



RESSOURCES ET ÉNERGIE  
**SQUATEX**

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# LOWER ST. LAWRENCE

## Conventional HTD Play

A. Aubiès-T., PhD., geo. & P. Laroche, ing., geo.

APGQ - QOGA

OCTOBER 31<sup>st</sup> 2016

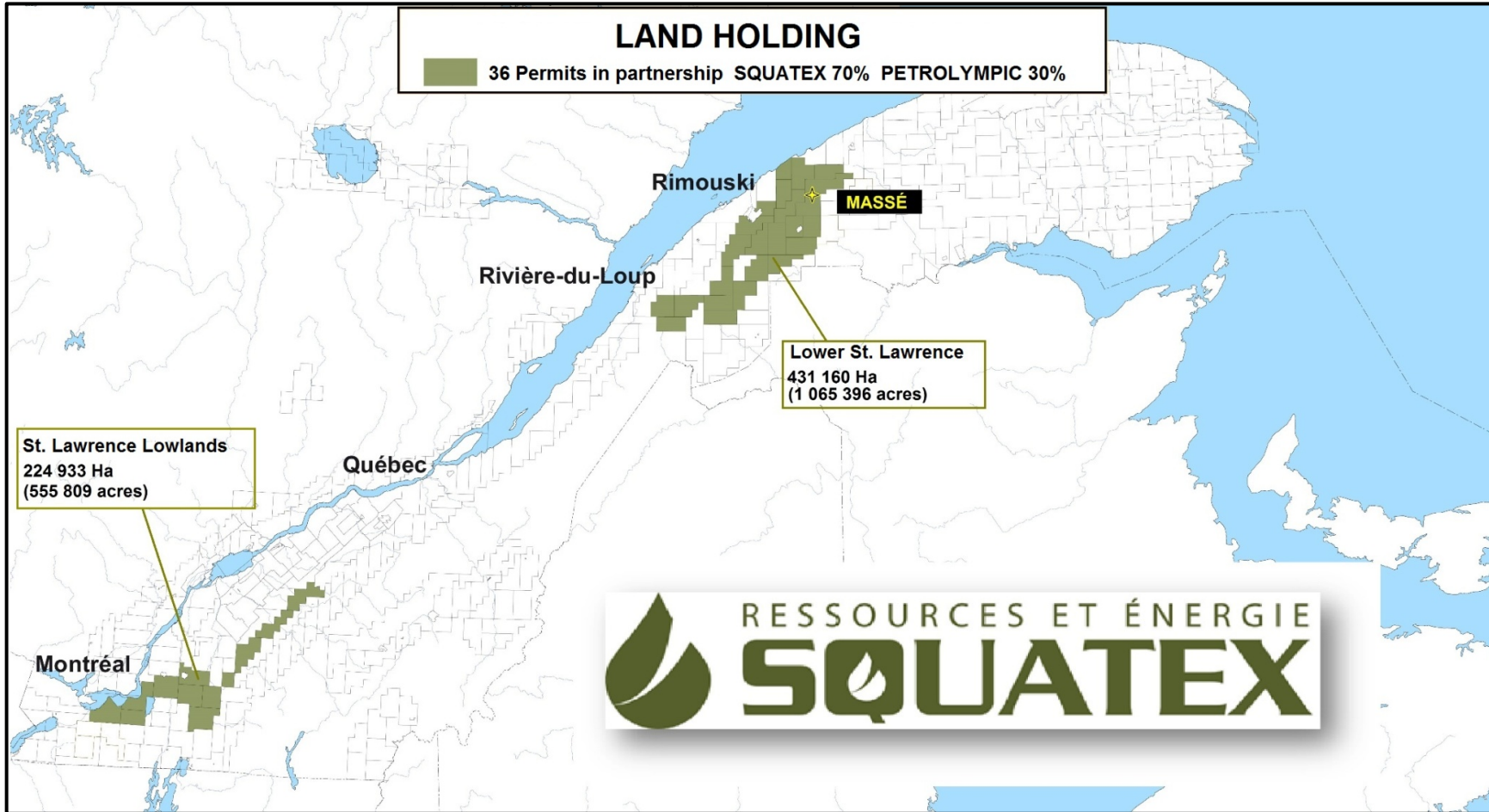
**2001 - 2016**  
**15 YEARS OF ACHIEVEMENT**

# FORWARD LOOKING STATEMENTS

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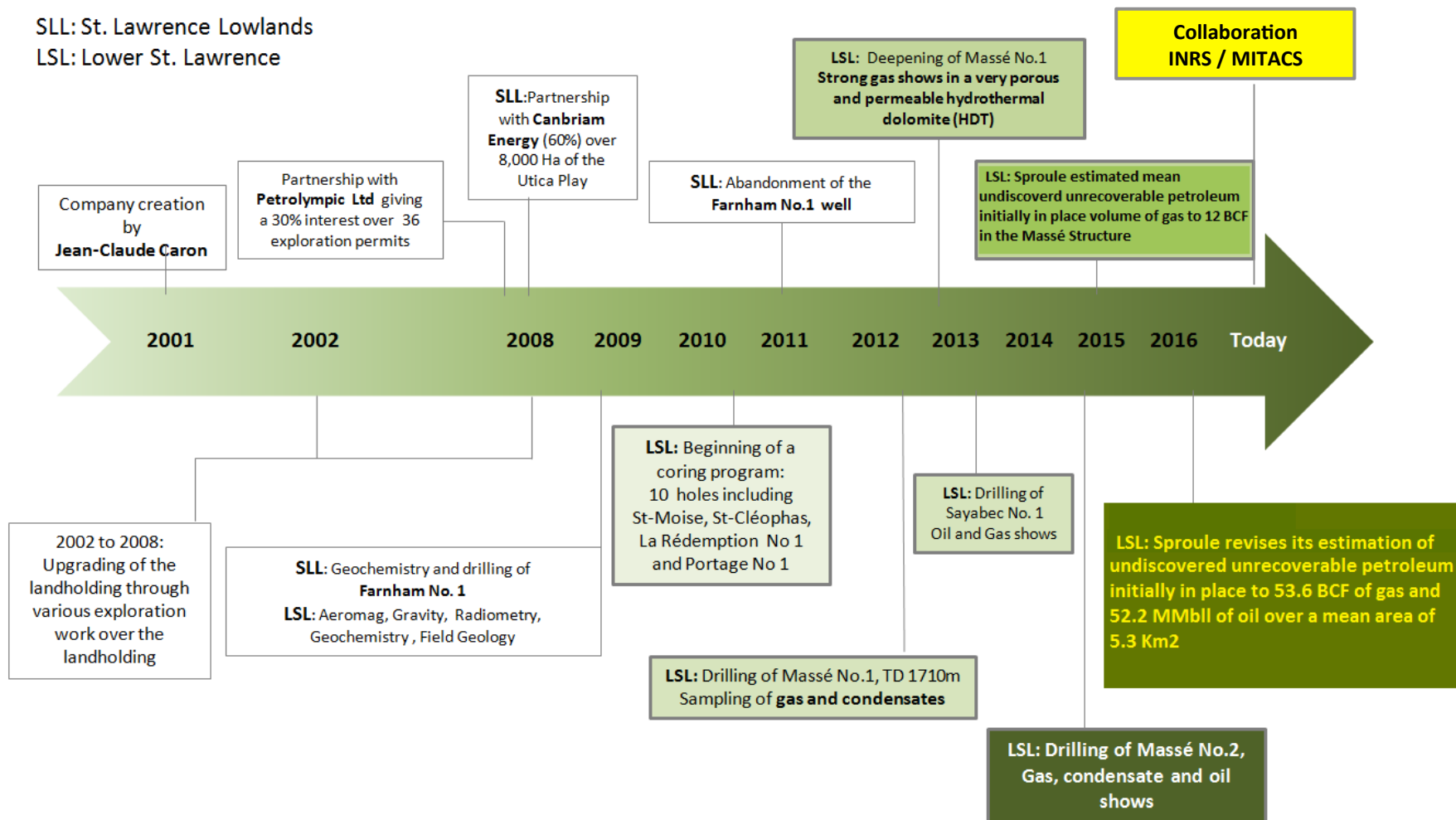
# SQUATEX EXPLORATION LICENCES



