

Uncertainties in global and regional sea level projections by 2100

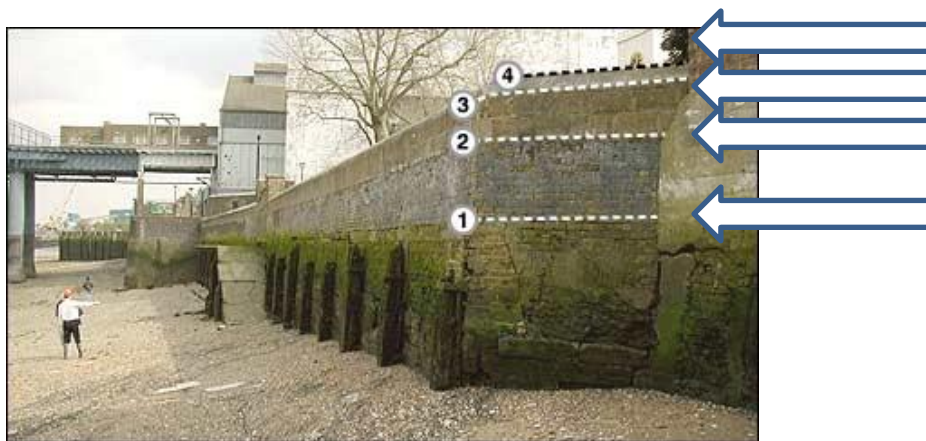
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Outline

- Motivation
- Sea level and sea level components
- AR5 IPCC projections
- Progress in understanding the main uncertainties
- Conclusion



