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MOCA-WP 2: Understanding of present and future methane release from ocean

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What is the status and current release of methane from marine seep sites and methane hydrates in the Arctic Ocean, and specifically around Svalbard?

How are these processes depending on trends in sea temperature and annual variations?

What is the present CH₄ emission from the seabed to the atmosphere?

- Quantify the present-day CH₄ emissions from the seabed west of Prince Carl Forland (Svalbard) and identify main influences on the processes.
- Improve the knowledge about the overall activity of the marine seep sites offshore Svalbard.



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Main aim: Up-scaling to provide emissions for present-day, and future emissions.

Measurements on a ship, by aircraft and on land stations

Task 2.1: Synthesis of available information about all MH areas in the Arctic and detailed description areas where MH emissions are known and seem possible (UiT)

Task 2.2: Detailed CH₄ emissions at present time for the Arctic (NILU)

Source attribution and generation of emission maps by use of inverse modelling using FLEXPART and all observations from WP1 and other observations of CH₄ in the Arctic.



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Task 2.3: Upscaling of CH₄ emissions for two regions with time (CICERO)

Develop parameterization of CH₄ emissions for MH as a function of temperature and other key parameters

Use an Earth System Model (NCAR CESM) combined with CMIP5 results for future temperature changes and its uncertainty for scenarios in 2050 and 2100 without CH₄ emissions from MH.

Estimate upper and lower bounds of CH₄ emissions from MH for 2050 and 2100 in 2 Arctic regions.



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- **Milestone 2.1:** Synthesis of available information about all MH areas in Arctic (M6)
- **Milestone 2.2:** Methane budget from individual seeps and seep areas (M20)
- **Milestone 2.3:** Ocean-seabed and ocean-atmosphere emission estimates, (M20)
- **Milestone 2.4:** Inverse modelling step 1 completed (M15)
- **Milestone 2.5:** Inverse modelling step 2, completed (M24)
- **Milestone 2.6:** Preliminary estimate of CH₄ emissions from MH for 2050 and 2100 (M18)
- **Milestone 2.7:** Parameterisation of CH₄ emissions from MH (M18)
- **Milestone 2.8:** Ocean temperature scenarios in 2050 and 2100 (M12)
- **Milestone 2.9:** Estimate upper and lower bounds of CH₄ emissions from MH for 2050 and 2100 (M26)



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- Discussion points



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