**656 093 Hectares (1 621 205 Acres)**

# SQUATEX: 15 YEARS OF ACHIEVEMENT

SLL: St. Lawrence Lowlands  
 LSL: Lower St. Lawrence

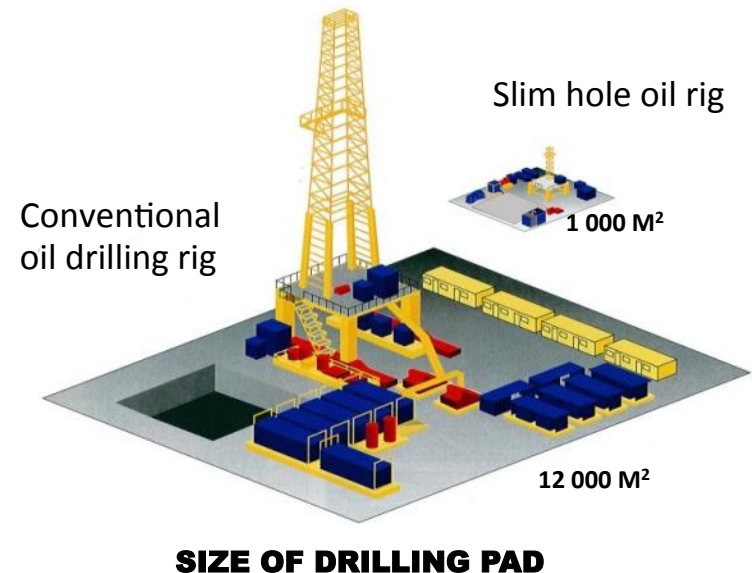
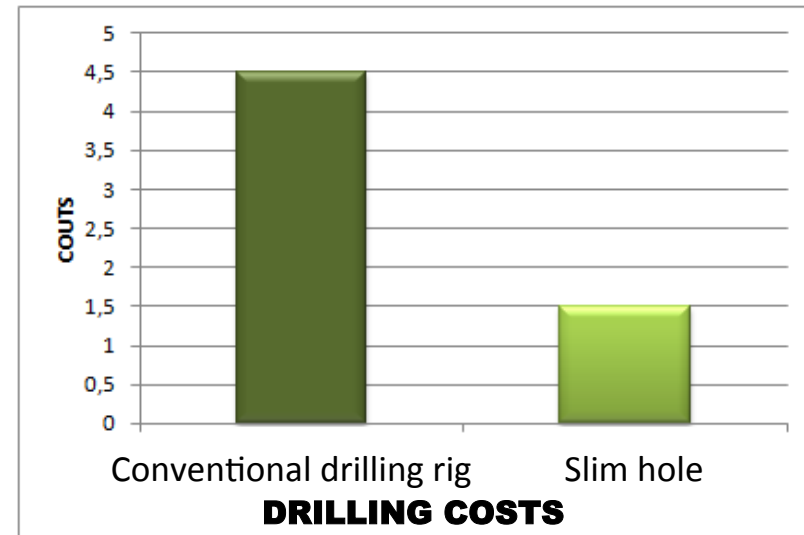




# OUR DRILLING TECHNIQUES : SLIM HOLE REDUCED ENVIRONNEMENTAL IMPACT AND COST

- Since 2010, SQUATEX, like some major oil and gas companies such as **Shell, Amoco, Total and Conoco Phillips**, is using **slim hole** drilling techniques.
- The same well information and technical data are gathered at cost far lower than by using a conventional oil drilling rig.
- Our resulting holes can be eventually completed and put into production.
- The small well pad design allows to greatly reduce **ambient noise, pollutants and the need of large quantity of water.**

Squatex drilling activities have a greatly **REDUCED IMPACT** on the environment.

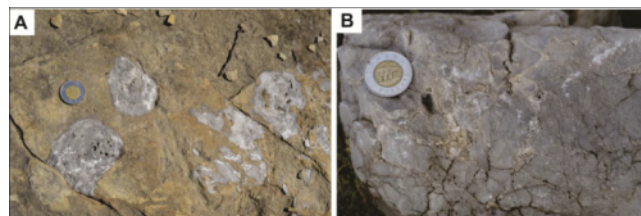


# COLLABORATION WORK WITH INRS IN 2015-2016

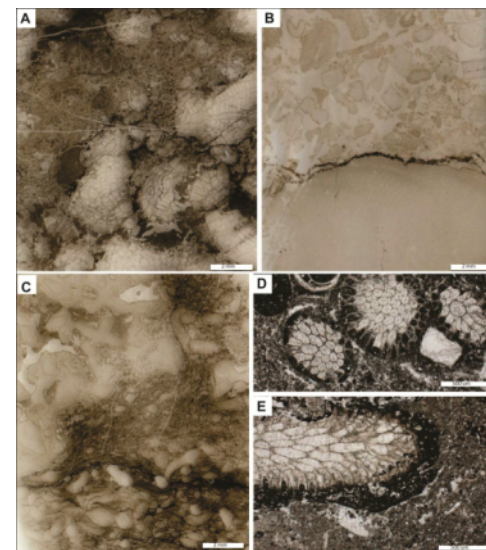
# FACIES ANALYSIS OF THE SAYABEC FORMATION

## Various porosities occurring within the Sayabec Formation

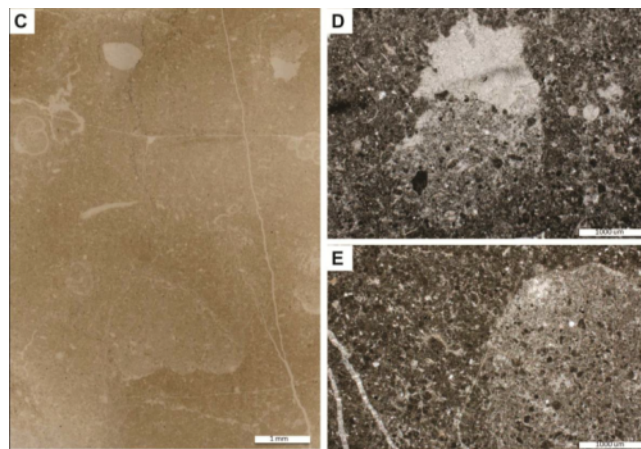
### Intrabioclastic porosity



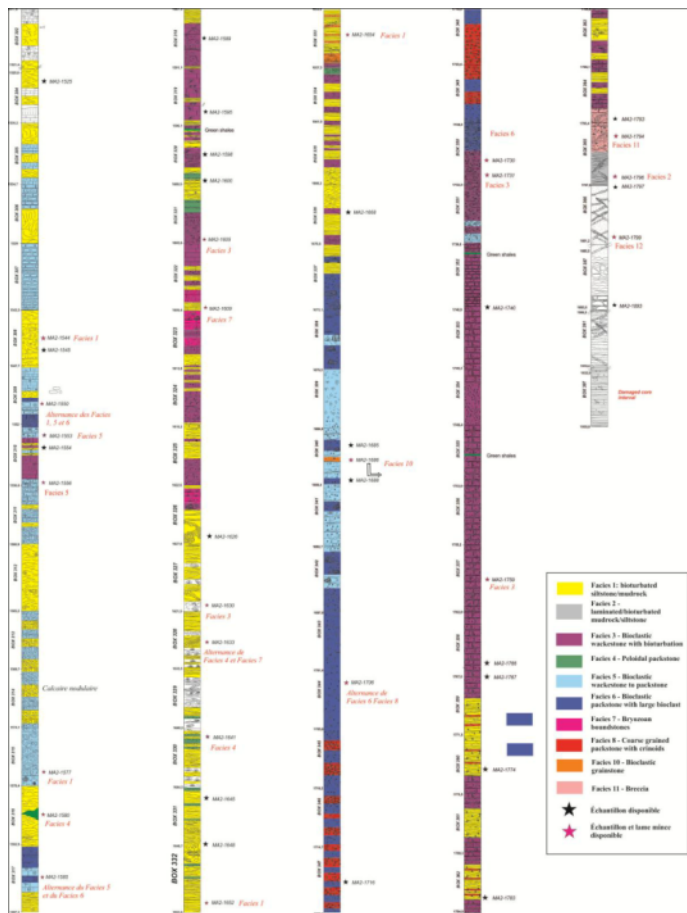
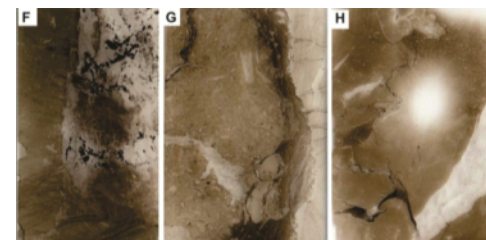
### Intragrain porosity