1953
1928
1890
1879

Photo from Environmental Agency, UK



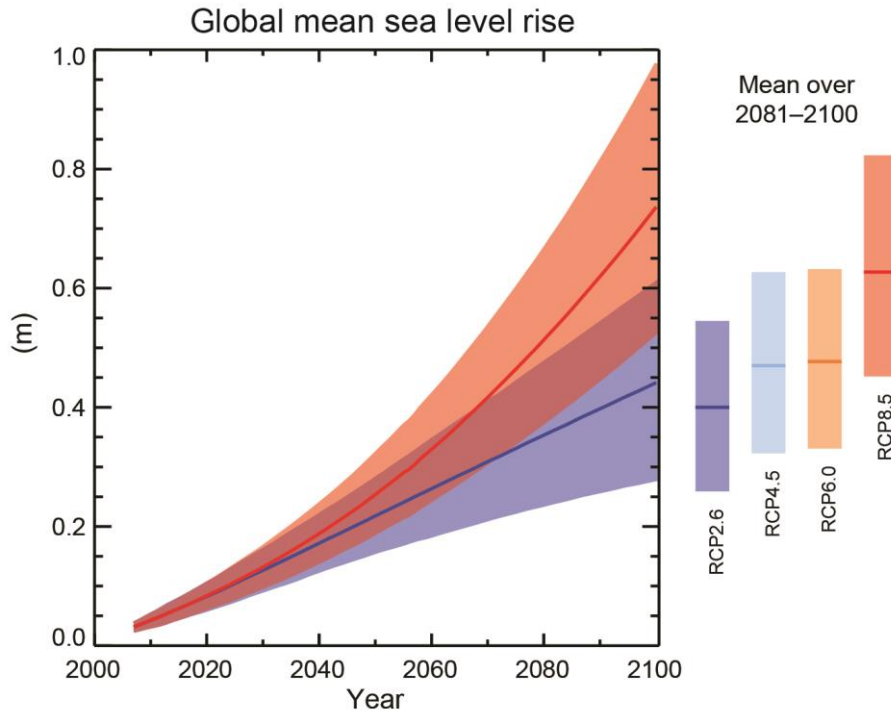
Photo from Environmental Agency, UK

Sea level and its projections

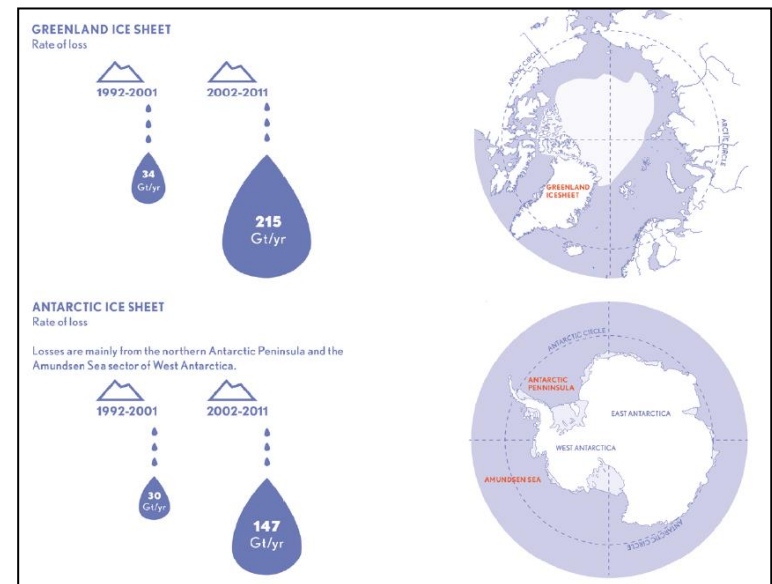


Uncertainties in global sea level projections by 2100

Likely range (66% probability)

