Natural Hydrogen

Task 49

Eric C. Gaucher (PhD)

Co-leader

Olivier Sissmann (PhD)

Co-leader

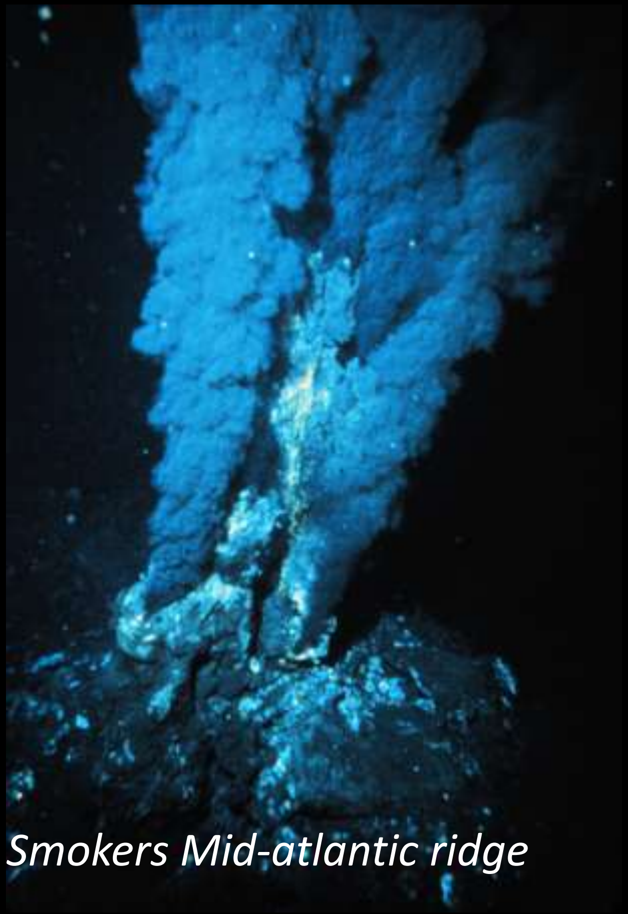
Natural hydrogen
Progress, challenges and cases studies

Task 49

Dr Eric C. Gaucher
TASK 49 co-leader

CEO & H_2 explorer
Lavoisier H_2 Geoconsult
www.lavoisierH2.com

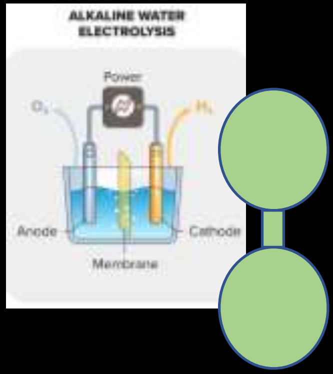
White chimneys at Champagne vent site, NW Eifuku volcano.



Black Smokers Mid-atlantic ridge

Our future: The Hydrogen Age ? (Holland and Provenzano 2007)

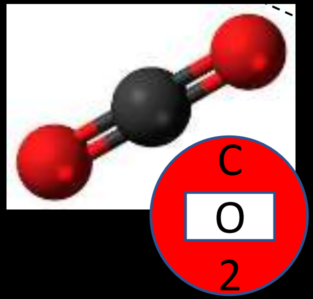
The Colors of Hydrogen – Brown, Grey, Blue, Green… And White/Gold

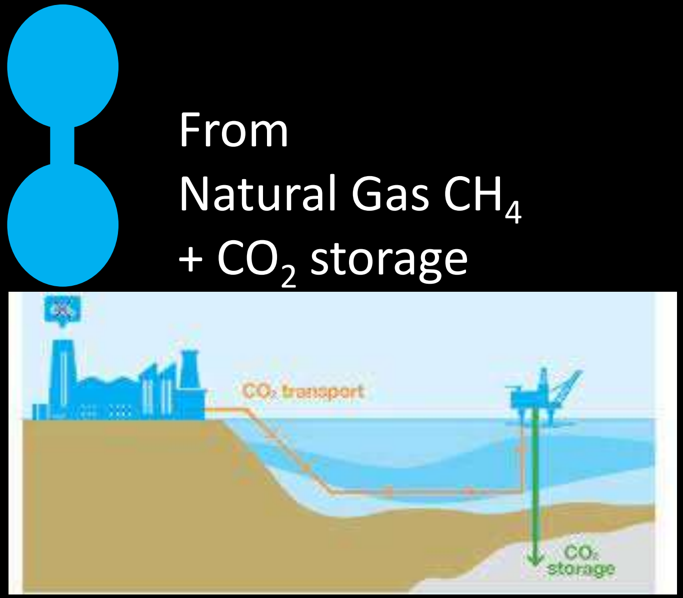


From
Green electricity

From
Nuclear
electricity

From
Coal gasification





From
Natural Gas CH_4
\+ CO_2 storage

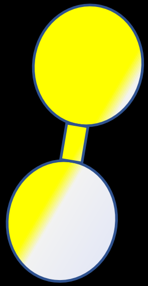
From
Natural Gas CH_4

From
Our Earth

Howarth, R.W. and Jacobson, M.Z. 2021 **How green is blue hydrogen?** Energy Science & Engineering.

And the newcomer:

White/Gold/
Native/Natural/
Geologic/Geogenic



Produced by the Earth

Lavoisier H_2 Geoconsult

Natural Hydrogen
From Scientific Press to Main Stream Press

nature geoscience

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nature > nature geoscience > perspectives > article

Perspective | Published: 03 October 2022

Orange hydrogen is the new green

F. Osselin, C. Soulaine, C. Fauguerolles, E. C. Gaucher, B. Scaillet & M. Pichavant

Nature Geoscience **15**, 765–769 (2022) | Cite this article

Osselin, F., ..., Gaucher, E.C., et al. (2022) Orange hydrogen is the new green. **Nature Geoscience** 15, 765-769.

JOURNALS ⌄ Science

SWI swissinfo.ch — Swiss perspectives in 10 languages

Climate change ›

White hydrogen – Switzerland joins the scramble for 'clean oil'

REUTERS

Startups race to strike hydrogen gold

The New York Times — Peter Coy

A Gold Mine of Clean Energy May Be Hiding Under Our Feet

Forbes

Forget Oil, New Wildcatters Are Drilling For Limitless 'Geologic' Hydrogen

02-2023
Press mainstream

Emmanuel Macron veut faire de la France un champion de l'hydrogène naturel

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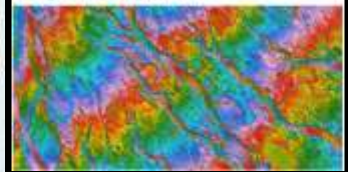
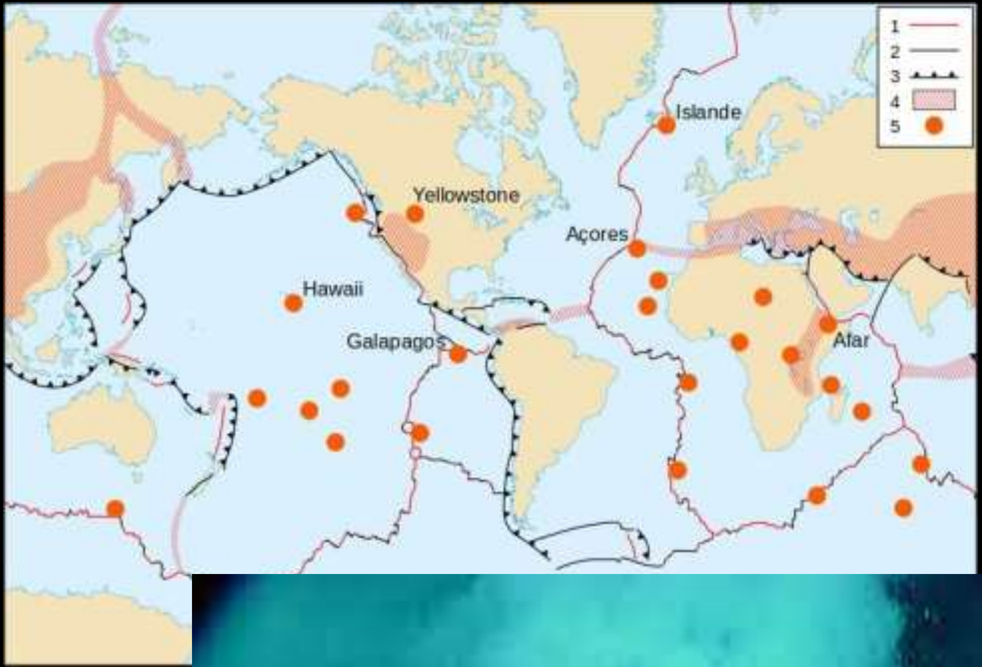
Energie aus dem Erdkern



Lavoisier H2 Geoconsult

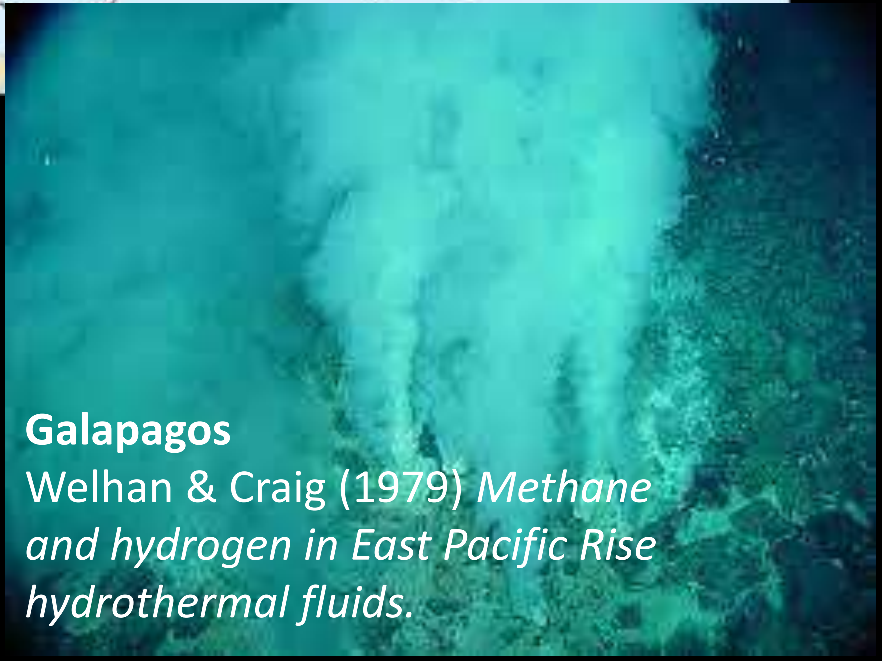
First discoveries

Black Smokers Mid-atlantic ridge

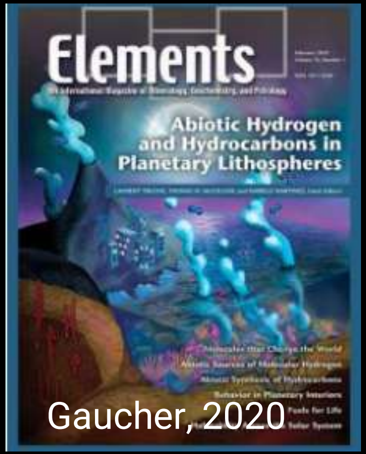


White chimneys at Champagne vent site, NW Eifuku volcano.

Serpentinized rock chimney
(in the 1990s)



Galapagos
Welhan & Craig (1979) *Methane and hydrogen in East Pacific Rise hydrothermal fluids.*



Gaucher, 2020

First discoveries

Russia – Larin NV (2014)

◄**Figure 7.** Progressive development of the Elektrostal structure. Moscow region and map of subsoil hydrogen concentrations (date of measurements 22/05/2012). Maxima correspond to the limit of the structure. *Dashed line* in *blue* shows the limit of the area, which is invaded by water and where measurements were not possible.

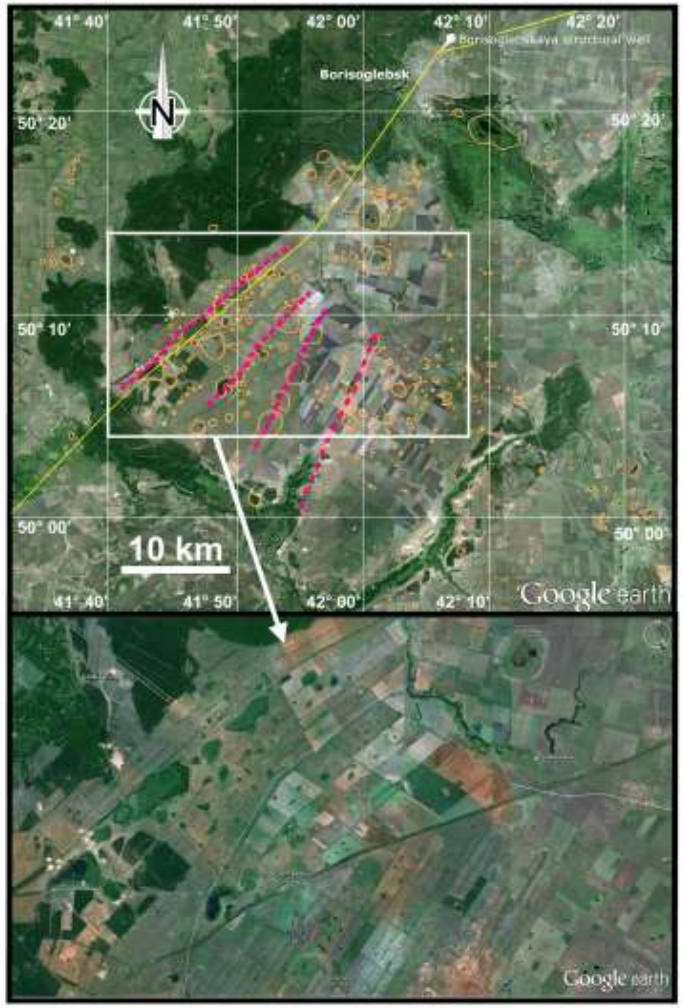
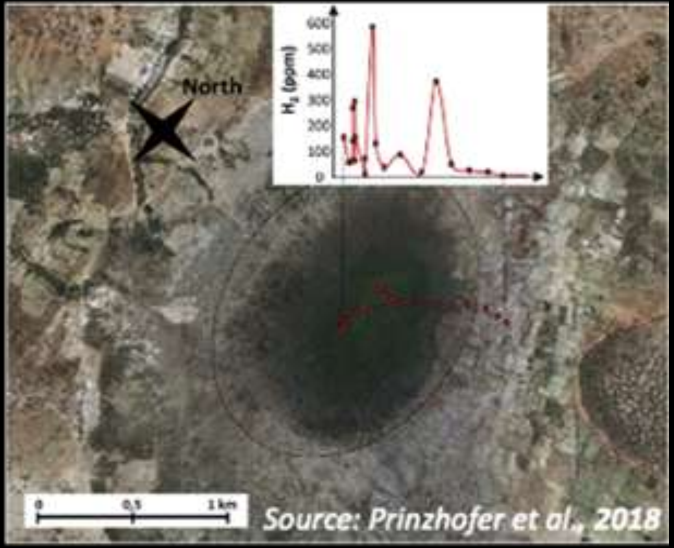
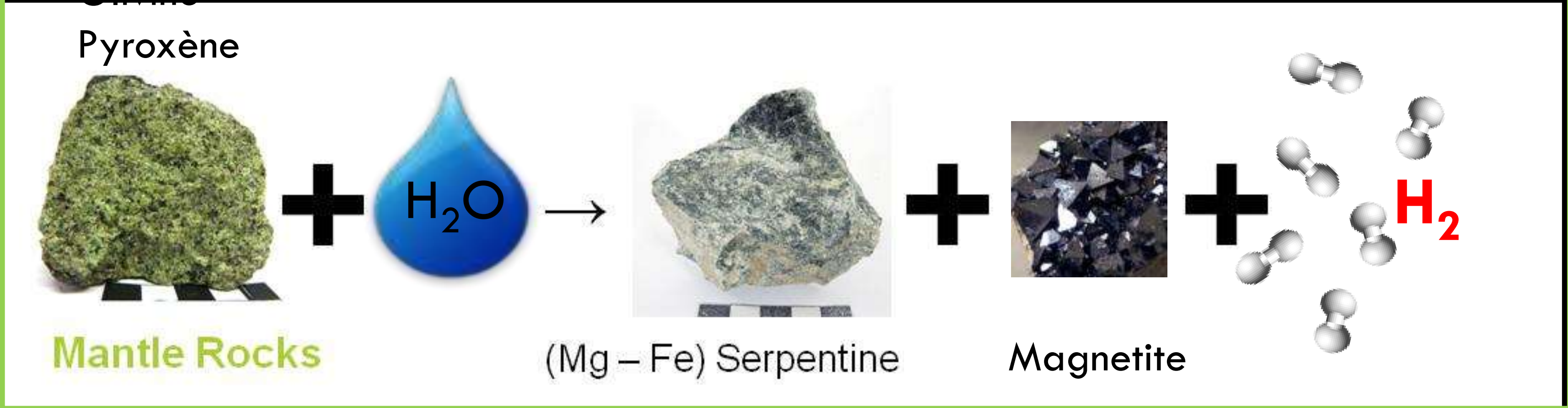


Figure 2. Distribution of depression sizes in a selected area in Central Russia (Borisoglebsk–Novokhopersk). Structures are outlined in orange polygons, and alignments of structures are shown as *pink dashed lines*. *Yellow line* shows the approximate position of one part of the cross-section (Fig. 3).



