

AREAS ADVERTISEMENT 2022

PERDICES OCCIDENTAL 2D-2018 Seismic Program – Area: VIM 38

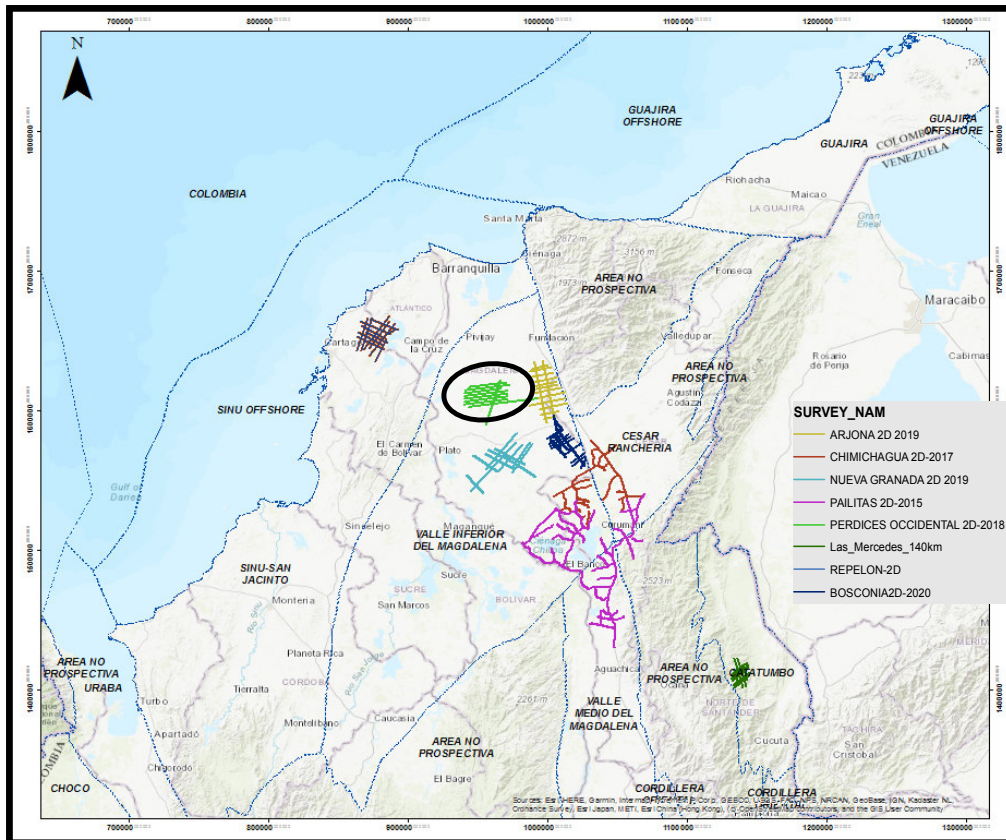
LOWER MAGDALENA VALLEY BASIN

April 29, 2022

Content

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- Infrastructure
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- VIM 38 - Data Base
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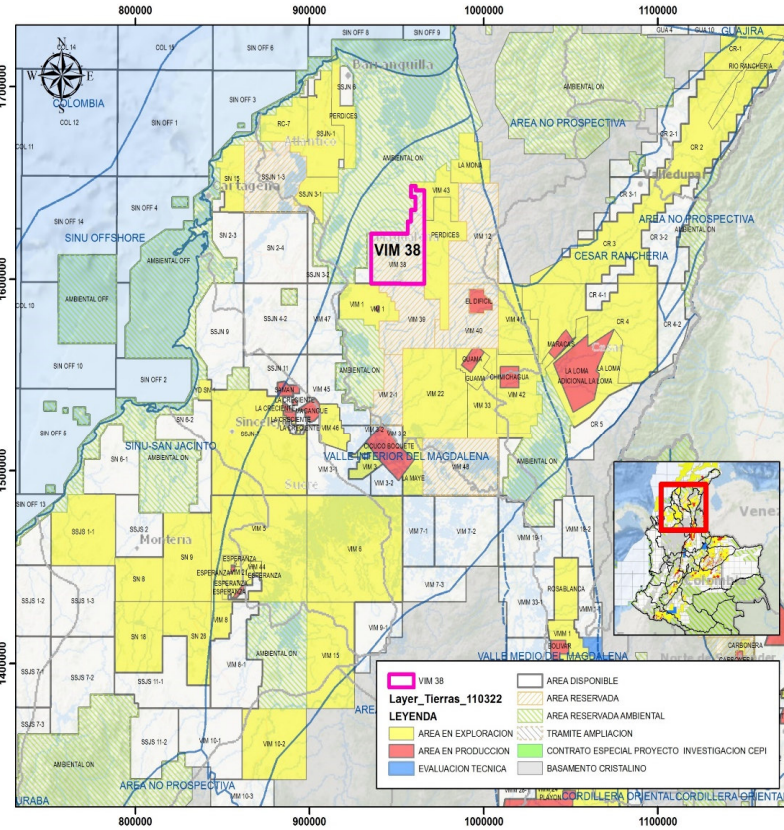
ANH Seismic Surveys