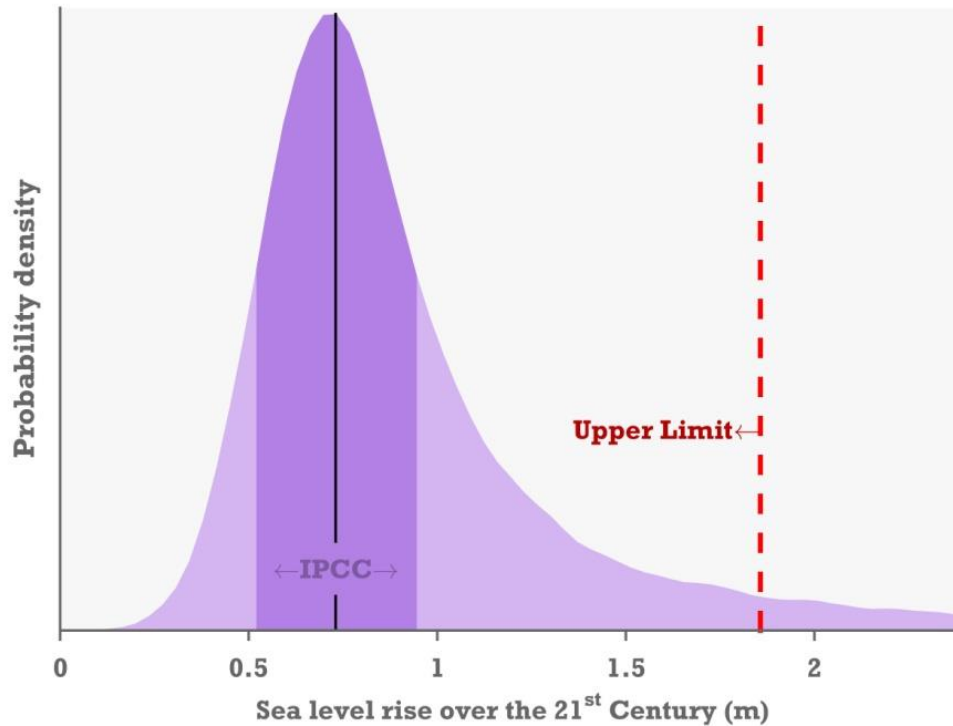


AR5 IPCC, 2013



Credits: Finnish Meteorological Institute

Probabilistic approach in global sea level projections

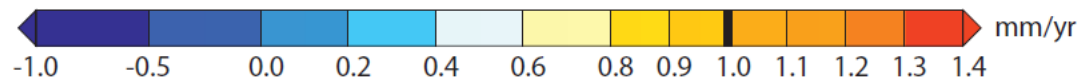
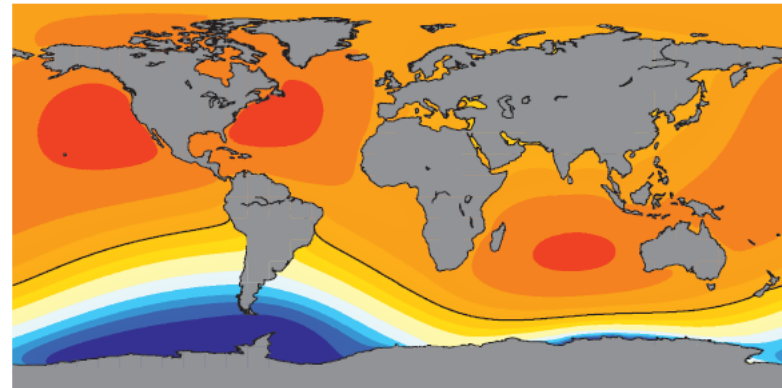
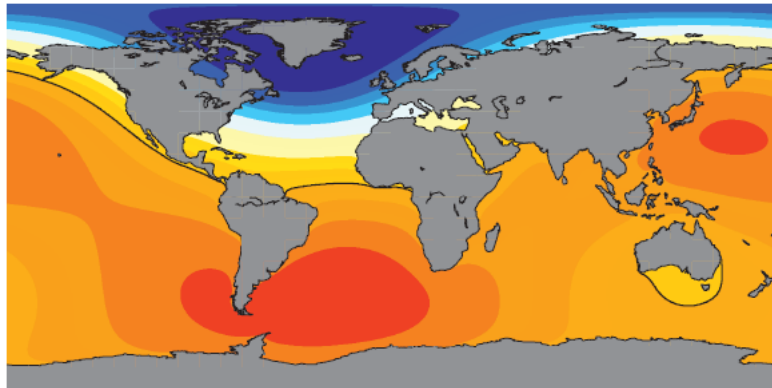


