



AREAS ADVERTISEMENT 2022

**NUEVA GRANADA 2D-2019 SEISMIC SURVEY
VIM 39 AREA**

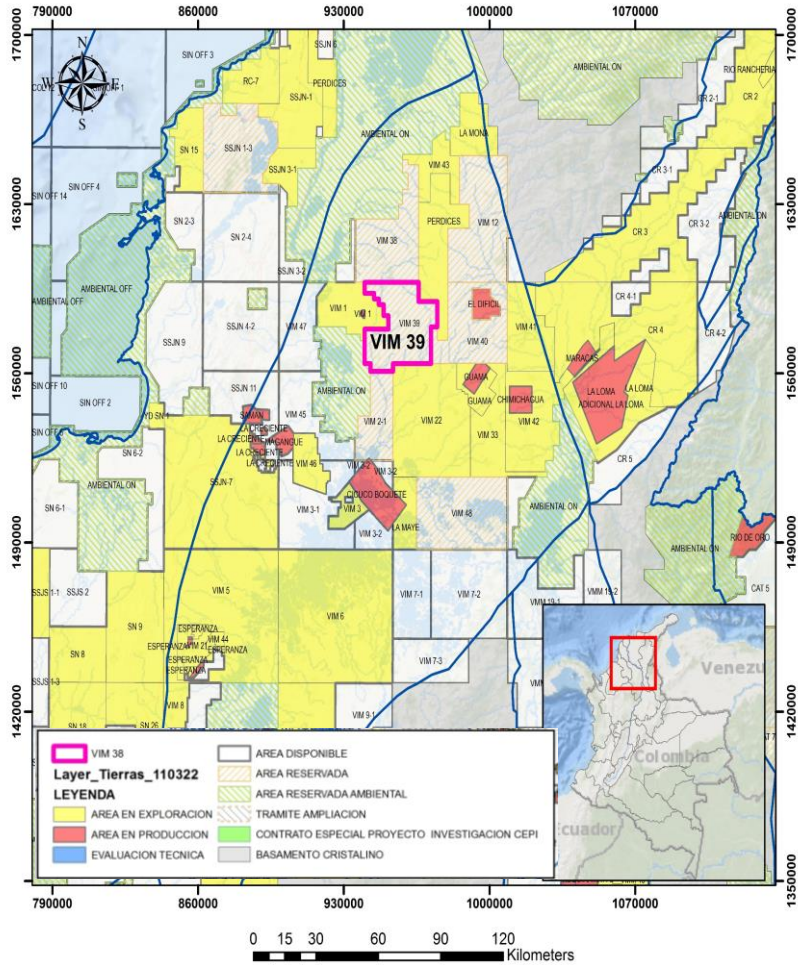
LOWER MAGDALENA VALLEY BASIN

June 24th, 2022

Content

- Introduction
- Geological Framework
- Infrastructure
- VIM 39 - Data Base
- Nueva Granada 2D - 2019
- Conclusions

Location

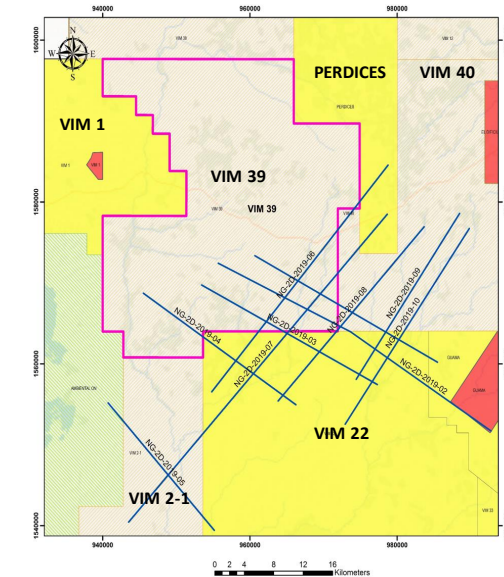


ANH Land Map, March 2022

VIM 39 Municipalities

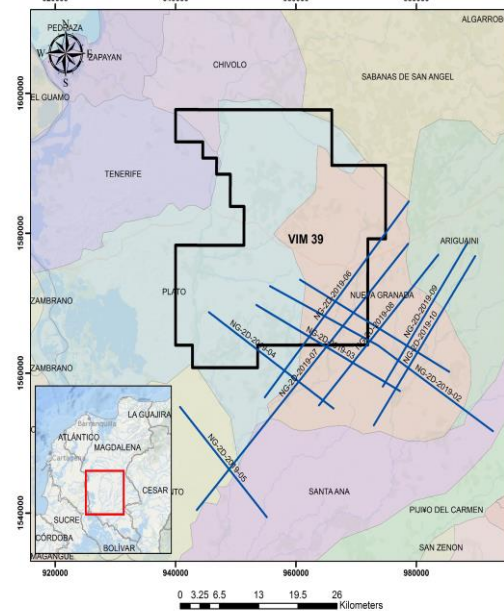
Department	Municipalities
Magdalena	Chivolo
	Sabanas de San Ángel
	Tenerife
	Plato
	Nueva Granada

**VIM 39 Block Area:
96155.46Ha**

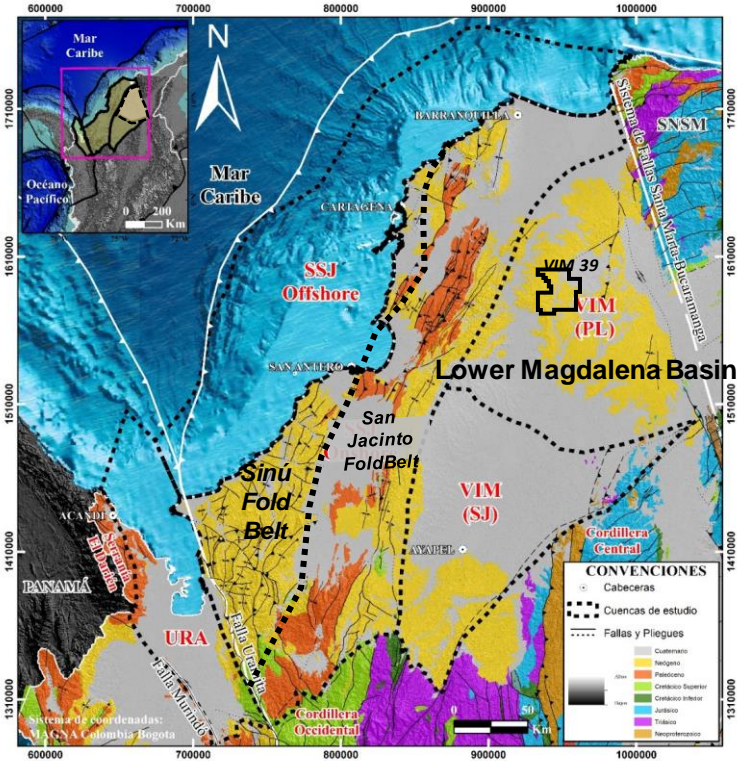


Seismic Lines Influence

Department	Municipalities
Magdalena	Nueva Granada
	Plato
	Ariguani
	Santa Ana
	Santa Barbara de Pinto