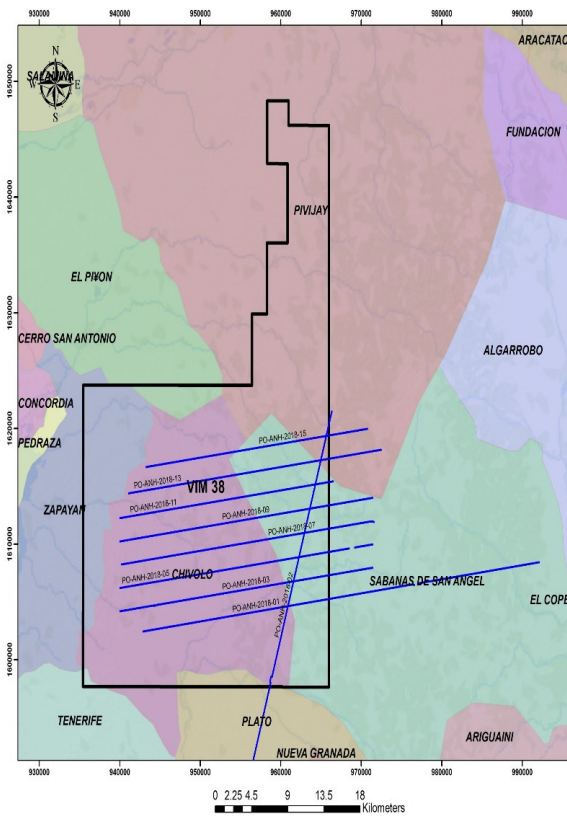
SURVEY	LENGTH (Km)	# LINES
REPELÓN-2D-2021	286	13
PERDICES OCCIDENTAL 2D-2018	295	9
ARJONA-2D-2019	336	14
NUEVA GRANADA 2D-2019	279,8	10
BOSCONIA NORTE 2D-2021	216	16
CHIMICHAGUA 2D -2017	395,56	20
PAILITAS 2D-2015	1317,2	52
LAS MERCEDES 2D-2021	137	9

Location

**VIM 38 Block Area:
96841.16 Ha**



ANH Land Map, March 2022 0 15 30 60 90 120 Kilometers

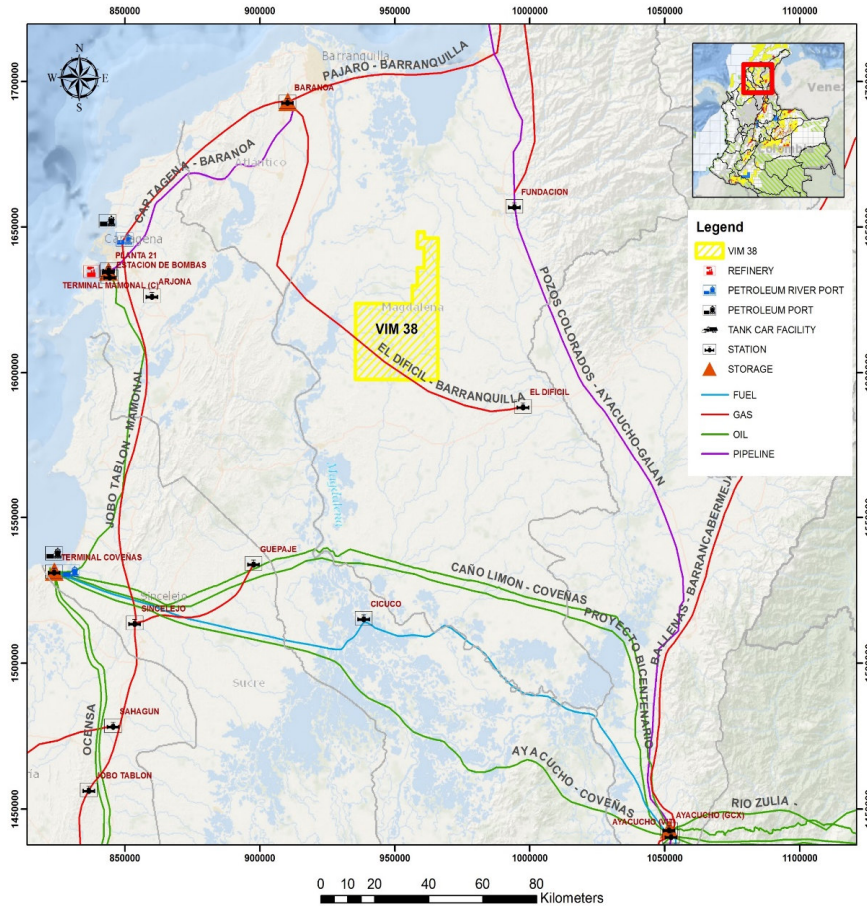


VIM 38 Municipalities

Department	Municipalities
Magdalena	Pivijay
	El Piñón
	Zapayán
	Chivolo
	Sabanas de San Ángel
	Tenerife
Plato	

Seismic Lines Influence

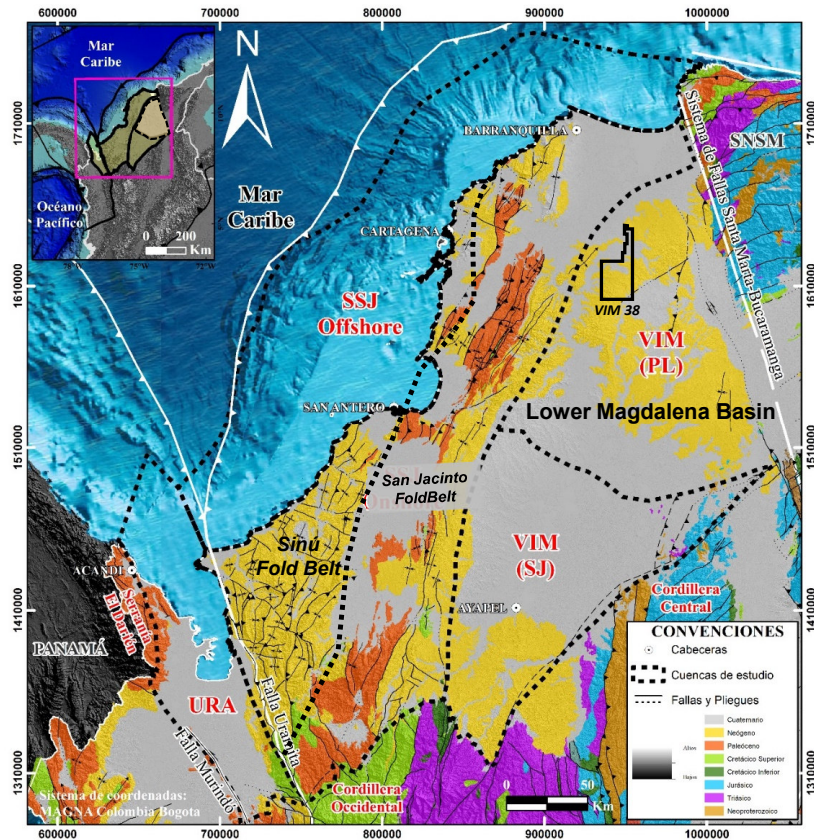
Department	Municipalities
Magdalena	Pivijay
	Chivolo
	Sabanas de San Ángel
	Plato



