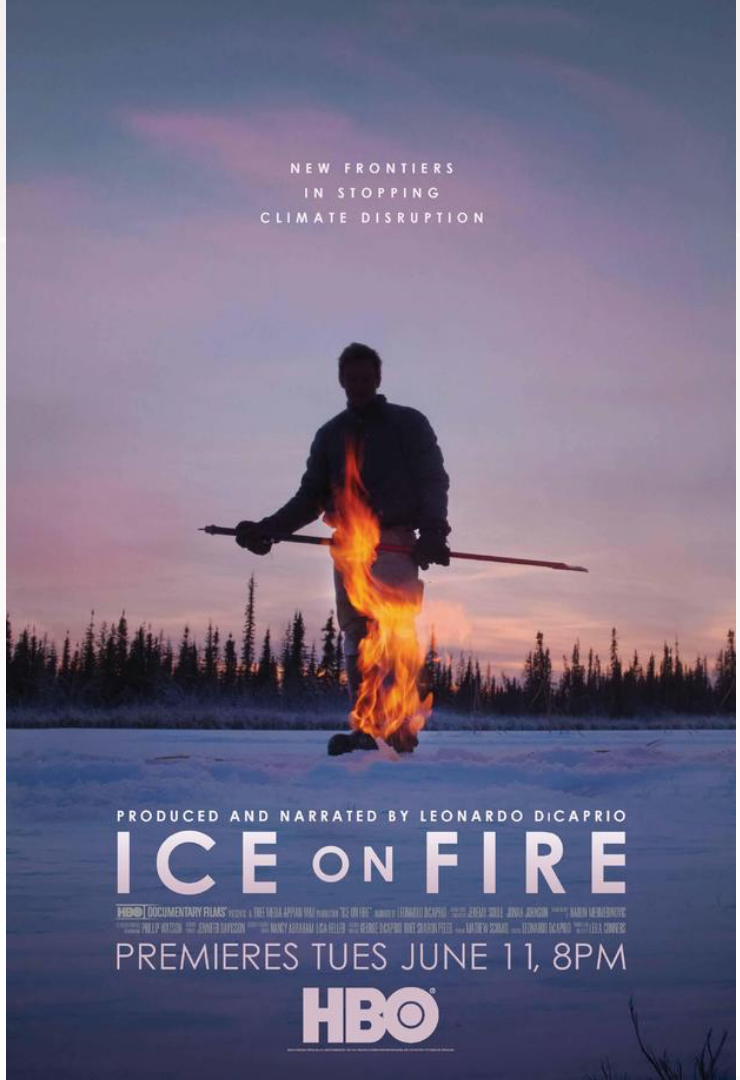
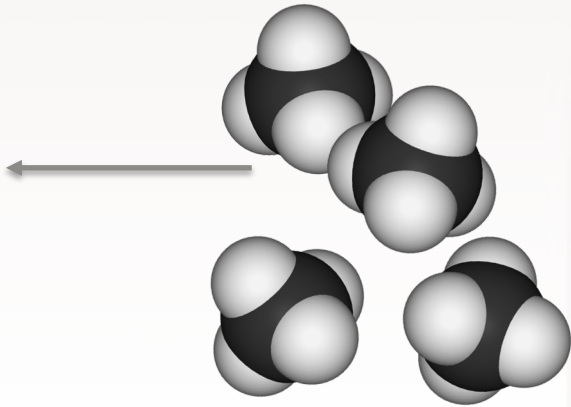
METHANE FROM THE SEA FLOOR TO THE ATMOSPHERE

