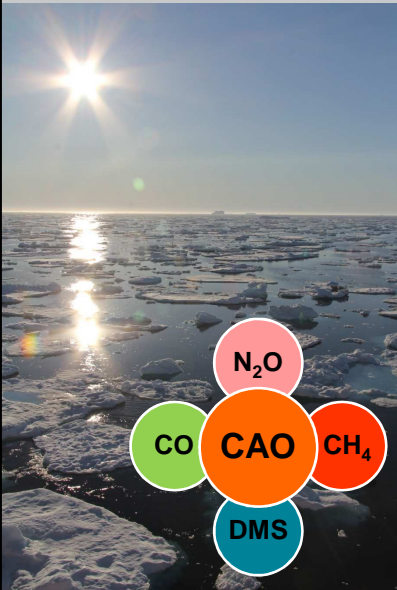


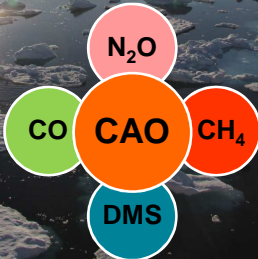
PML Plymouth Marine Laboratory PETRA



Pathways and emissions of climate-relevant trace gases in a changing Arctic Ocean – PETRA

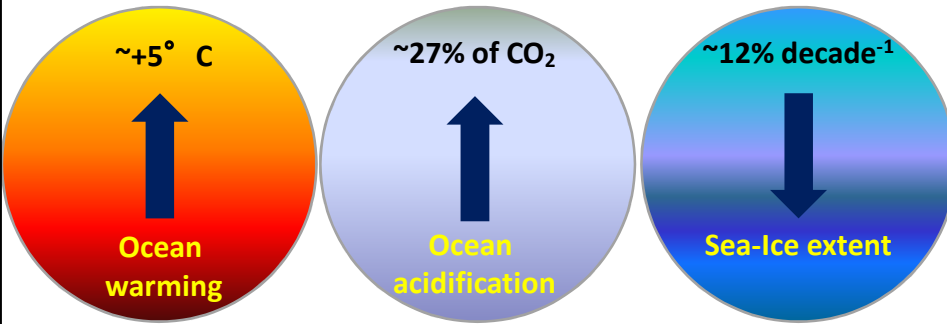
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GEOMAR Helmholtz Centre for Ocean Research Kiel

PML Plymouth Marine Laboratory Warming, Acidification, Decreasing Sea-Ice

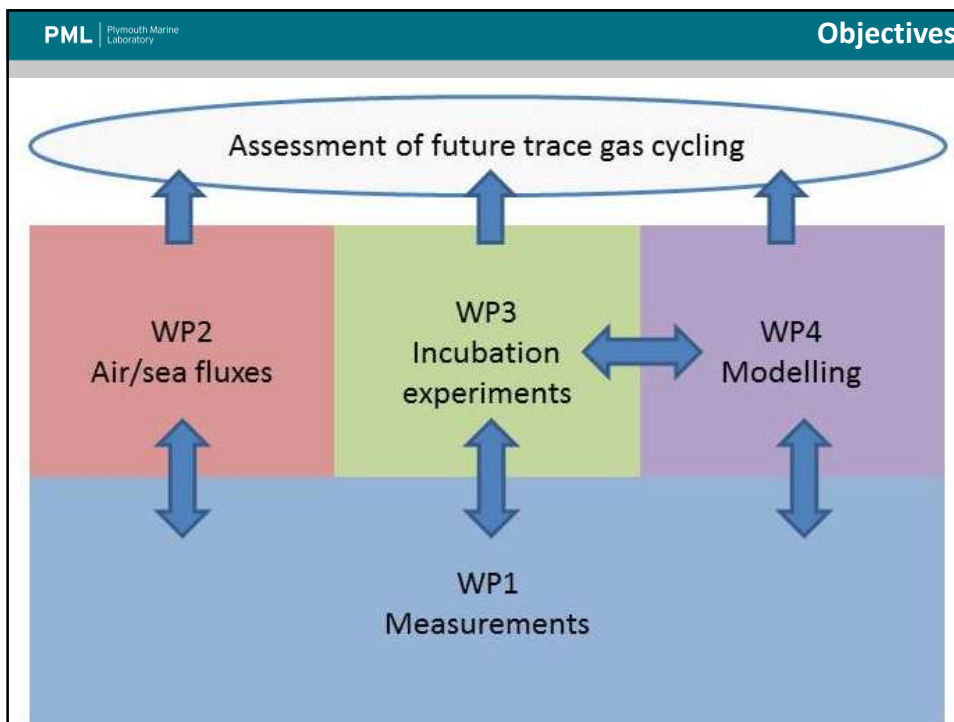


~+5° C  
Ocean warming

~27% of CO<sub>2</sub>  
Ocean acidification

~12% decade<sup>-1</sup>  
Sea-Ice extent

Combined impact may prove additive, synergistic or antagonistic



**PML** Plymouth Marine Laboratory **Fieldwork**

**2018** PS114; Fram Strait  
CHAOS; Barents Sea

**2019** ???? – HELP!

	T°C	OA	Light	Most vulnerable processes in the Arctic Ocean
N <sub>2</sub> O	X	X		Nitrification
CH <sub>4</sub>	X	X		Aerobic CH <sub>4</sub> oxidation, non-conventional CH <sub>4</sub> production via DMSP
DMS	X	X	X	(Multiple)
CO	X		X	photochemical production from POM and CDOM

**PML** Plymouth Marine Laboratory **PETRA will deliver**

- High resolution spatial distribution of trace gases**
  - $\text{N}_2\text{O}$ ,  $\text{CH}_4$ , DMS, CO,  $\text{CO}_2$
- Improved air-sea fluxes in regions of sea-ice**
  - Shipboard and satellite measurements
- Experimental evidence of CAO impact on trace gas fluxes**
  - Sensitivity of biogeochemical processes, nutrient chemistry and organism response
- Mechanistic understanding of stressor impacts on trace gases**
  - Including interaction between stressors

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