Jevrejeva et al, 2014

Uncertainties in regional sea level projections

Greenland

Antarctica



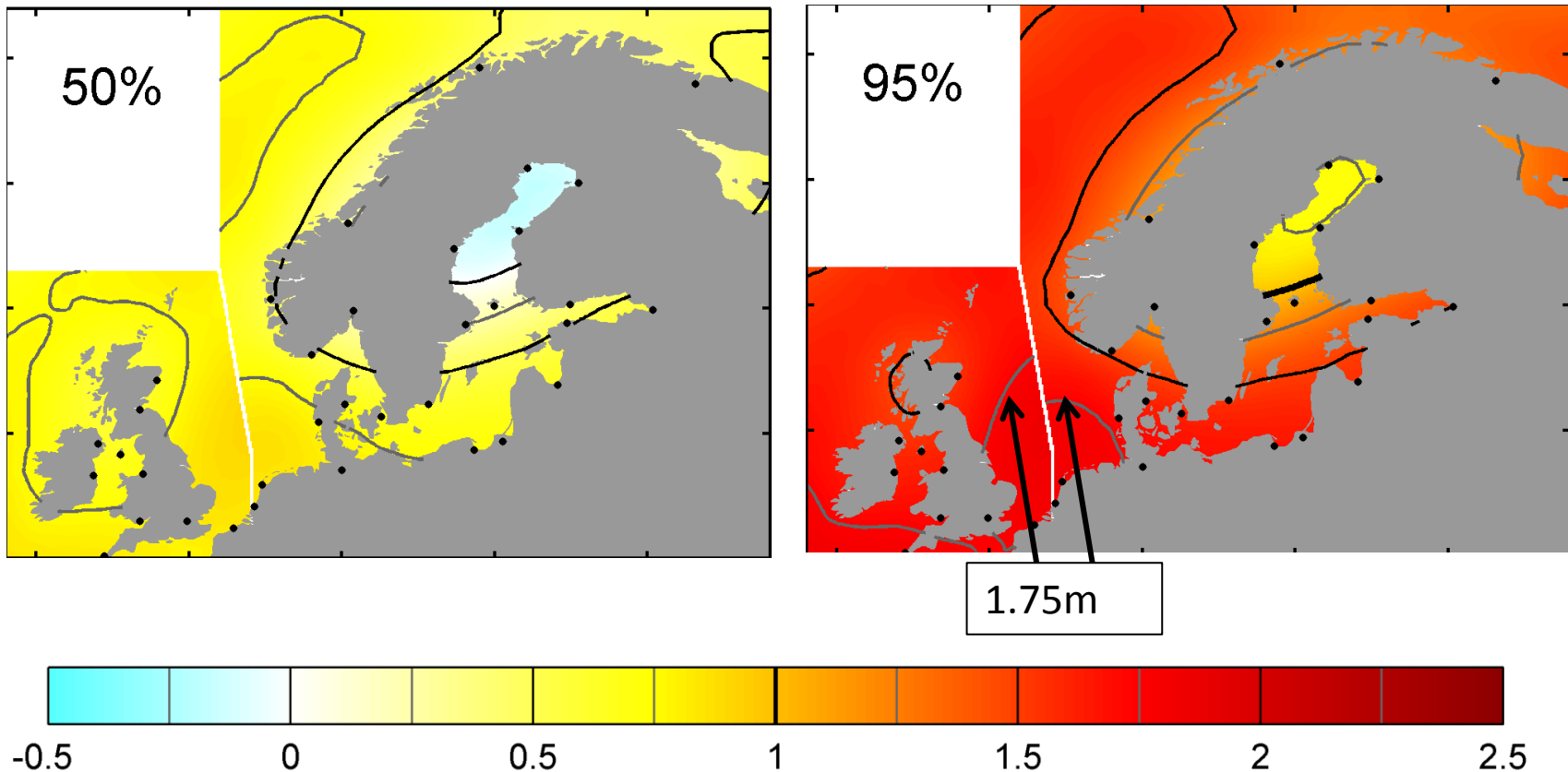
Tamisiea and Mitrovica, 2011



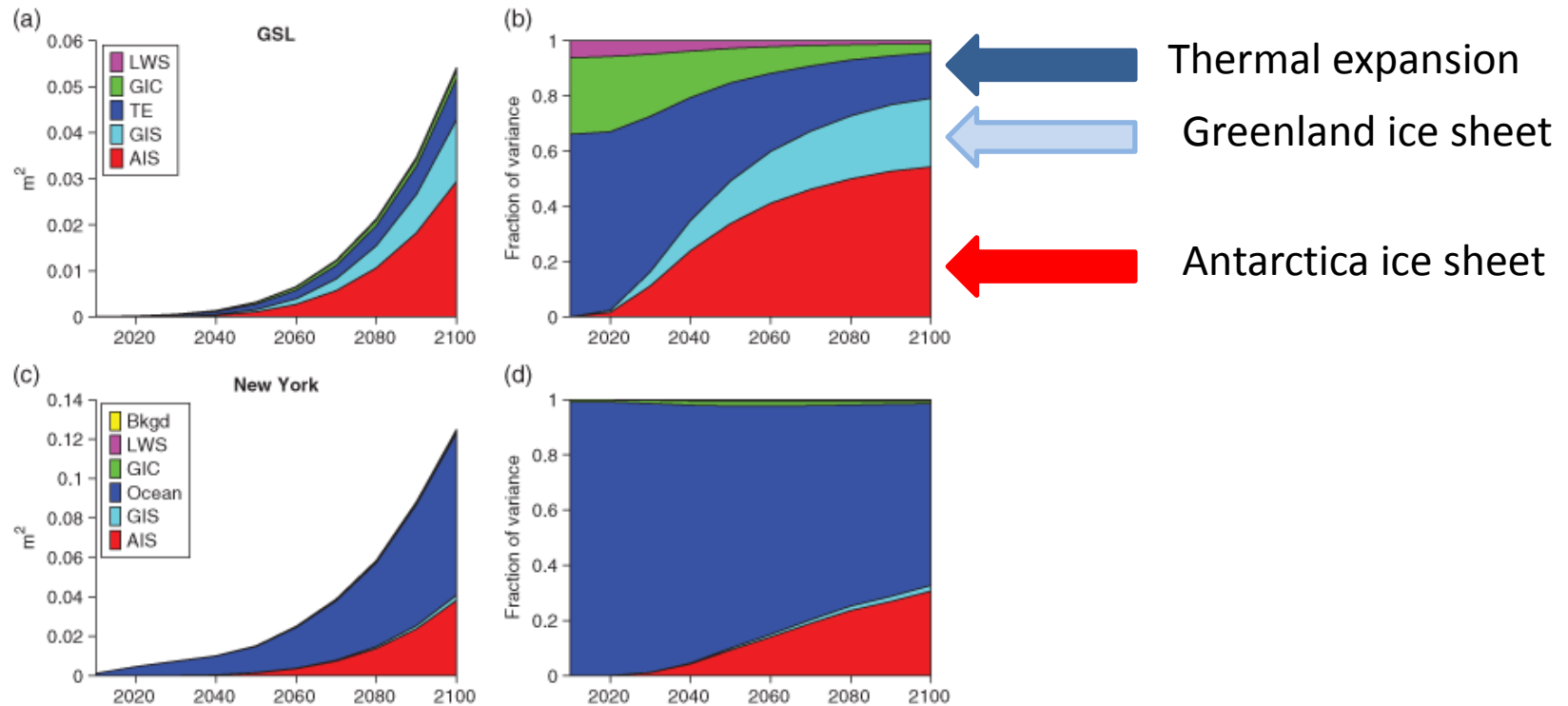
Northern Europe- the role of vertical land movement