THE INTEGRATIVE VIEW FROM RESEARCH INFRASTRUCTURES

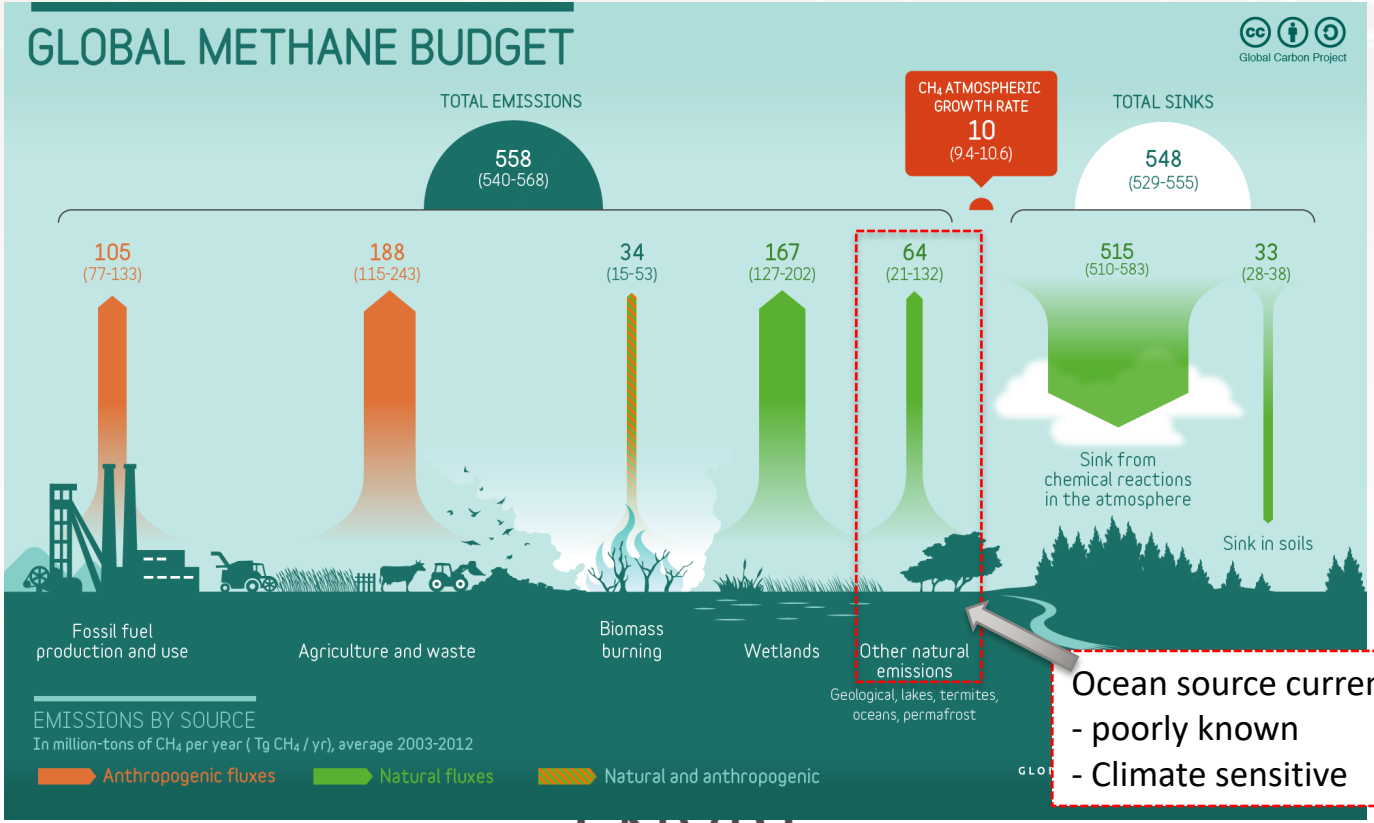
JEAN-DANIEL PARIS (CEA, FRANCE) + WP4 PARTICIPANTS

Supporting environmental research
with integrated solutions
- the Earth is our lab


NEW FRONTIERS
IN STOPPING
CLIMATE DISRUPTION
PRODUCED AND NARRATED BY LEONARDO DiCAPRIO
ICE ON FIRE
HBO DOCUMENTARY FILMS
PREMIERES TUES JUNE 11, 8PM
HBO