Natural H_2
Produced by Rock/Water interactions

Serpentinization



Production of abiotic CH_4

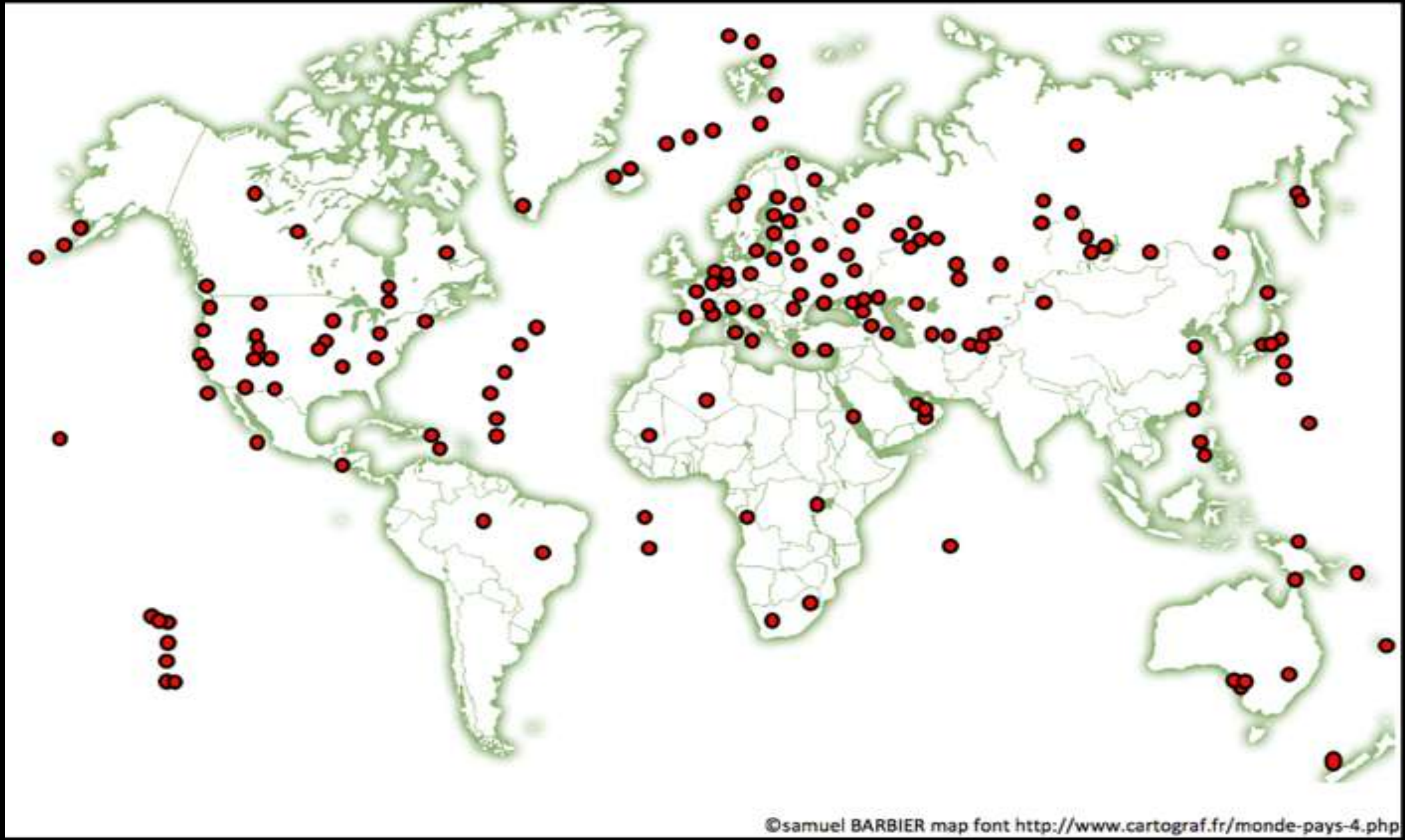
$H_2 + CO_2 \Rightarrow CH_4$

Iron Oxidation

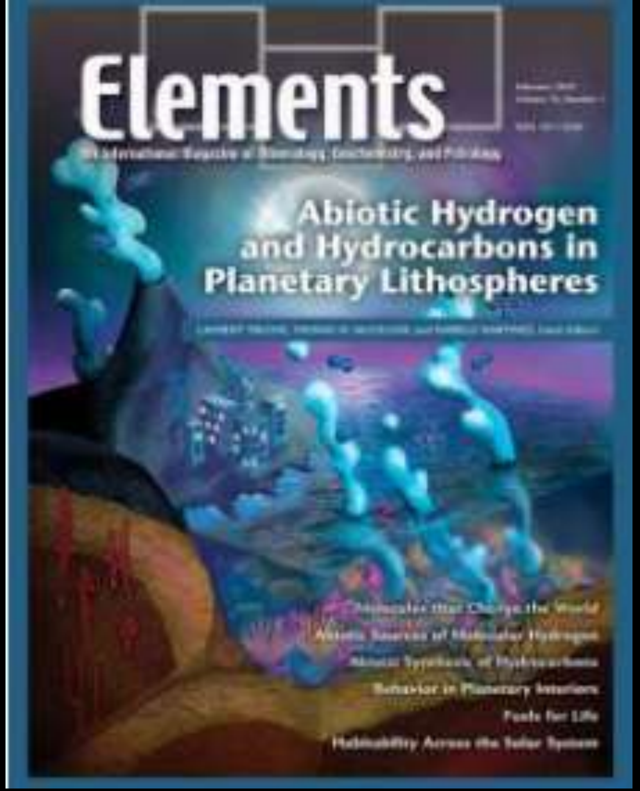
$2FeO + H_2O \Leftrightarrow Fe_2O_3 + H_2$

Natural Radiolyse

The water molecule is broken by radioactive radiations with a production of H_2



Barbier 2022 - Synthetic, non-exhaustive map of the main natural H2 emanation sites on earth, based on a generic synthesis of literature data. e.g. Zgonnik (2020), et Truche (2020).

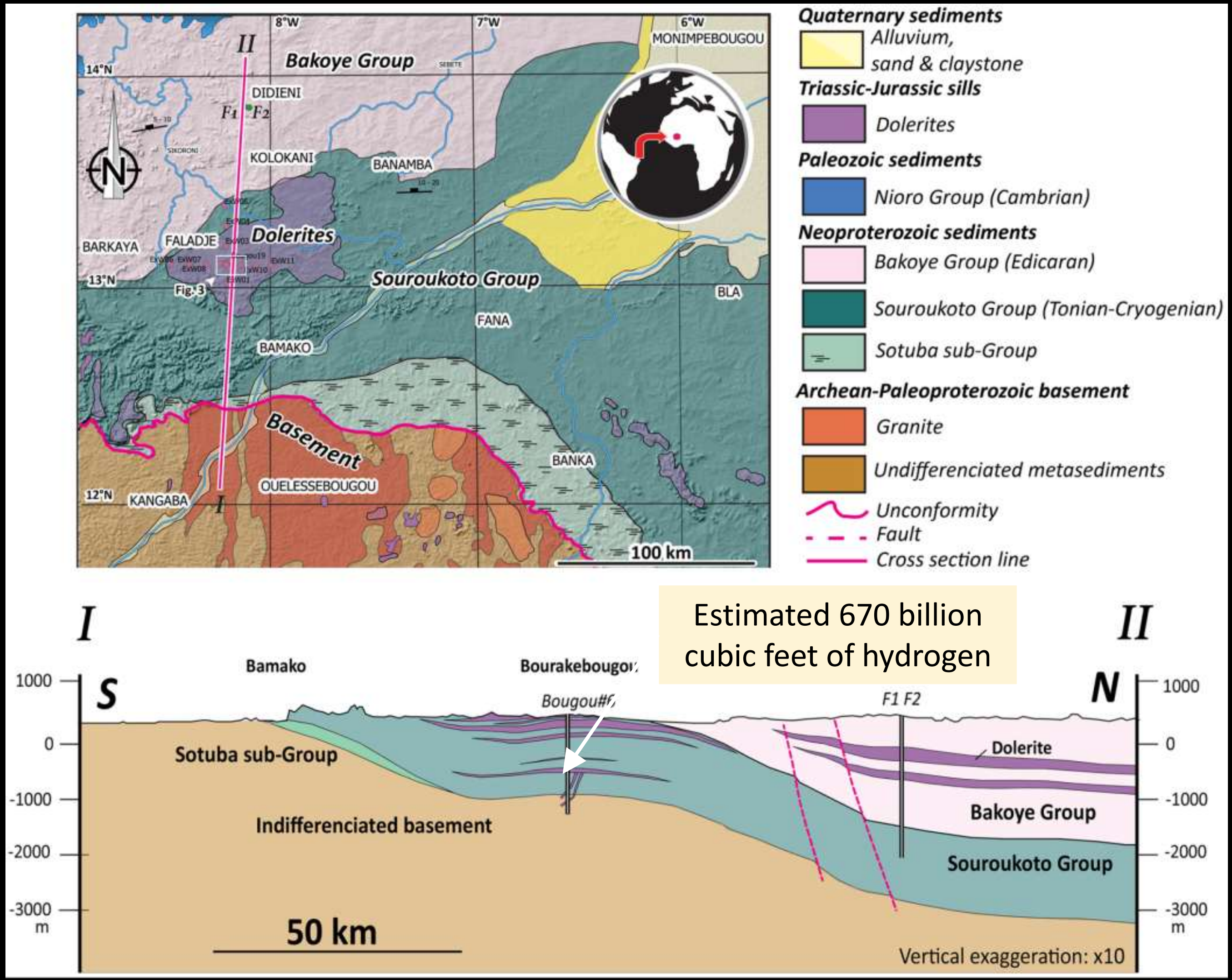


Mount Chimaera (Turkey)
abiotic CH_4 (87vol%) H_2 (10 vol%)

EC Gaucher (2020) New Perspectives in the Industrial Exploration for Native Hydrogen. Elements 16, n°1; 8-9

First natural hydrogen accumulation discovery

- 1987: Accidental discovery of flammable gas while drilling for water in Bourakébougou, Mali
- 2012: Petroleum company completes wells for gas production
- Gas is >97% hydrogen



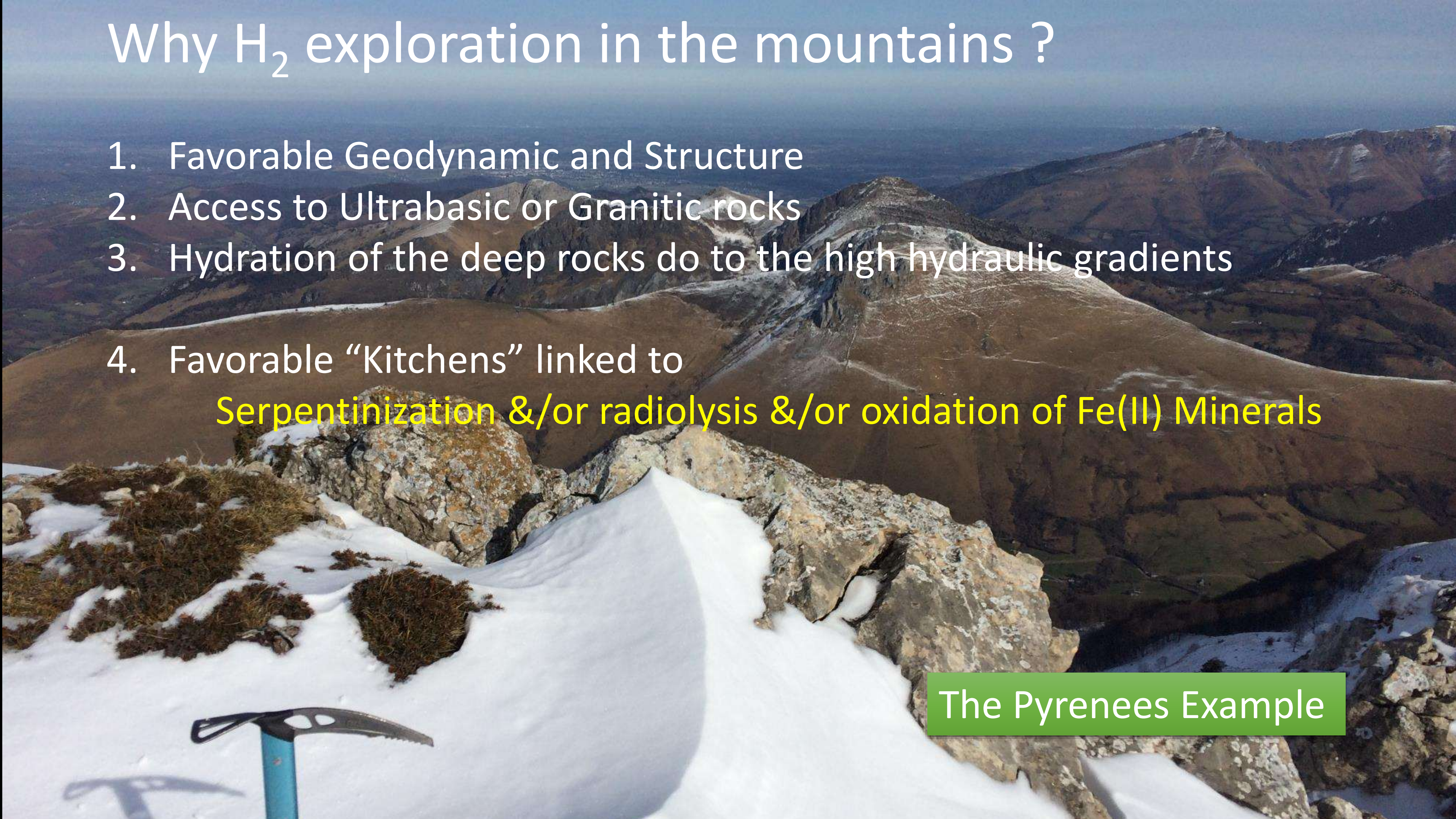
Estimated 670 billion cubic feet of hydrogen

(Maiga et al., 2023)

Why H_2 exploration in the mountains ?

