OCEAN SCIENCE DAY

17 June 2015, Paris

Scientific Challenges in the Arctic

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

Organisation des Nations Unies pour l'éducation la science et la culture

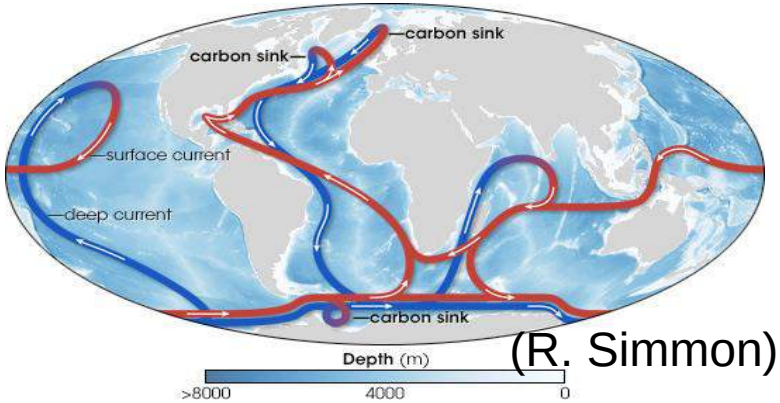
Commission océanographique intergouvernementale

Organización de las Naciones Unidas para la Educación la Ciencia y la Cultura

Comisión Oceanográfica Intergubernamental

Организация Объединенных Наций по вопросам образования науки и культуры

Межправительственная океанографическая комиссия



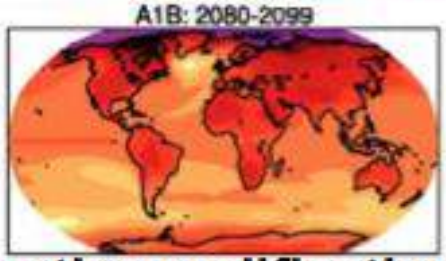
(R. Simmon)

Convener
Vladimir Ryabinin

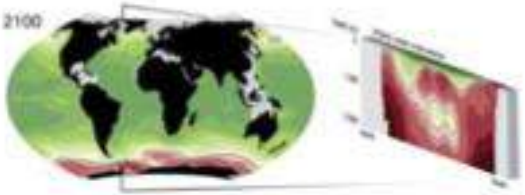
Intergovernmental Oceanographic Commission

Motivation

"Change is outpacing our understanding"