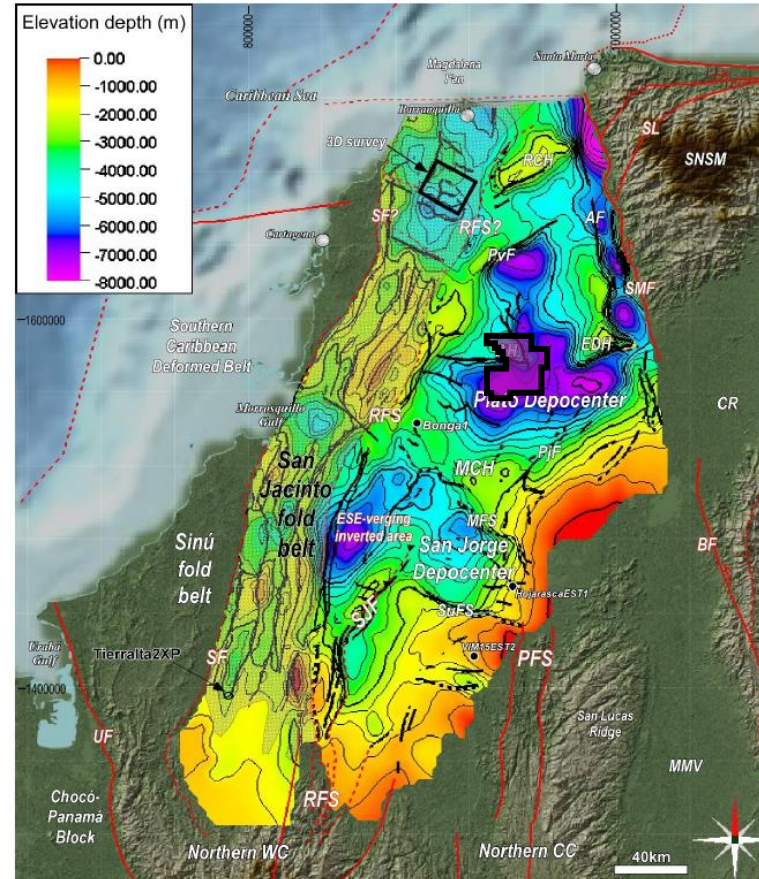


Geological Setting and Stratigraphic Chart

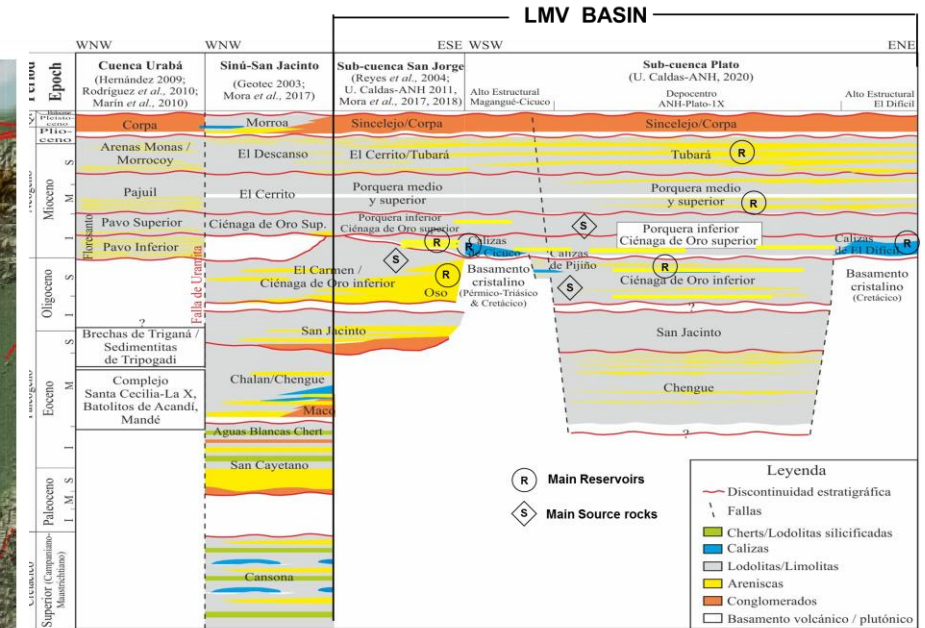


Taken from Universidad de Caldas – ANH, 2020

Structural Depth Model of the top of the Basement

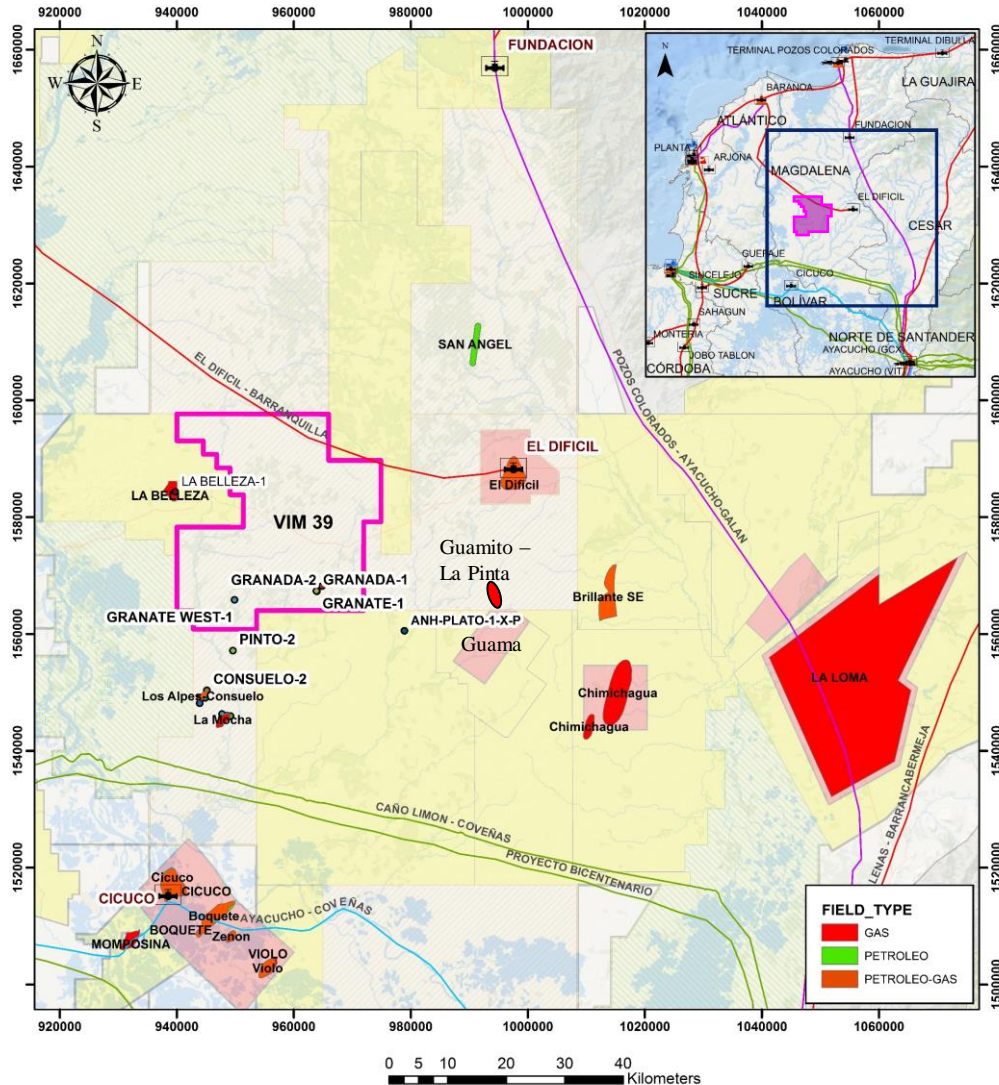


Mora, 2018



- In the area of interest two main units are considered reservoirs: Tubará and Upper Porquero Formations.