1. Favorable Geodynamic and Structure
2. Access to Ultrabasic or Granitic rocks
3. Hydration of the deep rocks do to the high hydraulic gradients

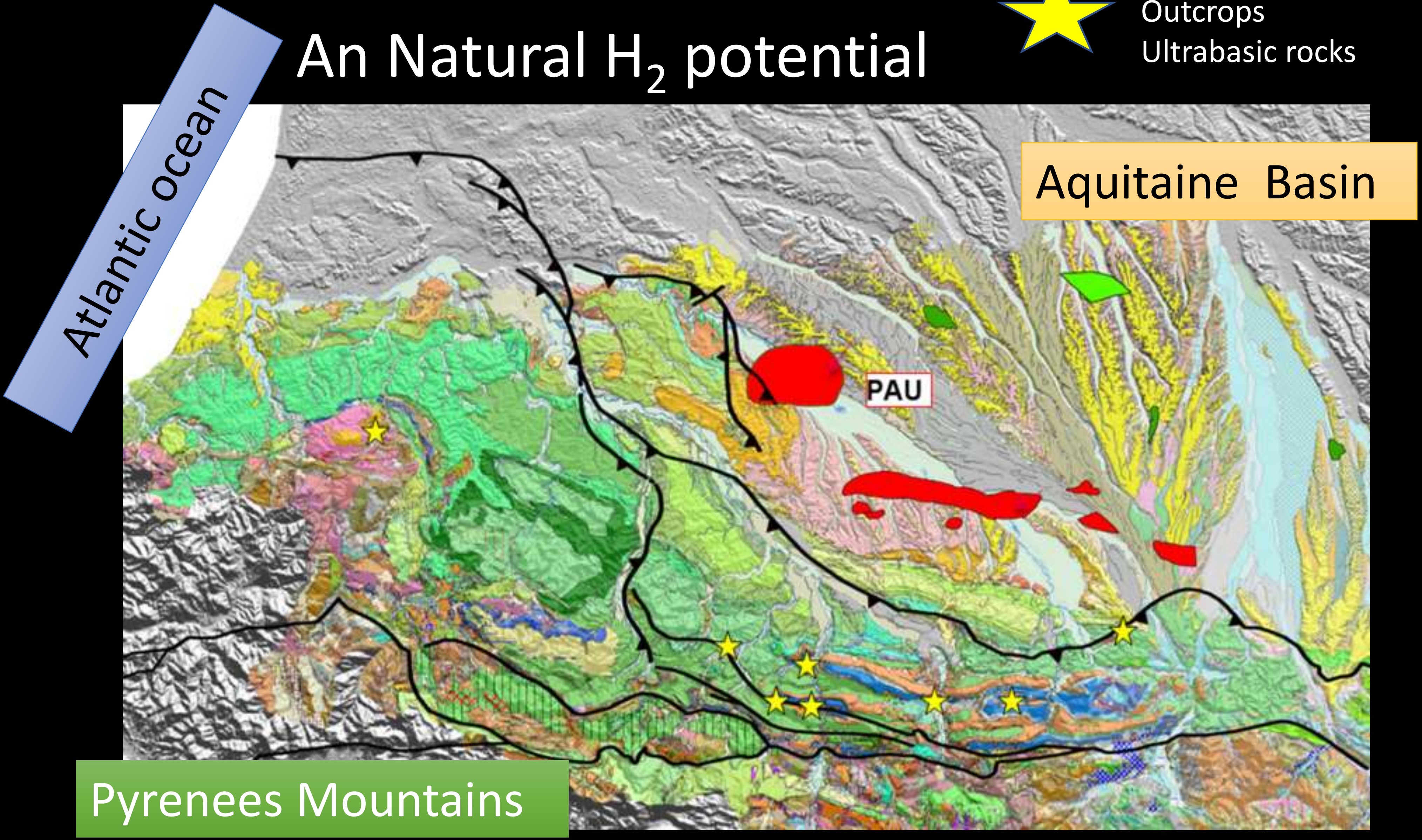
4. Favorable "Kitchens" linked to
   Serpentinization &/or radiolysis &/or oxidation of Fe(II) Minerals



The Pyrenees Example

An Natural H_2 potential

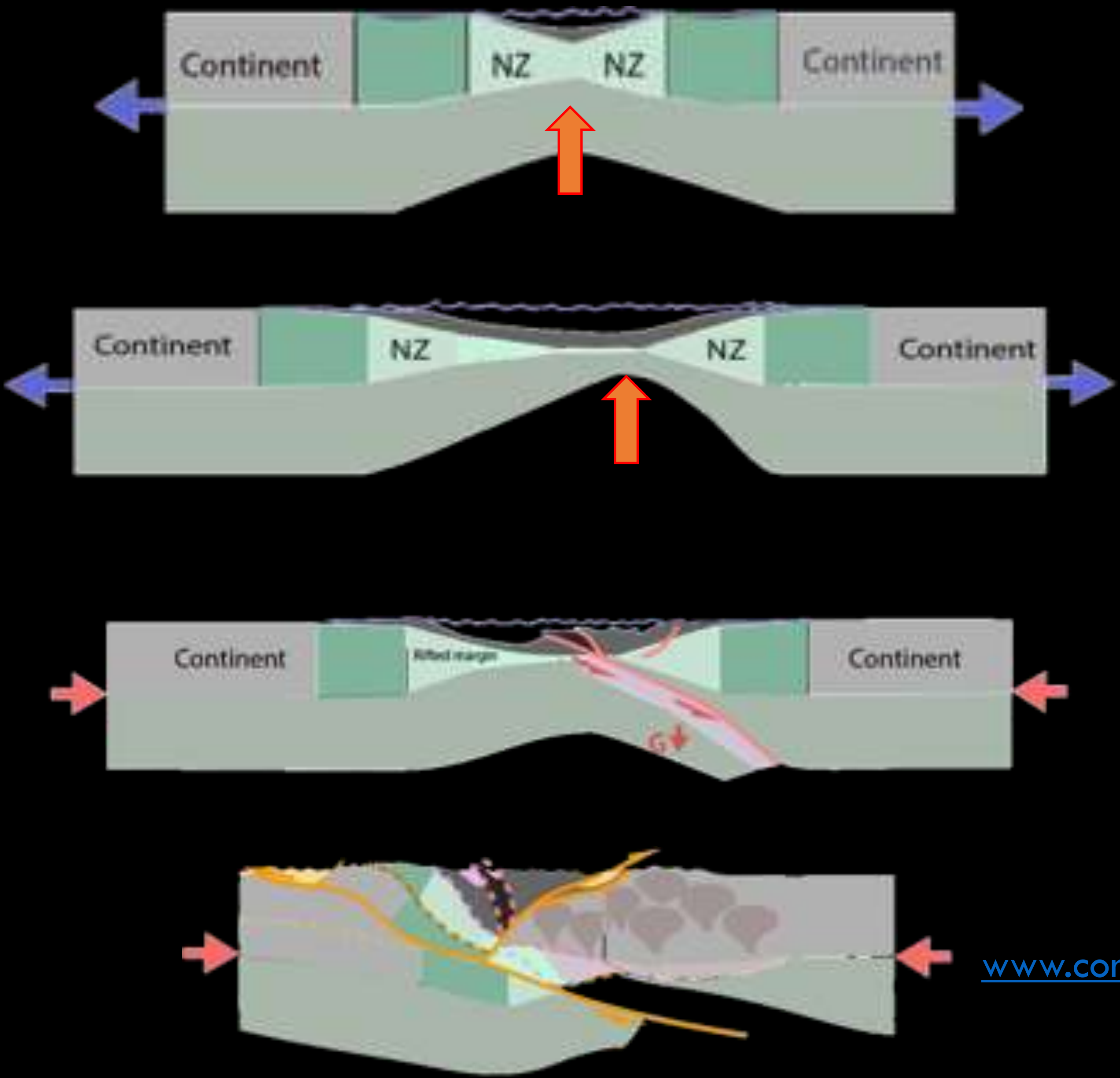
Outcrops
Ultrabasic rocks



Tectonic Context

Orogenic context: Creation of Mountains

With a trapping of **Mantle rocks** in an abnormal high position in the crust



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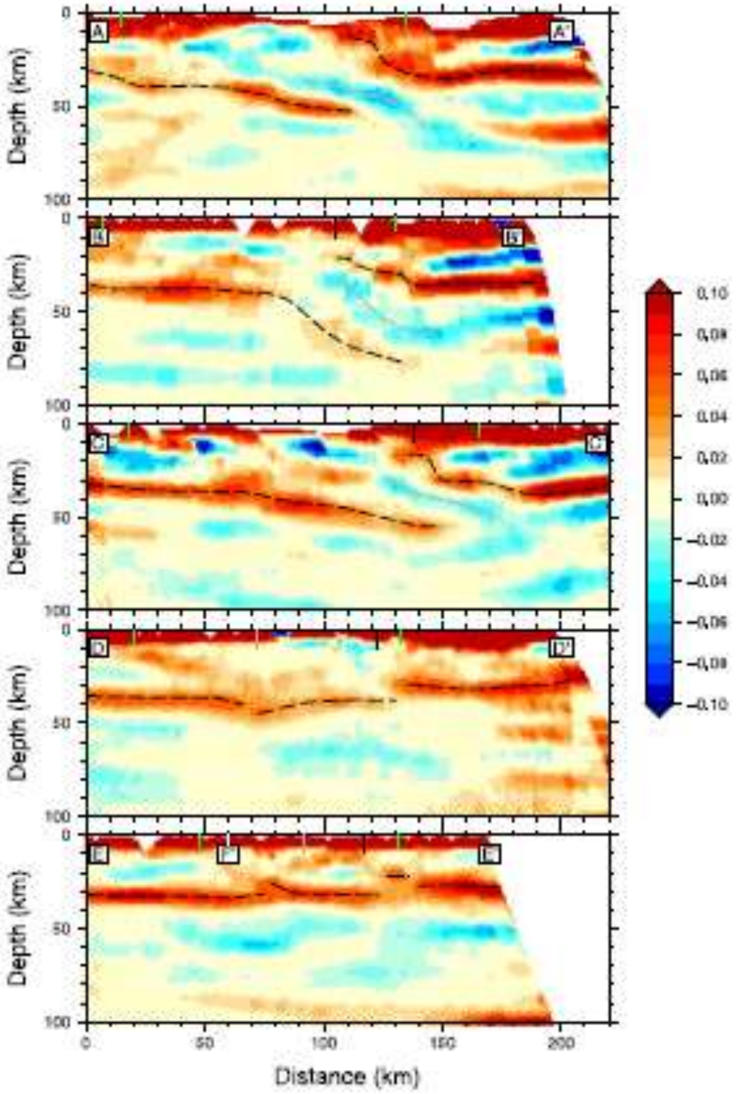


Figure 3. Common Conversion Point sections for (from top to bottom) transects (**A**-A'), (**B**-B'), (**C**-C'), (**D**-D') and (**E**-E') (see Fig. 1 for the localization of these transects). The Iberian and European Moho are represented with black dashed lines and the top of the subducting Iberian crust with a grey dashed line. The vertical lines show the positions of the SPFT and NPFT (green), the NPF (black, and of the Têt Fault (grey). The position of the crossing of transect (**E**-E') with transect (**F**-F') is also indicated.

SCIENTIFIC REPORTS

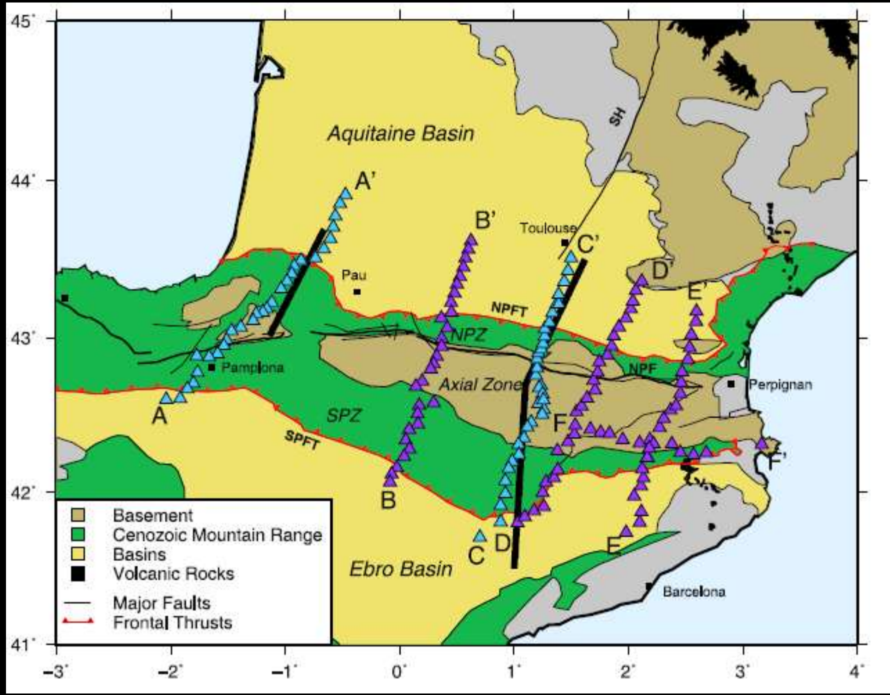
OPEN

The non-cylindrical crustal architecture of the Pyrenees

Sébastien Chevrot[1], Matthieu Sylvander[2], Jordi Diaz[3], Roland Martin[1], Frédéric Mouthereau[1], Gianreto Manatschal[4], Emmanuel Masini[5], Sylvain Calassou[5], Frank Grimaud[2], Hélène Pauchet[2] & Mario Ruiz[3]

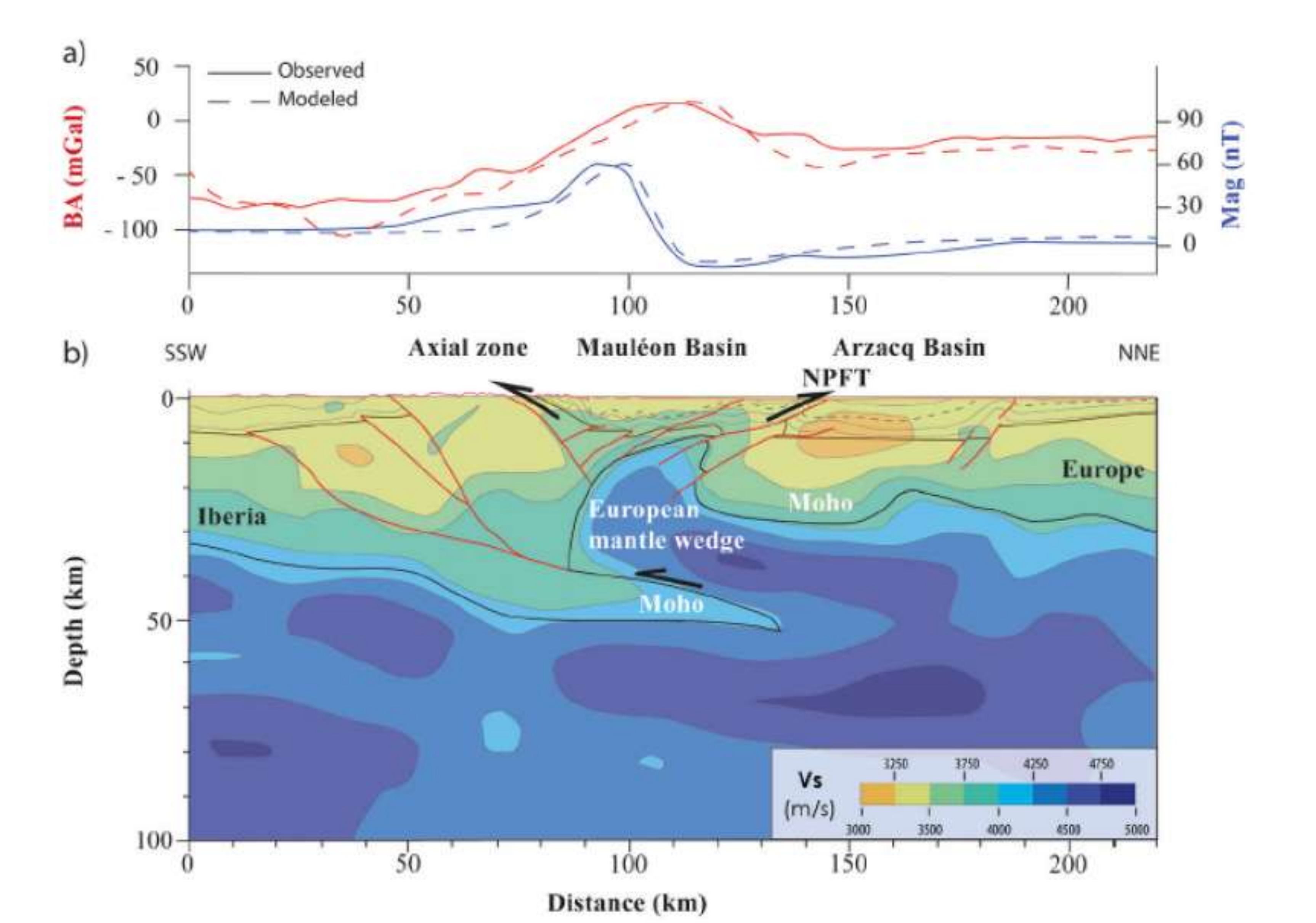
: 26 March 2018

ECORS



The example of the Pyrenees

Presence of dense, magnetic body associated with high velocities



GEOPHYSICS

Godard et al, 2021
Chevrot et al, 2021
www.convergent-margins.com

BSGF - Earth Sciences Bulletin 2021, 192, 47
© M. Lehujeur et al., Published by EDP Sciences 2021
https://doi.org/10.1051/bsgf/2021039