### Matrix Porosity



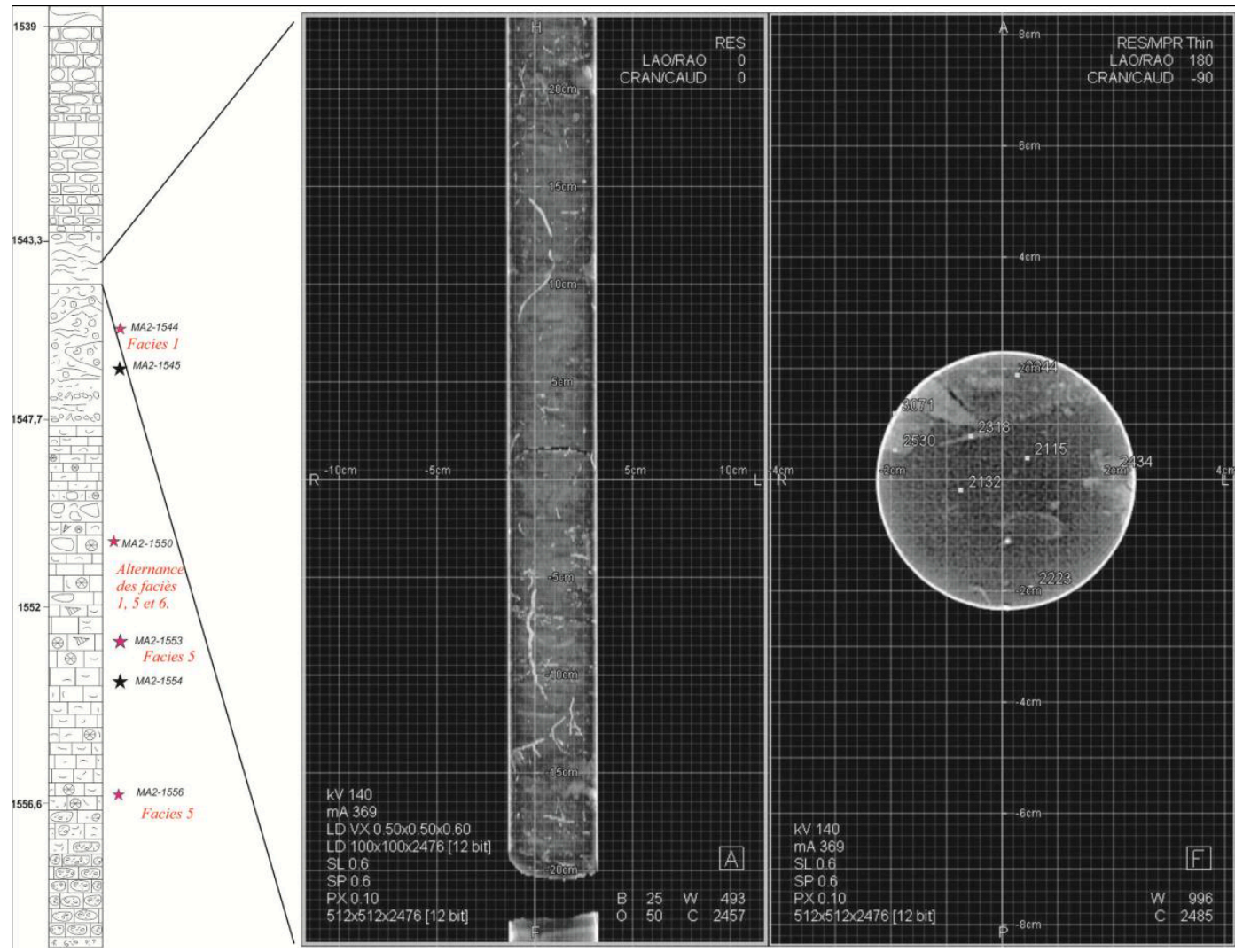
### Fractures porosity



Detailed stratigraphy within the Sayabec Formation

From S. Larmagnat et al. (2016)

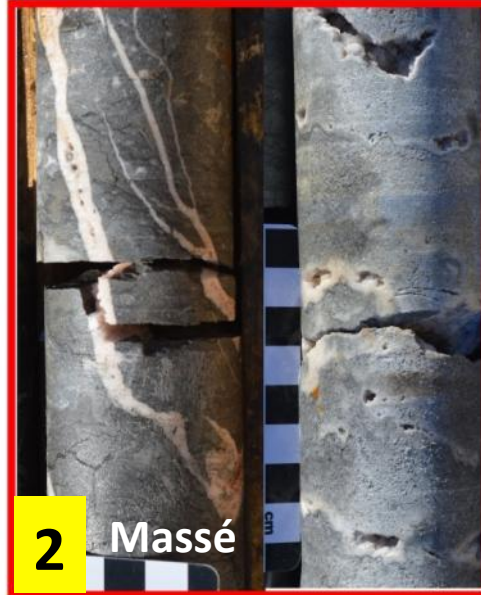
# PRELIMINARY RESULTS FROM TOMODENSITOMETRY



From S. Larmagnat et al. (2016)



# ANALOGUE : ALBION-SCIPIO (HTD TRENTON FM.)

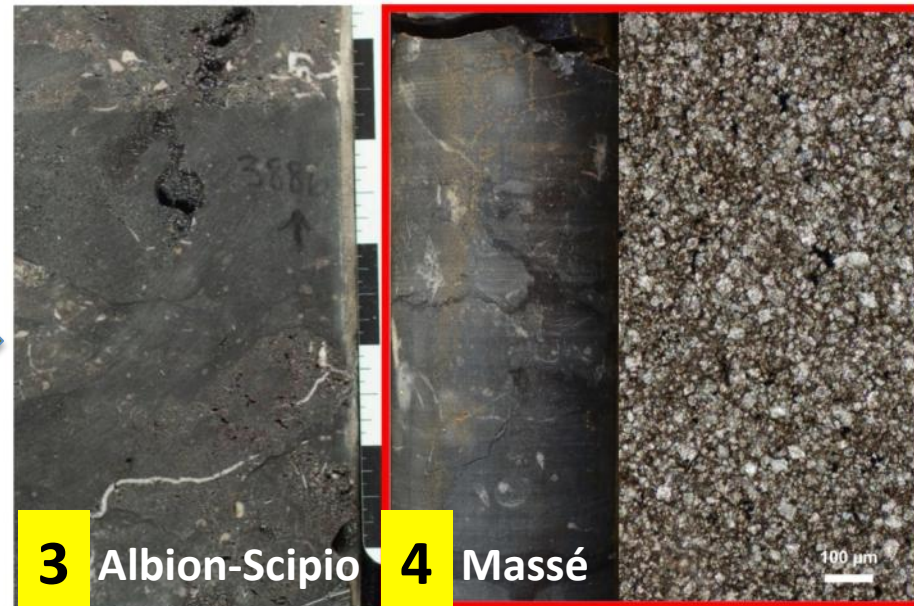


1 HTD Albion-Scipio (+250MMbbl of oil- Michigan).

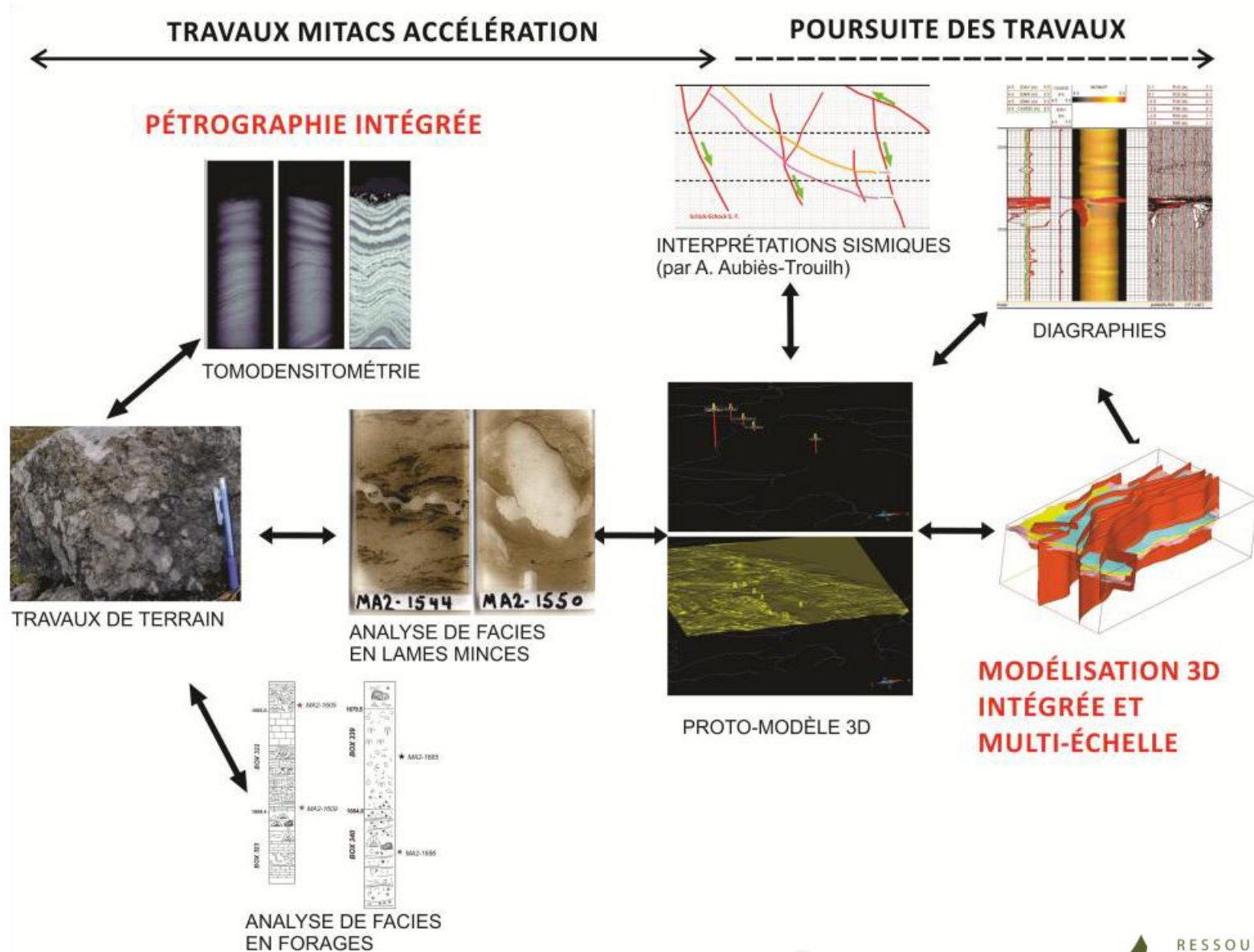
2 Fractures and vugs showing effective porosity within the Sayabec Formation.