Infrastructure and Fields



INFRASTRUCTURE NEARBY

PIPELINE	GAS PIPELINE	OIL PIPELINE
FUNDACION 84 Km	EL DIFICIL 37 Km	CAÑO LIMON COVENAS 50 Km

WELLS

ANH-PLATO-1-X-P	21713 Ft	GRANATE WEST-1	7000 Ft
APURE-1	11481 Ft	<u>GRANATE-1</u>	<u>12045 Ft</u>
APURE-2	12412 Ft	LA BELLEZA-1	11791 Ft
APURE-3	12041 Ft	PINTO-1	11206 Ft
GRANADA-1	3870 Ft	TUPALE-1	15592 Ft
GRANADA-2	4504 Ft		

FIELDS NEARBY

EL DIFICIL	CICUCO	BRILLANTE
CHIMICHAGUA	VIOLO	MOMPOSINA
BOQUETE	ZENON	LA LOMA
LA BELLEZA		

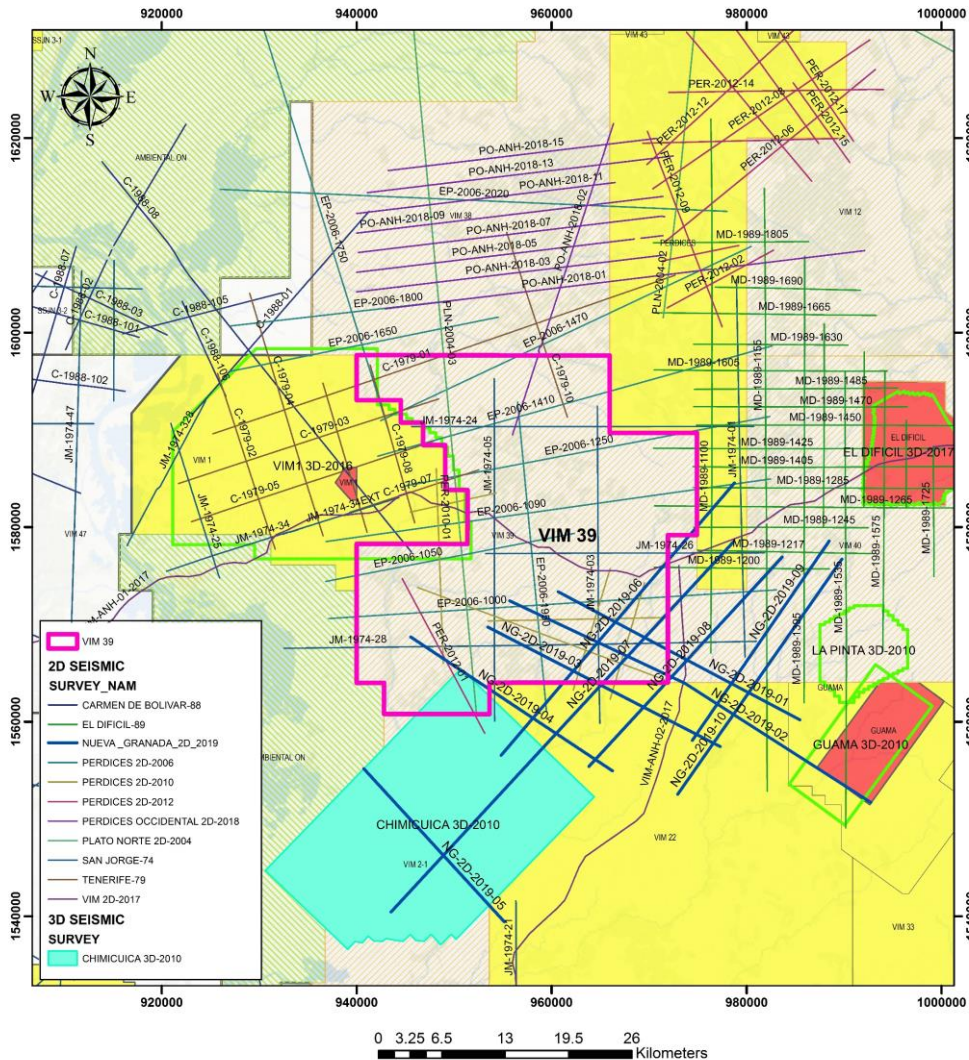
Database: Seismic

AVAILABLE 2D SEISMIC: 11 SURVEYS

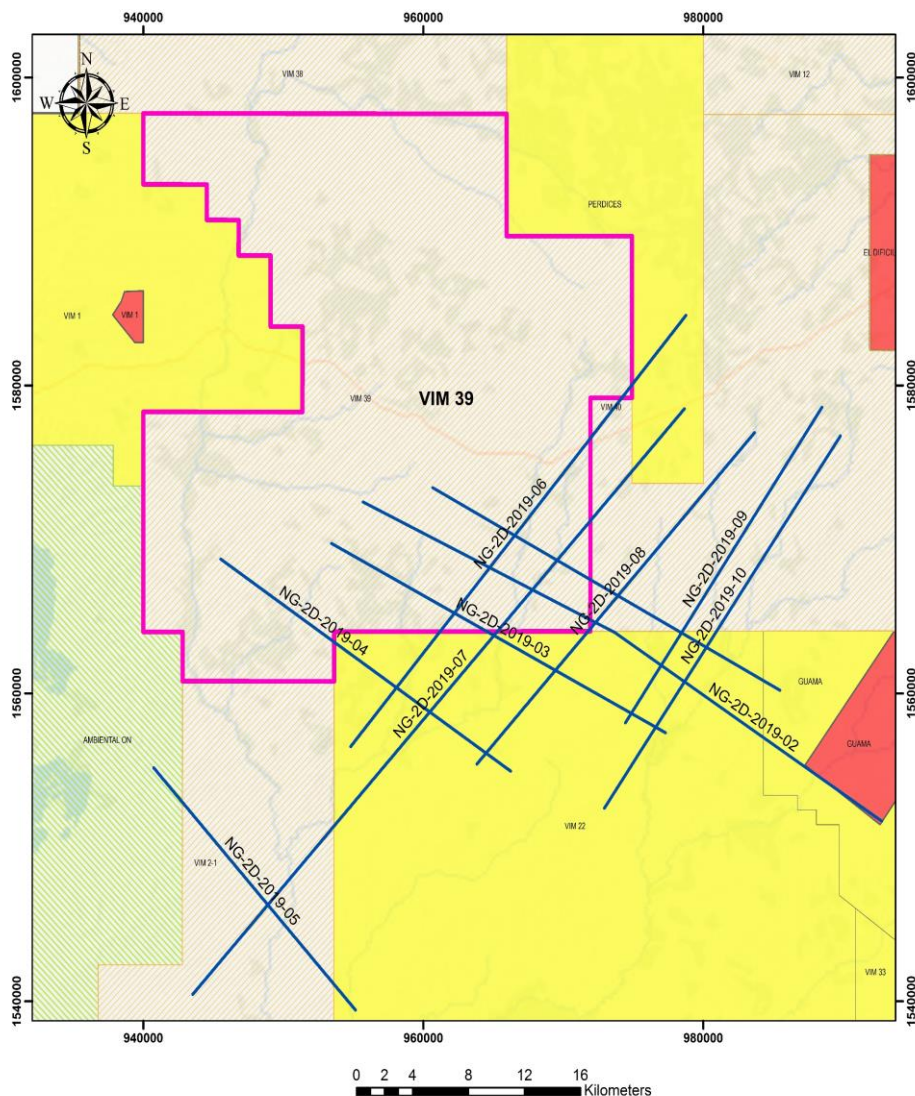
AREA	SURVEY NAME	TOTAL LENGTH (Km)	# LINES
VIM 39	CARMEN DE BOLIVAR-88	363.7	1
	EL DIFICIL-89	642.6	6
	NUEVA GRANADA 2D-2019	315.8	7
	PERDICES 2D-2006	536.1	8
	PERDICES 2D-2010	100	6
	PERDICES 2D-2012	255.3	1
	PERDICES OCCIDENTAL 2D-2018	295	1
	PLATO NORTE 2D-2004	450	1
	SAN JORGE-74	1140.6	5
	TENERIFE-79	216	6
	VIM 2D-2017	358	1
TOTAL LENGTH		4359.14	43

AVAILABLE 3D SEISMIC: 1 SURVEY

SURVEY	AREA (Km ²)
CHIMICUICA 3D-2010	511.80



Nueva Granada 2D: Acquisition and Processing



10 Seismic lines

Acquisition Parameters

Acquired by: Vector Geophysical
Record Tools: Sercel Unite V3
Sample rate: 2 Ms
Record Length: 8 S.