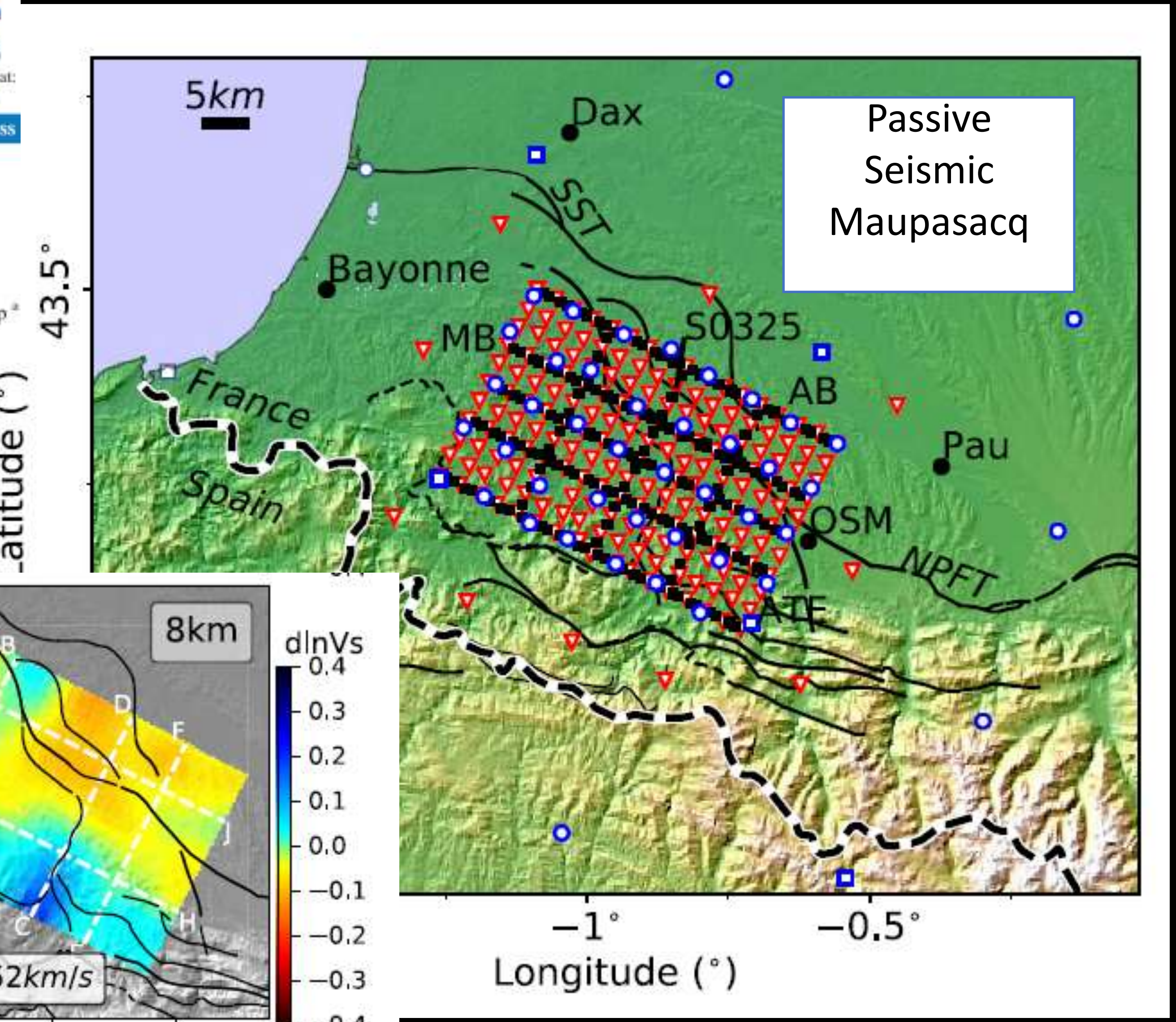
Special Issue Orogen lifecycle: learnings and perspectives from Pyrenees, Western Mediterranean and analogues
ed. O. Lacombe, S. Tavani, A. Teixell, D. Pedreira and S. Calassou (Guest editors)

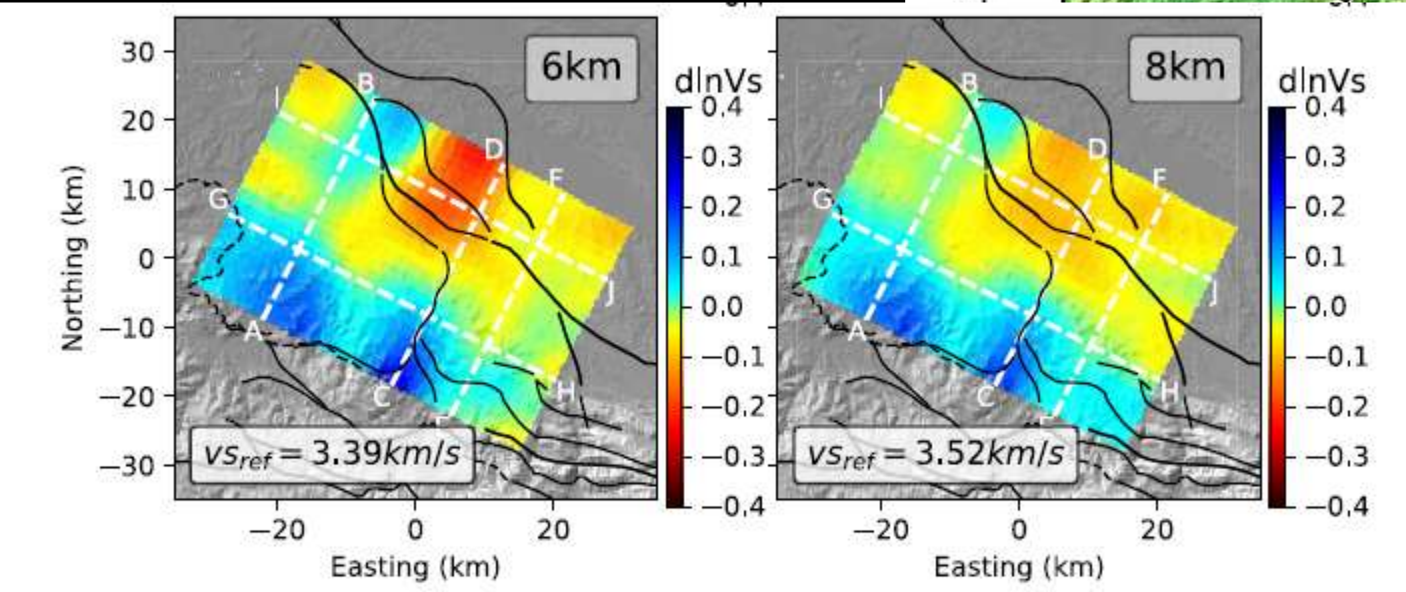
BSGF Earth Sciences Bulletin
Available online at:
www.bsgf.fr

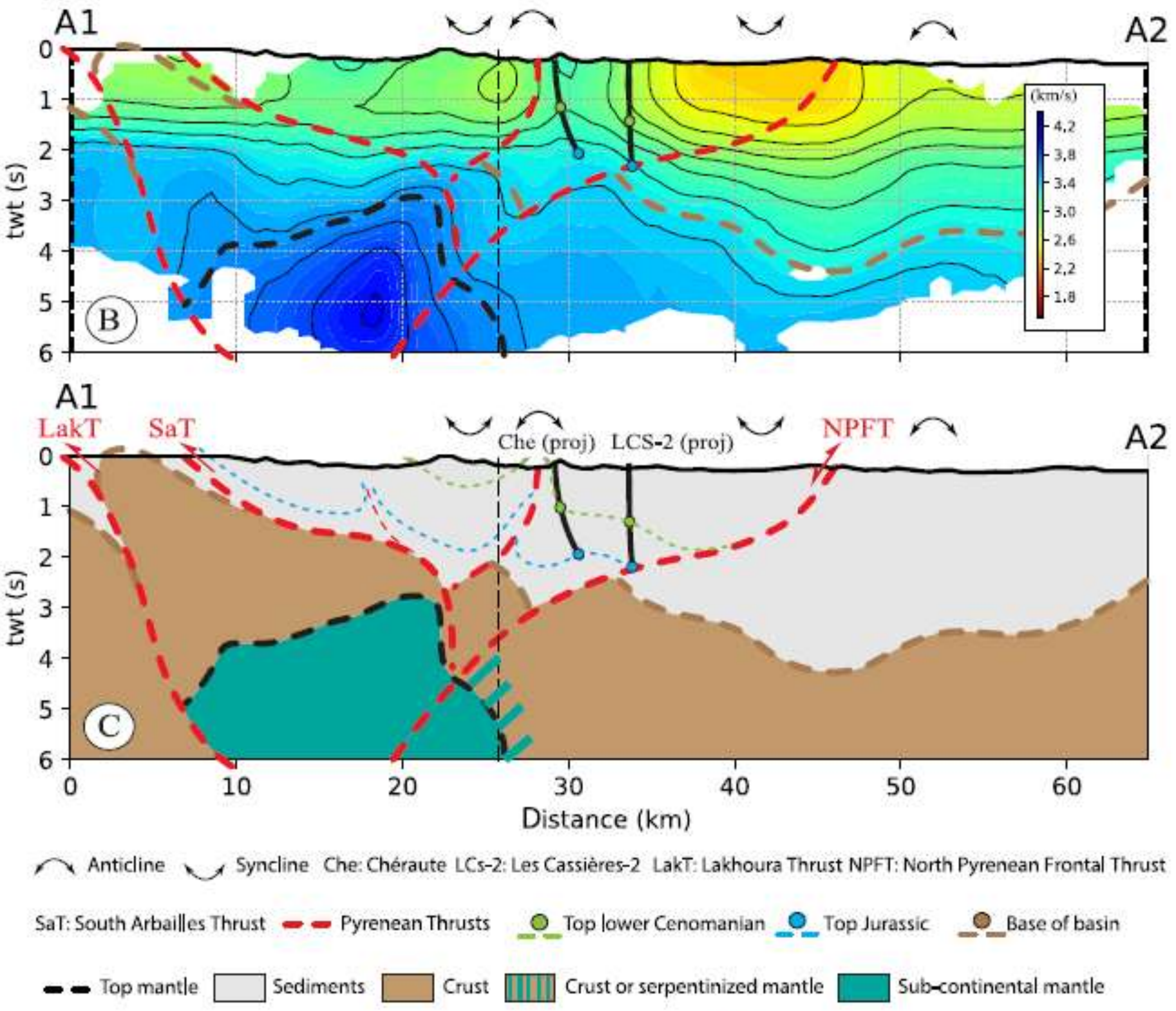
Open Access

Three-dimensional shear velocity structure of the Mauléon and Arzacq Basins (Western Pyrenees)

Maximilien Lehujeur[1,2,*], Sébastien Chevrot[1], Antonio Villaseñor[3], Emmanuel Masini[4,5], Nicolas Saspiturry[6], Rodolphe Lescoutre[7], Matthieu Sylvander[8] and The Maupasacq Working Group[a]







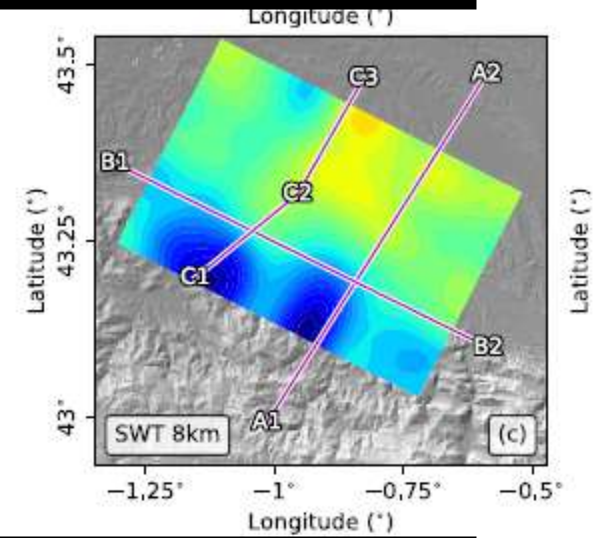


Fig. 14. SW-NE profile in the eastern Mauléon Basin showing the interpretation of the SWT (A) and LET (B) models. The final geological interpretation (C) is based on these models, the surface geology and boreholes. Location of axial traces of major anticlines and synclines are based on the geological map. The surface wave model successfully images the first-order basin architecture at shallow depth (syncline/anticline, faults) whereas the local earthquake tomography model provides information about the basement-sediment interface and the geometry of the high velocity body at depth.

The example of the Pyrenees

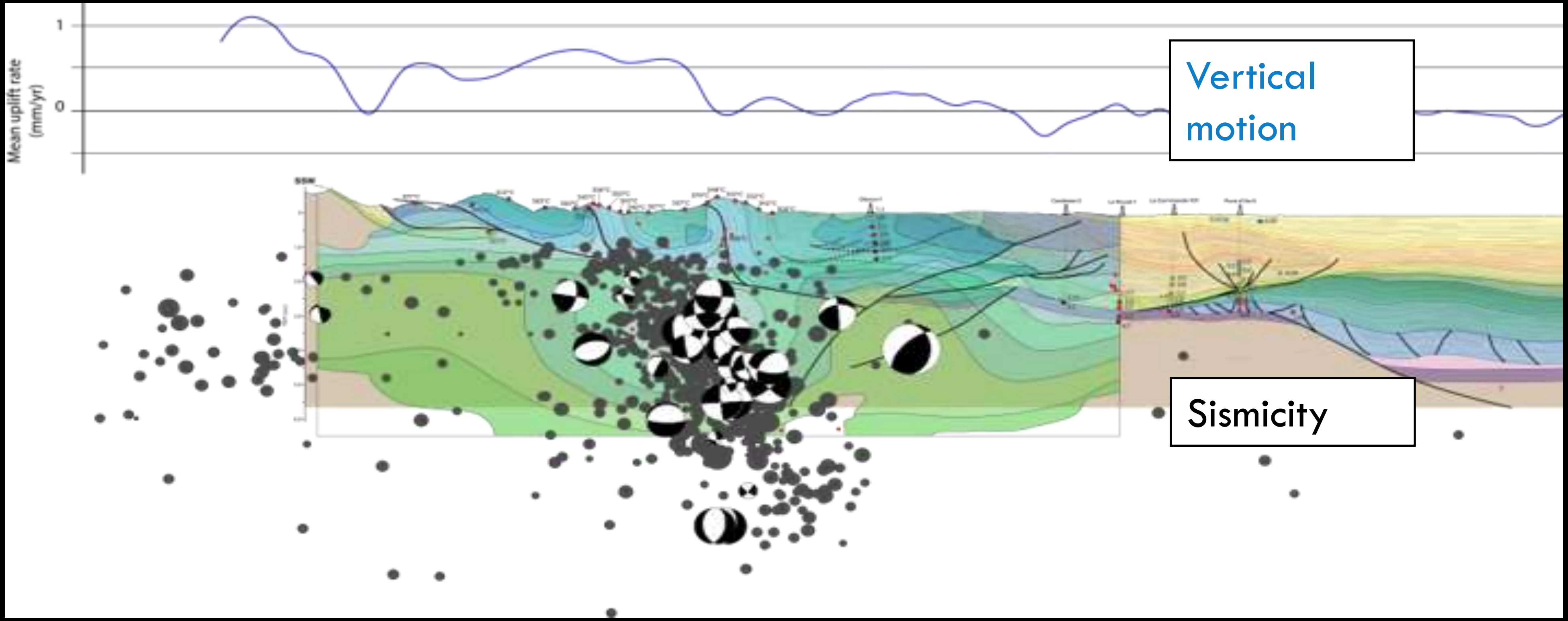
Presence of dense, magnetic body associated with an active sismicity :