3 Albion-Scipio reservoir facies showing variable porosity at cm scale.

4 Fine grain facies with matrix replaced locally by micro-dolomite in the Sayabec Formation.



# COLLABORATION SQUATEX / INRS-ÉTÉ : NEXT STEP

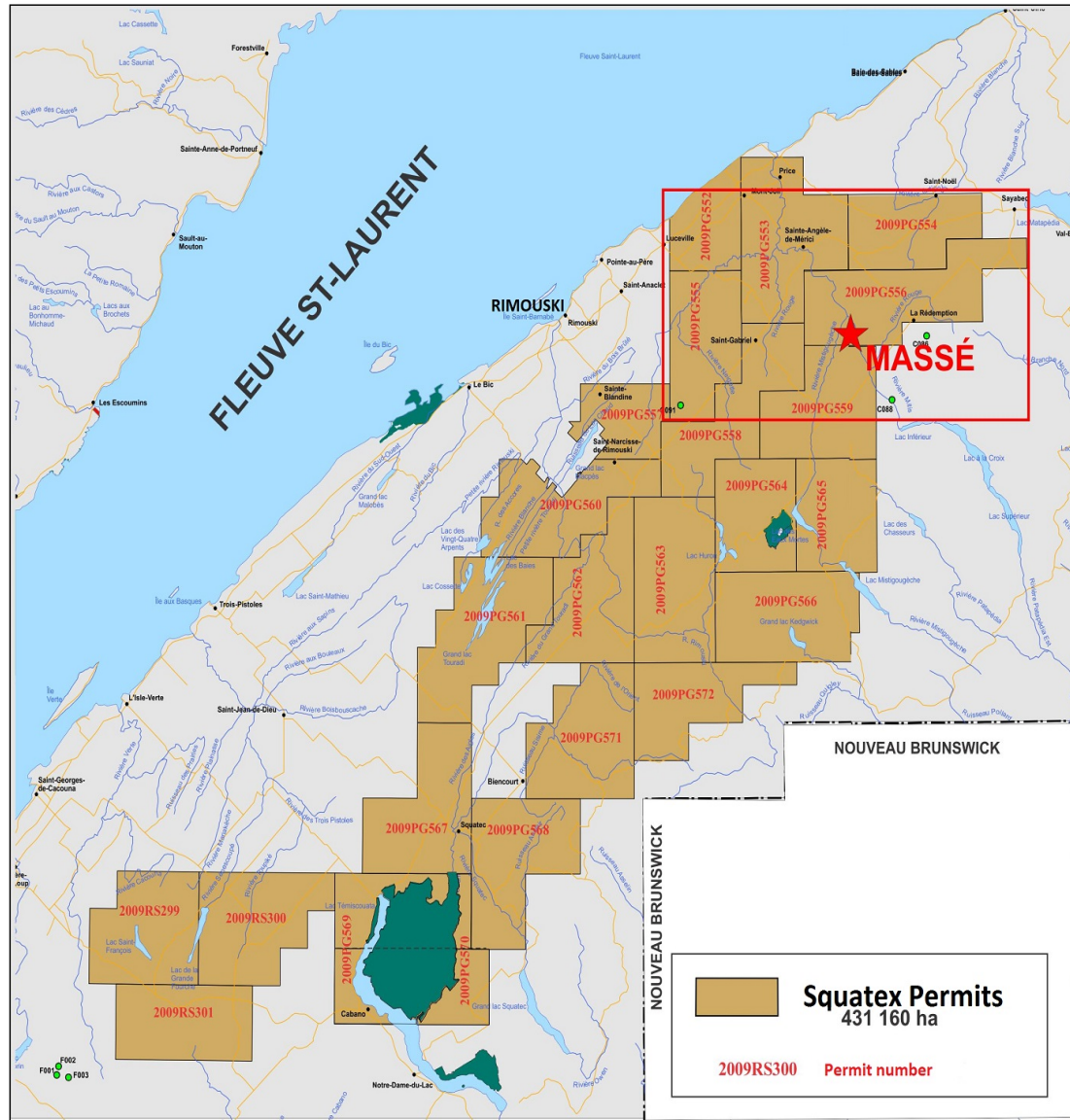


From S. Larmagnat et al. (2016)