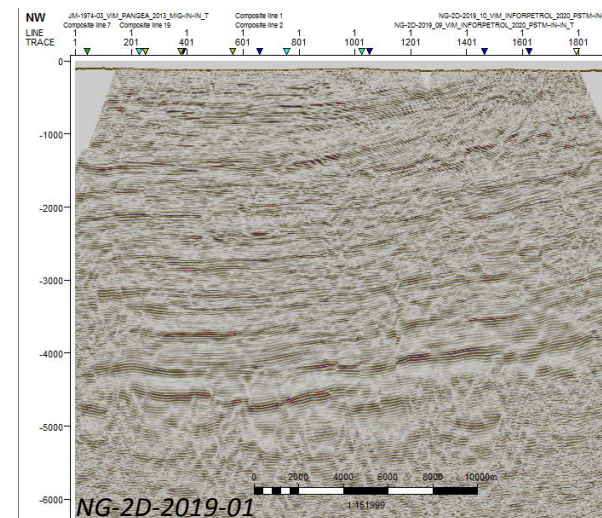
Source:

Source Type: Sismigel
Charge: 2700 g.
Depth: 10 m.
Interval: 50 m.

Receivers:

Geophone Type: Single Sensor
Natural Frequency: 10 Hz
Channels: 720
Type of laying: Roll on roll of
Nominal Fold :150
Receiver Interval: 25 m.
SP: 5013
Receiving Stations: 12521

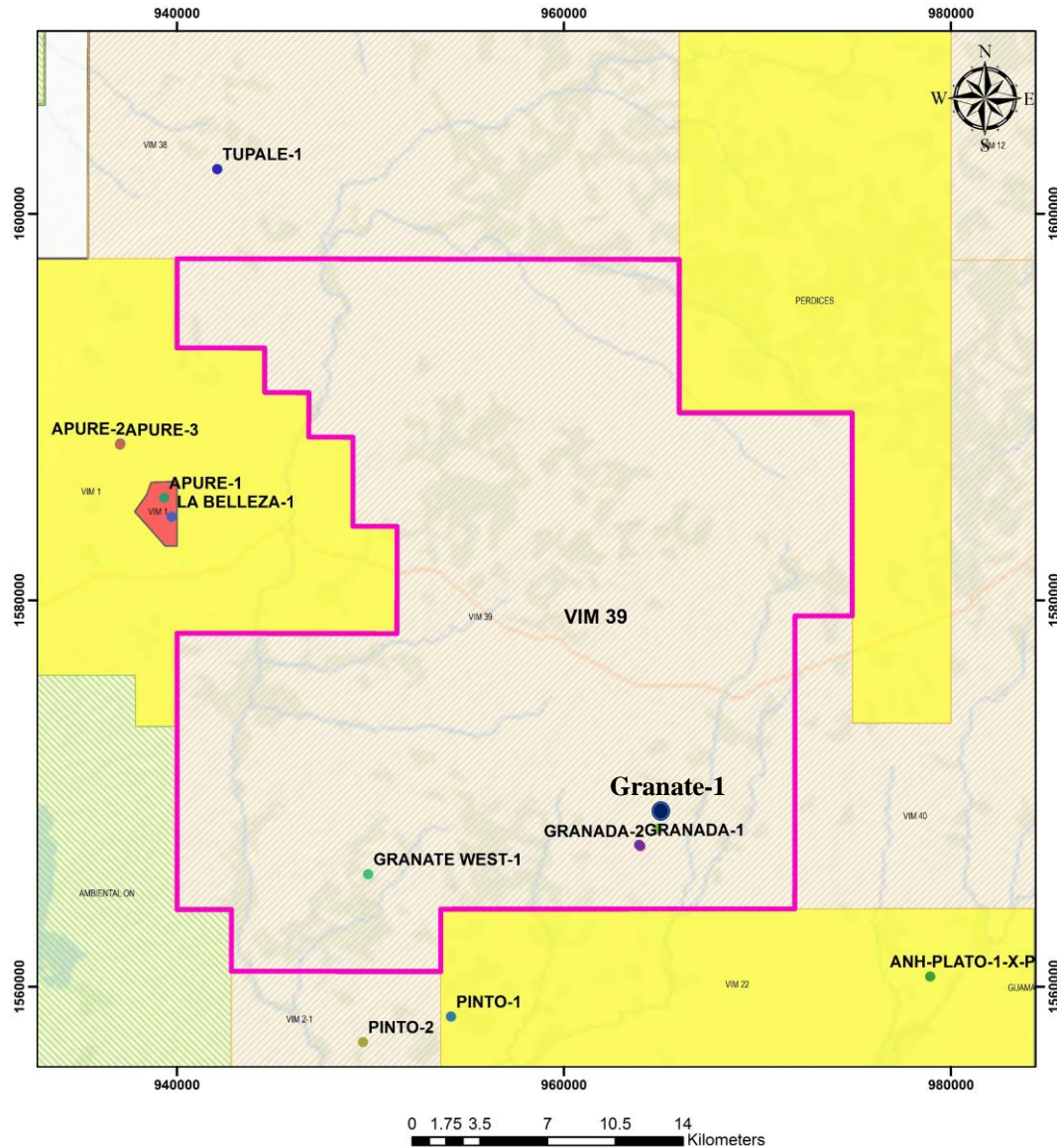
Processed by Inforpetrol (PSTM)



Straightforward sequence

- Geometry
- Noise attenuation
- First break picking
- Decon
- Statics correction
- Velocity Analysis
- Kirchhoff Migration

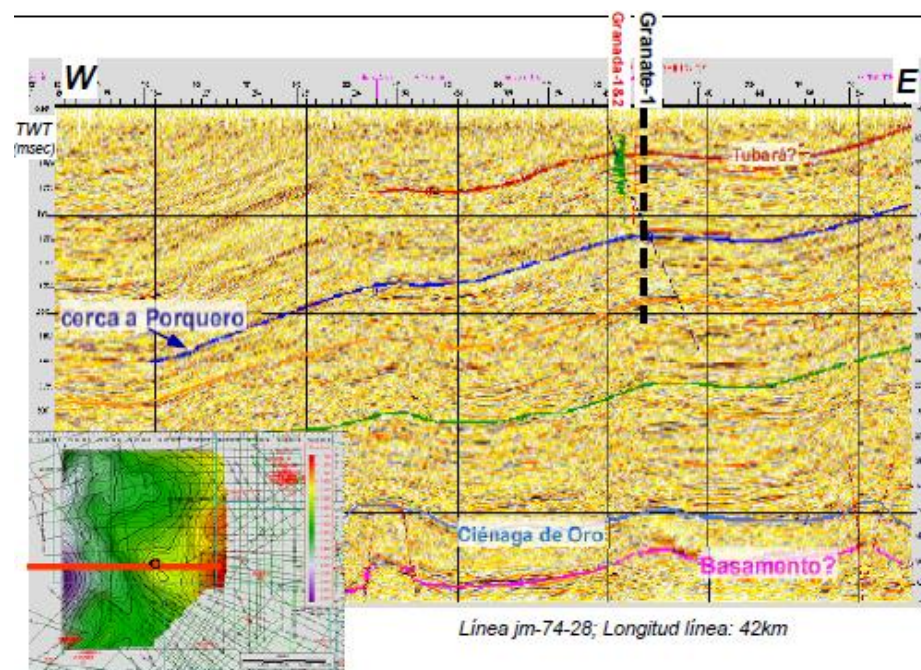
LINE	Sp's	LENGTH (Km)	LENGTH IN THE VIM39 BLOCK (Km)
NG-2D-2019-01	413	28	12.7
NG-2D-2019-02	743	42.5	17.9
NG-2D-2019-03	385	26.8	12.4
NG-2D-2019-04	347	24.8	9.7
NG-2D-2019-05	278	21.3	-
NG-2D-2019-06	651	36.8	17.6
NG-2D-2019-07	881	51.7	9.7
NG-2D-2019-08	431	29.2	0.2
NG-2D-2019-09	359	24.8	-
NG-2D-2019-10	525	29.4	-
TOTAL	5013	315.8	80.5



