

What's in a name? The tale of SLCPs

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Aerosols and Climate Cluster: Ambitious, High-Quality Science!





...with an interest in informing and engaging stakeholders...

→ Consider the Buzzword "SLCPs"

Short-Lived Climate-forcing Pollutants

SLCPs:

- Gases:
 - Methane (CH₄)
 - Ozone (O_3)
 - Hydrofluorocarbons (HFCs)
 - Nitrogen Oxides (NO_x)
 - Carbon Monoxide (CO)
 - Volatile Organic Compounds (VOCs)
 - Sulfur Dioxide (SO₂)

- Aerosol Particles:
 - Soot (incl. Black Carbon ("BC"))
 - Organic Carbon (OC)
 - Sulfate (SO₄²⁻)
 - Nitrate (NO₃-)
 - Ammonium (NH₄⁺)



SLCPs: Short-Lived Climate-forcing Pollutants

SLCPs are Short-Lived





SLCPs: Short-Lived Climate-forcing Pollutants |ASS





SLCPs: Short-Lived Climate-forcing *Pollutants*

SLCP Particles are Very Small







Atmospheric Soot Particle Diameter ca. 50-500 nm Alexander et al. 2008, Science Human Hair Diameter ca. 0.05 mm = 50000 nm \rightarrow 100x-1000x thicker than a soot particle

Health Impacts?





Filter used for ozone sampler pump at the SusKat-ABC Bode Supersite

After... One Day of Sampling!

Courtesy: Jinsoo, Khadak, Dipesh, Bhogendra

Air Pollution Impacts on Health



Outdoor air pollution in 2050:

top environmental cause of mortality worldwide,

ahead of dirty water and lack of sanitation

In Europe, current reduction in life expectancy: ca. 6 months
 Also similar impacts on agriculture and ecosystems

OECD

Reduced Visibility due to SLCPs





Reduced Visibility due to SLCPs





Reduced Visibility due to SLCPs



SusKat-ABC Field Campaign Supersite



SLCPs: Short-Lived *Climate-forcing* Pollutants

Global Mean Radiative Forcing, 1750 to 2005



15 Figure SPM.5 [FIGURE SUBJECT TO FINAL COPYEDIT]

[IPCC Report, 2013]

Global Mean Radiative Forcing, 1750 to 2005



16 Figure SPM.5 [FIGURE SUBJECT TO FINAL COPYEDIT]

[IPCC Report, 2013]

7 Key Global Measures for Reducing CH₄ Emissions IASS



Near-term Climate Protection and Clean Air Benefits: Actions for Controlling Short-Lived

Climate Forcers



Recovery from landfills



Coal mine methane capture



Intermittent aeration of rice paddies



Recovery from wastewater



Recovery from livestock manure



Reducing pipeline leakage



Recovery from oil and gas

9 Key Global Measures for Reducing BC Emissions



Improved biomass stoves



Cooking with clean fuel



Coal briquettes replacing coal



Modern coke ovens



Pellet biomass heating stoves



Reduce agricultural burning



IASS

Remove mega-emitters / DPF



Improved brick kilns



Reduce flaring



Mitigation Possibilities for CO₂ and SLCPs (BC + CH₄) IASS All Measures, but with a 20-year delay in starting the CO₂ emissions reductions 3 Reference CO₂ measures emperature change (C) (relative to 1890-1910) 2.5 2 1.5 $CH_{4} + BC$ measures uncertainty All measures range 0.5 2020 2020 2010 2050 2010 2060 2070

IASS Projects "ClimPol" and "ELIAS": (http://climpol.iass-potsdam.de/) → Improving science/society interface and linking mitigation and governance of air pollution and climate change

[UNEP, 2011; Shindell et al., 2012]

Climate Change Mitigation Co-Benefits





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POTSDAM

- Technical measures
- Non-Technical measures (behavior change)
 - Spread and implementation of new technologies
 - Awareness and reduction of environmental footprint
- Coordination or integration of air pollution and climate change policies
 - Numerous potential co-benefits
 - Best through long-term system-wide infrastructure transformations
- Engagement: Science-Stakeholder Interactions

imP₁ Informing and Engaging Different Audiences

(Lead: Julia Schmale)

ntials and Challenges of Integrating Air Quali

SLCP = short-lived climate-forcing pollutants

<u>http://climpol.iass-</u> potsdam.de/multimedia

(limPo

Change Policies in Europe

- Engaging stakeholders:
 - combining scientific, practical, political and other types of knowledge
 - co-designing practically relevant solutions 0
- Multi-way communication to support:
 - shaping the scientific agenda 0
 - policy development 0
- Key aspects for success:
 - Continuous engagement (trust) 0
 - Willingness for *mutual* learning 0
 - **Ensuring ownership** Ο
- Information Material
 - Policy Briefs 0
 - Website 0
 - SLCPs short film 0
 - etc. Ο

SLCPs: Activities and Intiatives





CCAC: The Climate and Clean Air Coalition http://www.unep.org/ccac/



http://www.rrcap. unep.org/abc/





http://www.igacproject.org/AirPolClim

http://ec.europa.eu/environment/air/ review_air_policy.htm

Thank you for your attention! Questions?





http://climpol.iass-potsdam.de/multimedia