METHANE, A GREENHOUSE GAS WITH CLIMATE-SENSITIVE SOURCES



Ocean source currently minor but:
- poorly known
- Climate sensitive

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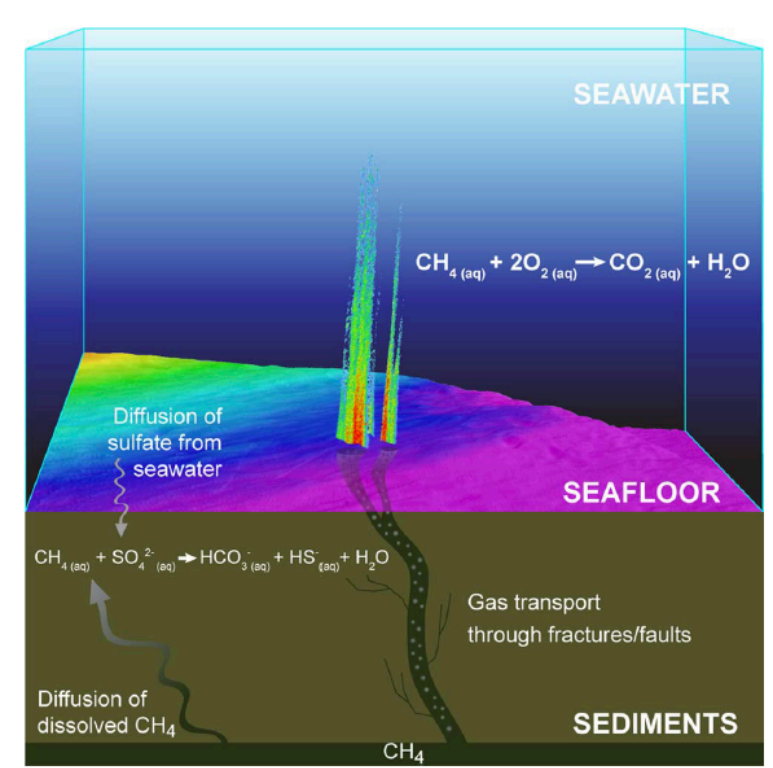
SUBSEA METHANE SOURCES – SEEPS, SEDIMENTS, HYDRATES



James et al., 2016

- 80-300 Tg CH_4 produced per year
- compare to 4,000 Tg in atmosphere
- 10,000,000 Tg stored in clathrate reservoirs
- Fortunately >90 % consumed by microbial degradation of methane in the sediment porewater column

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A global challenge that can be tackled only by a coordination of research infrastructures

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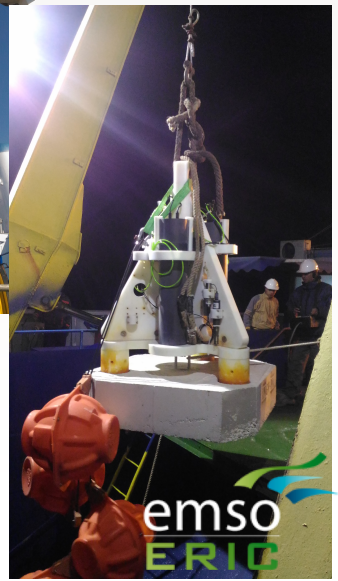
THE ENVRIPLUS METHANE CRUISE (BLACK SEA, 1-9 APRIL 2019)



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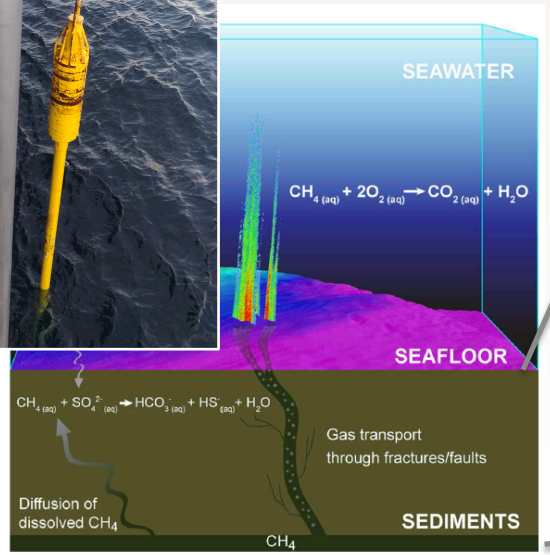
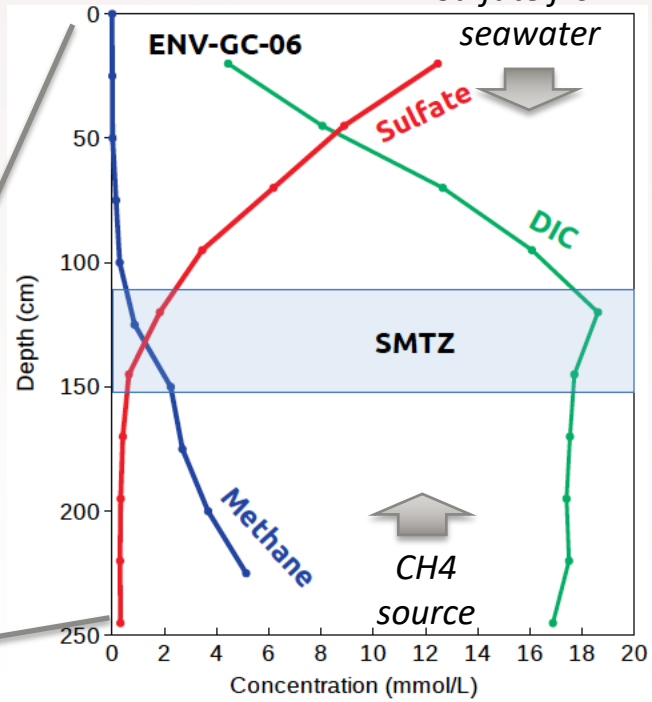
METHANE IN THE SEDIMENT: OXIDIZE OR ESCAPE?