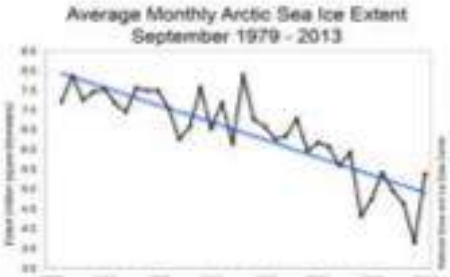


Arctic amplification of the global warming

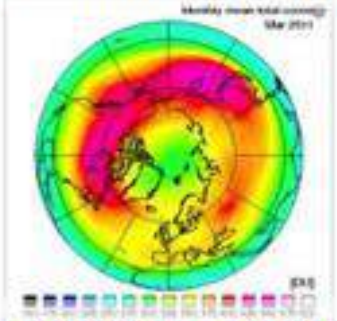


1672 Pg of Soil Organic Carbon, ~ 800 Pg Carbon in Atmosphere

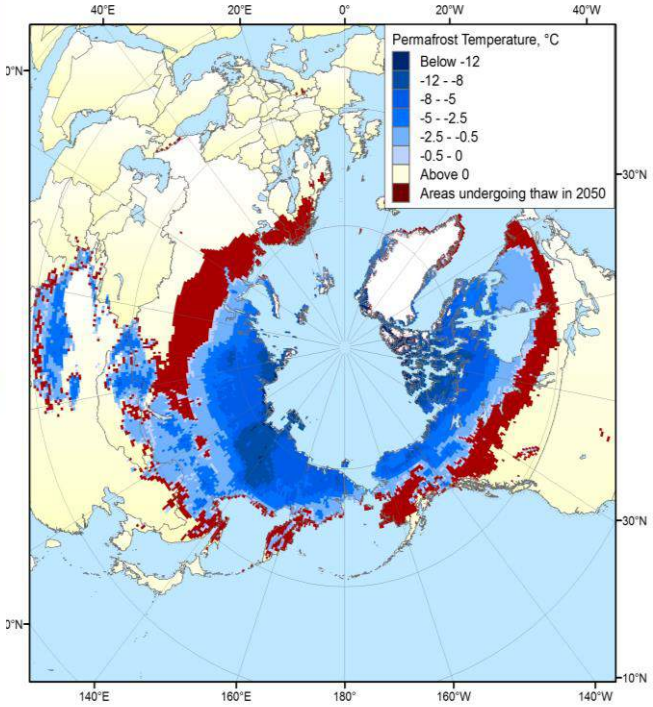
New sea routes, oil & gas, risks, safety, governance



AO sea-ice reduction



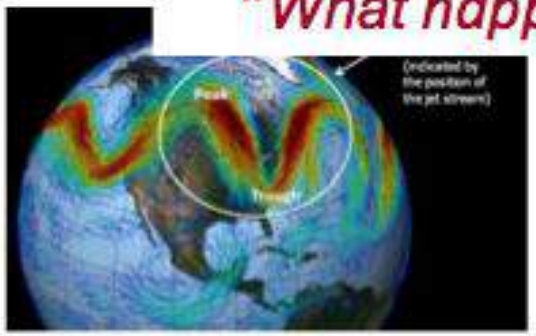
Surprises: ozone hole now in Arctic !



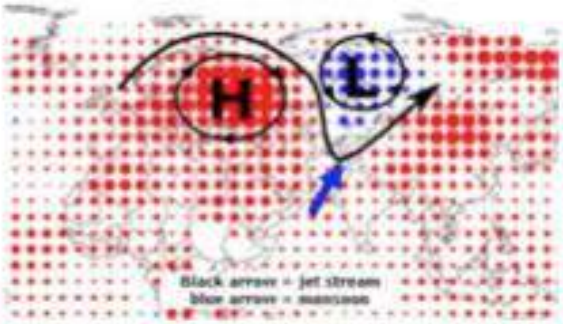
Heavily impacted ecosystems & people

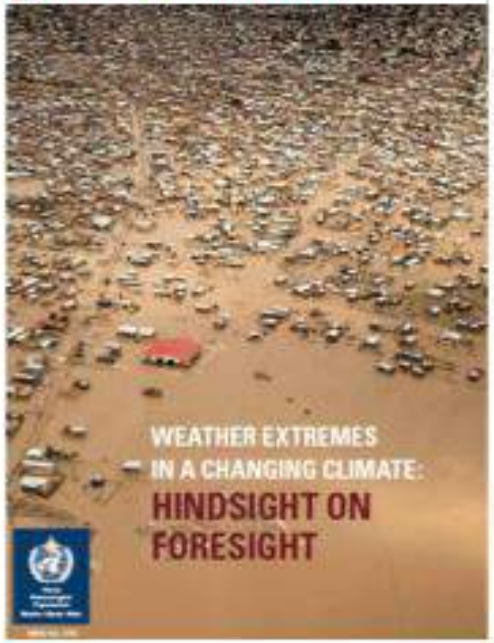
Motivation

"What happens in the poles does not stay in the poles"