WELL NAME	TD DATE	TD (Ft)
ANH-PLATO-1-X-P	5/23/2014	21713
APURE-1	4/4/1980	11481
APURE-2	6/27/1989	12412
APURE-3	3/13/2018	12041
GRANADA-1	4/12/1947	3870
GRANADA-2	12/20/1947	4504
GRANATE WEST-1	8/23/2012	7000
<u>GRANATE-1</u>	<u>1/23/2011</u>	<u>12045</u>
LA BELLEZA-1	9/25/2019	11791
PINTO-1	5/9/1947	11206
TUPALE-1	9/26/2009	15592

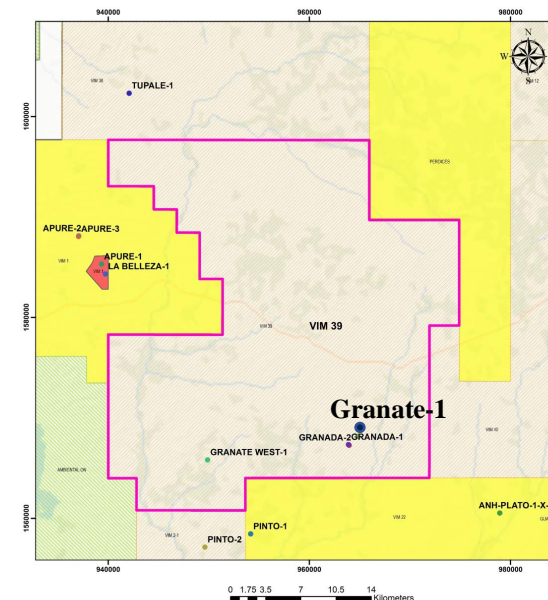
Granate-1 well

- Company: Hocol
- Total Depth: 12045'
- Spud date: January 2011
- Structure: Anticline with closure in four ways.
- Targets: Tubará Fm, and Upper Porquero
- Seismic anomalies at different stratigraphic levels within the Porquero Formation.
- Final Classification: Plugged and abandoned C3. Non commercial producer.
- Gas shows: 19,43% - 54,85%, associated to thin levels of sandstones. Mud weight: 11,2 – 17,4 ppg
- Tests: 8 tests in 16 open intervals (5036' – 8958')
- Estimated reserves: 133 Bcf.

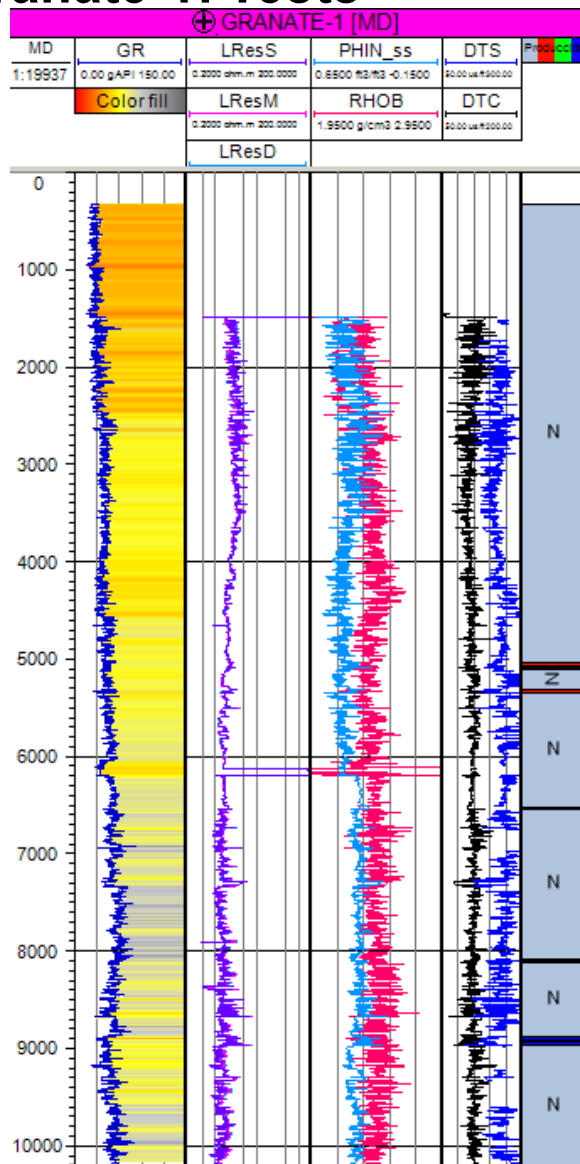


Línea jm-74-28; Longitud línea: 42km

Interpretación Sísmica Línea W-E jm-74-28 San Jorge-74



Granate-1: Tests



Summary of produced intervals. Granate – 1 well

No.	Depths (MD in ft)	Thickness(ft)	Lithology	FEL (shows)	GR	SP	Res (ohm)	Neut/Dens	Pixler
I	8928-8958	30	vf-fg-ssts	FG 24.96%	v~	v	6 a 8	v cruce	~ water
IA	8875-8906	31	vf-fg-ssts	FG 24.96%	v~	v	2 a 4	v cruce	~ water
II	8426-8452	26	vf-fg-ssts	10%	~	~	<2	~	v
	8418-8423	5	vf-fg-ssts	10%	~	~	<2	~	v
	8405-8412	7	vf-fg-ssts	10%	~	~	<2	~	v
II A	8299-8311	12	vf-fg-ssts	17%	v~	v	2 a 4		~
	8324-8334	10	vf-fg-ssts	19%	v~	v	2 a 4		~
III	8100-8116	16	vf-fg-ssts	SG 17.46%	v~	~	<3	v~	v
	8074-8081	7	vf-fg-ssts	FG 4.93%	v~	~	<2	~	v
IV	6518-6539	21	vf-fg-ssts	FG 30.1%	v	v	2-3.5ohm	v	v
V	5306-5346	40	f.gr-ssts	FG 52.26%	v	v	v 2-3.2ohm	v	v~
VI	5081-5099	18	f.gr-ssts	FG 54.85%	v	v	v 2-3.5ohm	v	v
	5036-5068	32	f.gr-ssts	FG 54.85%	v	v~	v 2-3ohm	v~	v

303 bls water

145 bls water, 12500 ppm Cl; 7000 scf/d

Dry test

Dry test

217 bls water, 1250-1460 ppm Cl; dry test.

Pumping N2; Burned gas on surface. 6000 scf/d estimated

Total volumen of gas estimated 31210 scf/d.
Water formation 11000-15000 ppm

3 days of test.