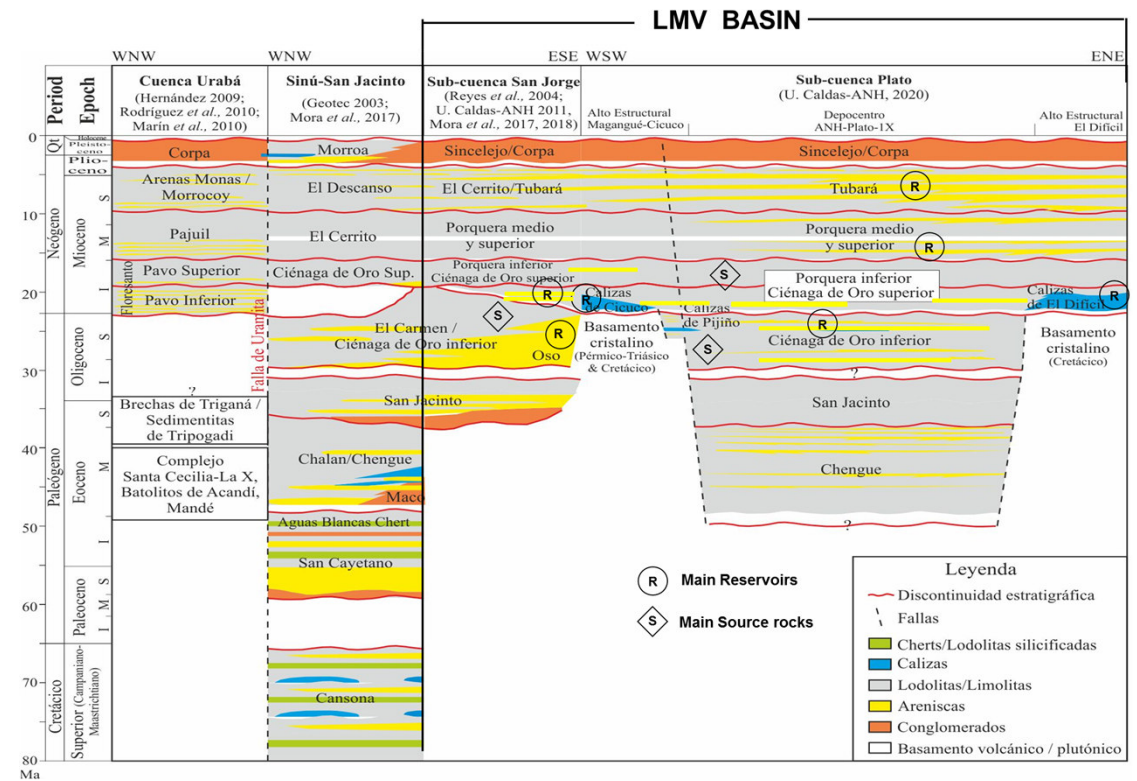
MAIN INFRASTRUCTURE

- Gas Pipeline
El Difícil – Barranquilla
- Pipeline
Pozos Colorados – Ayacucho - Galán

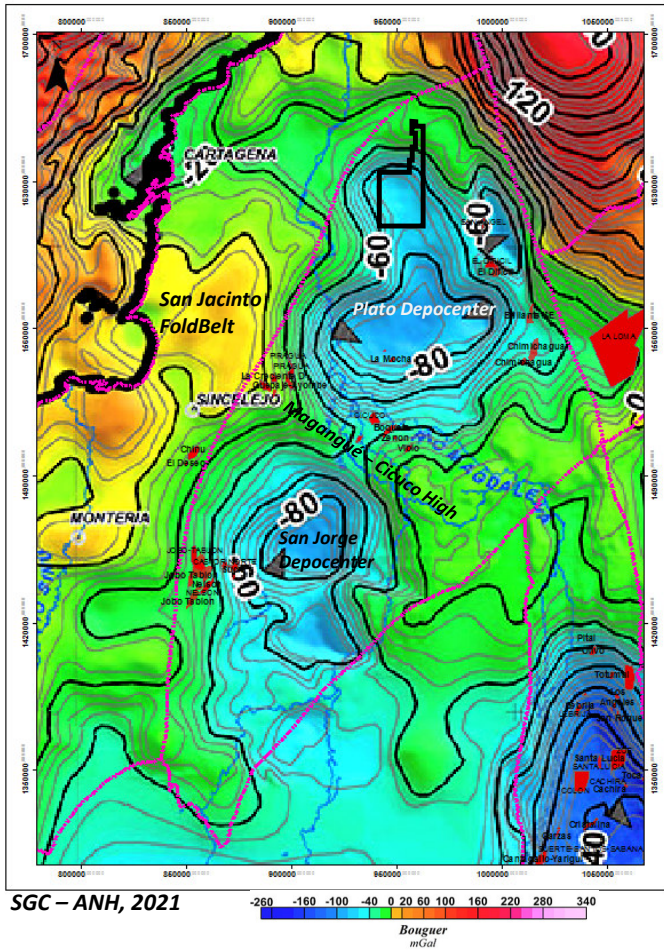
Geological Setting and Stratigraphic Chart