# MASSÉ STRUCTURE DISCOVERY



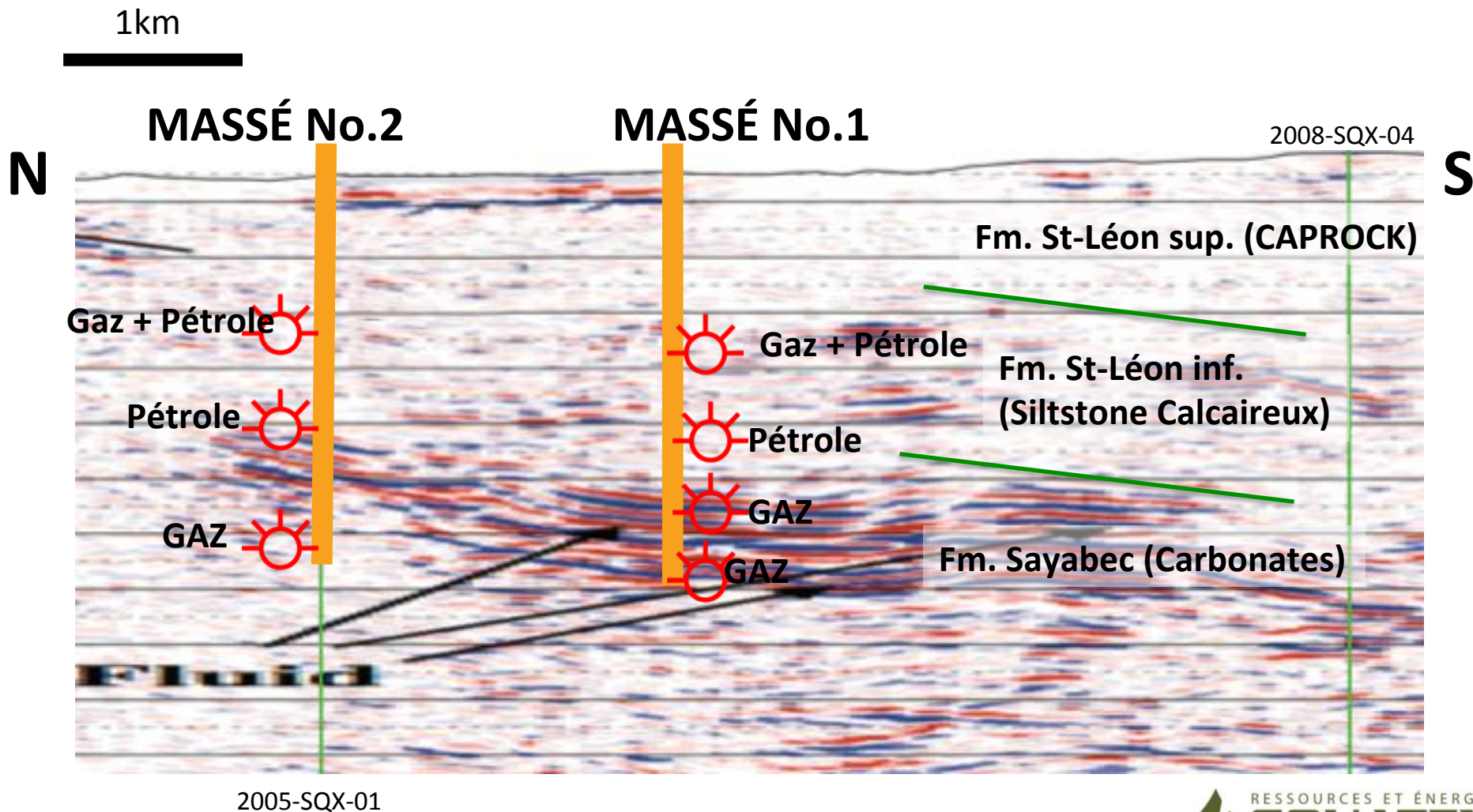
# LOWER ST. LAWRENCE : AREA OF INTEREST





# TARGET : HYDROTHERMAL DOLOMITE (HTD)

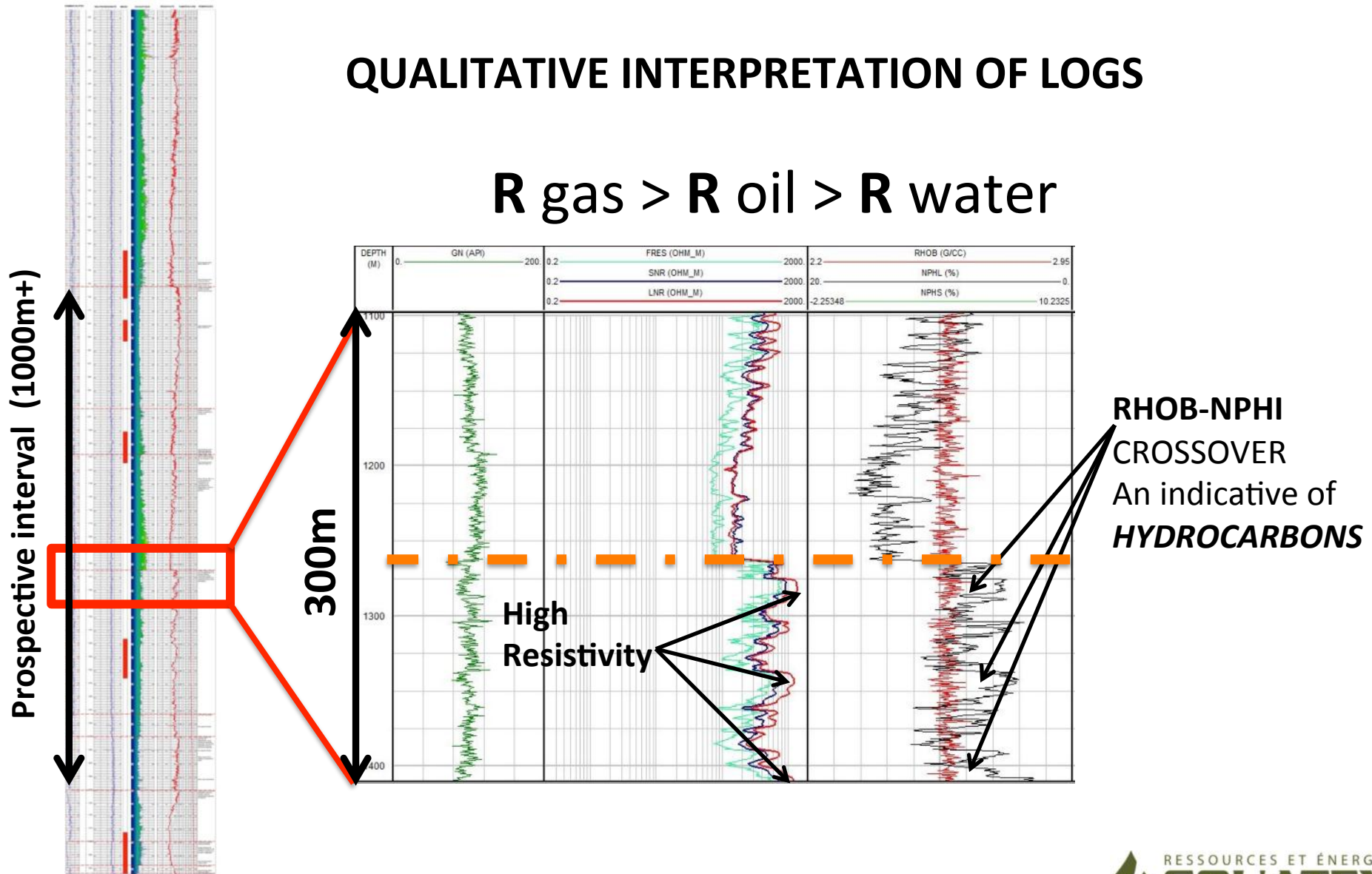
## INFERRED POROSITY BY THE AVO PROCESSING OF SEISMIC LINE MNR-2001-02



# SQUATEX MASSÉ No. 2 : WELL LOGS

## QUALITATIVE INTERPRETATION OF LOGS

$R_{\text{gas}} > R_{\text{oil}} > R_{\text{water}}$

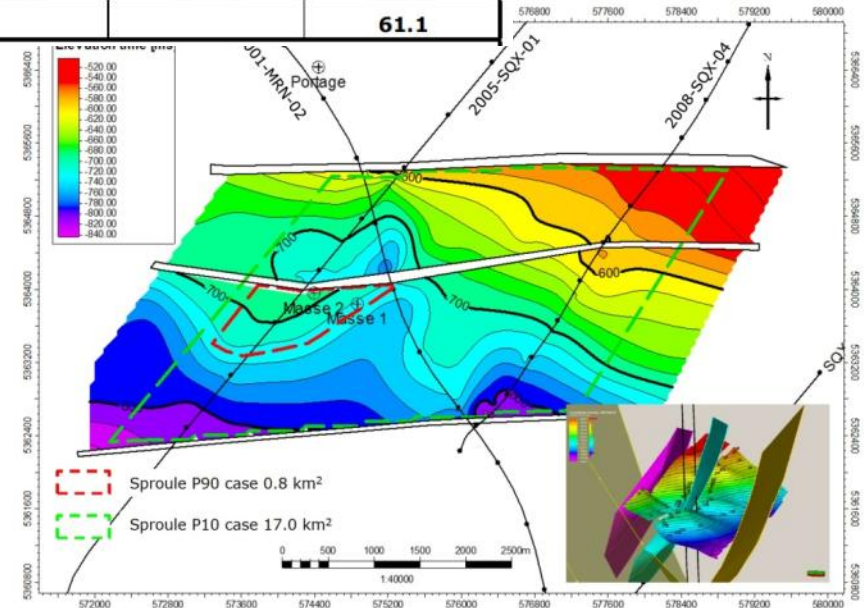


# SQUATEX MASSÉ : SPROULE EVALUATION

Structure	Formation		Low <sup>4</sup>	Best <sup>5</sup>	High <sup>6</sup>	Mean <sup>7</sup>
			(P <sub>90</sub> )	(P <sub>50</sub> )	(P <sub>10</sub> )	
Massé	St. Leon	Gas (BCF) <sup>2,3</sup>	0.2	1.0	3.8	1.6
		Oil (MMbbl) <sup>2,3</sup>	2.0	9.9	42.2	17.0
	Sayabec	Gas (BCF) <sup>2,3</sup>	4.4	24.0	119.7	49.0
		Oil (MMbbl) <sup>2,3</sup>	2.9	17.1	87.3	35.8
Total <sup>7</sup>		Gas (BCF) <sup>2,3</sup>	5.7	26.8	127.6	53.6
		Oil (MMbbl) <sup>2,3</sup>	10.0	33.9	113.6	52.2
		MMBOE <sup>2,3,7</sup>				61.1

## SPROULE 2016 REPORT

Estimation of a mean value of **53.6 BCF** of gas in place and **52.2 MMbbl** of oil in place over an interval of **1060m (gross pay zone)** within a mean surface of **5.2 km<sup>2</sup>**.



From Sproule 2016



# SQUATEX MASSÉ: SPROULE EVALUATION

Table S-2

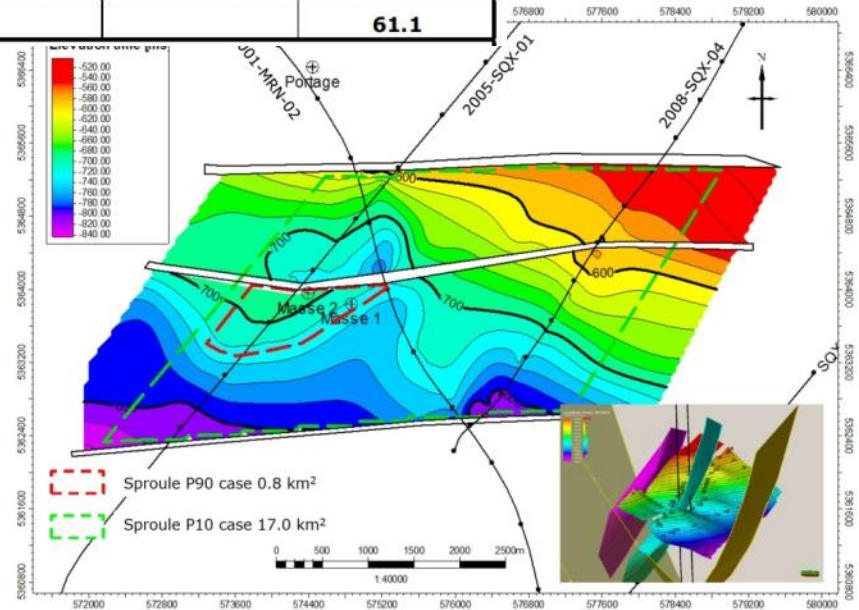
Summary of Project Gross Unrisked Undiscovered Unrecoverable Petroleum Initially-in-Place (PIIP) of the Eastern Massé Structure, Lower St. Lawrence Area, Québec, Canada<sup>1,2</sup> Estimated by Sproule Associates Limited, As of April 30, 2016

Structure	Formation		Low <sup>4</sup>	Best <sup>5</sup>
			(P <sub>90</sub> )	
Massé	St. Leon	Gas (BCF) <sup>2,3</sup>		
		Oil (MMbbl) <sup>2,3</sup>		
	Sayabec		49.0	
			87.3	35.8
		127.6	53.6	
		33.9	113.6	52.2
				61.1

Equivalent to **10 BCF (Gas)** and **10 MMbbl (Oil)** per km<sup>2</sup> over an average interval of **1000m** in thickness!!!

## SPROULE 2016 REPORT

Estimation of a mean value of **53.6 BCF** of gas in place and **52.2 MMbbl** of oil in place over an interval of **1060m** (gross pay zone) within a mean surface of **5.2 km<sup>2</sup>**.



