

Addressing Arctic Climate Change: Actions on Short-lived Climate Forcers



**Presentation by the International Cryosphere
Climate Initiative**

SLCFs: An overview

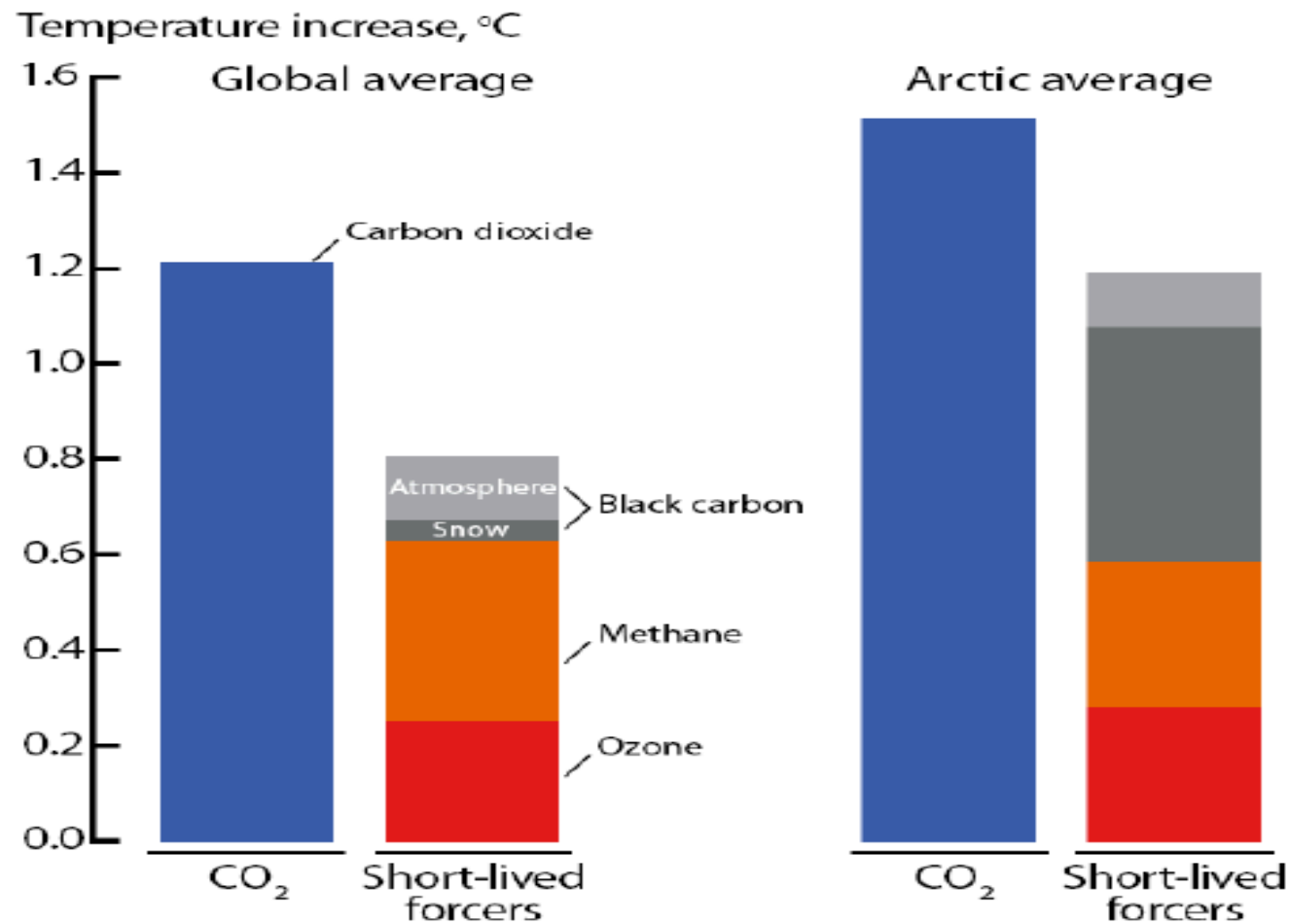


Short Lived Climate Forcers

<i>Compound</i>	<i>Lifetime</i>	<i>GWP</i> 100 yr	<i>GWP</i> 20 yr
<ul style="list-style-type: none">• Black Carbon-soot Regional and local	1-2 weeks	210-1500	690-4700
<ul style="list-style-type: none">• Tropospheric Ozone Regional and global Regulated under ECE-LRTAP	appr. 1 month	20% of methane	
<ul style="list-style-type: none">• Methane Regulated under KP. Global	12 yrs	25 ¹ (31)	72 (104)