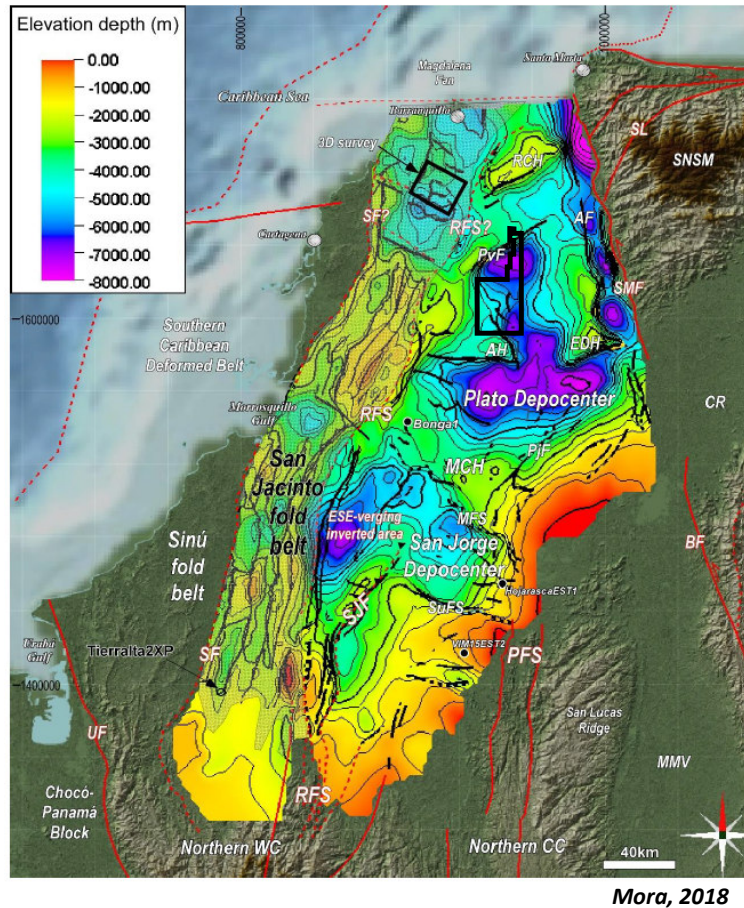
Taken from Universidad de Caldas – ANH, 2020



Bouguer Anomaly Map



Structural Depth Model of the top of the Basement



Main Morphological Features in LMV Basin

The positive anomaly representing the San Jacinto Fold Belt

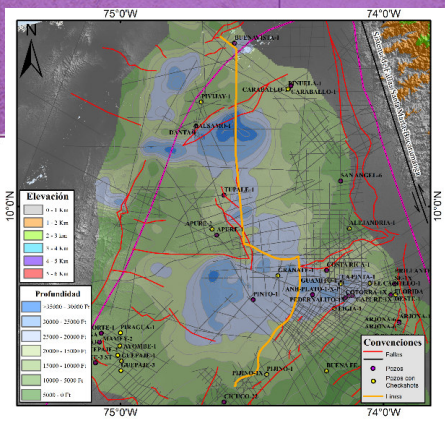
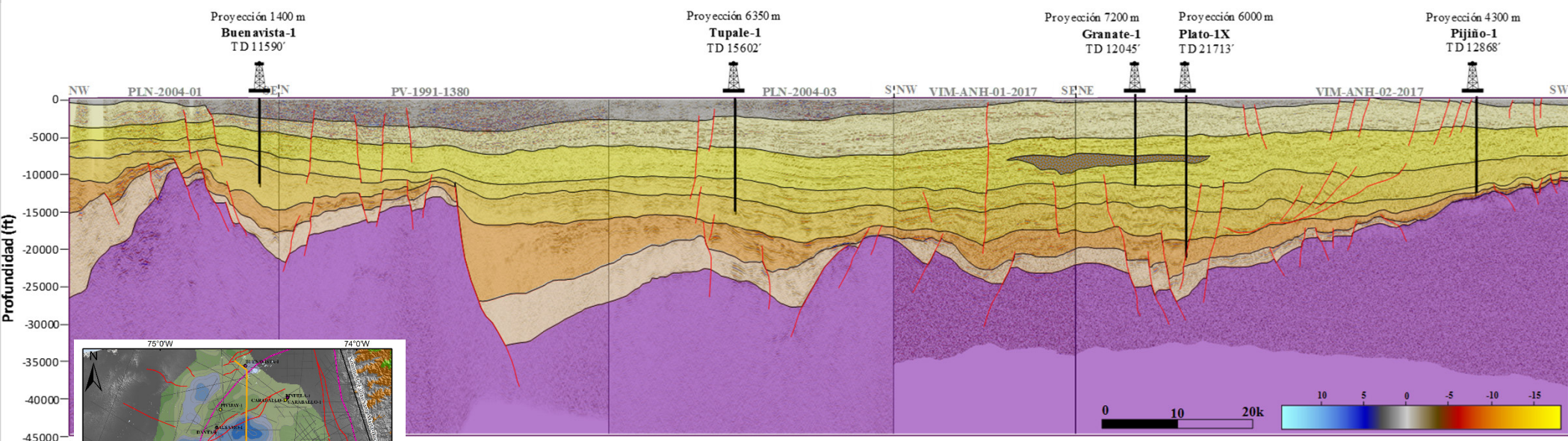
Plato Depocenter – Basement depths > 7000 m