From Sproule 2016

# EXPLORATION CONCEPT AND TARGETS

# PLAY CONCEPT

## SCHEMATIC CROSS-SECTION

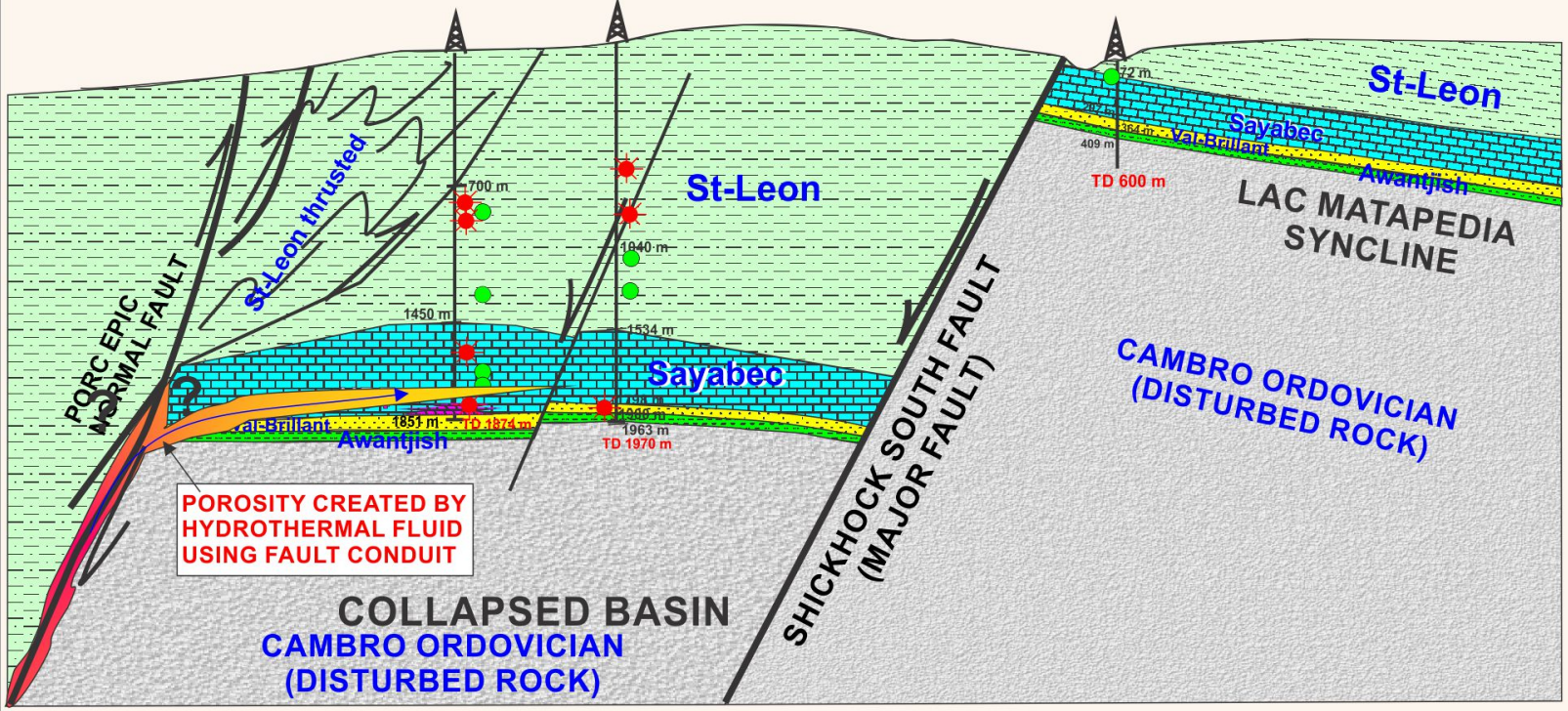
SW

NE

MASSÉ #1

MASSÉ #2

PORTAGE



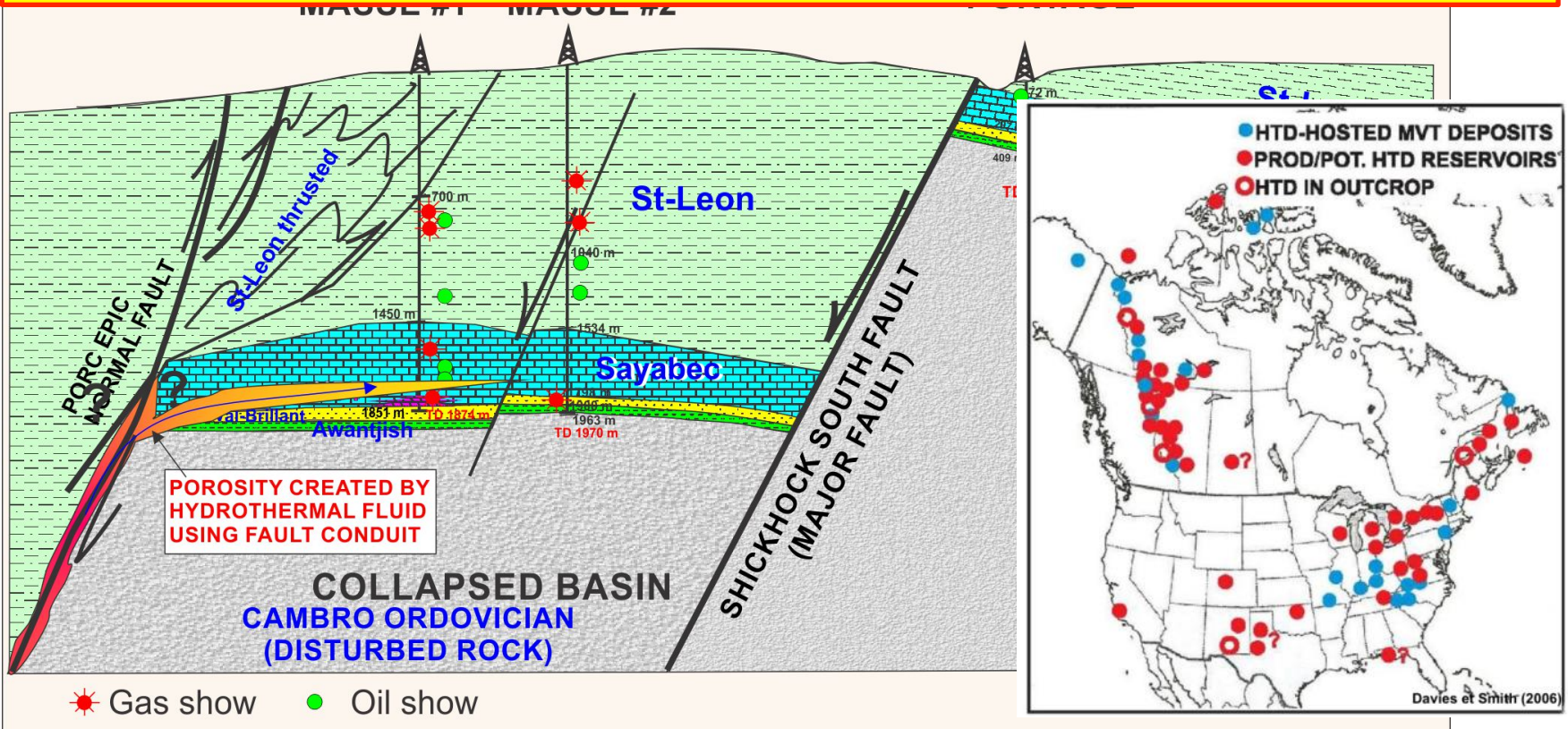
★ Gas show   ● Oil show

NOT AT SCALE



# PLAY CONCEPT

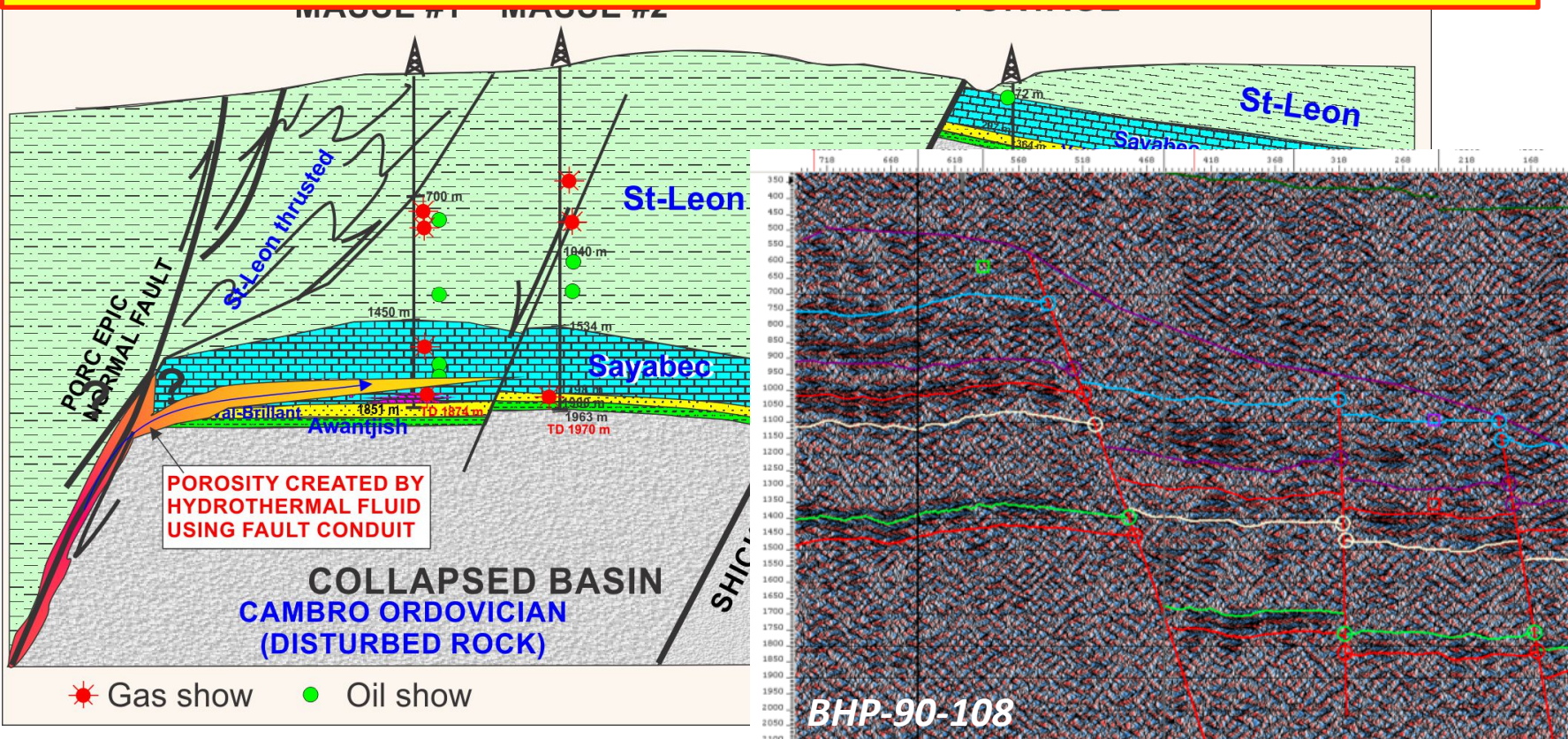
This play is also observed in the St. Lawrence Lowlands within the Trenton Formation = Potential for **CONVENTIONAL PRODUCTION** (no fracturation job)!!!