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Contribution to global and regional warming



SLCF Initiatives



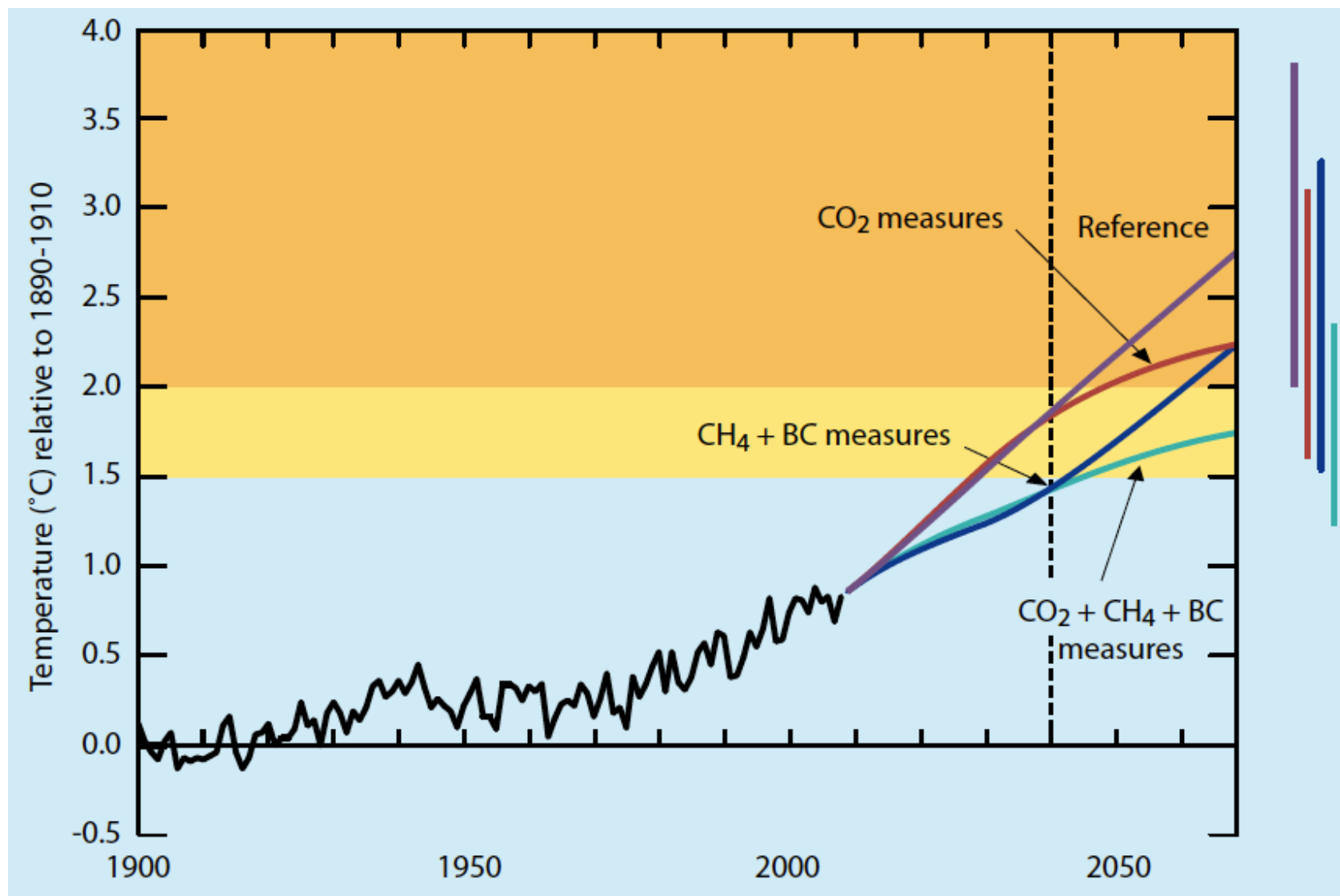
- Arctic Council – Task Force on Short Lived Climate Forcers (BC, methane and tropospheric ozone). Work ongoing
- ECE-CLRTAP – Included BC in the revision of the Gothenburg protocol 2010
- IMO – USA, Norway and Sweden has put BC in the Arctic on the Agenda of the MEPC
- UNEP: BC and Ozone Assessment and Action Plan development
- Initiatives to promote SLCF reductions, e.g. the *Global Methane Initiative*, *Global Alliance for Clean Cookstoves*, *Prototype Methane Funding Facility (PMFF)*

