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SEAGAS: A Brazilian-European project to compare gas hydrate systems on the Atlantic and Mediterranean ocean margins

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Marie Skłodowska-Curie Actions (MSCA)



MSCA-GF-SEAGAS Objectives

Research Objective
1st comparison of gas hydrate dynamics on ocean margins that undergo different forms of climate forcing: open Atlantic margin of Brazil and semi-enclosed Mediterranean Sea

Training Objective
To diversify the competencies of the researcher and the two hosts, through joint research activities addressing shared research interests

Strategic Objective
To stimulate the development of future projects involving Brazilian and European scientists in mutually beneficial research activities

MSCA-GF-SEAGAS (2016-2019)

Strengths in marine geochemistry	Strengths in marine geology & geophysics
Shared interests in building capacity in gas hydrate research	

Gas Hydrate – Ice that Burns

Formation dependent on :

- pressure (higher)
- temperature (lower)
- a source of gas

Found in :

- areas of permafrost
- water depths >300 m
- mainly on continental margins (natural sources of gas)

Global gas hydrate locations

Organic carbon in the earth

Gas hydrates	10,000 10 ¹⁵ g
Other	500
Peat	830
Land biota	830
Dissolved organic matter	980
Soil	1,400
Recoverable and non-recoverable fossil fuels (coal, oil, natural gas)	5,000

on conservative estimates, form the largest natural reserve of carbon on Earth

SEAGAS Study Areas and Project Structure

Gas Hydrate Occurrences on the Atlantic-Mediterranean margins

SEAGAS study areas

- Nile fan (enclosed sea)
- Amazon fan (open Atlantic)
- Rio Grande cone (open Atlantic)

Project structure

- Numerical modelling of gas hydrate stability to guide interrogations of datasets held by hosts on the Brazilian and Nile margins
- generate hypotheses to test through the acquisition of new data, during a joint research campaign to the Nile or Amazon deep-sea fans

Source: USGS Gas Hydrates Project

Submarine gas hydrate stability zone (GHSZ)

Typical continental margin :

GHSZ dynamics:

- thickens/thins over time, with changes in sea level (pressure) and water temperature
- release of gas and water may trigger submarine landslides (and more gas release)

SEAGAS conceptual framework : first comparison of gas hydrate systems on margins that have undergone different forms of glacial-interglacial (10⁴ yr) climate forcing

Open ocean (Norwegian margin)

Mediterranean Sea (Nile margin)

Expected changes in gas hydrate stability for a post-glacial rise in both sea level and bottom water temperatures

Changes on upper slope ← **Basin-wide changes**

MSCA Opportunities for Researchers

Where to find more information

- Website **MSCA** : <http://ec.europa.eu/msca>
- H2020 Participants Portal : <http://ec.europa.eu/research/participants/portal>
- Euraxess Links Brazil : <https://euraxess.ec.europa.eu/worldwide/brazil>
- CONFAP/FAPs: "Guidelines for the preparation of research proposals in collaboration with proposals submitted to EU Horizon 2020" (<http://www.fapesp.br/9775>)

SEAGAS proposed French-Brazilian campaigns

Aim : to test hypotheses on gas hydrate dynamics through the joint acquisition of multi-disciplinary data (geological/geochemical/geothermal/geotechnical/geophysical)

Proposals submitted to French national ship-time programme

- Nile fan - SEAGAL**
Submitted 09/2016 by S. Migeon (, ranked top priority, decision on vessel scheduling expected 2018-2019)
- Amazon fan – AMARYLLIS**
Submitted 09./2016 by A. Govein (CNRS), ranked second priority; resubmitted 09/2017 (for 2019-2020)

Scientific drilling proposal in preparation - IODP

- Amazon fan - submission led by UFF planned for 2018, campaign possible in 2019-2020**

References

Beauchamp B (2004) Natural gas hydrates: myths, facts and issues. *Comptes Rendus Geoscience* 336 (9): 751-765.

Fillon RH and Roberts HH (2007) *AAPG Search and Discovery Article #30051*

Kvenvolden KA (1993) Gas hydrates—Geological perspective and global change. *Reviews of Geophysics* 31: 173–187.

Kvenvolden KA (1998) Methane hydrate – a major reservoir of carbon in the shallow geosphere? *Chemical Geology* 71: 41-51.

Mienert J, Vanneste M, Bünz S, Andreassen K, Hafliadason H, Sejrup H-P (2005) Ocean warming and gas hydrate stability on the mid-Norwegian margin at the Storegga Slide. *Marine and Petroleum Geology* 22: 233–244.

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