Eurofleets





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T. Giunta et al.

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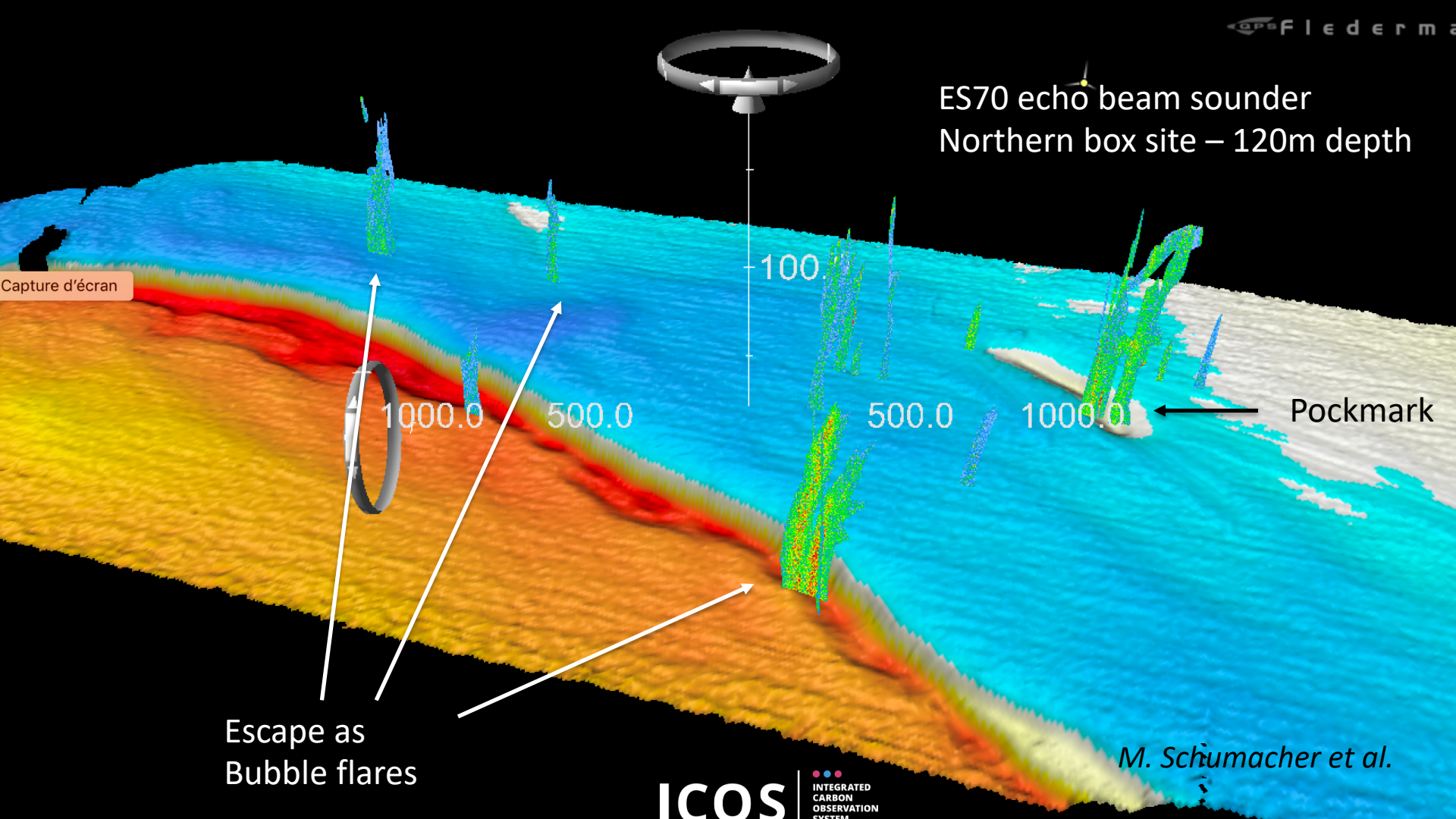
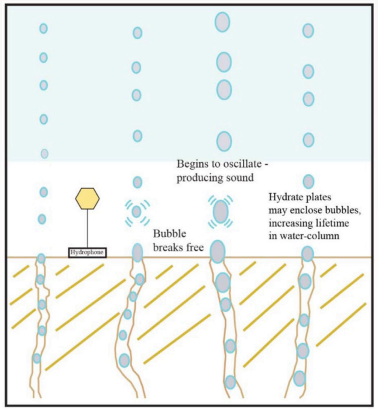
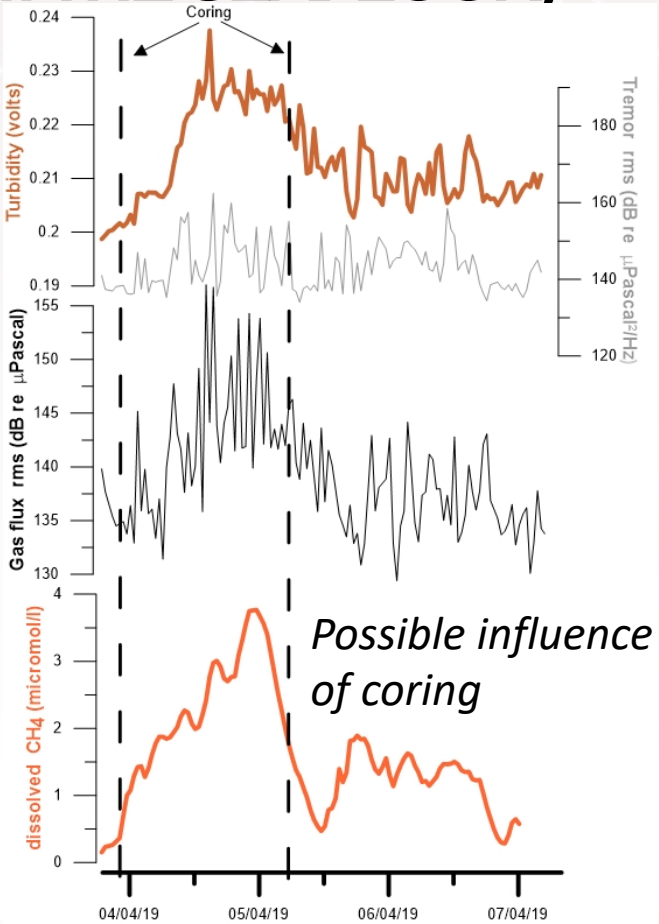

ES70 echo beam sounder
Northern box site – 120m depth
100.
1000.0
500.0
500.0
1000.0
Pockmark
Escape as
Bubble flares
M. Schumacher et al.
ICOS
INTEGRATED
CARBON
OBSERVATION

BUBBLE FLUX VARIES IN TIME (AS SEEN FROM THE SEAFLOOR)



b)

Italiano et al.