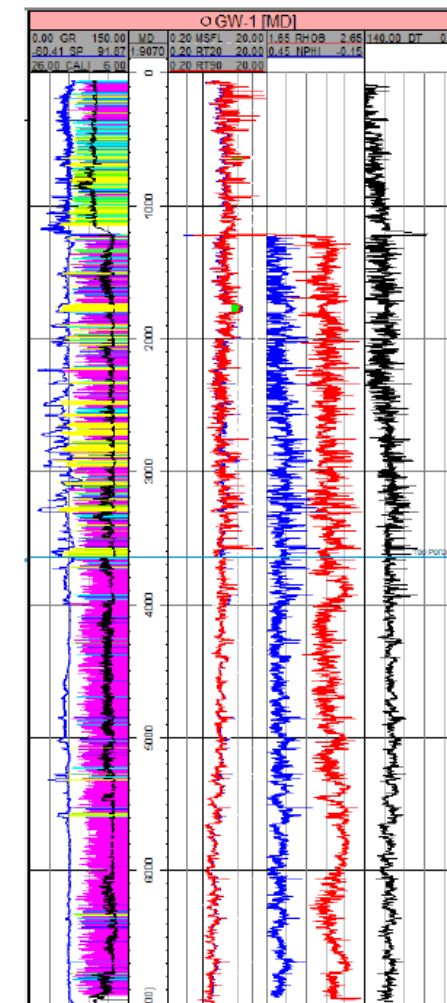
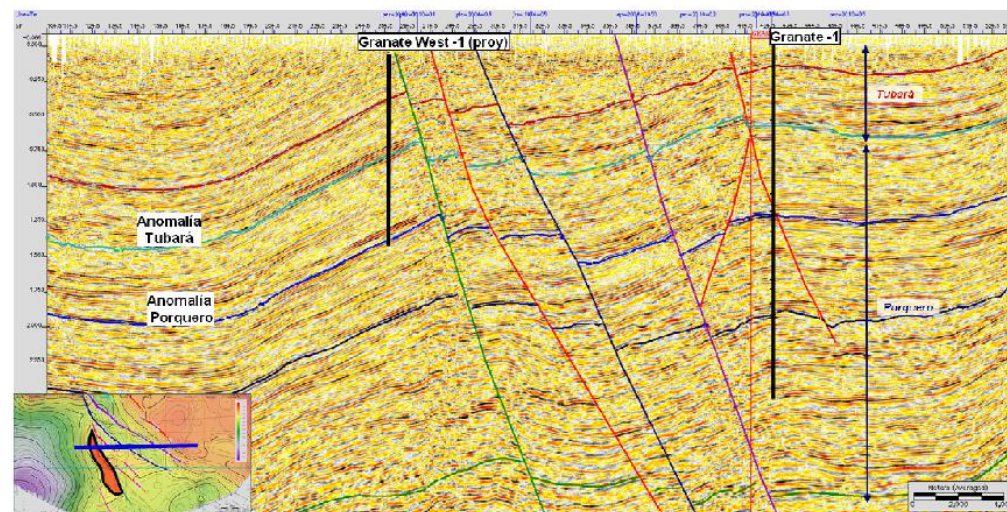
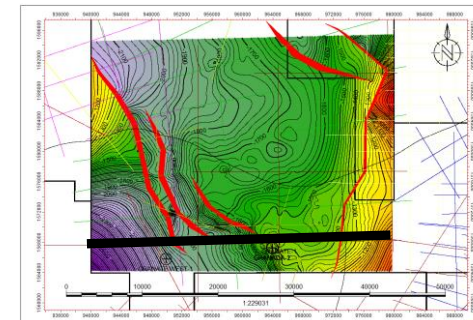
After test started a peak production of 54000 scf/d.

Gas production without water.

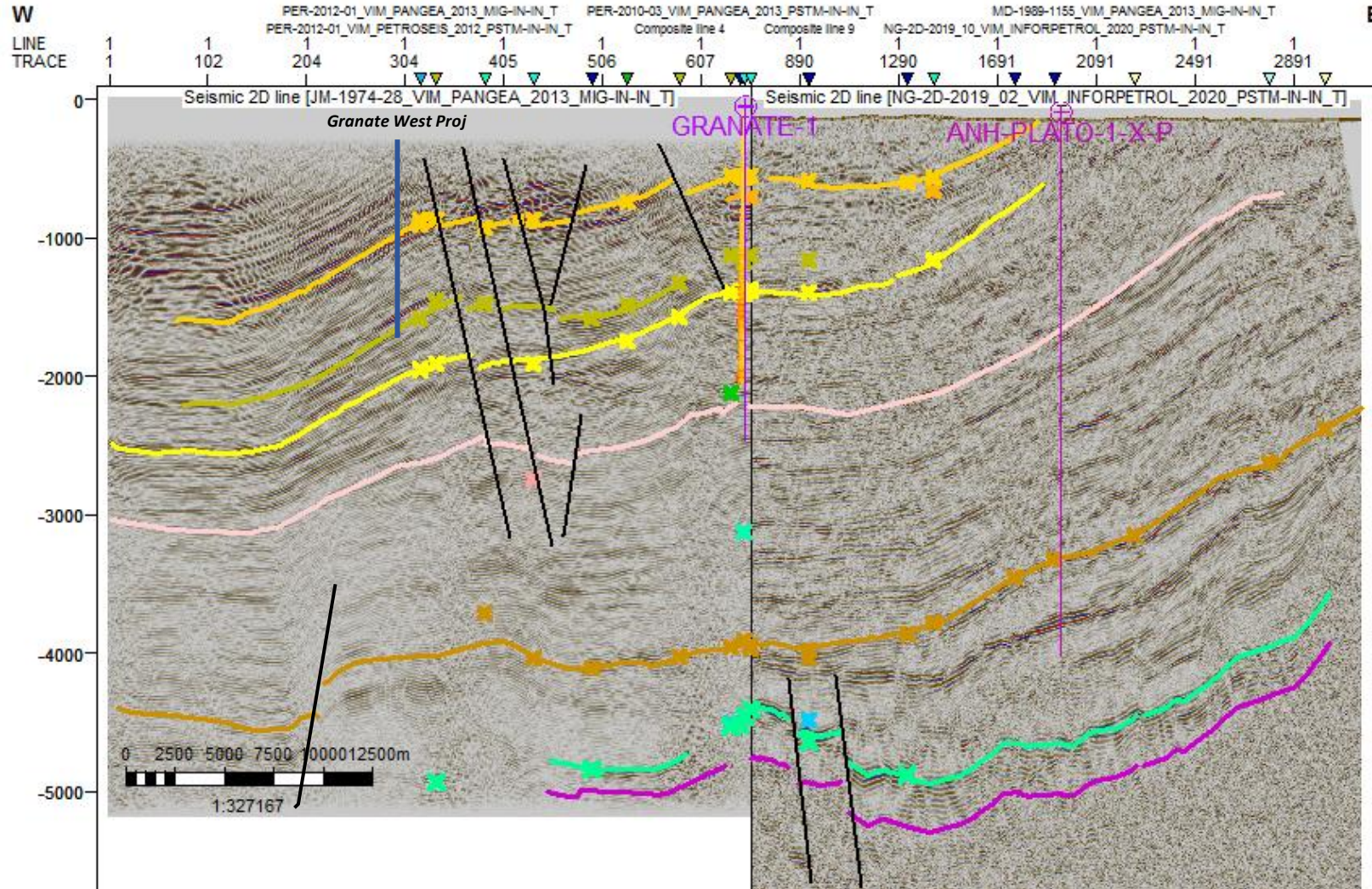
Gas flows 7000-8000 scf/d constant. Peak production of 10000 scf/d

Granate-1 West well

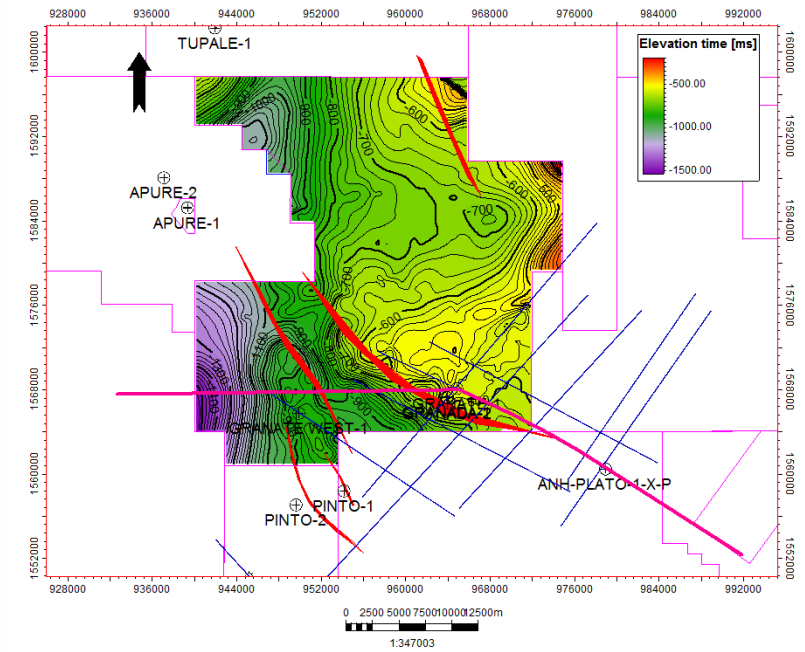
- Company: Hocol
- TD: 7000'
- Spud date: August 23rd of 2012
- End date: September 12th of 2012
- Structure: Combined
- The Tubará Formation was drilled with a mud weight between 8.8 and 11 ppg. Poor gas shows were obtained with a maximum of 4% composed mainly by methane (C1).
- The Porquero Formation was drilled with a mud weight between 10.5 and 13.8 ppg and a low gas background was obtained with poor shows of methane and ethane that reached a total gas maximum of 6% in the thin and scarce sandstones levels.
- During the drilling of the Upper Porquero, from 5350 to TD, connection gas peaks were that reached 20% and showed a more complex chromatography (C1 to C4 or C5)