RCP8.5 (global 0.74m, 50%)

(global 1.8m, 95%)

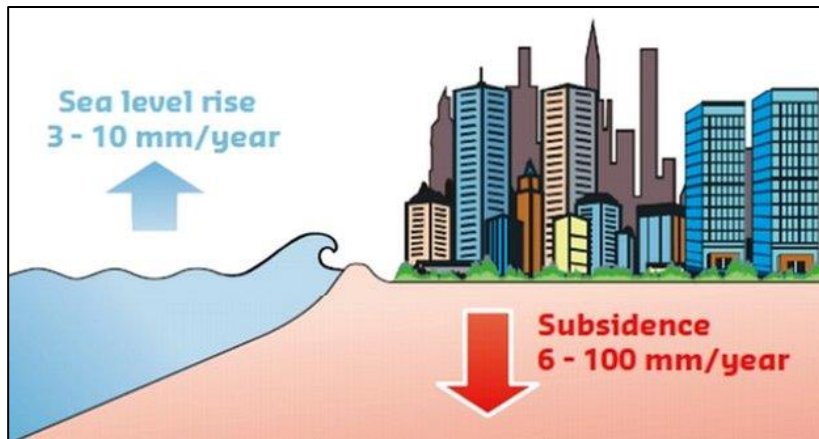


Uncertainties at individual locations (New York)



Kopp et al, 2014

Sinking coastal cities



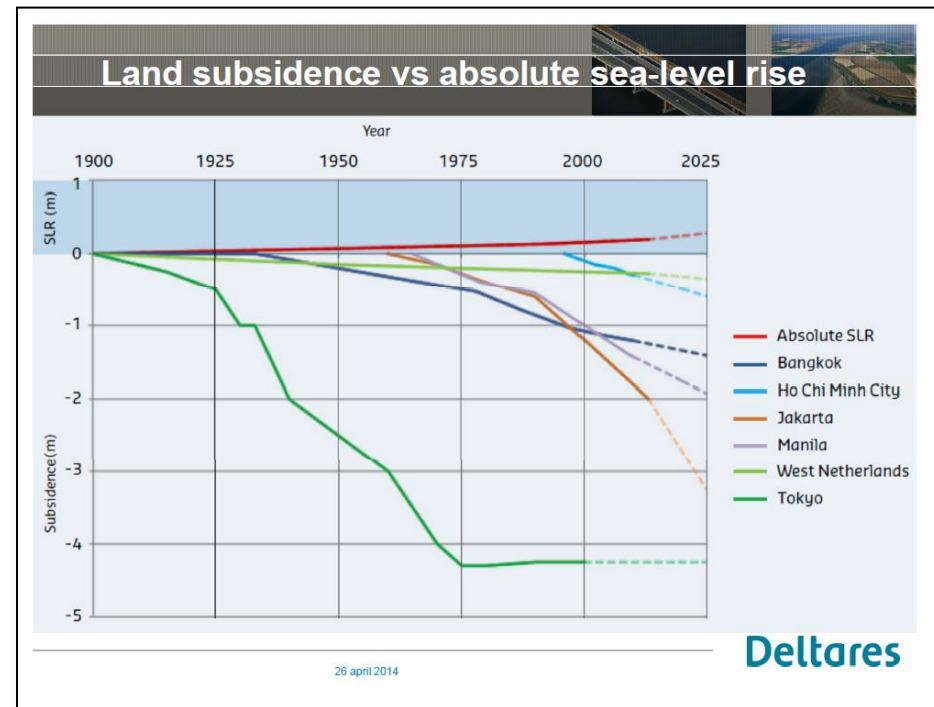
Gilles Erkens – Deltares Research Institute | Utrecht University

