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

Daniel Praeg^{1,2}, João Marcelo Ketzer¹, Sébastien Migeon², Tadeu dos Reis³, Cleverson Silva⁴, Vikram Unnithan⁵











¹Instituto do Petróleo e dos Recursos Naturais do PUCRS, Porto Alegre, RS, BRASIL ²Géoazur (UMR7329 CNRS), Valbonne, Cote D'Azur, FRANCE ³Universidade do Estado do Rio de Janeiro, Faculdade de Oceanografia, Brazil ⁴Universidade Federal Fluminense, Department of Geology, Niterói – RJ, Brazil ⁵Jacobs University Bremen, GERMANY







Marie Skłodowska-Curie Actions (MSCA)



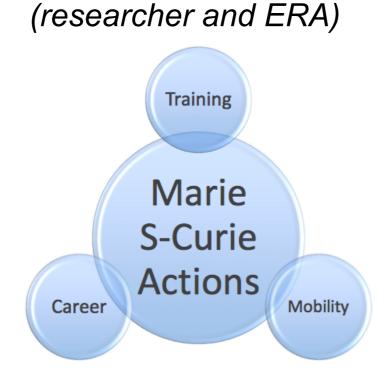
international collaboration (outgoing & return hosts)

Global Fellowships

• skills training & exchange (researcher and hosts)

career development

research project of benefit to





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

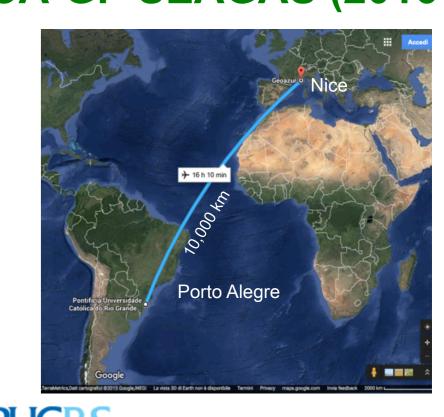
> Training Objective

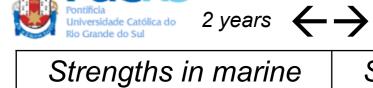
To diversity the competencies of the researcher and the two hosts, through joint research activities adressing shared research interests

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 geology & geophysics

geochemistry Shared interests in building capacity in gas hydrate research



Global

Fellowships

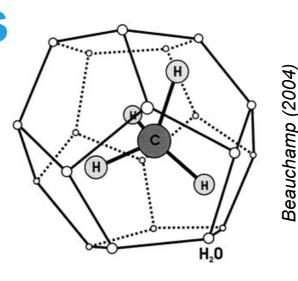
GFs: 12-24 months for the outgoing phase plus

12 month return phase in Europe

Gas Hydrate – Ice that Burns

 ice-like compounds of water (H₂O molecular cages) and natural gas

(CH₄), a powerful greenhouse gas



1 m³ solid yields up to $160 \text{ m}^3 \text{ of gas}$

on conservative

estimates, form

the largest

natural reserve

of carbon on

Earth

gas concentrators - mainly methane

water

Submarine gas hydrate stability zone (GHSZ)

Formation dependent on :

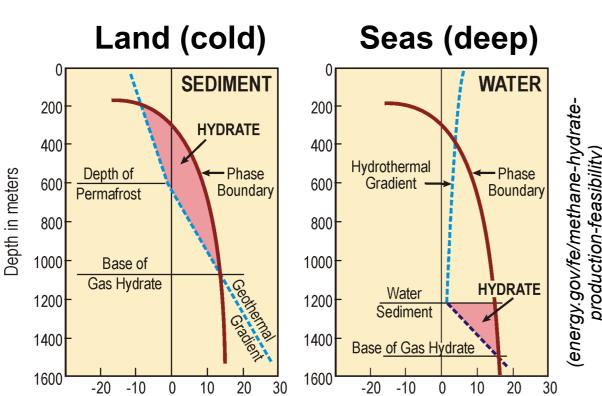
- pressure (higher)
- temperature (lower)
- a source of gas