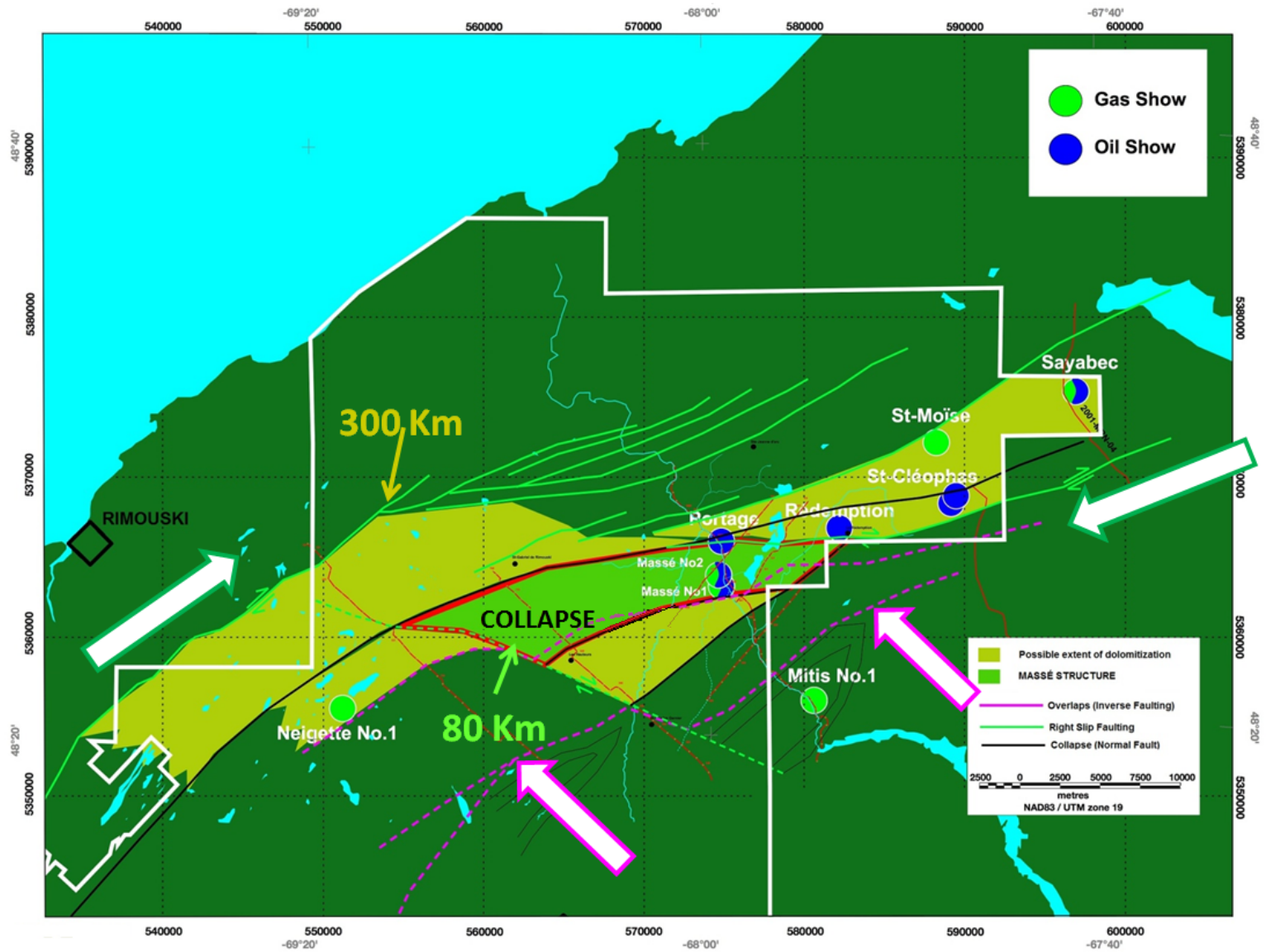
# PLAY CONCEPT

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# PROSPECTIVE AREAS AND FORTHCOMING WORKS

