



Observed changes in Global Climate. Global sea-level rise and permafrost thawing: results from Ice2Sea and outlook to PAGE21

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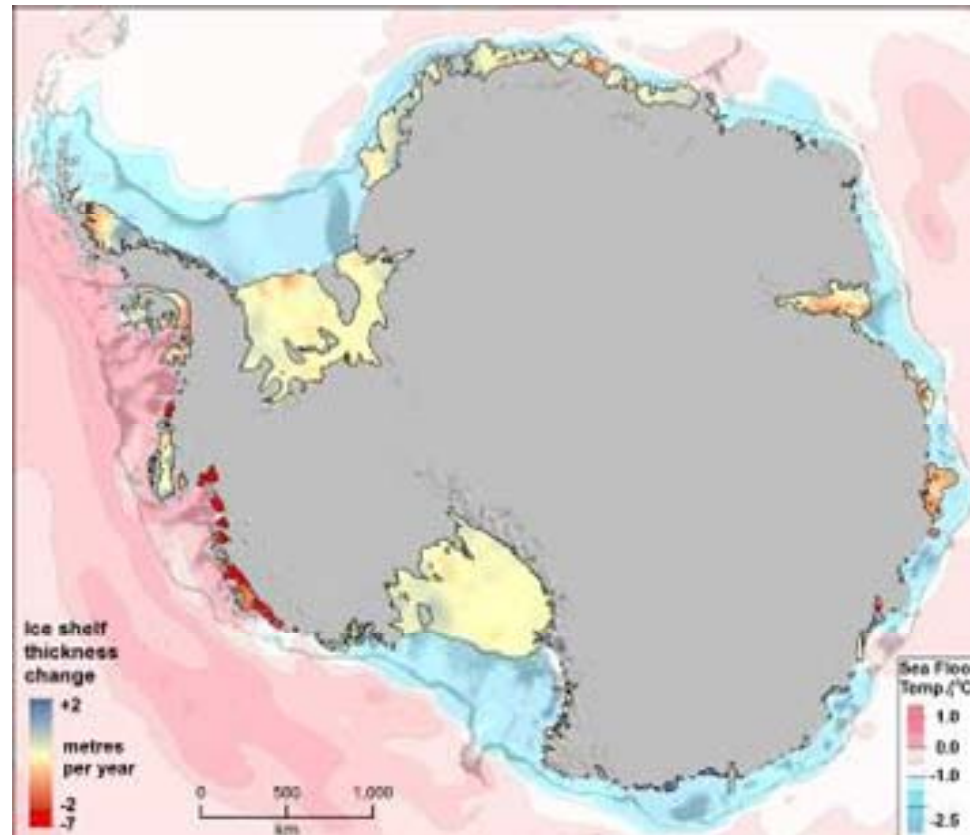
Directorate-General Research and Innovation

Unit « Climate Change and Natural Hazards »



Estimating the future contribution of continental ice to sea-level rise

Duration	2009-2013
Consortium	24 key organisations in climatology, glaciology, oceanography from 13 EU countries
EU Contribution	€ 10m
Objective	Fill a critical knowledge gap (IPCC AR4) and reduce uncertainties in global-sea level rise projections. Strong dissemination of results to support policy-making.
More information	www.ice2sea.eu



Achievements and significance I

1. Shown that the **majority of current ice-loss from Antarctica results from increased melting of floating ice shelves** (red) by the relatively warm ocean (pink).

Significance: Ice-ocean interaction is key to establishing the maximum contribution that Antarctica could make to sea-level rise and therefore key to capturing worst-case scenarios of sea-level rise.

Novel approach: other research has focused more on the changes due to the ice's interaction with the atmosphere.

(Fig: Pritchard et al, Nature, 25th April, 2012)



Achievements and significance II

2. under a variety of emission scenarios, **after 2060 the delivery of heat to Antarctica by the oceans will increase dramatically**, impacting parts not currently losing ice (Hellmer et al., Nature, 9th May, 2012).

***Significance:** The current high rates of ice-loss from the Amundsen Sea sector of Antarctica is a significant contribution to current sea level rise and results from changes in the flow of heat from the ocean to the ice sheet. Ice2sea's projection of future ocean change shows that similar but much larger effects are likely elsewhere in Antarctica in the second half of the 21st Century. How much and how soon, is something that ice2sea's models should tell us in coming months (results available by Aug 2013)*



Achievements and significance III

3. Development of the **first “complete” inventory of the world’s glaciers**. This will improve projections of the contribution of mountain glaciers to sea-level rise and reduce a key source of uncertainty in SLR projections.

***Significance:** A major problem with earlier assessments and projections of glacier contributions to sea-level rise (eg.AR4) was the absence of a global glacier inventory that included all glaciated areas of the globe. As part of a multinational and multi-programme effort, Ice2sea has been involved in developing such an inventory in time for projection of SLR for IPCC AR5.*



Changing Permafrost in the Arctic and its Global Effects in the 21st Century

www.page21.eu



PAGE21 objectives:

- improve our understanding of the processes affecting the size of the arctic permafrost carbon and nitrogen pools
- produce, assess and disseminate high-quality datasets on permafrost at the station and pan-Arctic levels
- improve global climate models accordingly
- use these models to reduce the uncertainties in feedbacks from arctic permafrost to global change

Implementation & Partnership:

- The research makes use of a unique set of Arctic permafrost investigations performed at stations that span the full range of Arctic bioclimatic zones.
- The PAGE21 Consortium comprises the experienced European permafrost researchers, together with eminent scientists from Canada, Russia, the USA, and Japan.
- It brings together 19 institutions and small enterprises from 11 different countries, and a large number of international partners in Canada, the USA, and Japan.
- First results expected by the end of 2012.



Key new initiatives launched in 2012

- *A cluster of 3 projects (SPECS, EUPORIAS, NACLIM) on seasonal to decadal forecasting, modelling and impacts (EU funding 26 M€)*

Forthcoming topics in 2013 Work Programme

- *Oceans and climate*
- *Atmospheric processes*
- *Land cover, land use change and cc mitigation*
- *Climate-related risks for coastal areas*





Thank you for your attention!

Find out more:

www.ec.europa.eu/research/horizon2020