Strong hypothesis of an **active Serpentinization**

GEOPHYSICS

Godard et al, 2021
Chevrot et al, 2021
www.convergent-margins.com

After Maupazascq Data



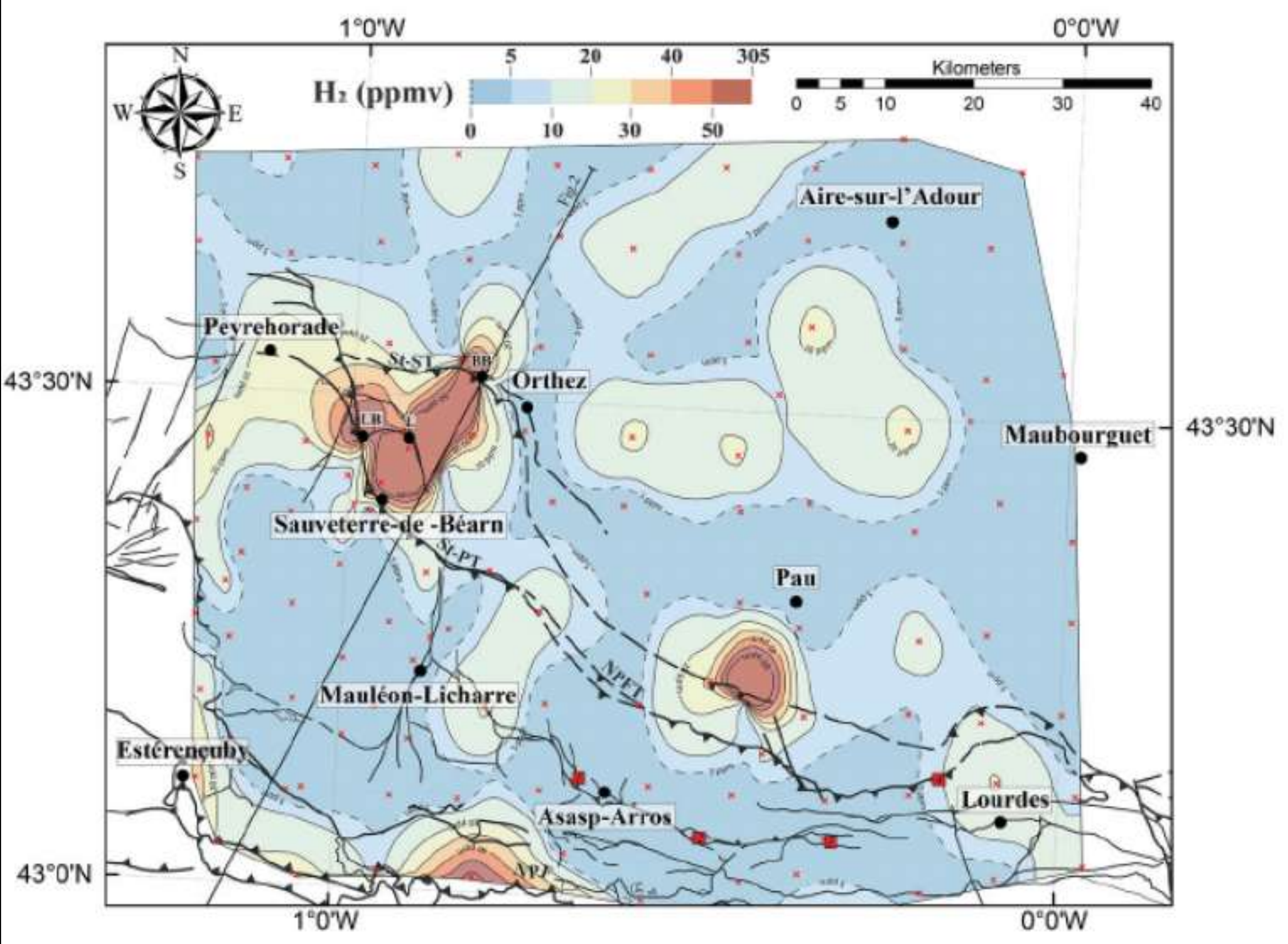
Exploration of H_2 Seeps in soils

The example of the Pyrenees

SOIL GAS ANALYSES

Lefeuvre, Truche et al, 2021

www.convergent-margins.com



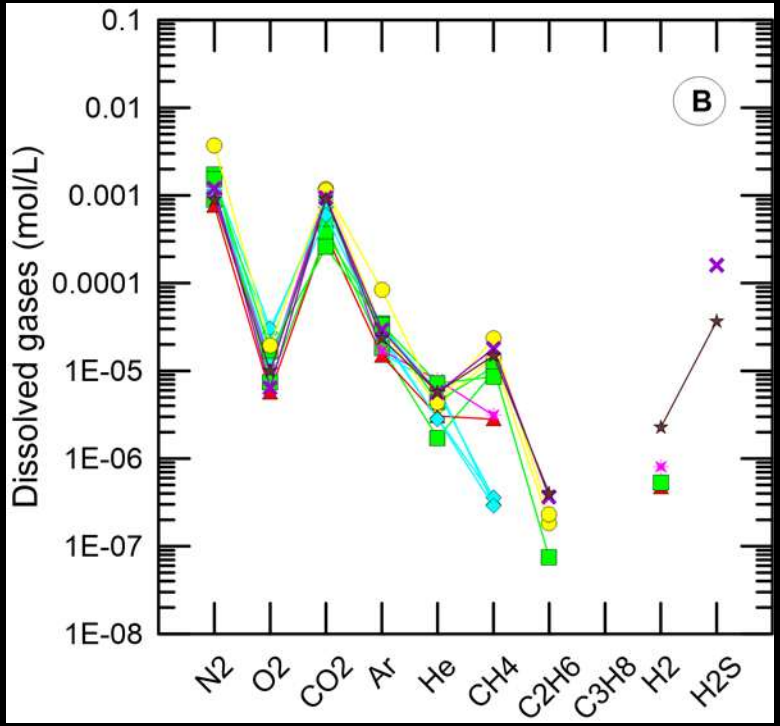
Lefeuvre, N., Truche, L., Donzé, F.-V., Ducoux, M., Barré, G., Fakoury, R.-A., Calassou, S. and Gaucher, E.C. (2021) Native H2 Exploration in the Western Pyrenean Foothills. Geochemistry, Geophysics, Geosystems 22, e2021GC009917.

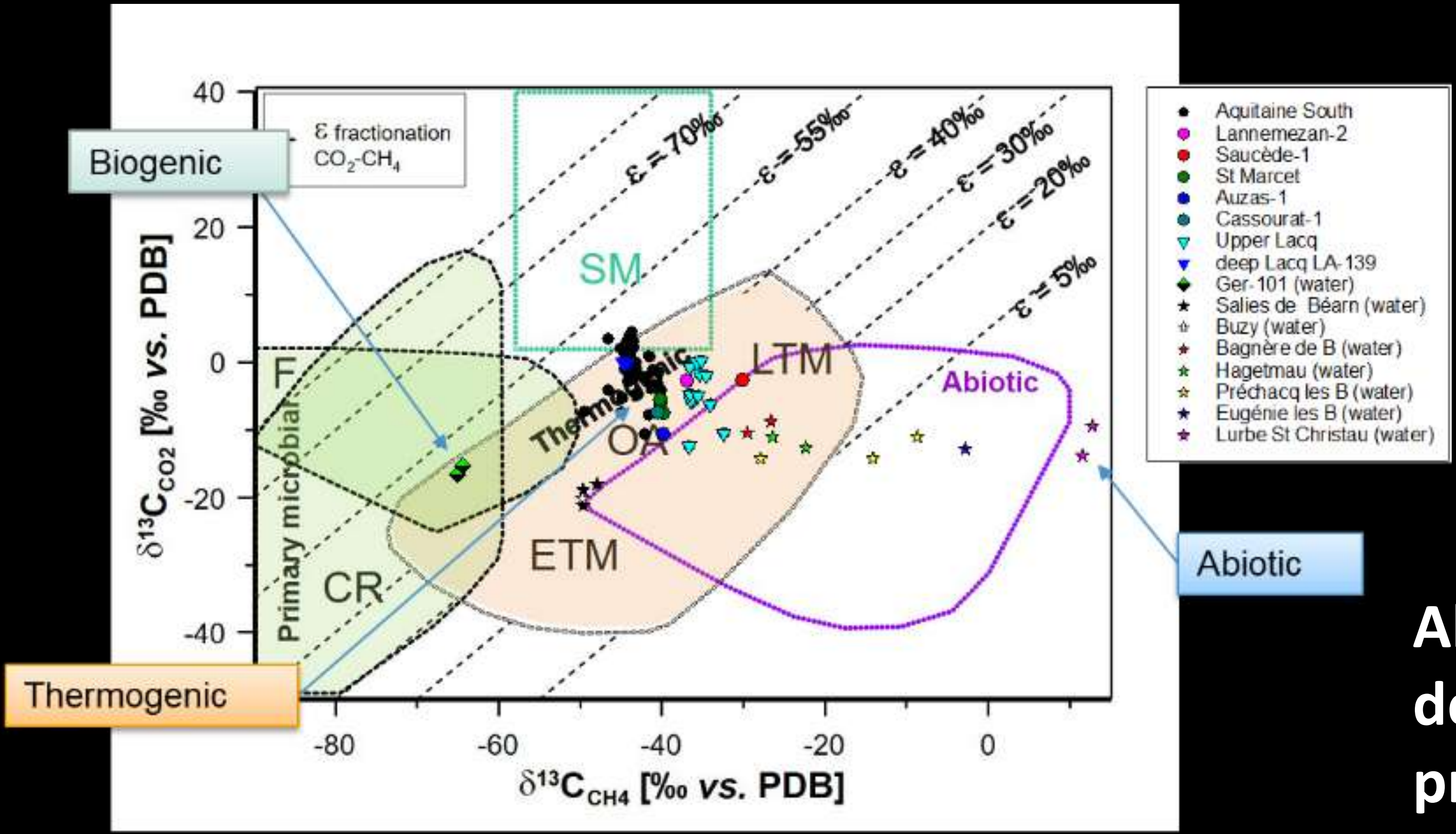
The example of the Pyrenees

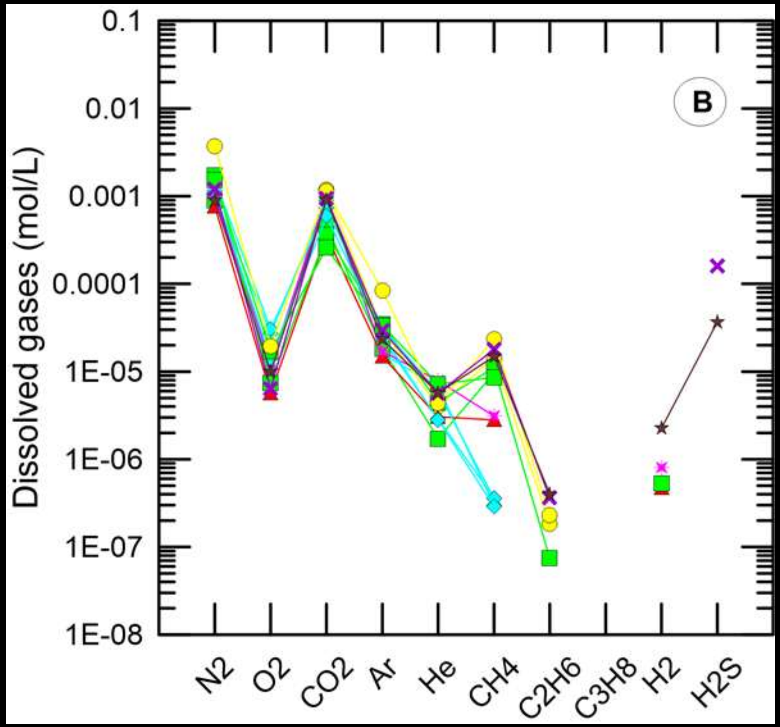
DEGASSING OF HYDROTHERMAL WATERS

DEEP AQUIFERS

Tremosa, Gaucher et al, 2021
www.convergent-margins.com







Abiotic methane demonstrates the presence of H_2 in the Pyrenean example

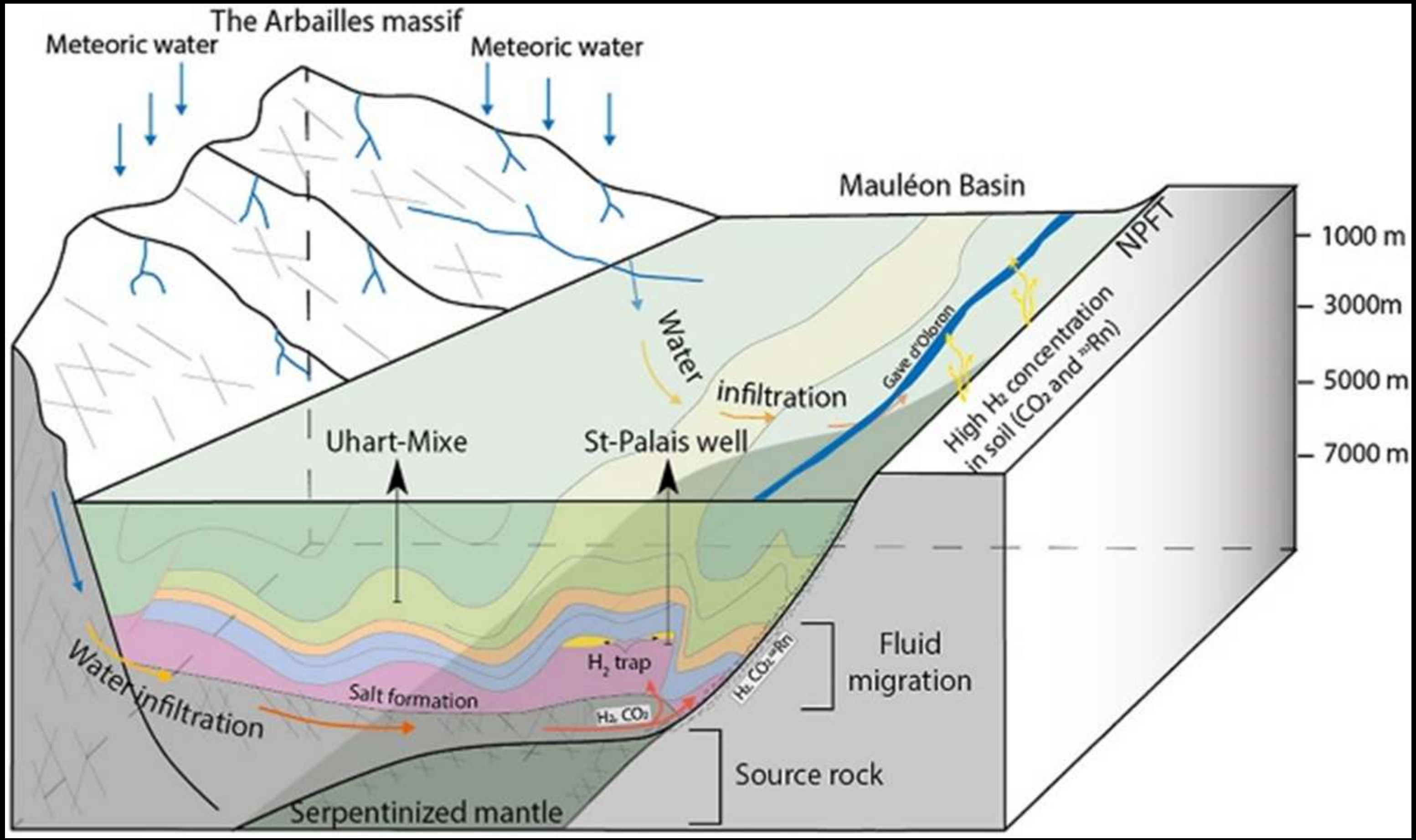
Presence of H_2 and abiotic CH_4

$$CO_2 + 4\,H_2 \rightarrow CH_4 + 2\,H_2O$$

Tremosa et al, 2024

www.convergent-margins.com

The Pyrenean Model of H_2 Production



Lefeuvre, N., Truche, L., Donzé, F.V., Gal, F., Tremosa, J., Fakoury, R.A., Calassou, S. and Gaucher, E.C. (2022) Natural hydrogen migration along thrust faults in foothill basins: The North Pyrenean Frontal Thrust case study. Appl. Geochem., 105396.

Ultrabasic rocks at 8 km

Water infiltration
Hydrothermal loop

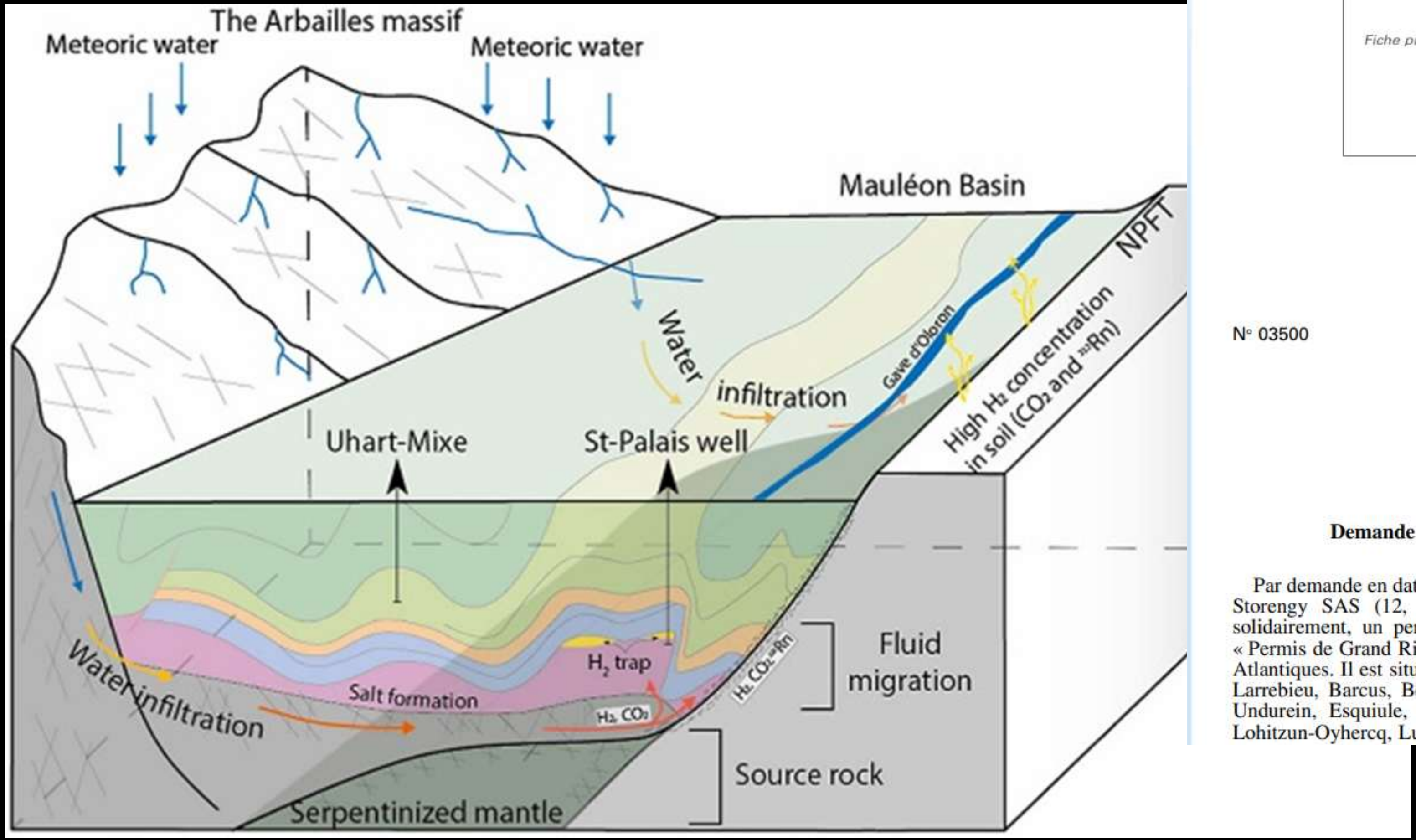
Temperature window for serpentinization
200/300°C

H_2 seepages along major faults

H_2 and abiotic methane in thermal waters

Two licences of exploration for natural H_2

The Pyrenean Model of H_2 Production



Lefeuvre, N., Truche, L., Donzé, F.V., Gal, F., Tremosa, J., Fakoury, R.A., Calassou, S. and Gaucher, E.C. (2022) Natural hydrogen migration along thrust faults in foothill basins: The North Pyrenean Frontal Thrust case study. Appl. Geochem., 105396.