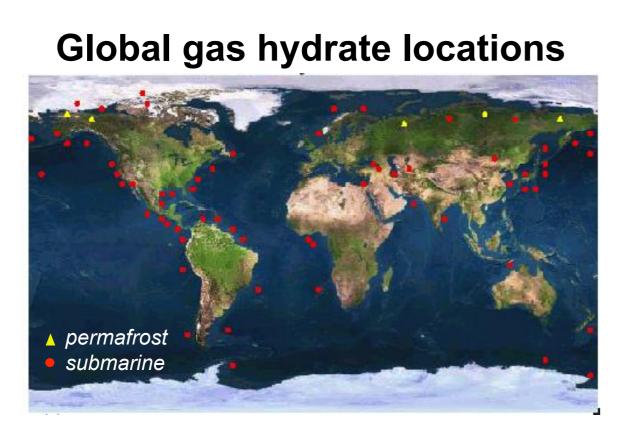
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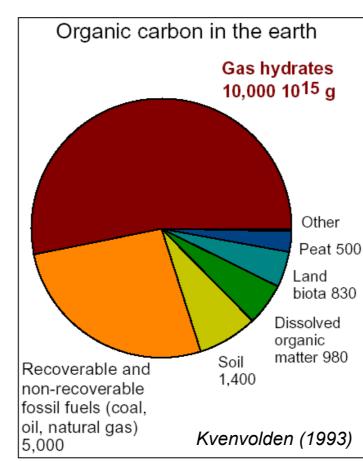
- areas of permafrost
- water depths >300 m
- mainly on continental margins (natural sources of gas)

Typical continental margin :

Zone of Potential Instability

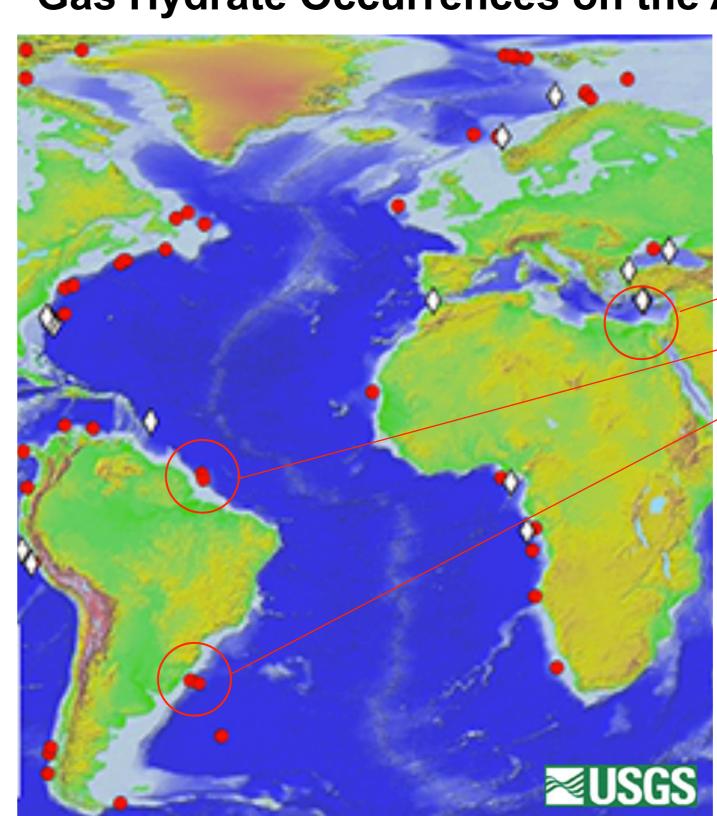






SEAGAS Study Areas and Project Structure

Gas Hydrate Occurrences on the Atlantic-Mediterranean margins



Source: USGS Gas Hydrates Project

Gas hydrate inferred (seismic)

Gas hydrate sampled

SEAGAS study areas

Nile fan Amazon fan Rio Grande cone -

enclosed sea 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

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) Glacial sea level zone due t Expected changes in gas hydrate stability for a postglacial rise in both sea level Sea level change: 120 m and bottom water temperatures

Mediterranean Sea (Nile margin) all depths >800 m **Basin-wide changes**

MSCA

GHSZ dynamics:

Opportunities for Researchers



Where to find more information

Assumed geothermal

gradient = 27.3°C/1000m

• 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



thickens/thins over time, with changes in sea level

release of gas and water may trigger submarine

(pressure) and water temperature

landslides (and more gas release)

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 multidisciplinary data (geological/geochemical/geothermal/geotechnical/geophysical)

Proposals submitted to French national ship-time programme

Changes on upper slope

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



Acknowledgement

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References

Marie Skłodowska-Curie actions

successful research career

A pocket guide:

Your passport to a

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