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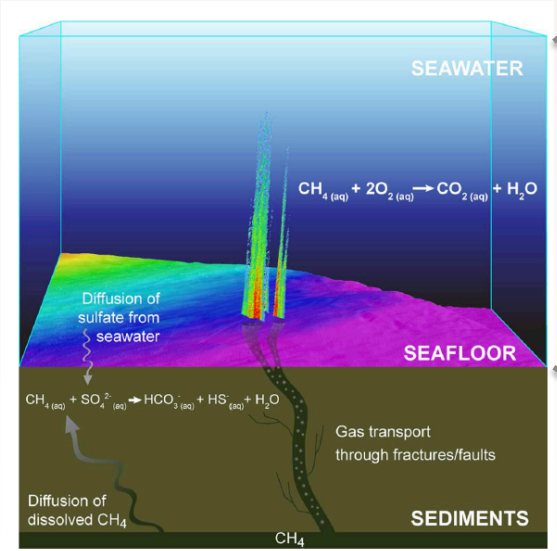
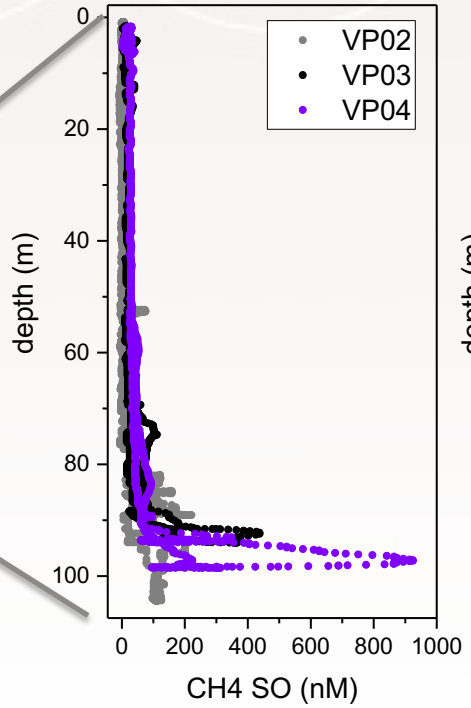
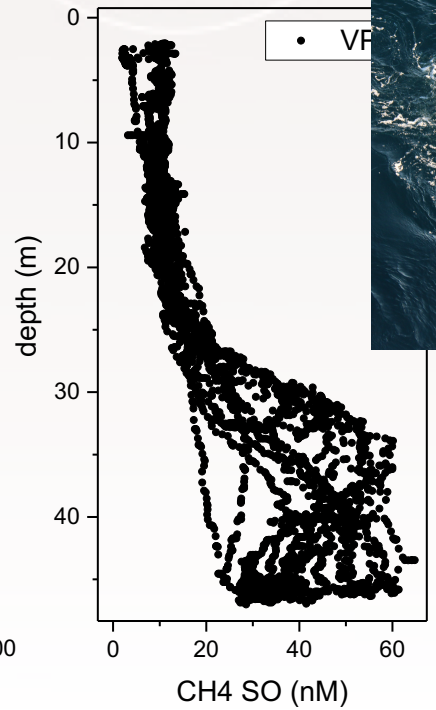
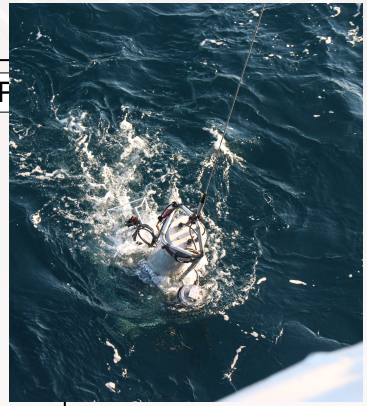
TRANSPORT AND OXIDATION OF METHANE IN THE WATER COLUMN