1er septembre 2023 JOURNAL OFFICIEL DE LA RÉPUBLIQUE FRANÇAISE Texte 83 sur 99

ANNONCES

Les annonces sont reçues à la direction de l'information légale et administrative

Demandes de changement de nom : téléprocédure sécurisée
Fiche pratique disponible sur https://psl.service-public.fr/mademarche/pub-changement-nom/demarche

Autres annonces : annonces.jorf@dila.gouv.fr
ou
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(L'Administration décline toute responsabilité quant à la teneur des annonces.)

CONCESSIONS DIVERSES

N° 03500

Préfecture des Pyrénées-Atlantiques

Avis de mise en concurrence

Demande de permis exclusif de recherches d'hydrogène natif et substances connexes dit « Permis de Grand Rieu » (Pyrénées-Atlantiques)

Par demande en date du 28 février 2023, les sociétés 45-8 Grand Rieu SAS (2, rue Myron Kinley, 64000 Pau) et Storengy SAS (12, rue Raoul Nordling, 92277 Bois-Colombes CEDEX) ont sollicité, conjointement et solidairement, un permis exclusif de recherches d'hydrogène natif et d'éventuelles substances connexes, dit « Permis de Grand Rieu », pour une durée de cinq années et portant sur une partie du département des Pyrénées-Atlantiques. Il est situé sur le territoire des communes d'Ainharp, Angous, Aren, Aroue-Ithorots-Olhaïby, Arrast-Larrebieu, Barcus, Berrogain-Laruns, Charre, Charritte-de-Bas, Chéraute, Dognen, Domezain-Berraute, Espès-Undurein, Esquiule, Géronce, Geüs-d'Oloron, Gurs, Jasses, Lay-Lamidou, Ledeuix, L'Hôpital-Saint-Blaise, Lohitzun-Oyhercq, Lucq-de-Béarn, Moncayolle-Larrory-Mendibieu, Moumour, Oloron-Sainte-Marie, Orin, Poey-

Two licences of exploration for natural H_2

The Iceland example

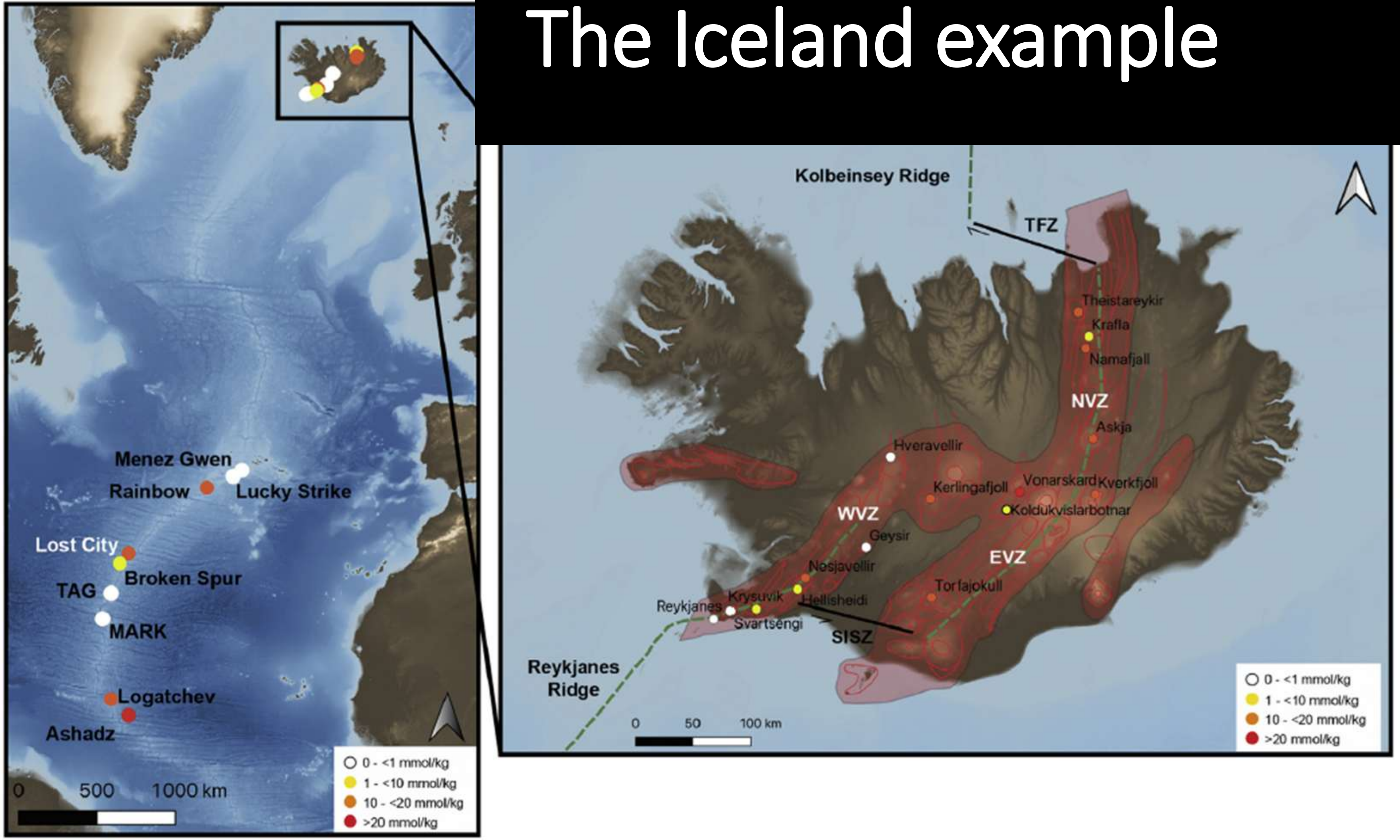


Fig. 1 – Geothermal systems along the mid-Atlantic Ridge (MAR) and in Iceland. WVZ, EVZ and NVZ are for West, East and North Volcanic Zone; SISZ is for South Icelandic Seismic Zone; TFZ is for Tjörnes Fractured Zone.

Available online at www.sciencedirect.com

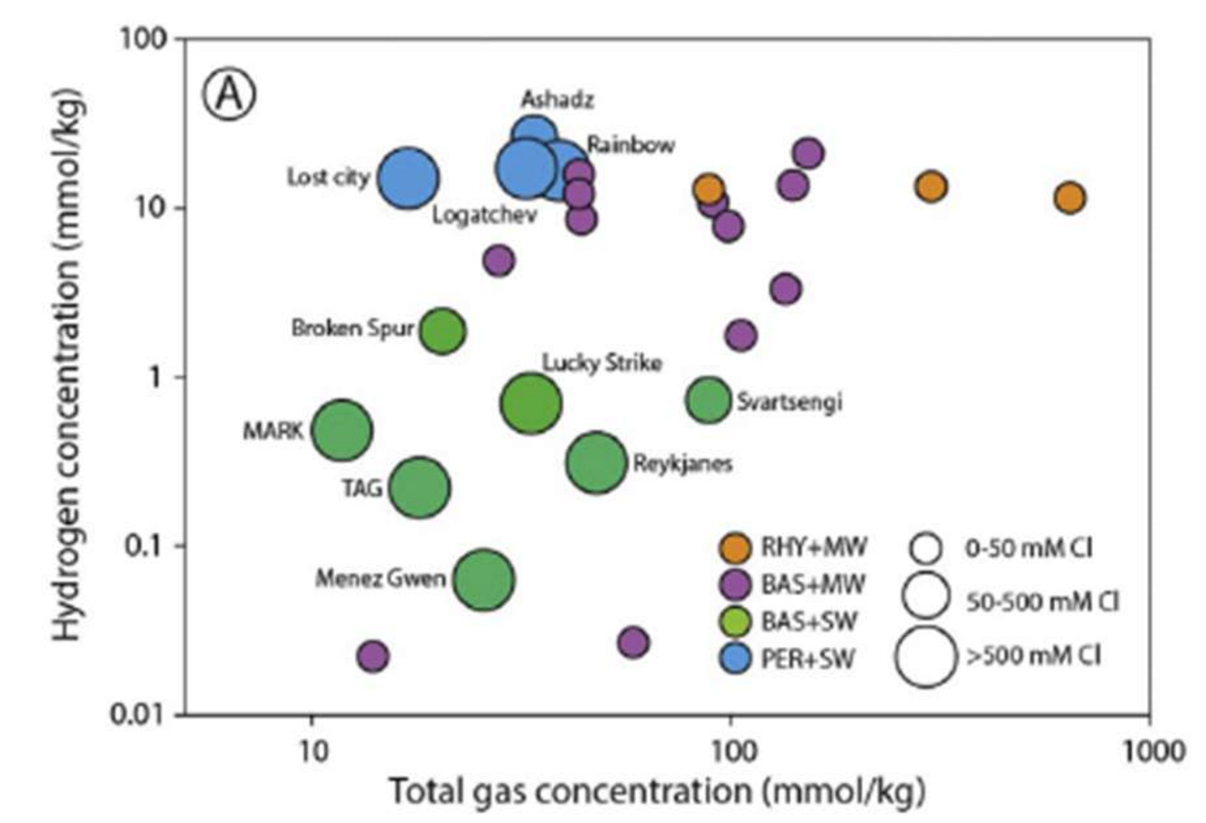
ScienceDirect

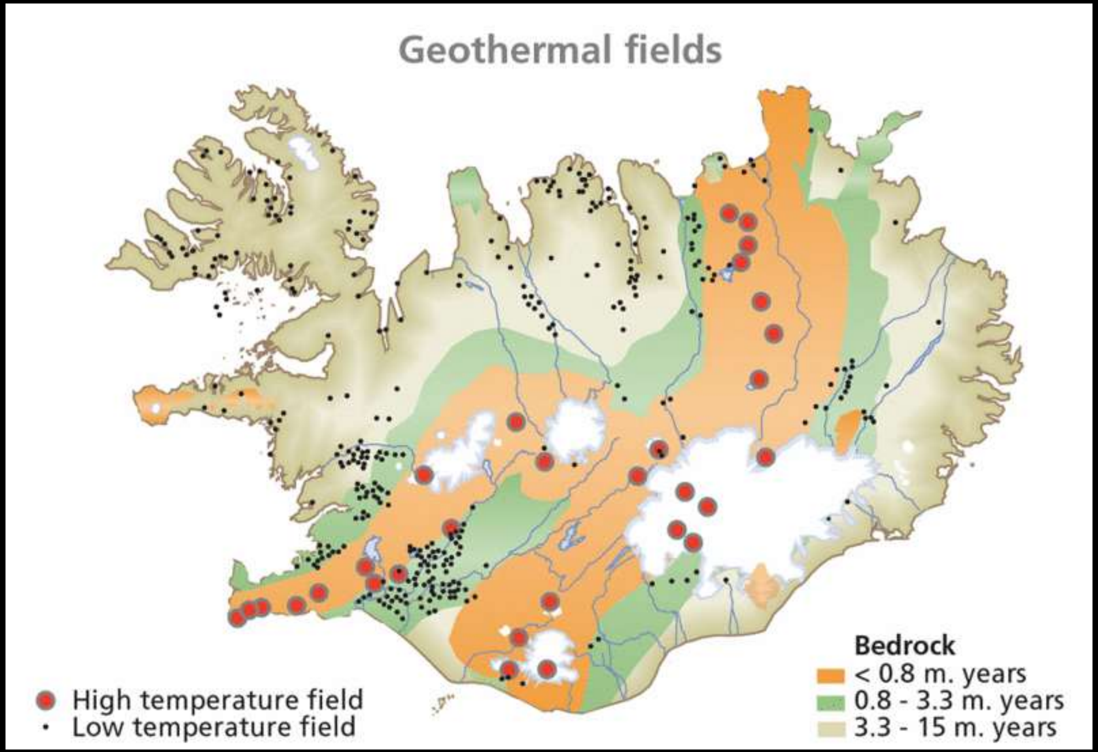
journal homepage: www.elsevier.com/locate/he

Hydrogen emissions from hydrothermal fields in Iceland and comparison with the Mid-Atlantic Ridge

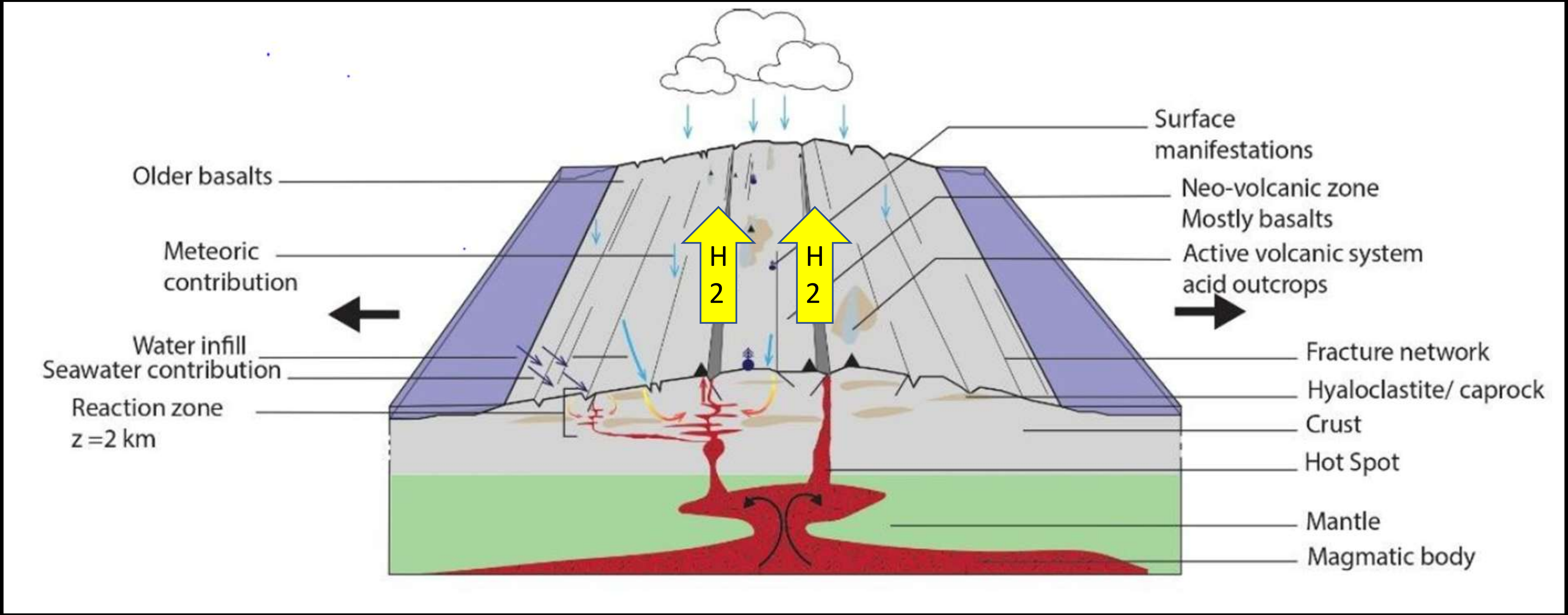
Valentine Combaudon [a], Isabelle Moretti [a,*], Barbara I. Kleine [b], Andri Stefánsson [b]