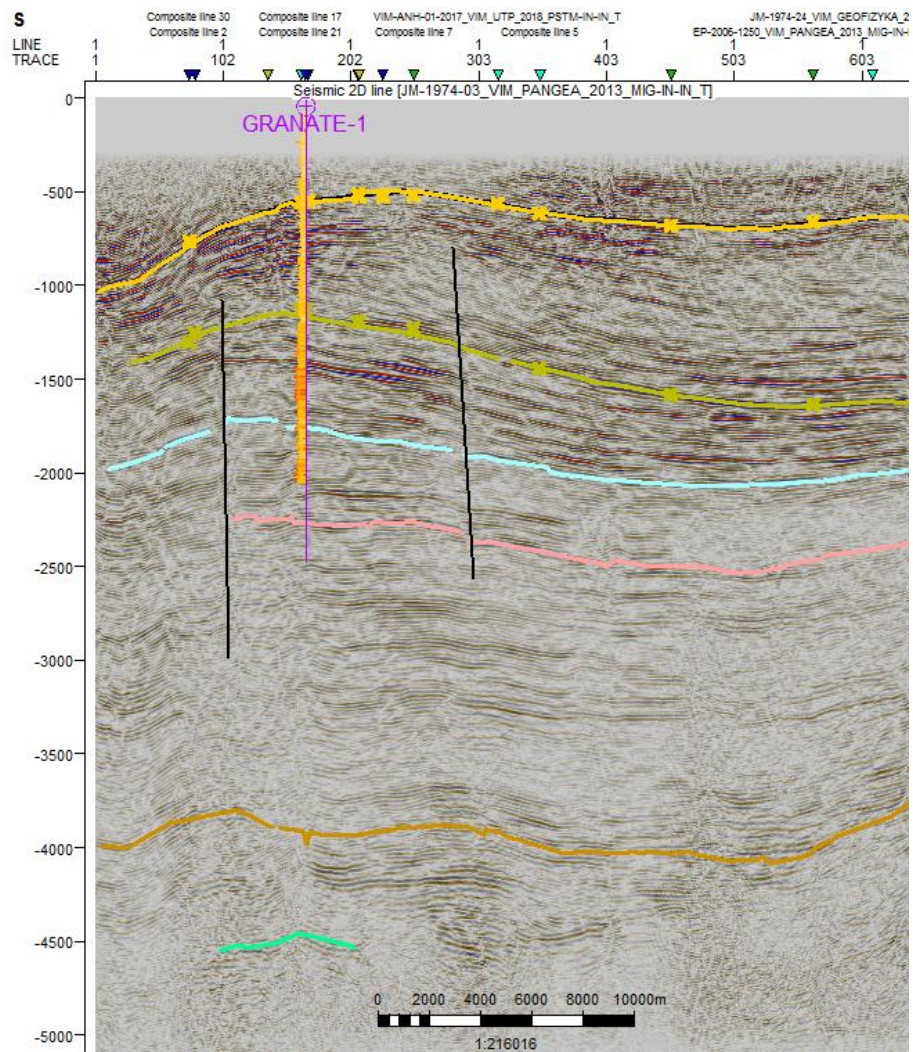


Seismic Interpretation

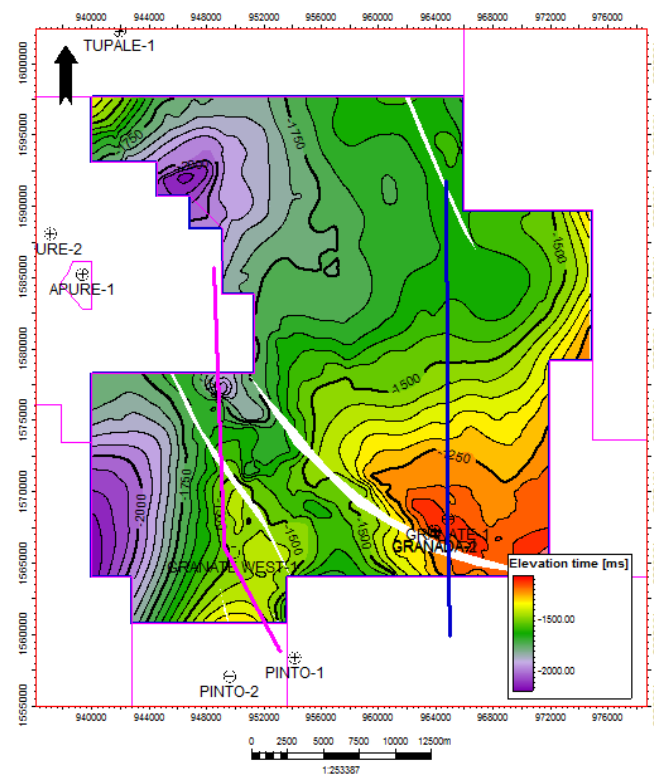


Tubará TWT Map

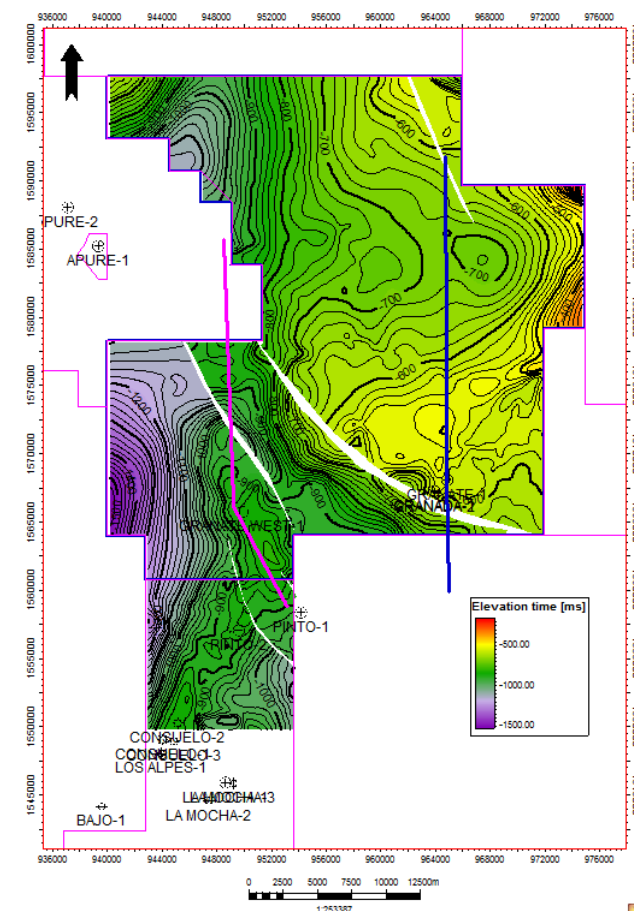


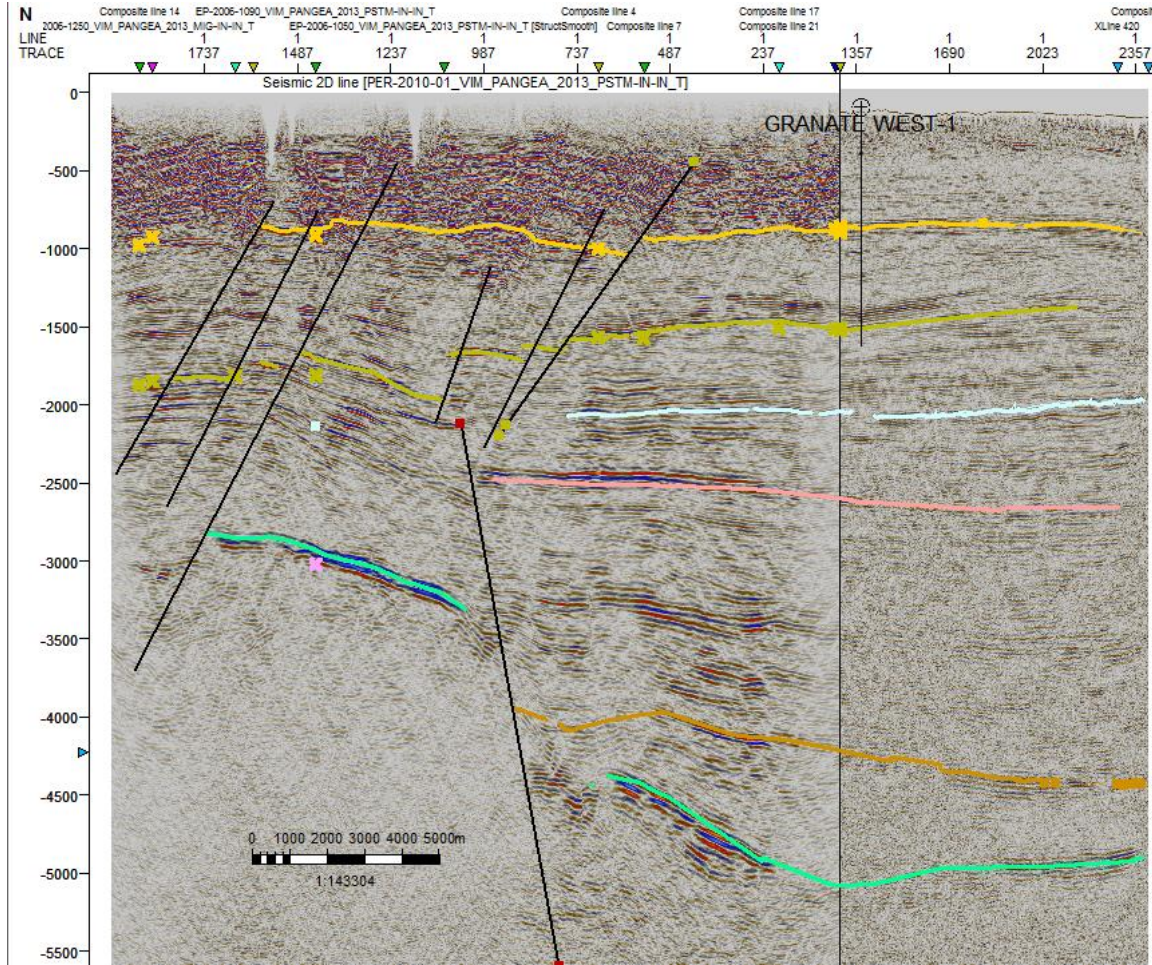


Upper Porquero

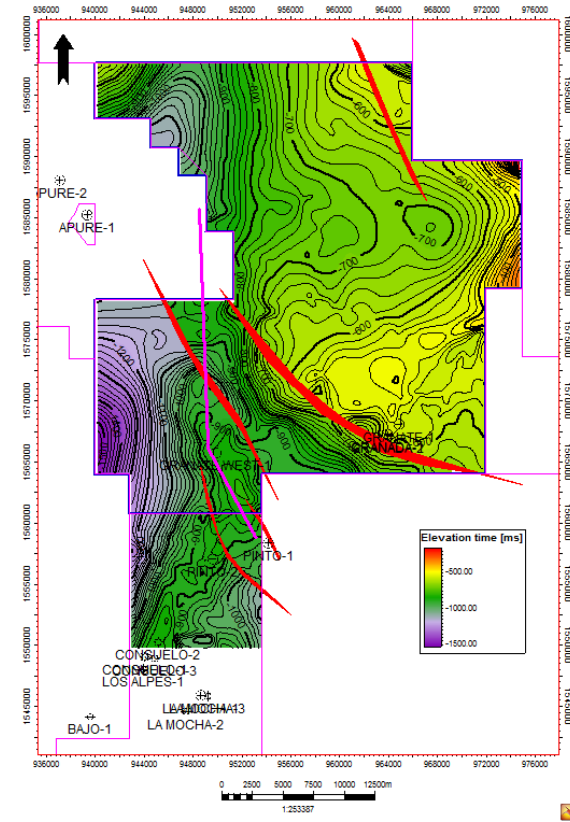


Tubará

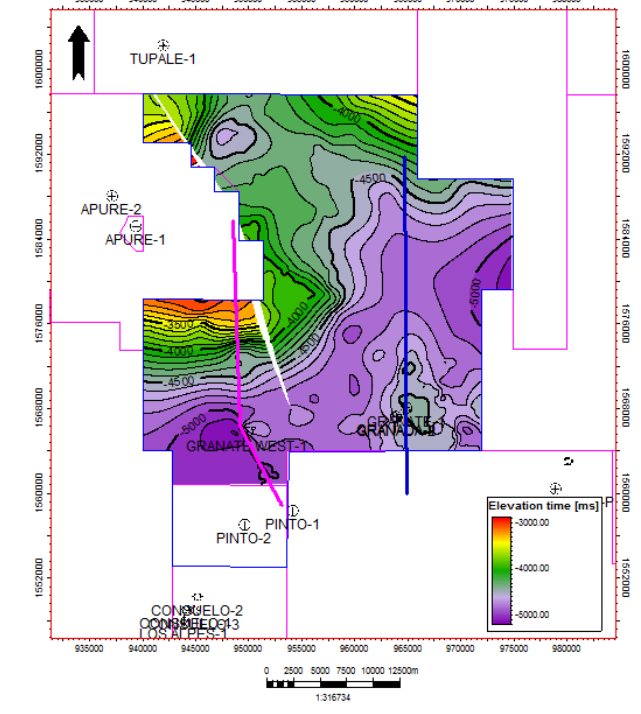




Tubará



Ciénaga de Oro



Conclusions

- The VIM 39 area has eleven 2D seismic programs, distributed in 43 lines. These surveys have been acquired since 1979 and the most recent program is Nueva Granada 2D-2019, acquired by Vector Geophysical.
- The seismic program Nueva Granada 2D-2019, is located in the northern of the LMV basin in the Magdalena department, within the area reserved by the ANH, VIM 39. Corresponding to 315,8 Km of length, distributed in seven seismic lines, 5 dip lines and 5 strike lines, with a 5013 source points and 12521 receiver stations.
- Four exploratory wells have been drilled in the VIM 39 area, where, Granate-1 well, drilled by Hocol in 2011 was considered non commercial producer. The formation characteristics could not be estimated, but it is concluded that the permeability is very low, even lower than initially estimated (<0.001 mD). Measurements from electrical logs, production test and samples showed very tight sands in thin beds along Upper Porquero.
- The Granate-1 exploratory well was a dry well in the Tubará Formation and producer of gas in the Porquero Superior, however, the production rates obtained in the tests (7000 scfd) do not reach commercial quantities, so it was decided to plug and Leave.
- Different types of plays were identified, as anticlines with closure in four ways and seismic anomalies at different stratigraphic levels within the Porquero Formation. Tubará Fm is mainly affected by normal faults of local nature, its thickness is constant throughout the sub-basin, and it outcrops to the east. The Ciénaga de Oro Formation presents important variations of thicknesses due to having been deposited while the depocenter was formed and fill paleotopography.