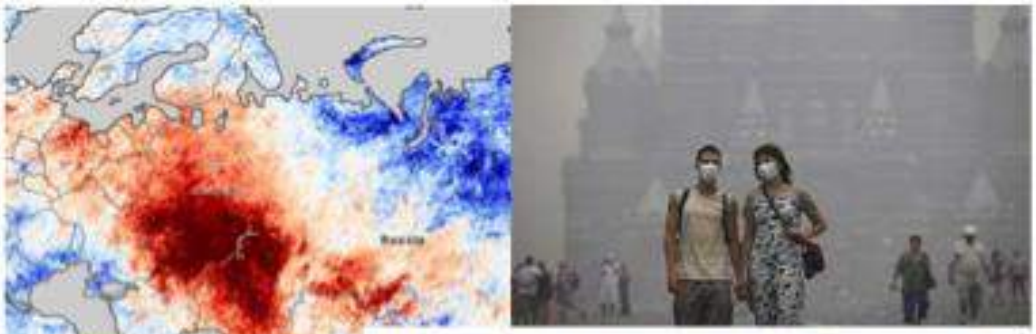


Polar vortex & jet stream



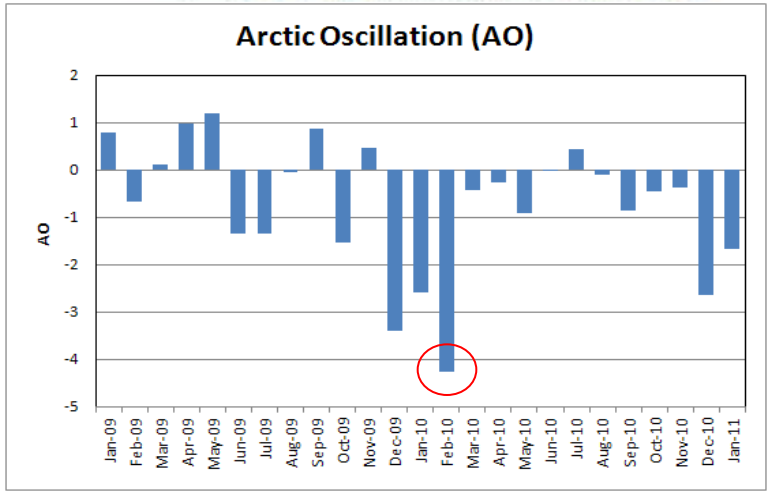


2010 Pakistan flood

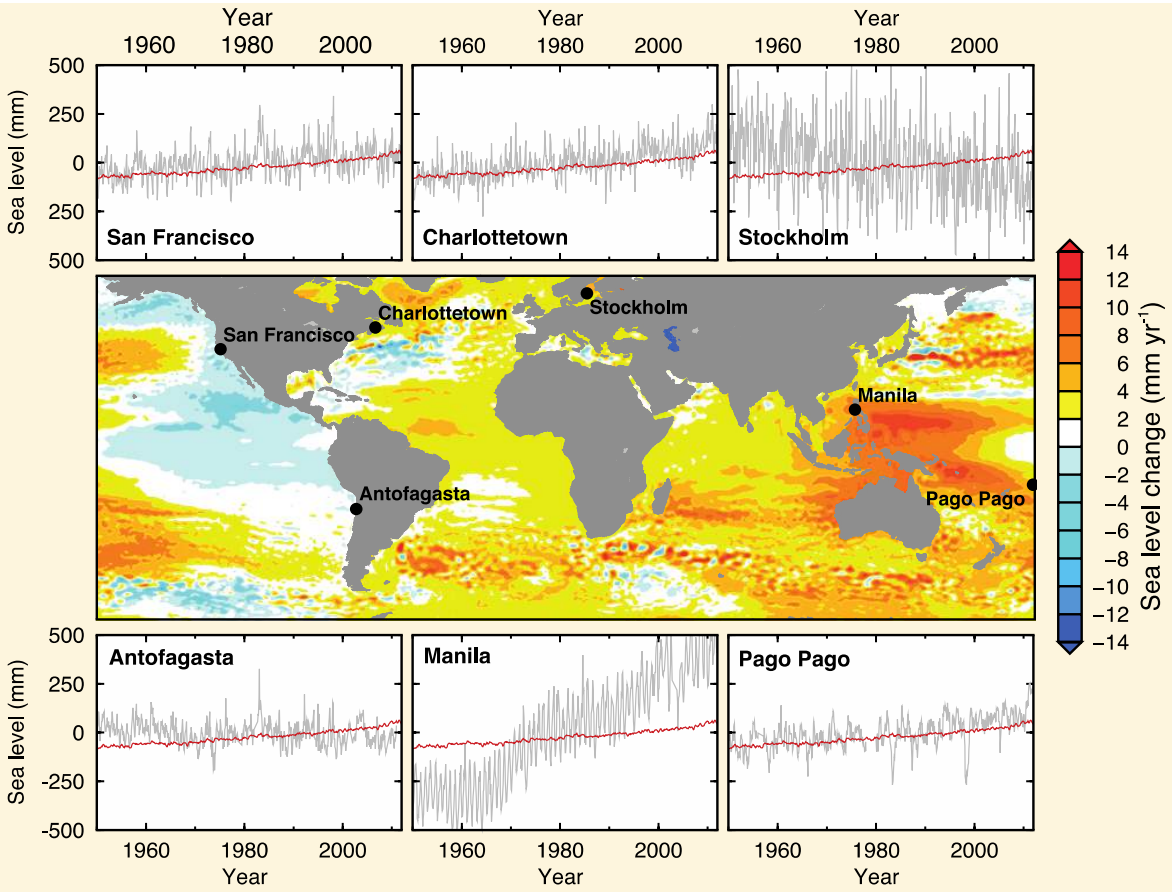


2010 heat wave, Russia

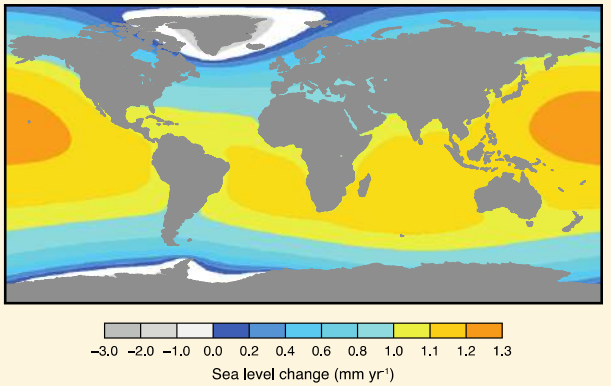
2014 cold wave, East N America



Sea level rise rate: geographically variable

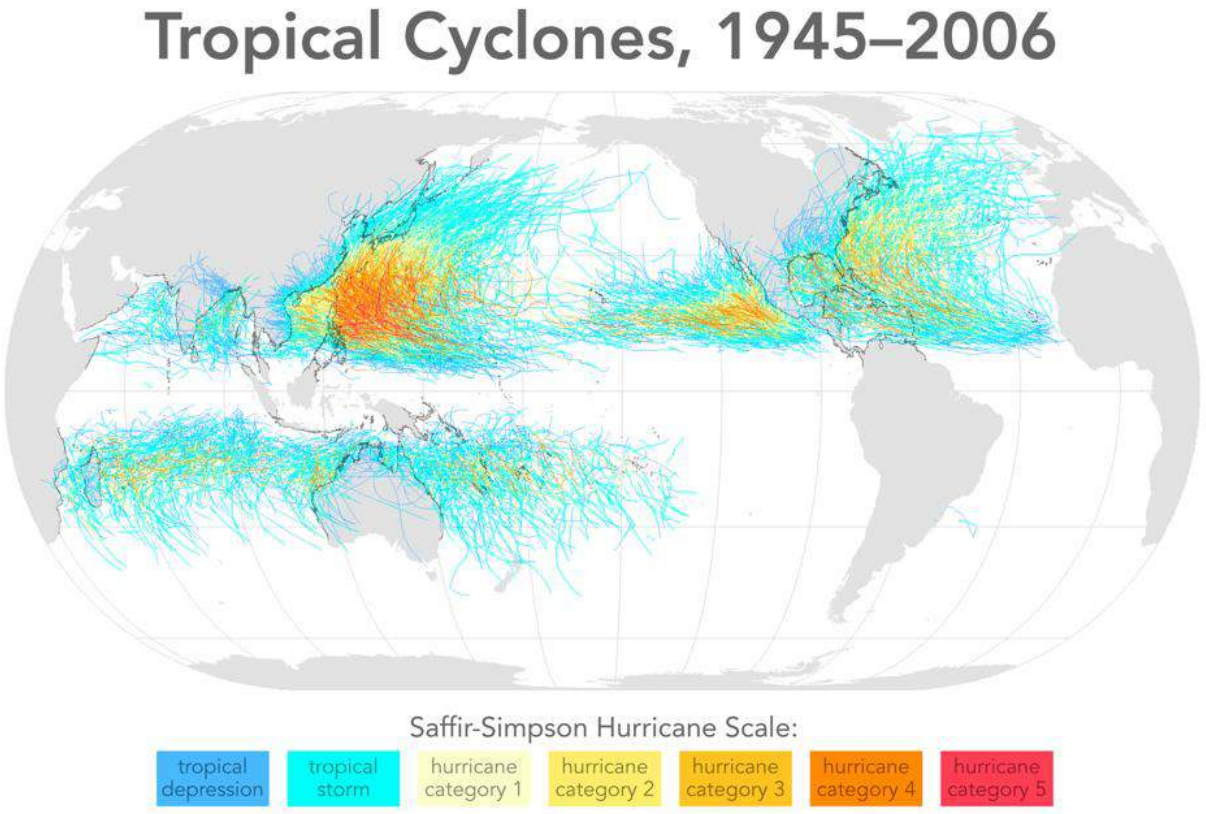


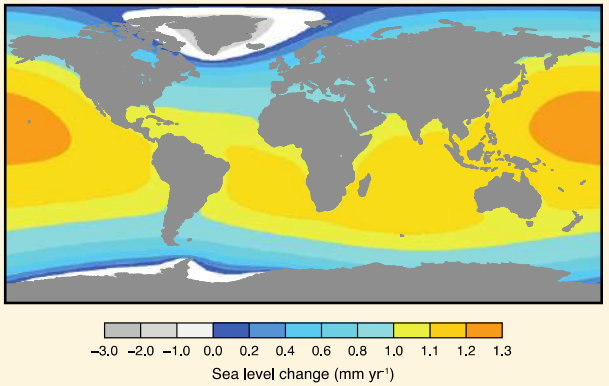
FAQ13.1, Figure 1 | Map of rates of change in sea surface height (geocentric sea level) for the period 1993–2012 from satellite altimetry. Also shown are relative sea level changes (grey lines) from selected tide gauge stations for the period 1950–2012. For comparison, an estimate of global mean sea level change is also shown (red lines) with each tide gauge time series. The relatively large, short-term oscillations in local sea level (grey lines) are due to the natural climate variability described in the main text. For example, the large, regular deviations at Pago Pago are associated with the El Niño-Southern Oscillation.



FAQ13.1, Figure 2 | Model output showing relative sea level change due to melting of the Greenland ice sheet and the West Antarctic ice sheet at rates of 0.5 mm yr⁻¹ each (giving a global mean value for sea level rise of 1 mm yr⁻¹). The modelled sea level changes are less than the global mean value in areas near the melting ice but enhanced further afield. (Adapted from Milne et al., 2009)