H2 Concentration





Geological Model of H_2 Production



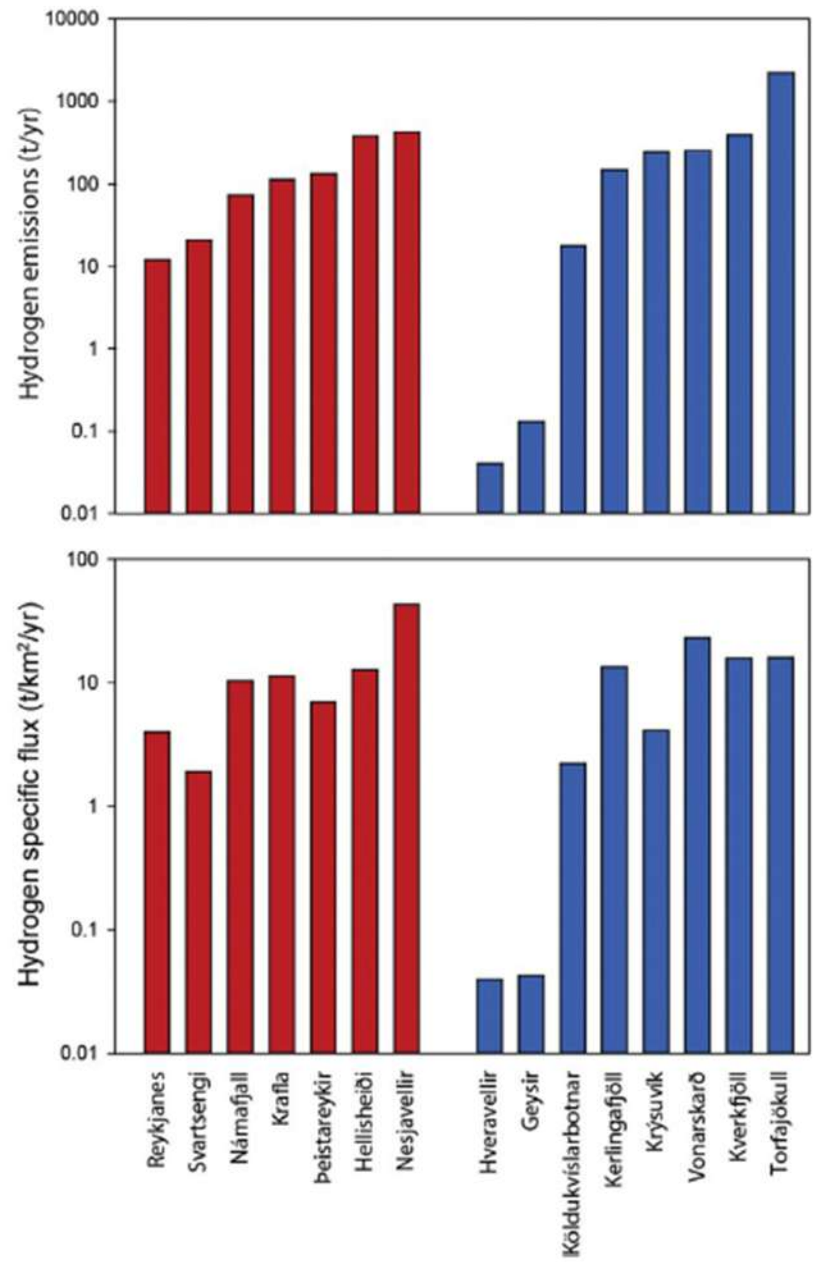


Fig. 6 – The H_2 emissions and specific flux for Icelandic geothermal fields.

Annual production of H_2 :

1.16 Kt in Geothermal Power Plants

3.40 Kt in others known Geothermal fields

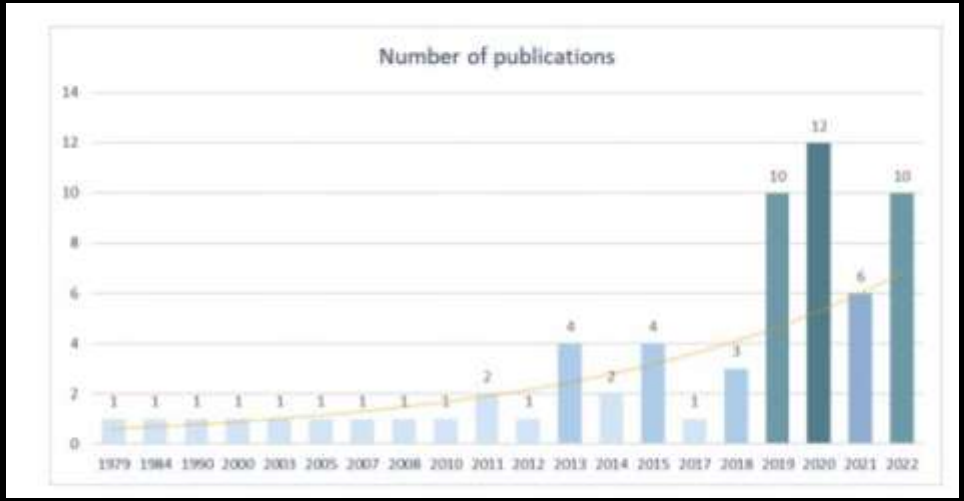
Assuming an H_2 price of \$2 per kg, 1.16 kt of native hydrogen could represent a profit of \$2.3 million per year.

Given that investment is very limited thanks to the Hellisheidi plants already installed, investment would be limited to a gas separator and a storage and distribution system.

It should be noted that H_2 recovery is not optimized by this system.

Identify scientific clusters on natural hydrogen - Publications in the world

Figure 2: (a) Progress of the number of publications related to natural H_2 and (b) repartition of natural H_2 publications by country.



Scientific articles published that explicitly reference natural hydrogen

Gaucher and al, European Geologist Journal, 2023

Exploration phases / Costs

2024

1M US$
Data Mining, Soil Gas sampling
Geological Model

2025

2M US$
Geochemical Monitoring
Gravi/Mag/Seismic Acquisition

2026

10M-20M US$
On-shore borehole
Demonstrating, Developing

2027

Research

Developement

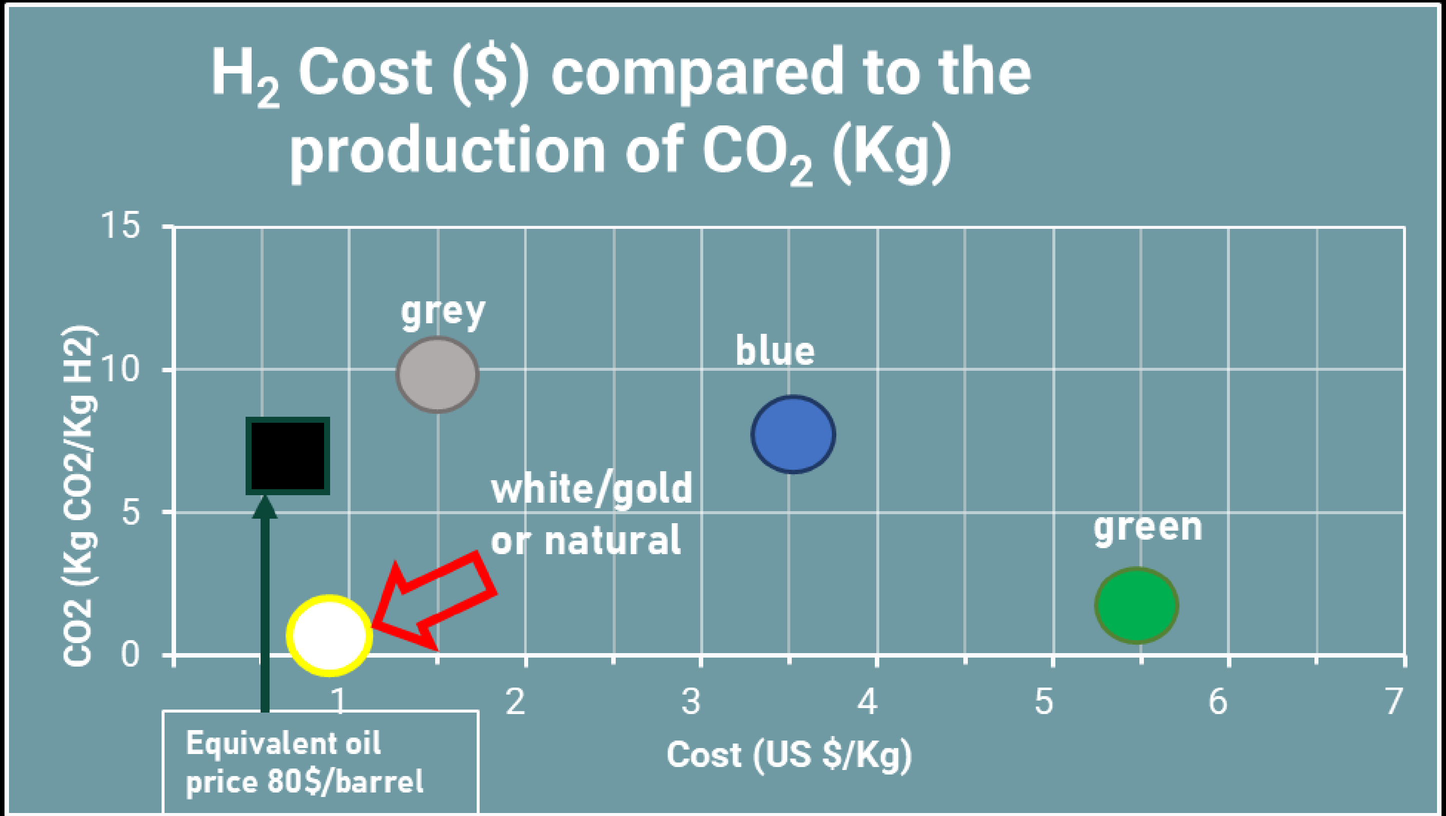
Cost versus CO_2 /Kg H_2

Manufactured hydrogen (black, grey, blue, green, etc.) vs. natural hydrogen: a major cost difference!

~ 1 USD / kg_H2

⇔

~ 0,3 USD / kWh



Levin 2023 – Hnat Summit

TRL Natural H_2 Exploration/Production	in the literature	Where?
0 Discovery of H_2 at the Earth surface	Done	Turkey, Oman, France Mali, New Caledonia, USA, Australia…
1 Systematic research of H_2 seepages in various environments	Done	On the 5 continents
2 Short time monitoring of sites	Done for 5 - 6 sites	Mali – France – Australia –Switzerland – USA – Brasil…
3 Understanding of the origin of H_2	Done for 2-3 site	France – Mali – Australia - USA
4 Small Scale prototype of permanent H_2 fluxes / Numerical modelling of the H_2 permanent seepages / Global understanding of the Hydrogen system	**In progress**	In progress in Academia – France – USA - Australia
5 Median Scale prototype (1200 m) Perennial production of a demonstrator over several years	Done for 1 site - **In progress**	Mali – Hydroma – *Australia Gold Hydrogen*
6 First deep borehole (3000 – 5000 m)	**In progress**	USA - Natural Hydrogen LCC / Desert Mountain Energy
7 First Exploration plan at regional scale Several boreholes	**In progress**	Australia Santos – GoldH2 / USA KOLOMA
8 Prototype of Production of the first discovery	**No**	
9 Scaling-up / Commercial exploitation	**No**	

Mining Law

Exploration licenses = bottleneck

Present time situation

- Africa - Mali (Licenses are open) – Morocco (Mining law in prep.)
- Australia (South Australia, Tasmania, Western Australia are open)
- USA (Application of Oil&Gas laws) - *for instance, in the US, the Inflation Reduction Act offers 3 USD per kg premium on low-carbon hydrogen production.*
- France: Additions of H_2 et He in mining law (04/2022)
  - 9 licenses requested, two of which have been awarded (TBH2 12/2023 and 45-8 Energy 05/08/2022 He, they add H_2)
- Some Eastern European countries (Kosovo, Poland - Sept 2023)
- Spain (Aragon) : under discussion
- Colombia (A. Camacho, Minister of Mines and Energy says the law is ready, H-NAT Summit).
- Philippines (Bid Round for H_2 Nat)
- Canada: Quebec the administration works to fill the legal vacuum.
  Saskatchewan, the Oil&Gas and Helium regulation is used.
- Brazil: Process on-going for federal law

Regulation / permitting: France

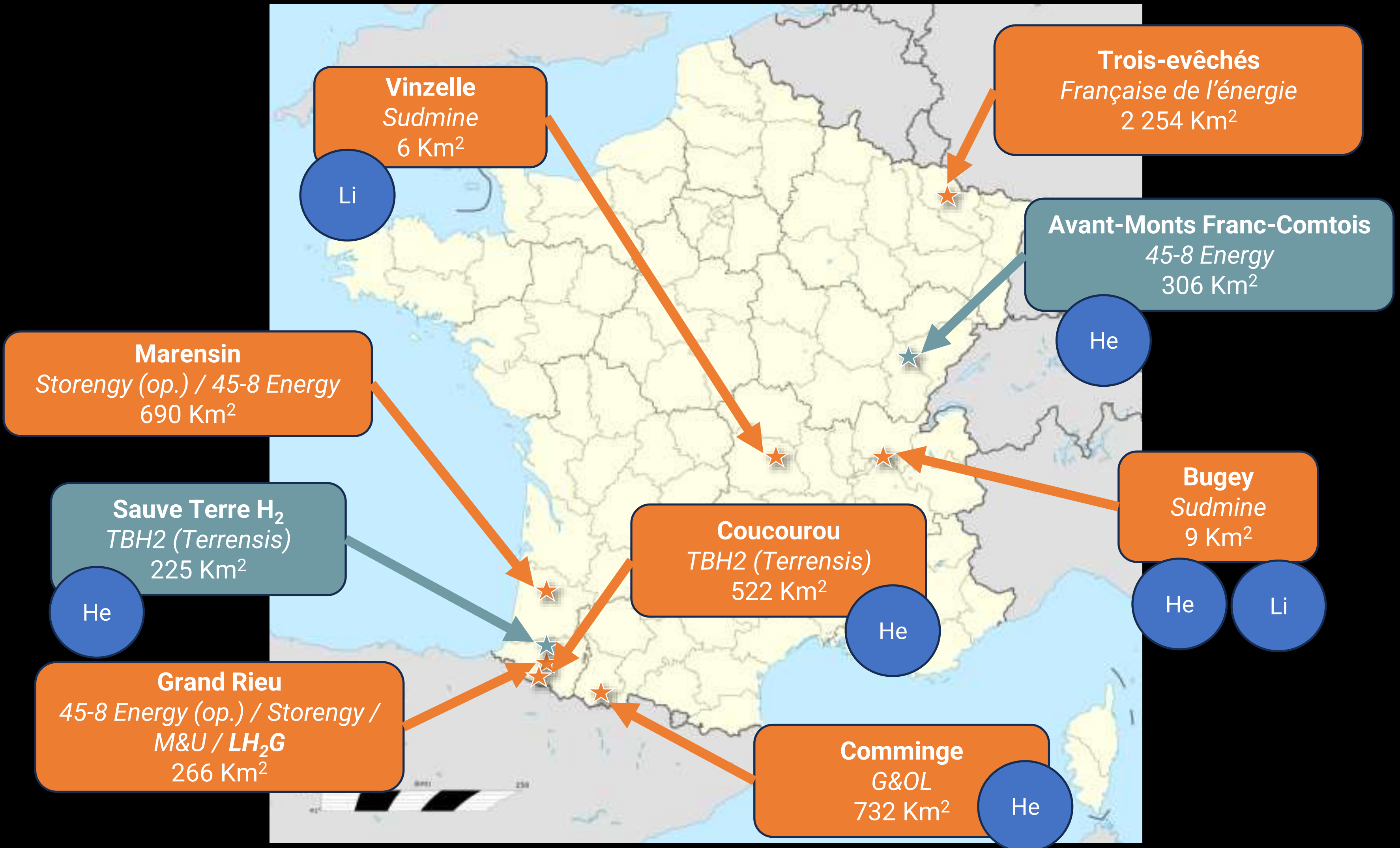
H_2 License award

H_2

9 Licenses

6 Operators

He Coproduction



Regulation / permitting: the remarkable case of South Australia

An incentive law

- **Over 40 PEL / H Nat applications since 02/2021**
- One-stop shop (DEM-ERD) for assessing applications: Proposed licenses
- Native title agreement required before granting a License
- Efficient negotiation process in South Australia

A success story : Gold Hydrogen

1920s - 1930s: hydrogen discovered while drilling for oil
2020 : creation of Gold Hydrogen
2020-2022 : studies, modelling, project preparation, lobbying for changes to permitting regulations South Australia
October 2023: "Ramsay-1" well drilled **=> H_2 & He !**
November 2023: drilling of the "Ramsay-2" well **=> H_2 & He !**

Regulation in Tasmania and Western Australia

Western Australia vote a Bill to enable exploration for naturally-occurring hydrogen through the concept of a regulated substance, which is an element that occurs naturally within a natural geological formation (May 2024).

MINERAL CATEGORIES

1. Metallic minerals and atomic substances.
2. Coal, peat, lignite and oil shale.
3. Rock, stone, gravel, sand and clay used in construction, bricks and ceramics.
4. Petroleum products including natural hydrogen but excluding oil shale.
5. Industrial minerals, prescribed precious stones and prescribed semi-precious stones.
6. Geothermal substances

MAXIMUM SIZE OF LICENCES

The maximum size of an exploration licence is:

- 250 km^2 for category 1, 2, 3 or 5 minerals.
- 500 km^2 for category 6 minerals.
- 5,000 km^2 for category 4 minerals.

Mineral Resources Tasmania - August 2023

Boreham et al. 2021

Regulation in Philippines

The Philippines has auctioned the rights to explore for natural hydrogen in two areas located around 200 km from the capital, Manila, on the island of Luzon.

