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SESE Seminar Information

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 - English : Korea Polar Research Institute (KOPIR) / Principal Scientist
4. Seminar Title
 - Korean : 한국 최초 쇄빙연구선 아라온 관측으로 보여준 너무나 평범한 북극해 메탄 방출
 - English : Surprisingly Not-So-Big Emission of the CH₄ from the Arctic Ocean Based on Decadal Observations Onboard the Korean Ice Breaker, R/V Araon
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8. Abstract

Approximately 10 % of the gas hydrate in the world ocean expects to be deposited in the Arctic continental shelf. Due to the current rapid change in Arctic climate, sea ice extent is rapidly reduced as being reinforced with Arctic amplification. These current change could make the gas hydrate unstable as the sub-sea permafrost thawing, lead to release of the CH₄ trapped in gas hydrate, and end up free of sea ice in this century by positive feedbacks. Korea Polar Research Institute (KOPRI) has ongoing interest in Arctic environmental conditions including the potential release of the key greenhouse gas, methane (CH₄), from the seabed to the water column and finally, further to the atmosphere. During the last decade throughout a series of campaigns on the Korean ice-breaker, R/V Araon, we measured CH₄ concentrations at the surface ocean and overlying air in summer season to estimate the emissions from the western arctic seas including the Chukchi Sea, the Beaufort Sea, and the East Siberian Sea. We compare each of these seas and the Central Arctic Ocean covering the deep Arctic Ocean basin. The surface ocean showed super-saturation almost everywhere with respect to the CH₄ in the overlying air. Nonetheless, we have insufficient regional coverage to assess any possible saturation anomaly trend in each sea. Flux densities of outgassing CH₄ were 0.3 mg m² d⁻¹ in the East Siberian Sea, 0.05 mg m² d⁻¹ for the Chukchi Sea, 0.08 mg m² d⁻¹ for the Beaufort Sea, and 0.02 mg m² d⁻¹ for the Central Arctic Ocean. These values are modestly larger than the global mean value of the continental shelf except for the Central Arctic Ocean where the CH₄ emission is slightly lower. Our estimate of CH₄ emission in the East Siberian Sea is far larger than other Arctic Seas abiding by the previous observations, but its magnitude is far lower due likely to the distance from the hot spot area. Furthermore, our estimate of annual CH₄ emission from the Arctic Ocean is up to thousands times lower than the latest estimate in the Arctic budget of the CH₄. Future methane flux studies should be extended to shallow, nearshore environments where rate of permafrost degradation should be greatest in response to ongoing marine transgression.

*** Enclosed: Short CV of Speaker**