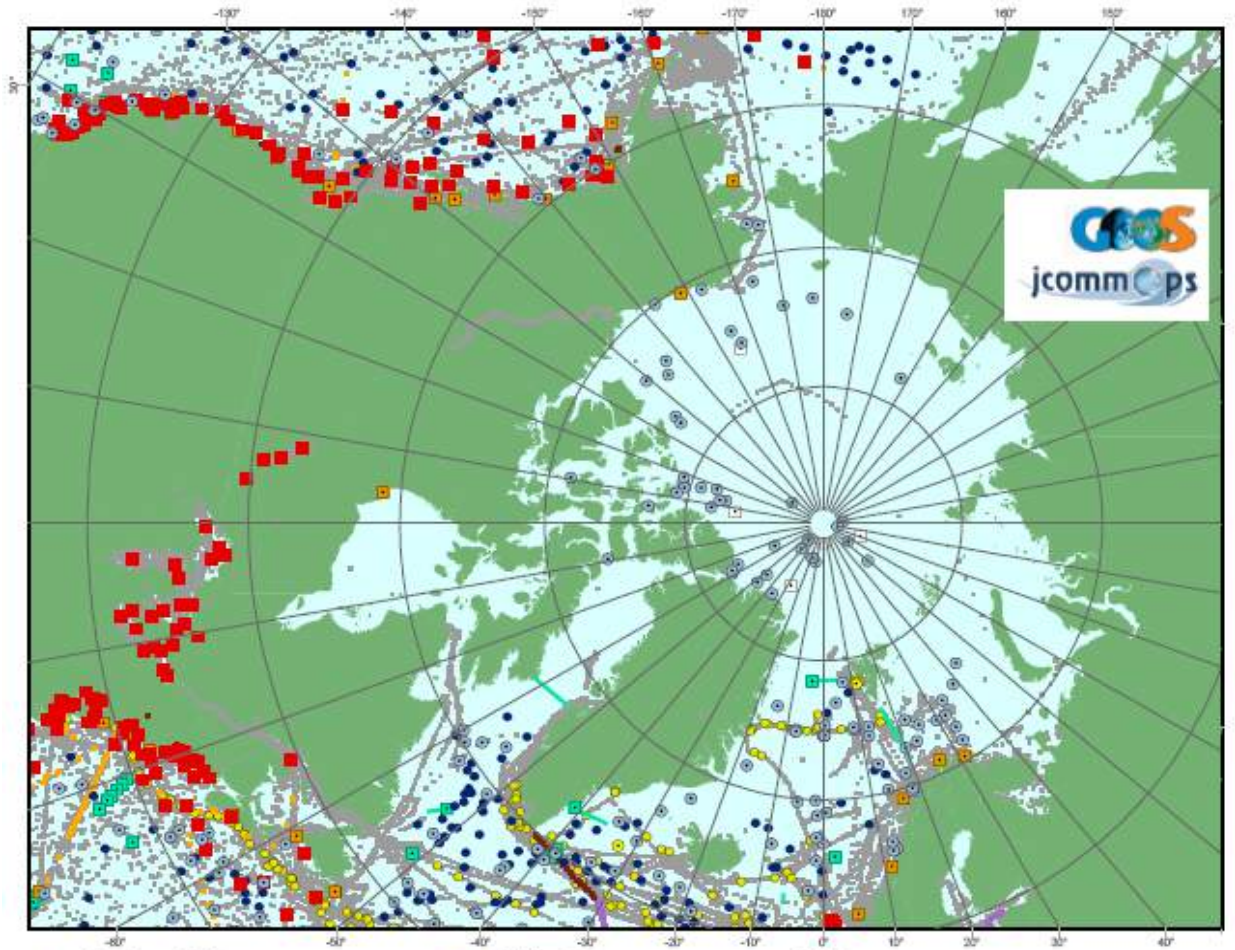
Sea level rise and tropical cyclones





FAQ13.1, Figure 2 | Model output showing relative sea level change due to melting of the Greenland ice sheet and the West Antarctic ice sheet at rates of 0.5 mm yr^{-1} each (giving a global mean value for sea level rise of 1 mm yr^{-1}). The modelled sea level changes are less than the global mean value in areas near the melting ice but enhanced further afield. (Adapted from Milne et al., 2009)

Observations in the Arctic



Latest location for platforms and tracks (all observations) for ships, as of June 2010.

3 gurus of Arctic.polar research

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