Tom Bucx – Deltares Research Institute

Rien Dam - WaterLand Experts | Deltares Research Institute

Ger de Lange – Deltares Research Institute

John Lambert – Deltares Research Institute

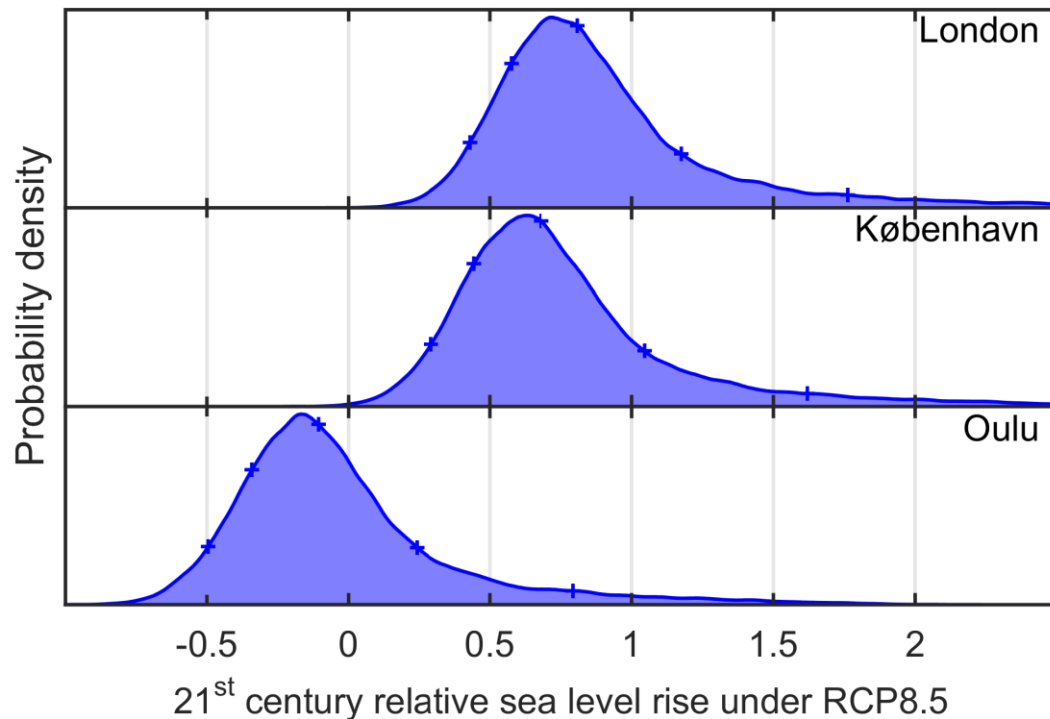


Credits to Deltares

Conclusion

1. Sea level community is making a substantial progress in understanding of global and regional sea level rise.
2. There are several sources of uncertainties in global sea level projections, with the largest uncertainties in projecting ice loss from Greenland and Antarctica ice sheets.
3. For regional and local sea level projections there are additional sources of uncertainties, associated with ocean dynamics and vertical land movement.
4. The key uncertainty in any projections is emission scenarios.
5. Sea level will continue to rise for several centuries
6. One of the main challenges for sea level scientists is to communicate these uncertainties to the general public, stakeholders and governments.

Upper limit sea level rise for individual locations



RCP8.5

Grinsted et al, 2015

	5%	50%	95%	99%
Belfast	0.27	0.64	1.57	2.22
Newlyn	0.45	0.82	1.81	2.49
Cardiff	0.40	0.77	1.73	2.40
Edinburgh	0.26	0.64	1.56	2.20
Liverpool	0.35	0.71	1.66	2.31
Aberdeen	0.27	0.66	1.58	2.21
London	0.43	0.81	1.76	2.43