UNEP/WMO Integrated Assessment

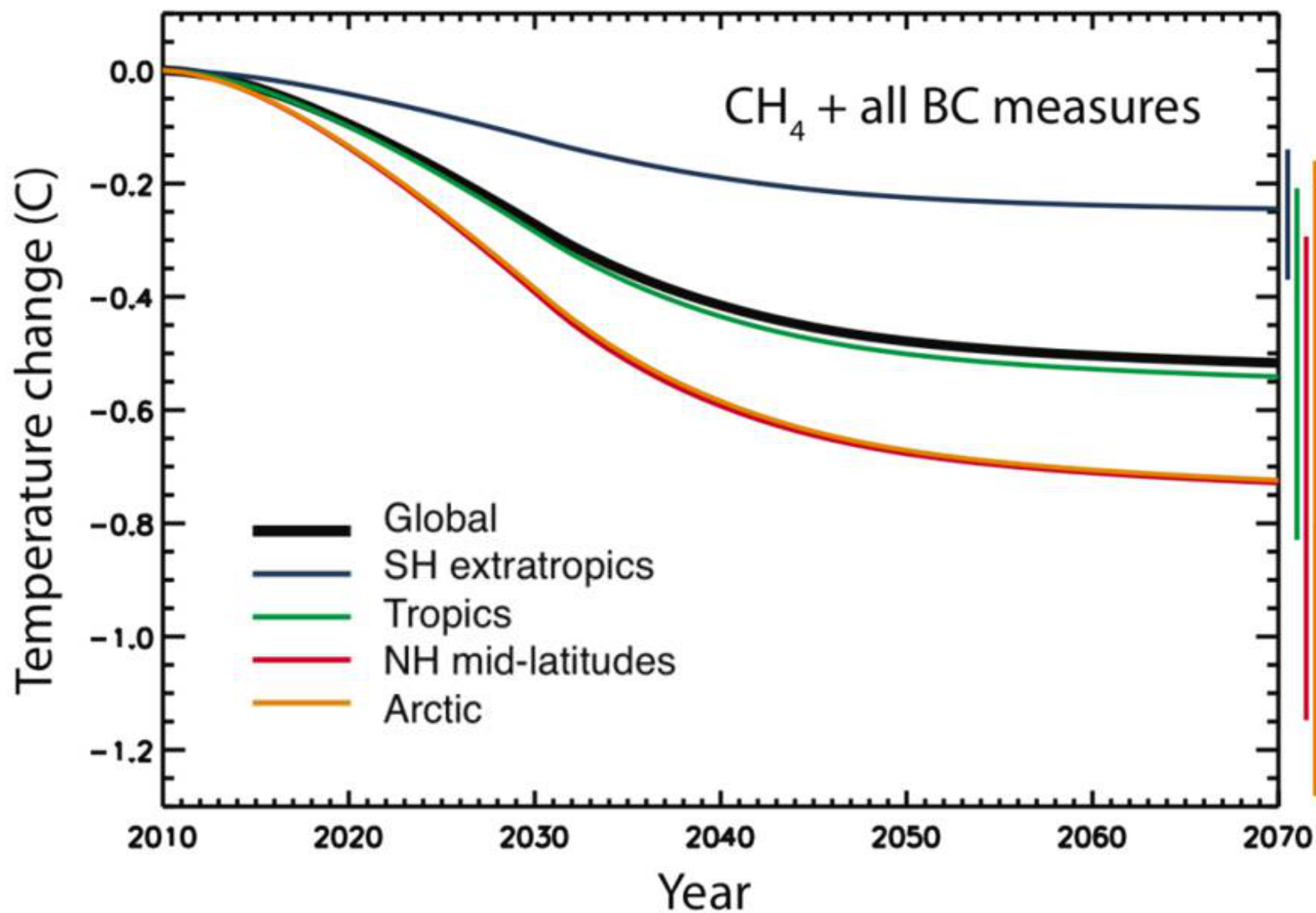


- UNEP/WMO Integrated Assessment on Black Carbon and Tropospheric Ozone launched on June 14, 2011.
- UNEP released a "SLCF Action Plan" on 25 November 2011 that will be presented in Durban on Friday 9 December at a side-event
- The UNEP reports - a key source for discussing SLCF action
- Integrated Assessment: http://www.unep.org/dewa/Portals/67/pdf/Black_Carbon.pdf

Result for Global Temperature Change from the combined results from NASA-GISS and ECHAM models (JRC)



Temperature change in latitudinal bands



The Arctic and the Global Climate



- Climate change is severely affecting the Arctic, its ecosystems, society, economy and people
- Exploitation of Arctic natural resources, facilitated by climate change impacts, may contribute to additional destruction of valuable Arctic habitats
- Many feedbacks in the Arctic may accelerate global climate change: snow cover, sea ice melting and methane releases from the tundra and the Arctic seas