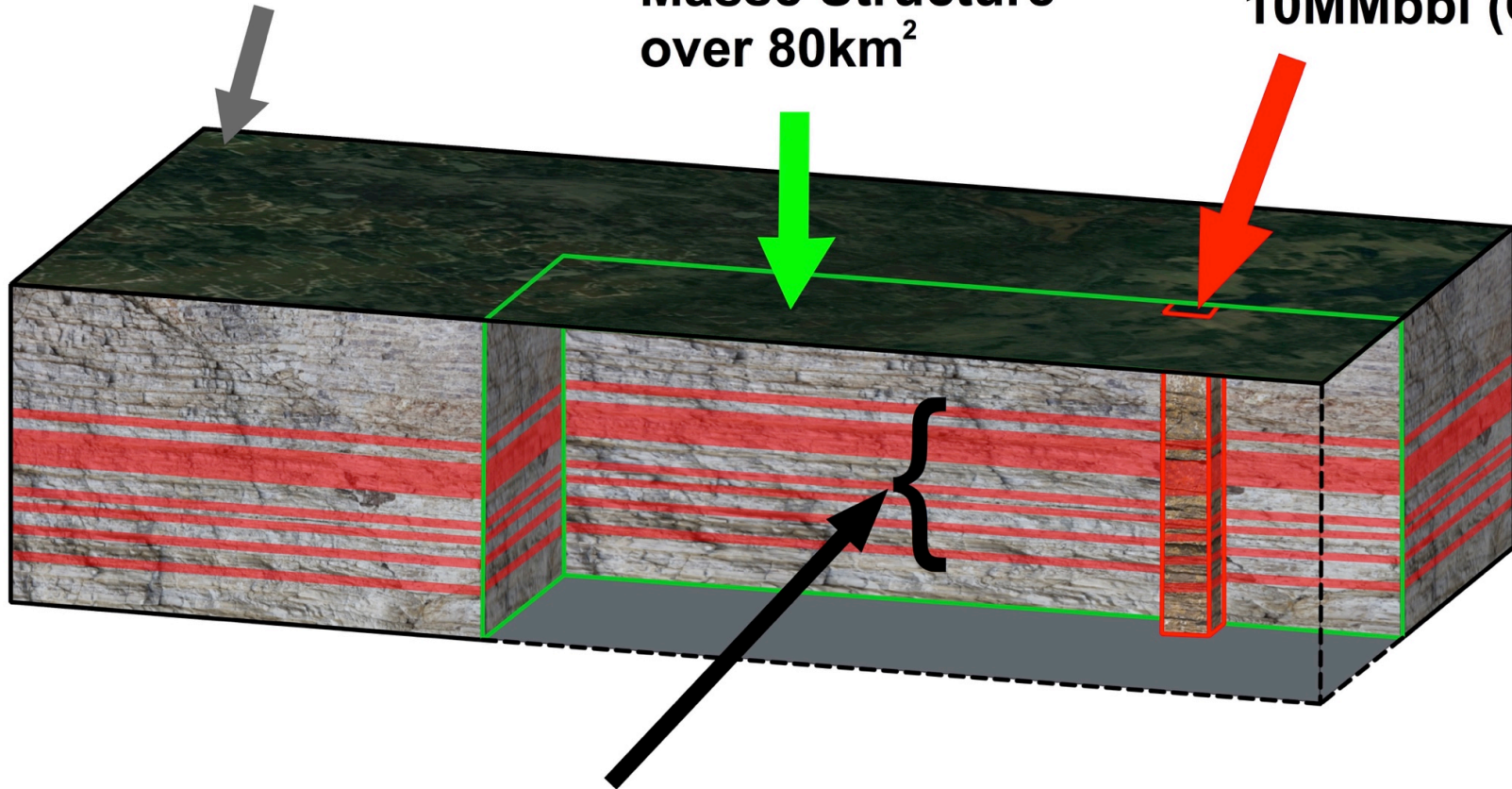


# SQUATEX LSL : CONVENTIONAL HTD PLAY

Play over  
an area of 300km<sup>2</sup>

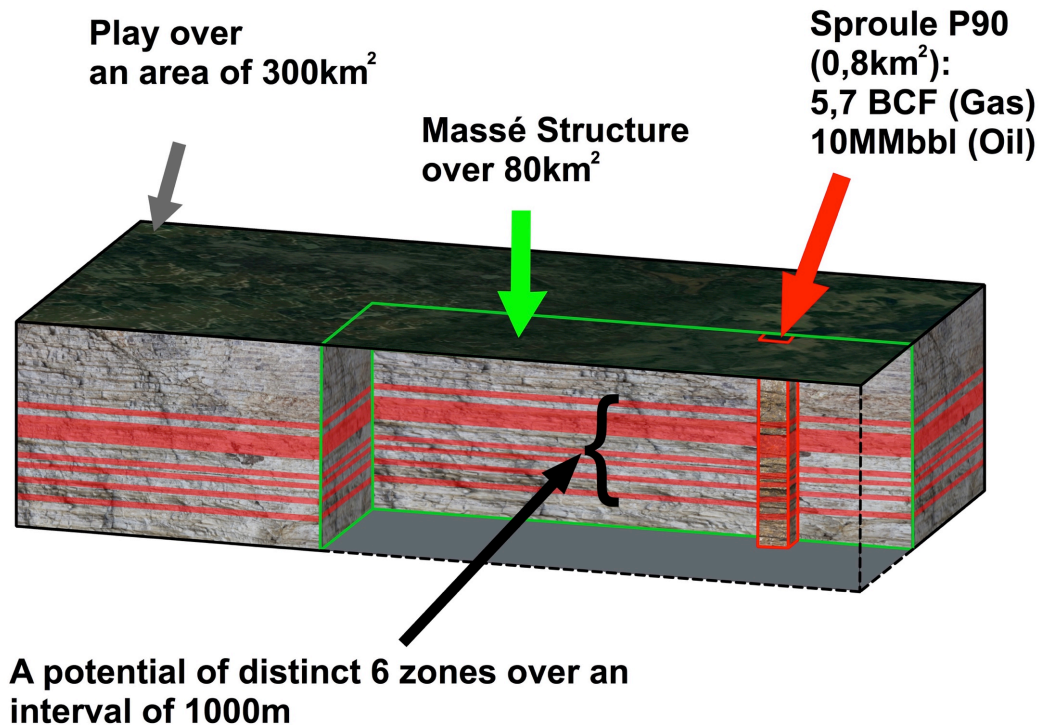
Sproule P90  
(0,8km<sup>2</sup>):  
5,7 BCF (Gas)  
10MMbbl (Oil)

Massé Structure  
over 80km<sup>2</sup>



A potential of distinct 6 zones over an  
interval of 1000m

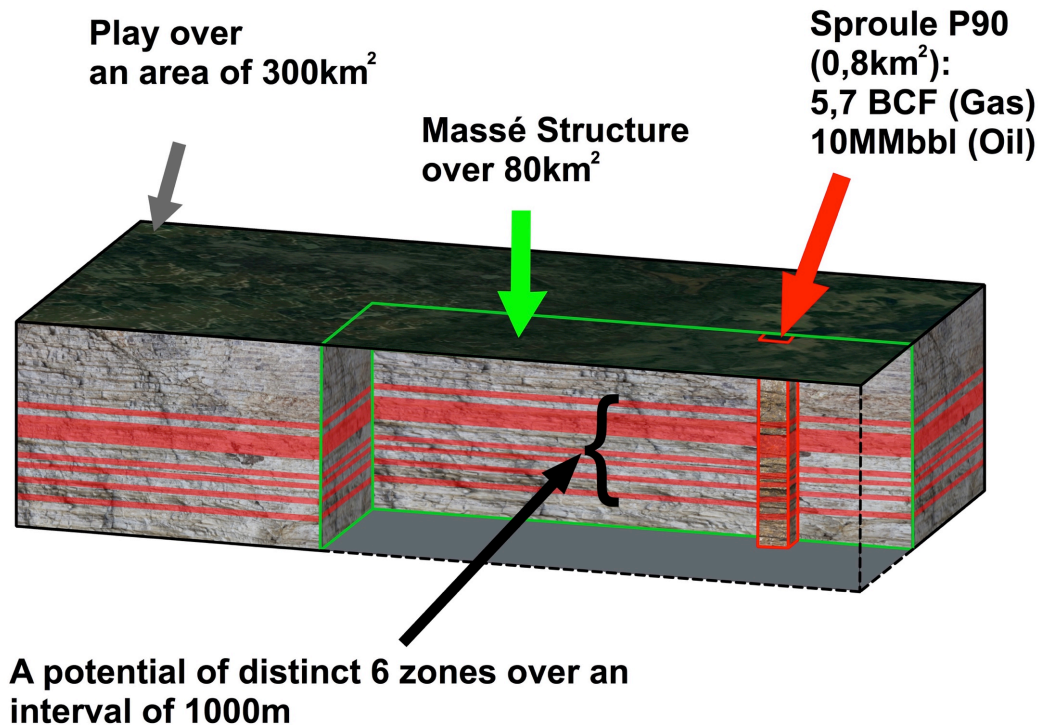
# THE FUTURE FOR SQUATEX IS:



- Investigate the **Hydrothermal Dolomites extent** over the Lower St.Lawrence (on an area of +/- 300km<sup>2</sup>)

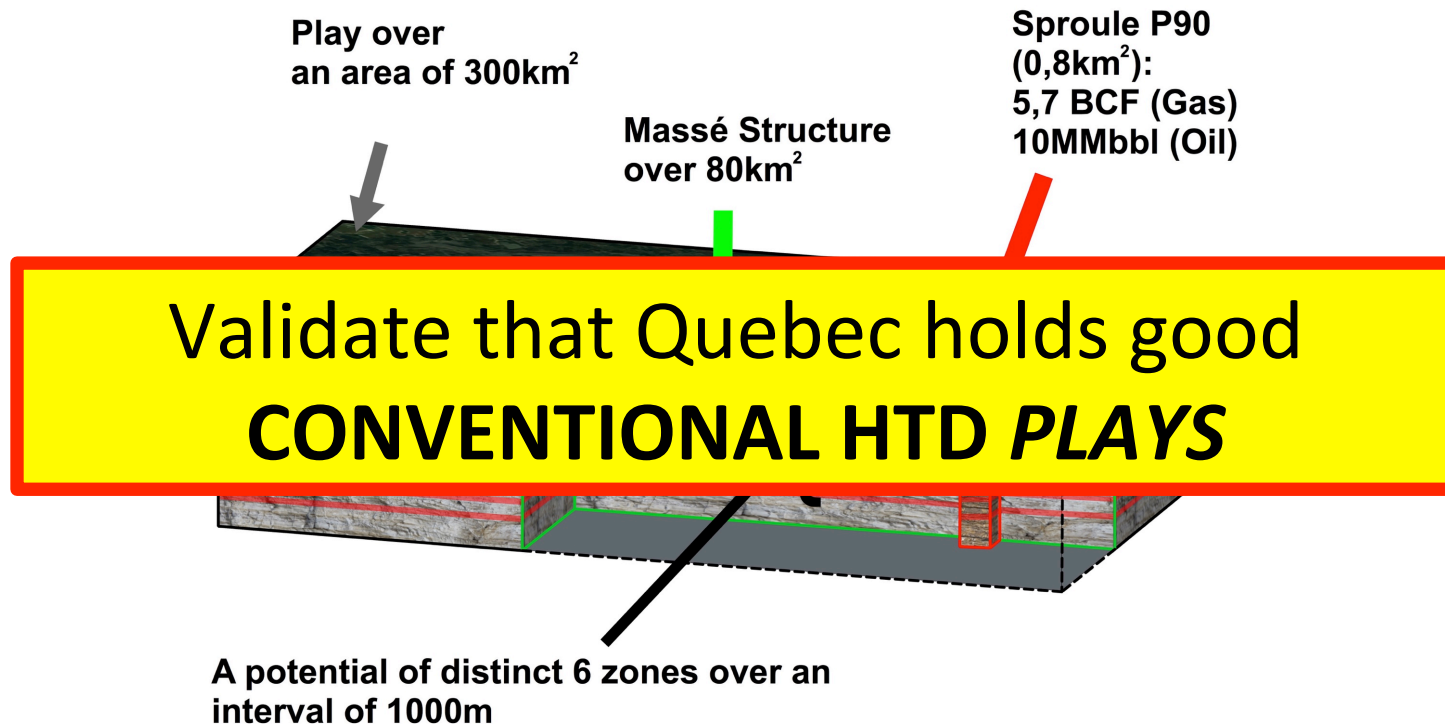


# THE FUTURE FOR SQUATEX IS:

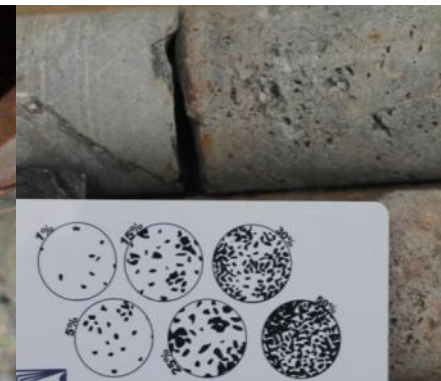


- Investigate the **Hydrothermal Dolomites extent** over the Lower St.Lawrence (on an area of +/- 300km<sup>2</sup>)
- Validate the **hydrocarbon** potential on a **1000m** interval containing numerous porous levels which could hold **10 BCF of gas** and **10 MMbbl of oil per km<sup>2</sup> (Mean)**

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- Validate the **hydrocarbon** potential on a **1000m** interval containing numerous porous levels which could hold **10 BCF of gas and 10 MMbbl of oil per km<sup>2</sup> (Mean)**



## Thanks:

S. Larmagnat, M. Malo, J. Raymond, K. Bédard  
P. Francus, L-F. Daigle & M. Des Roches



Université du Québec

**Institut national de la recherche scientifique**

Eau, Terre et Environnement



**CRSNG  
NSERC**



**2001 - 2016**

**15 YEARS OF ACHIEVEMENT**