Magangué – Cicuco High (MCH)

San Jorge Depocenter – Basement Depths > 5000m

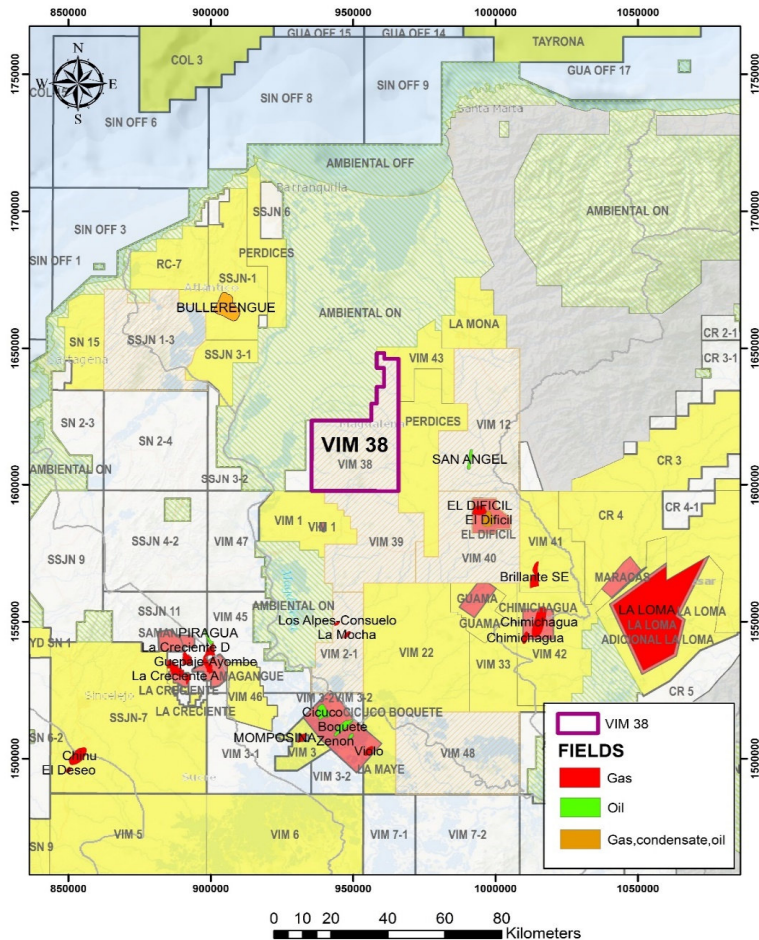
Structural elements. EDH: El Dificil High; PvF: Pivijay Fault; AH: Apure High; RFS: Romeral Fault system; PFS: Palestina Fault system; SJF: San Jerónimo Fault; MCH: Magangué-Cicuco High; PjF: Pijiño Fault; RCH: Remolino-Ciénaga High; BF: Bucaramanga Fault; SMF: Santa Marta Fault; AF: Algarrobo Fault SL: Sevilla Lineament; UF: Uramita Fault; SF: Sinu Fault; CR: Cesar-Ranchería basin; MMV: Middle Magdalena Valley basin; SNSM: Sierra Nevada de Santa Marta.

Structural Section



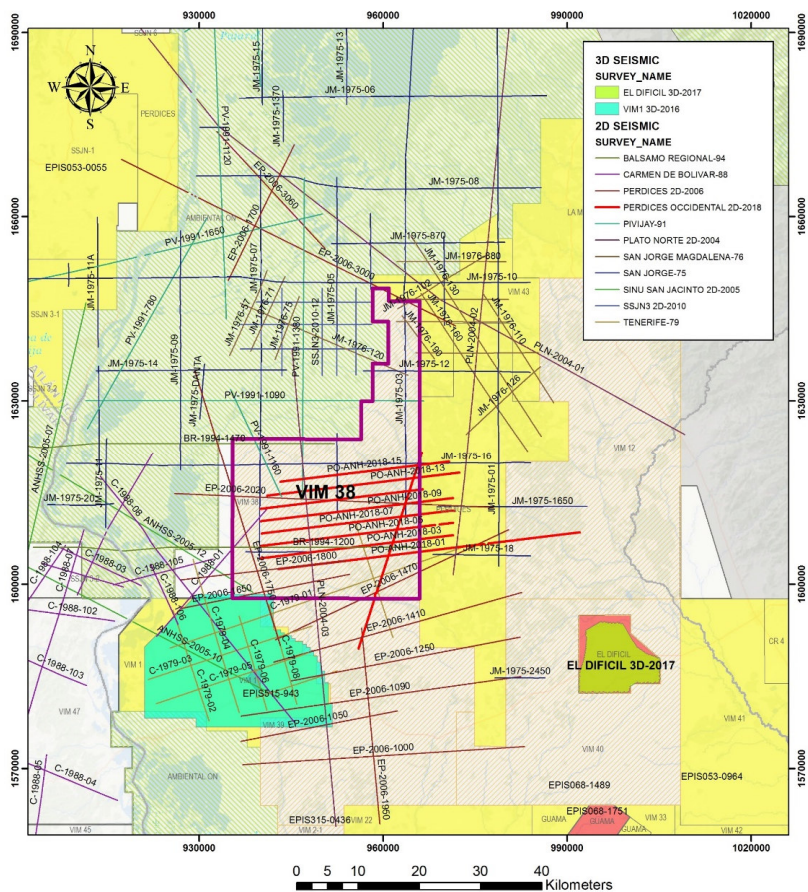
Taken from Universidad de Caldas – ANH, 2020