- Changes in the Arctic have worldwide repercussions: sea level rise (0.9-1.6 m) affecting 100s of millions of people.

The Arctic Council and SLCFs

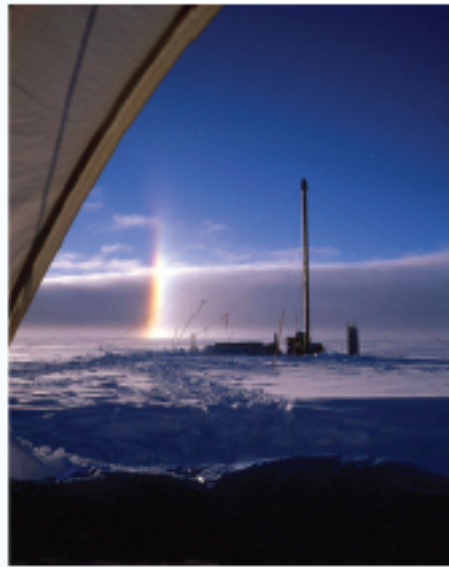


- The Arctic Council formed in 1996, 8 nations
- SLCFs started to be discussed informally in 2007
- Two "Chatham rules" informal workshops
- AMAP workshop in 2008 – Recommendations to SAOs to take action on SLCFs
- Tromsø Declaration in April 2009
- First meeting of the SLCF Task Force February 2010
- Report – both recommendations (and technical report) considered by Ministers in Nuuk in April 2011, with renewed mandate to 2013

Important Arctic Council reports

The Impact of Black Carbon on Arctic Climate

P.K. Quinn, A. Stohl, A. Arneth, T. Berntsen, J. F. Burkhart, J. Christensen, M. Flanner, K. Kupiainen, H. Lihavainen, M. Shepherd, V. Shevchenko, H. Skov, and V. Vestreng