Grilli et al.
Sensor technology ACTRIS

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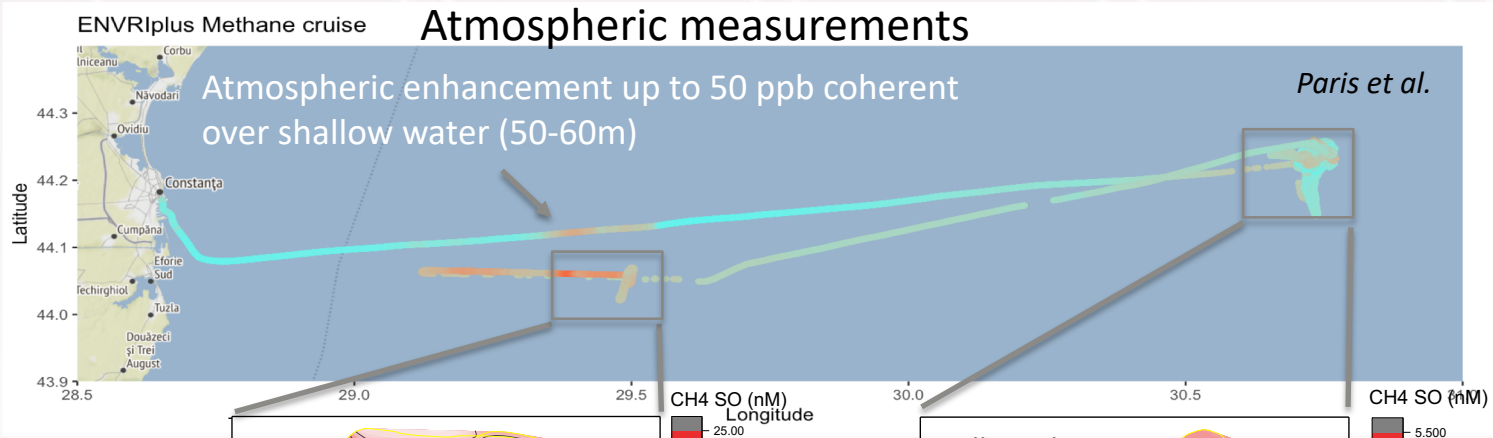
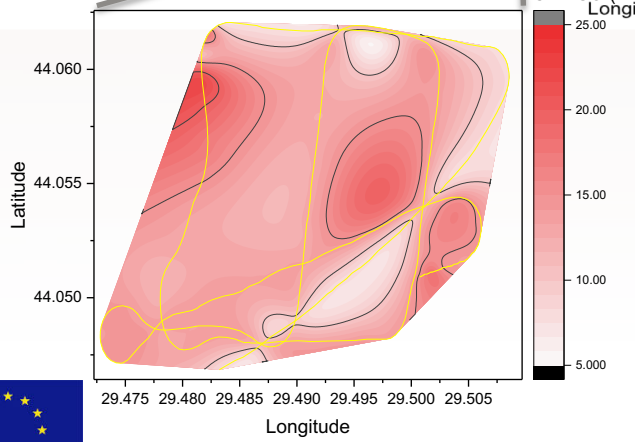
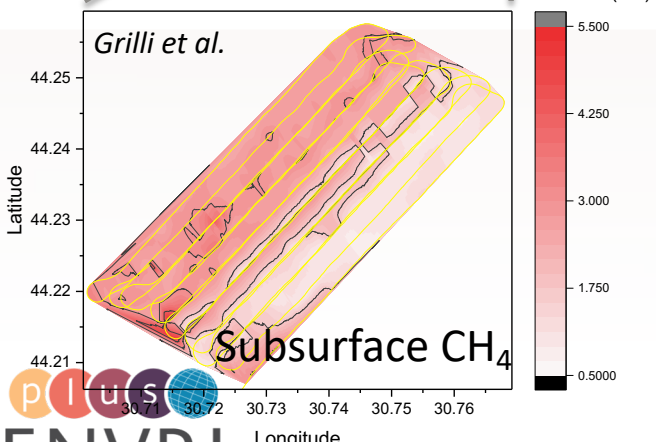
HOW MUCH METHANE REACHES THE ATMOSPHERE?







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NEXT STEPS TOWARD INTEROPERABLE OBSERVATIONS FOR CROSS-CUTTING ENVIRONMENTAL SCIENCE

- Establish a **blueprint** for joint operations of Research Infrastructures on cross-cutting challenges
- Elaborate the concept of a **systematic monitoring capability based on existing Research Infrastructures** to detect large scale changes in methane fluxes in European/global waters
- Propose joint actions of Research Infrastructures on sensors and observatories
- Establish a European network of best practices and capacity building for harmonized monitoring
- Promote intercomparison exercises and harmonization/standardisation of sensor test practices

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