Near Fields



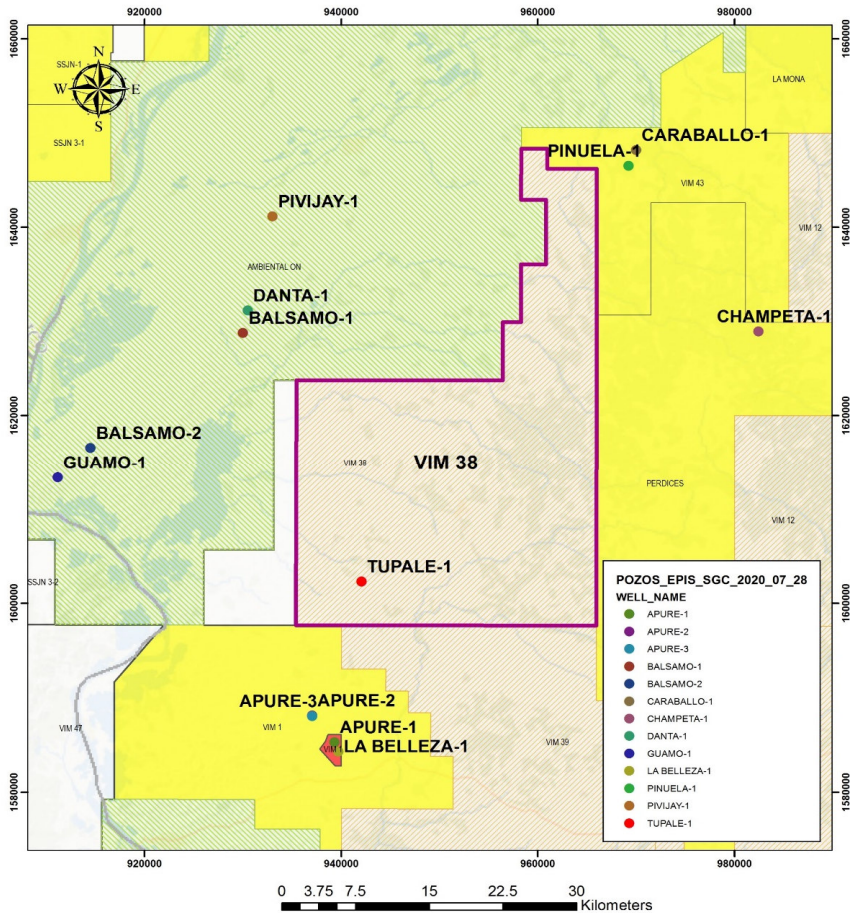
FIELD	CONTRACT	RESERVOIR	PRODUCTION	DISCOVERY YEAR
Apamate	La Creciente	Ciénaga De Oro	24 MMcf/d Initial test	2011
Ayombe	Ayombe	Ciénaga De Oro		1993
Boquete	Cicuco Boquete	Ciénaga De Oro	421,40 BPDC	1961
Brillante SE	Sierra Nevada	Ciénaga De Oro	2.687 MBO & 578 MMscf	2010
Bullerengue	SSJN1	Chengue - Porquero	13,778.47 BPDC & 675.091 MMcf/d (2020-2022)	2015
Arjona	Chimichagua	Ciénaga de Oro	39.706 MMcf/d	
Chinú	SSJN-7	Ciénaga de Oro		1956
Cicuco	Cicuco Boquete	Ciénaga de Oro	6,154 BPDC	1956
El Deseo	SSJN-7	Ciénaga De Oro		
El Dificil	El Dificil	Ciénaga De Oro	746,24 BPDC	1942
Guepajé	Ayombe	Ciénaga De Oro		1992
Guepajé	Magangué	Ciénaga De Oro		1992
La Belleza	VIM-1	Ciénaga de Oro	Tested 2.696 BOPD (43° API and 11.8 MMcf/d of gas)	2019
La Creciente A	La Creciente	Ciénaga De Oro	58,258 MMcf/d	2010
La Creciente D	La Creciente	Ciénaga De Oro	4,178 MMcf/d	2010
La Mocha	ANH	Tubará	632.8 MMscf	1963
Los Alpes-consuelo	ANH	Tubará	4.5 BCF	1963
Momposina	Cicuco Momposina	Ciénaga De Oro	2.9 BCF	1990
Bonga -	Saman	Ciénaga De Oro	345,53 BPDC & 407,064 MMcf/d	1993
San Angel	Magdalena			
Violo	Cicuco Boquete	Ciénaga De Oro	2.6 BCF	1958
Zenon	Cicuco Boquete	Ciénaga De Oro		1959

DATABASE: Seismic



AVAILABLE 2D SEISMIC: 12 SURVEYS

AREA	SURVEY NAME	TOTAL LENGTH (Km)	LENGTH INTO THE AREA (Km)	# LINES
VIM 38	BALSAMO REGIONAL-94	141.1	19.6	2
	CARMEN DE BOLIVAR-88	27.7	8.92	1
	PERDICES 2D-2006	208.5	101.3	6
	PERDICES OCCIDENTAL 2D-2018	266.5	202.4	9
	PIVIJAY-91	127.2	28.2	3
	PLATO NORTE 2D-2004	78.1	26.1	1
	SAN JORGE MAGDALENA-76	93.5	32.4	5
	SAN JORGE-75	324.5	96.8	6
	SINU SAN JACINTO 2D-2005	91.2	3.9	1
	SSJN3 2D-2010	18.9	0.0011	1
	TENERIFE-79	70.1	31.2	2
	TOTAL LENGTH		1447,8	551,4