Technical Report of the Arctic Council Task Force on Short-Lived Climate Forcers

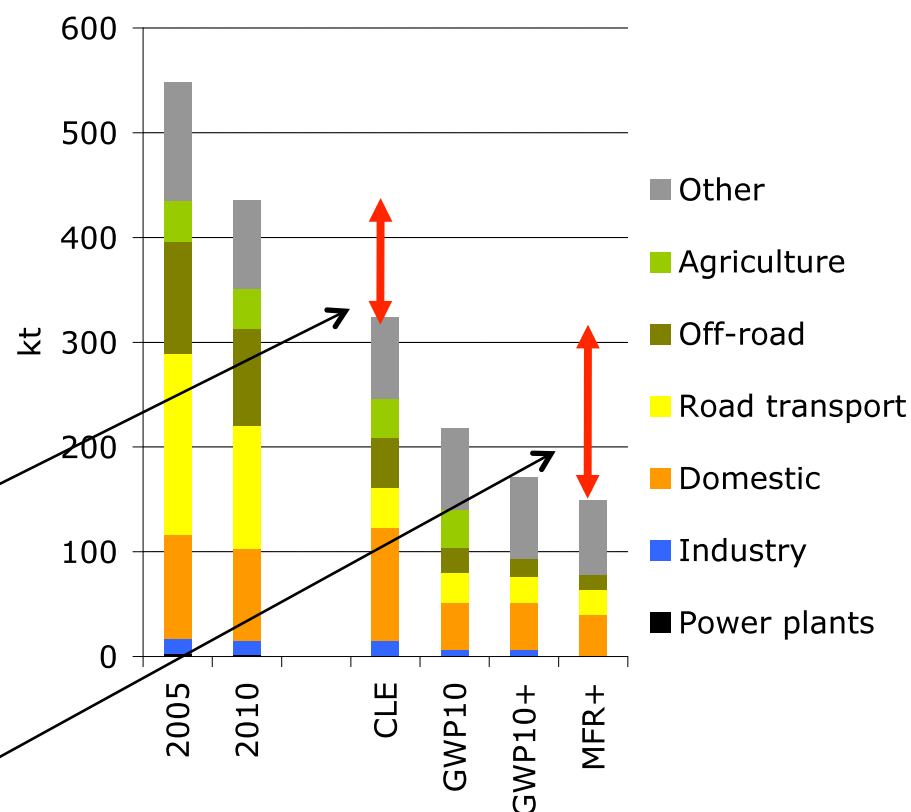
An Assessment of Emissions and Mitigation Options for Black Carbon for the Arctic Council



Summary Message on Black Carbon Emissions

- Emissions that reach the Arctic and deposit on snow most important – closer sources have much greater per-unit impact
- Highest Arctic-impact sources can be identified: Arctic Council majority, OECD nations 80-90%
- Reductions from anticipated transport regulations account for almost all projected decline by 2030; other sources will remain unchanged or grow without additional measures
- Additional reduction opportunities in transportation, residential and agricultural/forestry sectors

Arctic Council countries



Source: draft analyses by IIASA GAINS model, 2010

Transport



- **On-road and off-road diesel engines**
 - Regulations that target particulate matter for new vehicles, if fully implemented, are projected to reduce black carbon from new vehicles to near-zero
 - Additional early measures could accelerate this decline by:
 - ✦ more retrofitting of older vehicles
 - ✦ enhancing current controls on existing vehicles and equipment
 - ✦ improving inspection and maintenance programs
 - ✦ accelerating the timeline or broadening the scope of existing regulations for new engines.

Residential Burning



- **Residential burning (wood, coal) for heat**
 - Major source of emissions that actually reach the Arctic
 - Significant for all Arctic Council nations
 - Projected to remain essentially unchanged or increase by 2030 without new and additional measures:
 - ✦ Improved technology
 - ✦ Additional BC standards
 - ✦ Change-out programs (e.g., pellet stoves)

Open Burning



- **Agricultural burning and wildfires**
 - Significant source reaching the Arctic. Russia and Ukraine account for 75-80% of emissions
 - Some Council nations already ban agricultural burning; others control when and where burning may occur; others rely solely on local regulation. Russia ad hoc local regulation. Large improvements possible at low or negative cost (Russia, North America; also Ukraine)
 - Potential measures include no-burn and no-till methods. Major co-benefit is the prevention of wildfires – most wildfires human in origin
 - Strong health, environment and public safety co-benefits

Shipping and Gas Flaring



- **Shipping**

- Currently small source but potential high impact
- Potential increase in traffic and impact with melting sea ice
- Council nations comprise 90% of current shipping activities in Arctic, so within-Council action has good opportunity to impact problem
- Measures should continue to include broader engagement with IMO

