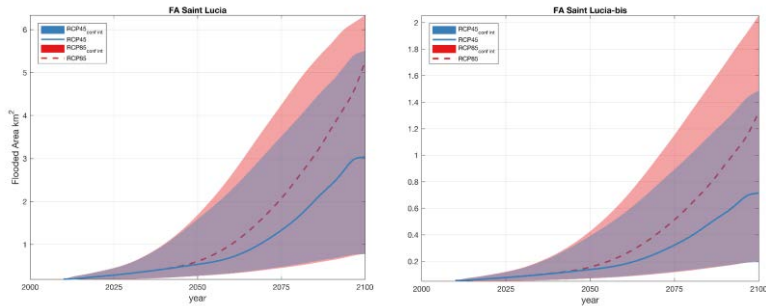


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Effect of DEM quality on estimated impacts



Effect of DEM quality on estimated impacts



Parameter	HR	Standard	Ratio
FA (km ²)	3	0.7	1/4
EAFE	3000	200	1/15
EAD (mil USD)	18	0.15	1/100

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What is really at stake?

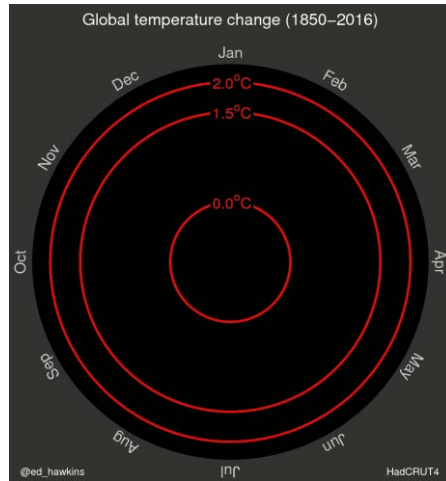
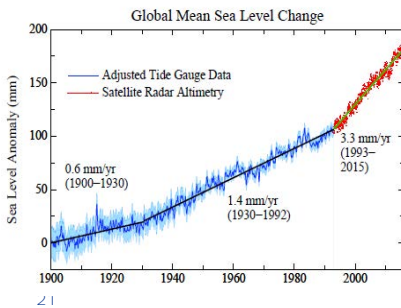
- Projections indicate an order of magnitude increase of direct impacts by the end of the century
- Without considering tipping points
- Without considering indirect impacts
 - Business interruption
 - Ecology
 - Sector interactions
 - Criticality of transport hubs
 - Etc....

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What is really at stake?

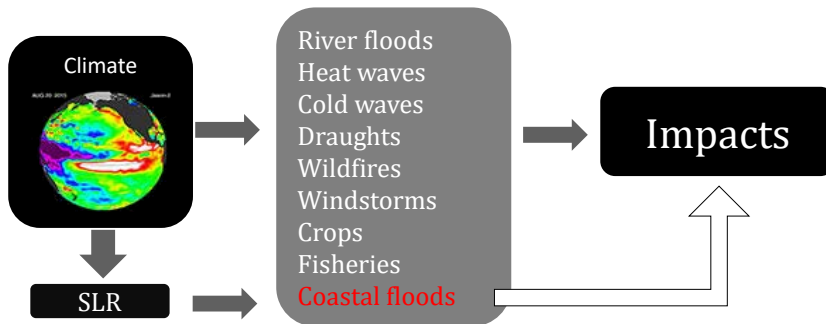
- The ocean absorbs >90% of the increase in energy
- Past sea levels under +1.5-2°C were 6-10 m higher than present
- Expansion of sea water per °C of warming is greater at higher temperature and higher pressure



Hawkins, MetOffice, 2016



What is really at stake?



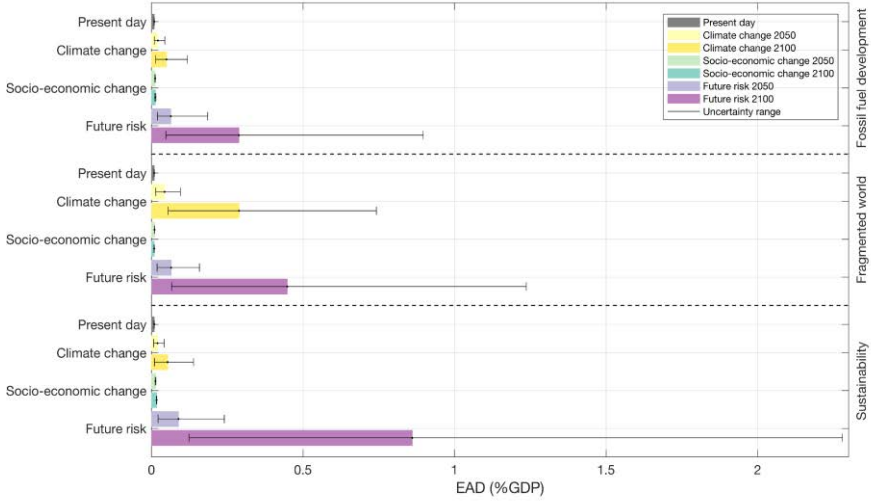
River floods: 0.04% GDP ⇒ 0.1% GDP

Coastal floods: 0.01% GDP ⇒ 0.29-0.86% GDP

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Physical vs socio-economic drivers



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Intangible/indirect impacts



www.wikipedia.org

	Coastline (km)	GDP	Expenses	GDPratio
Jamaica	894	14	0.7599	5.43%
NL	2000	752	1.7	0.23%



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Adaptation and social justice



James G. Titus and Michael Craghan (2009)



<http://porterbriggs.com>

- Need to acknowledge the challenging nature of coastal adaptation in view of climate change
- Urgency of moving towards the direction of a timely response, taking coordinated and fair measures

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Key conclusions

- ESLs rising with a faster pace along the century
- Increase of coastal losses by one or two orders of magnitude
- Climate change far more dominant than socio-economic development
- Coastal flooding becomes one of the prominent natural hazards in view of climate change
- A framework for impact assessment for SIDS in place and preliminary results available, but

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Thank you very much...