PDA n° 1 - 134,096 hectares
PDA n° 2 - 96,439 hectares

The Philippines' 2024 tender is accepting bids from developers until August 27, with exploration rights to be awarded as early as November this year.

According to the government press agency, the launch of the PDA has already "attracted" Helios Aragón and other companies.

Philippines Government 2024

Conclusion

- Natural H_2 exists / The Earth produces massive quantities of it.
- This subject is currently in a pre-industrial phase with pioneering companies. France, USA, Australia…
- Exploration methods need to be reinvented on the basis of oil and gas technologies.
- Assessing reserves requires a major research effort.

The place of natural hydrogen in the energy transition: A position paper
E Gaucher, I Moretti, N Pélissier, G Burridge, N Gonthier
Eur. Geol., 5-9

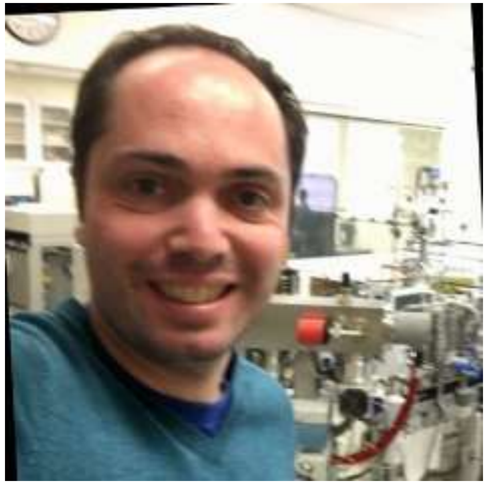
Lavoisier H_2 Geoconsult

Task 49

Eric C. Gaucher (PhD)
Co-leader
Olivier Sissmann (PhD)
Co-leader

Co-leaders

Dr Eric C. Gaucher
Lavoisier H_2 Geoconsult

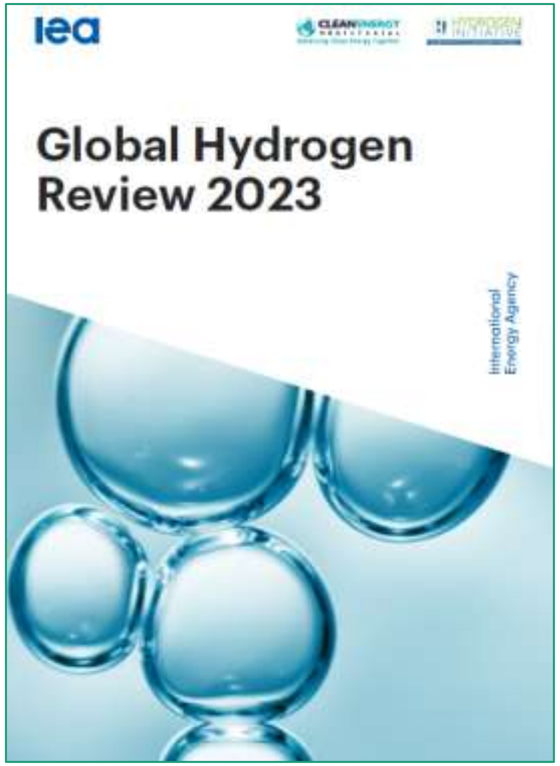


Dr Olivier Sissmann
IFPEN

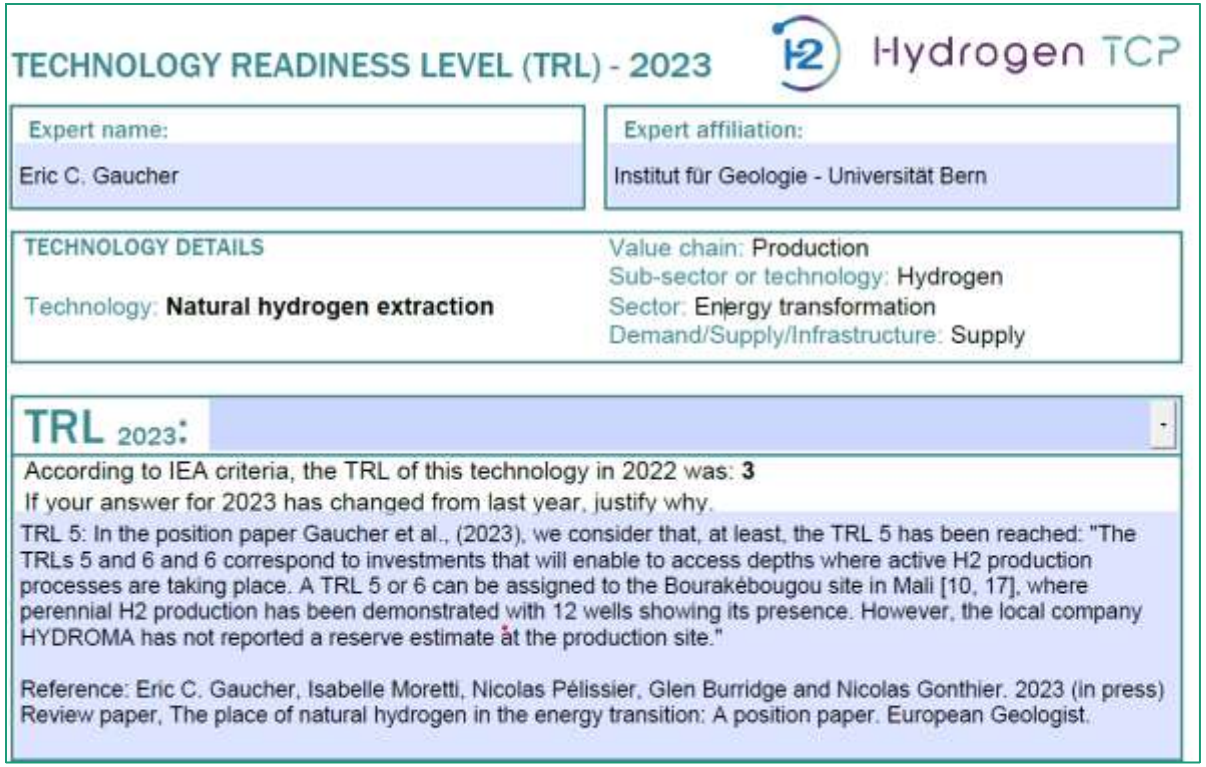
General Secretary

Dr Omid H. Ardakani
Natural Resources Canada

Past Contributions



First contribution



TECHNOLOGY READINESS LEVEL (TRL) - 2023 — Hydrogen TCP

Expert name:	Expert affiliation:
Eric C. Gaucher	Institut für Geologie - Universität Bern

TECHNOLOGY DETAILS

Technology: **Natural hydrogen extraction**

Value chain: Production
Sub-sector or technology: Hydrogen
Sector: Energy transformation
Demand/Supply/Infrastructure: Supply

TRL 2023:

According to IEA criteria, the TRL of this technology in 2022 was: **3**

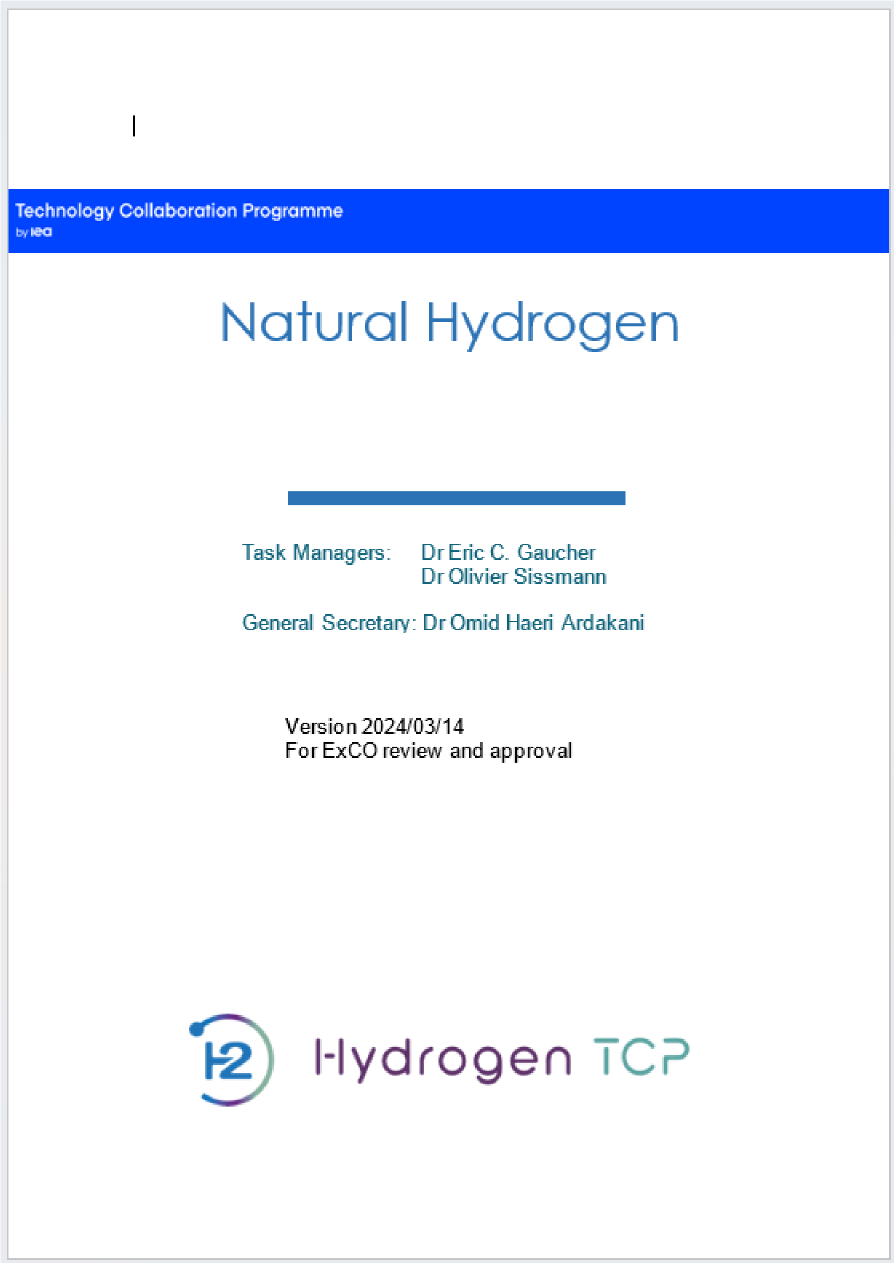
If your answer for 2023 has changed from last year, justify why.

TRL 5: In the position paper Gaucher et al., (2023), we consider that, at least, the TRL 5 has been reached: "The TRLs 5 and 6 correspond to investments that will enable to access depths where active H2 production processes are taking place. A TRL 5 or 6 can be assigned to the Bourakébougou site in Mali [10, 17], where perennial H2 production has been demonstrated with 12 wells showing its presence. However, the local company HYDROMA has not reported a reserve estimate at the production site."

Reference: Eric C. Gaucher, Isabelle Moretti, Nicolas Pélissier, Glen Burridge and Nicolas Gonthier. 2023 (in press) Review paper, The place of natural hydrogen in the energy transition: A position paper. European Geologist.

Second contribution

Workplan report Approved by the 97th EXCO April 2024



Technology Collaboration Programme
by iea

Natural Hydrogen

Task Managers: Dr Eric C. Gaucher
Dr Olivier Sissmann

General Secretary: Dr Omid Haeri Ardakani

Version 2024/03/14
For ExCO review and approval

Hydrogen TCP

Last Contributions

Third contribution

STRUCTURE OF THE TASK 49

A. Bibliographic synthesis/state of the art (Science/web/journals)
B. Writing a road map for Scientific research
C. Observation of Exploration/Production economic sector
D. Development of Reserves Economic Evaluation
E. Policy recommendation
F. Public Acculturation / Risk Assessment
G. Environmental impacts of Natural H_2
H. Organization of Events

EXECUTIVE COMMITTEE OF THE TASK 49

A. GARRIDO Carlos J.

B.ETIOPE Giuseppe

C.MORETTI Isabelle

D.ELLIS Geoffrey

E.BURRIDGE Glen

F.JACKSON Owain

G.FONT Carmen

H.BORDELEAU Geneviève - RISK David

Co-Leader:

Dr Eric C. Gaucher

Dr Olivier Sissmann

General Secretary:

Dr Omid H. Ardakani

Participants

Confirmed / active participants: 34 experts

Universities
Research centers
Major Oil/Gas companies
Start-ups
Consultants

Organization	Country
Lavoisier H2 Geoconsult	FR
IFPEN	FR
Instituo Andaluz de Ciencias de la Tierra (CSIC-IACT)	ES
Istituto Nazionale di Geofisica e Vulcanologia (INGV)	IT
Université de Pau et des Pays de l'Adour (UPPA)	FR
US Geological Survey	US
Glen Burridge & Associates	UK
H2Au	UK
Helios Aragon	ES
Institut national de la recherche scientifique (INRS)	CA
St. Francis Xavier University	CA
Geological Survey of Canada	CA
Geoscience Australia	AU
CSIRO	AU
OMV	AT
HR Consulting Energy and Geosciences Ltda	BR
Enki GeoSolutions ; Institut national de la recherche scientifique (INRS)	CA
Institut national de la recherche scientifique (INRS)	CA
Ecopetrol	CO
Geological Survey of Finland (GTK)	FI
Stealth	FR
Bundesanstalt für Geowissenschaften und Rohstoffe (BGR)	DE
Bundesanstalt für Geowissenschaften und Rohstoffe (BGR)	DE
Japan Organization for Metals and Energy Security (JOGMEC)	JP
Dhow Energy	NL
NORCE	NW
Korea University	KO
Repsol	ES
Repsol	ES
Shell	UK
The University of Edinburgh	UK
University of Colorado at Boulder	USA
Texas Tech University	USA
Koloma	USA

Participants

Interested parties:
16 countries

Country	Participants
Australia (AU)	2
Austria (AT)	1
Brazil (BR)	1
Canada (CA)	5
Columbia (CO)	1
United States (US)	4
Finland (FI)	1
France (FR)	5
Germany (DE)	2
Netherland (NL)	1
Italy (IT)	1
Japan (JP)	1
Norway (NO)	1
South Korea (KR)	1
Spain(ES)	4
United Kingdom (UK)	4

ON GOING PRODUCTION OF DELIVRABLES

- Brief - Update of the natural hydrogen position paper
- Road map for Scientific research
- Technology Insights to defined operation models of natural hydrogen licenses
- Technology Insights to define reservoir models of economic natural hydrogen licenses.
- Brief - Analysis of the regulatory scope adopted and best practices in countries that have included natural hydrogen in the Mining Code.
- Brief - Review and mapping of Natural H2 Funding.
- Brief for the best practice in the social acceptance of natural H2.
- Roadmap for the evaluation of natural H2 environmental impacts.

Related topics

- Our group is exchanging views with the other hydrogen Technology Collaboration Programme (TCP) groups:

1. Underground hydrogen storage (Task 42)
2. Safety and RCS of Large Scale Hydrogen Energy Applications (Task 43)
3. Hydrogen Certification (Task 47)

- TCP on Greenhouse Gas R&D/IEAGHG are on-going.

Timeline 2024-2026

2023

- Task organization
- Expert recruitment
- New co-leader **Olivier Sissmann**

January - March 2024

- Writing of the workplan
- Finish Task organization
- Ask for approval

- Kick-off meeting March 2024
- In person meeting / Nov2024

2025-2026

-Production of documents

- Final Report End of Task.

IEA Hydrogen Coordination Group

IEA Hydrogen TCP

Technology Collaboration Programme
by iea

IEA Hydrogen Coordination Group

The Hydrogen Coordination Group was established under the IEA CERT (Committee on Energy Research and Technology) in 2024

Objective:

- To **map and align all the hydrogen activities** within the TCPs on the IEA.
- **Identify overlaps or synergies** between the different programmes.
- **Organize joint activities** across the TCP network but also together with Mission Innovation's Hydrogen Mission.

Mapping excercise
Identify all hydrogen related activities in the different TCP action plans
3 months

Analysis of results
Mid 2024

Proposal of Joint Activities and Deliverables
12 months

Preparation of deliverables.
2025

Final report
Dec 2025

IEA Hydrogen Coordination Group

For 2025, three key outputs are proposed:

1. **Global Report:** An integrated view of hydrogen-related activities within the TCP network, organized by technical categories and cross-cutting issues. Topics in the Global Report will include key areas as transport, industry, energy systems, buildings, and cross-cutting issues.
2. **Synergians and Gap Analysis:** Identification of cross-cutting topics, collaboration opportunities, and an assessment of gaps and overlaps in ongoing activities, with actionable recommendations for future work.
3. **Expert Database:** Creation of a database of experts linked to the Global Report and the development of a taxonomy to classify expertise by scientific field, technology, and application/market, supporting the IEA, TCP network, and hydrogen sectors

Thank you!

IEA Hydrogen TCP