- **Gas flaring**

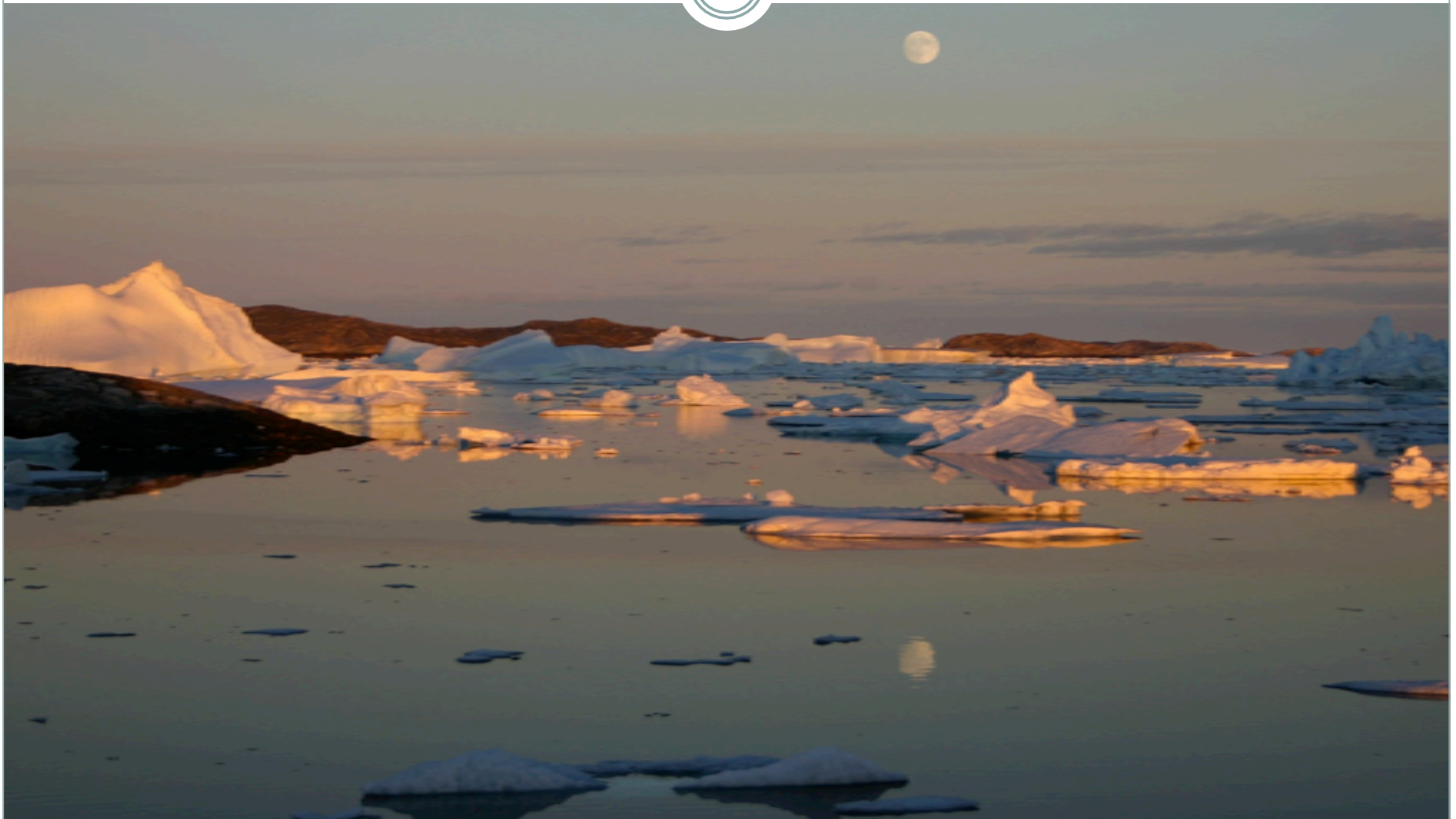
- Remains a large unknown, but **potentially highly significant** source of black carbon emissions, especially as oil and gas activities expand
- Premature to identify measures. Improved emission estimates, private sector engagement and in-field measurements are needed

SLCFs and the Arctic



- The Arctic countries are highly motivated to take action to slow down warming by means of reducing SLCF
- The Arctic countries play an important role in showing the world what can be done in terms of BC reductions
- The Arctic Council and its member countries could also outreach to other regions of the world, including other mountainous, glaciated regions like the Himalayas, the Andes and others.

Thank you!



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