WELL NAME	TD DATE	TD (Ft)	CLASSIFICATION	WELL STATUS	COMPANY
APURE-1	9/17/1980	11481	C3	Plugged & Abandoned	Parex Resources Colombia Ltd Sucursal
APURE-2	10/19/1989	12412	C3	Plugged & Abandoned	Chevron Petroleum Company
APURE-3		12041			Parex Resources Colombia Ltd Sucursal
BALSAMO-1	11/15/1951	10706	C3	Plugged & Abandoned	Pacific Stratus Energy Colombia Corp
BALSAMO-2	6/15/1955	10007	C3	Plugged & Abandoned	Pacific Stratus Energy Colombia Corp
CARABALLO-1	7/31/1946	11805	C3	Plugged & Abandoned	Richmond Colombian Company Of Colombia
CHAMPETA-1	08/26/2015	12300	A3		Hocol S.A.
DANTA-1	11/15/1969	9973	A-2c	Dry, Plugged & Abandoned	The Superior Oil Company
GUAMO-1	4/19/1960	11986.7	B3	Producer	Pacific Stratus Energy Colombia Corp
LA BELLEZA-1	2021	11791	B3	Producer	Parex Resources Colombia Ltd Sucursal
PIÑUELA-1	2/10/1978	14685	C3	Plugged & Abandoned	Elf Aquitaine
PIVIJAY-1	9/15/1979	10700	C3	Plugged & Abandoned	Pacific Stratus Energy Colombia Corp
TUPALE-1	3/8/2010	15589.4	C3	Plugged & Abandoned	Ecopetrol S.A.

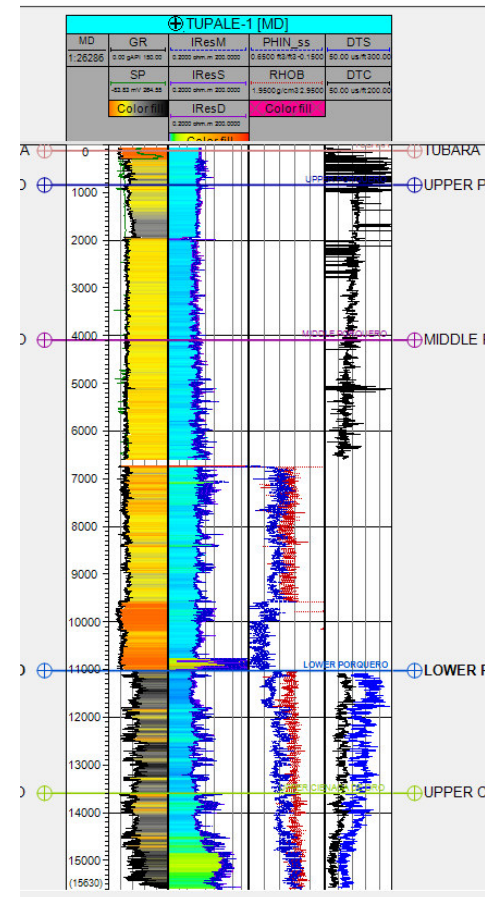
Túpale-1 Well

- **Company:** *Ecopetrol*
- **TD:** 15602'
- **Spud date:** September 26 – 2009 **End date:** December 20 - 2009
- **Structure:** Closure in the HW against a normal fault
- **Target:** Sands Ciénaga de Oro – Porquero Fm
- **Status:** Abandoned
- **Tests:** 14834' – 15440' (Ciénaga de Oro Fm)
- **Reservoir:** The presence of finely laminated clastic deposits of sandstones and clays in suggest that the Túpale-1 well would be located in an intermediate position on the flank of the channel levee system. These reservoirs have low resistivities, and it was considered a tight sand.
- The chromatograph (readings every 30 sec) detected concentrations from methane gas (C1) to normal pentane (nC5).

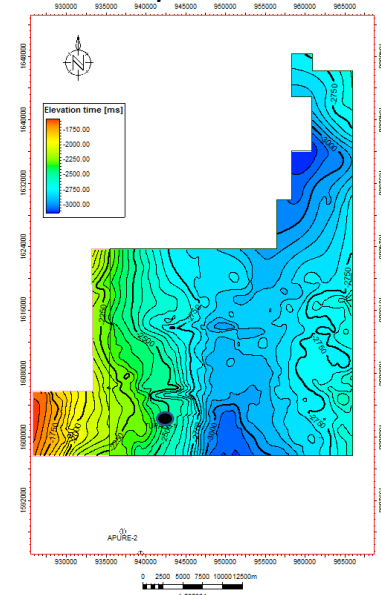
Fm Porquero (9700-10900): Suggests the presence of an overpressured zone with an estimated pore pressure of 13.5 ppg, with high gas problems that forced the mud weight up to 14.5 ppg. Between 11812 and 11870, there is a sandy level that shows one of the main overpressure events that exceeds the weight of the mud, which is 14.5 ppg. From this sandy level, the back ground gas increases to 17% with frequent gases of connection between 20 and 40% and gas shows associated mainly with sandstone levels that reached a maximum gas of 50%.

Ciénaga de Oro Formation: (13,590' to 15,602') The back ground gas for this interval was 7% with frequent connection gases between 20 and 50% and gas shows associated mainly with sandstone levels composed mainly of C1. From this sandy interval, it is considered that the formation presents abnormal pressures that were the ones that produced a lack of control of the well.

