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Title: *A call for coordinated Polish research on climate relevant greenhouse gas fluxes in the Arctic*

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The Arctic region is an important but poorly researched component of the global carbon cycle. Air-sea CO₂ fluxes are generally poorly constrained in shelf basins and practically an enigma in the Arctic Ocean. The methane fluxes within the ocean and through the sea surface are as uncertain. The seasonal fluxes to and from Arctic land permafrost were researched only in few points and only for a few years.

If the knowledge of present state of Arctic fluxes of climate relevant gases is so poorly known what can one say about their future balance in a region warming over twice faster the average for our planet? Especially as permafrost on land and clathrate beds under the sea bottom are one of the largest known carbon reservoirs. Because both the reservoirs are potentially unstable in a warming world, carbon fluxes from them can be potentially catastrophic for our climate although the probability of such emissions and relevant time scales are also badly constrained. So far the information available makes it difficult even to determine present fluxes levels which will make it difficult in future to be sure whether the situation has changed and if so, how much.

It is not surprising that this situation became the focus of interest of the scientific community. In Europe a COST action was started to coordinate national efforts in this field: "Permafrost and gas hydrate related methane release in the Arctic and impact on climate change: European cooperation for long-term monitoring (PERGAMON)". This author is one of the two Polish representatives in its Management Committee.

This proposal is a call to start a coordinated Polish campaign of CO₂ and methane flux studies in the Arctic, involving both marine and land studies. Poland has infrastructure making it possible to start such a research programme. The summer Arctic cruise of r/v Oceania and the Polish Polar station in Hornsund should make it possible to start such a program basing on grant funding. However, it requires input from several groups of scientists: oceanographers, geophysicists, atmospheric physicists and chemists and isotope specialists.

This talk will present the present state of research of greenhouse gas fluxes in the Arctic, the short history and present state of work on starting a Polish program of research of methane and CO₂ fluxes and perspectives of how such program could fit the international scientific effort in this important field.