However, the biggest drawback was related to the well control, and the presence of very high gas readings



TWT Map Upper Lower Porquero Fm.



Túpale Well - Tests

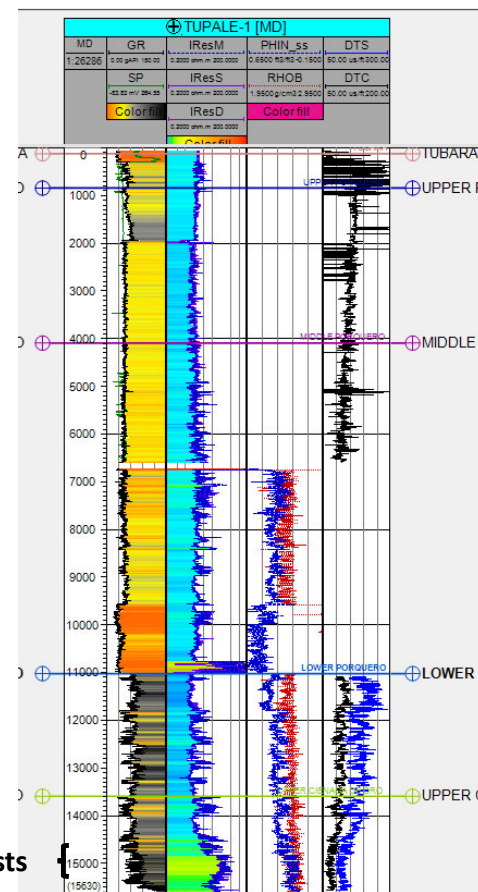
Ciénaga de Oro @ 13590'

DATOS DE CAÑONEO

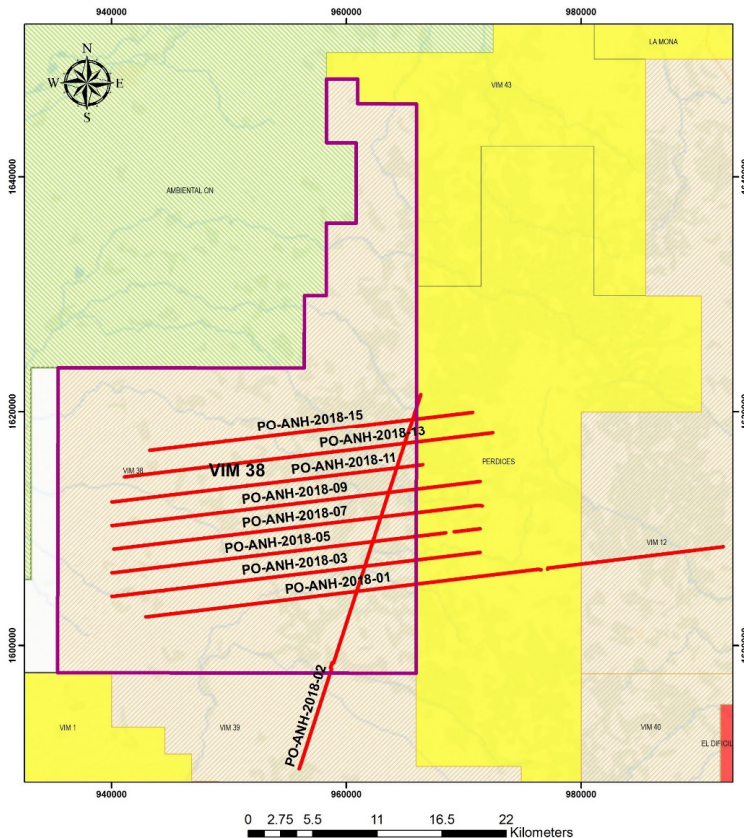
INTERVALO ABIERTO	PIES	NUMERO DE DISPAROS	SACOS DE CEMENTO	FONDO DE CEMENTO	TOPE DE CEMENTO
14834' - 14870'	36	180	N/A	227	38
14908' - 14940'	32	160	N/A	6700	6115
14960' - 14980'	10	50	N/A	8594	8294
15010' - 15150'	140	700	N/A	14814	14514
15170' - 15190'	20	100	N/A		
15320' - 15370'	50	600	N/A		
15430' - 15440'	10	120	N/A		

DATOS DE PRODUCCIÓN

Prueba No.	Fecha Inicio/Fin	Intervalos Probado (ft)	Formación Probada	Balance de Producción					Resultados
				Fluido de Trabajo (Bls)	Agua de Formación (Bls)	Crudo (Bls)	Total Líquidos de formación (Bls)	Gas (kpc)	
DST-1	06-Feb-10 12-Feb-10	15320-15370 15430-15440	Ciénaga de Oro	355 (lodo+salmuera+agua fresca)	51	0	51	0	Acuífera. Durante la prueba se recuperaron 51 bls de agua de formación de 15000 ppm Cl-, pH de 10 a 20°C y resistividad igual a 0.46 Ohm-m @ 25°C.
DST-2	18-Feb-10 25-Feb-10	14,834'-14,870' 14,908'-14,940' 14,950'-14,960' 15,010'-15,150' 15,170'-15,190'	Ciénaga de Oro	192 (lodo+salmuera+agua fresca)	88	0	88	0	Acuífera. Durante la prueba se recuperaron 88 bls de agua de formación de 15000 ppm Cl-, pH de 10 a 20°C y resistividad igual a 0.44 Ohm-m @ 25°C.



Perdices West 2D: Acquisition Parameters



9 Seismic lines

Acquisition Parameters

Acquired by: *Petroseismic Services*
Record Tools: *INOVA G3i HD*
Sample rate: *2 Ms*
Record Length: *8020 ms*

Source:

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

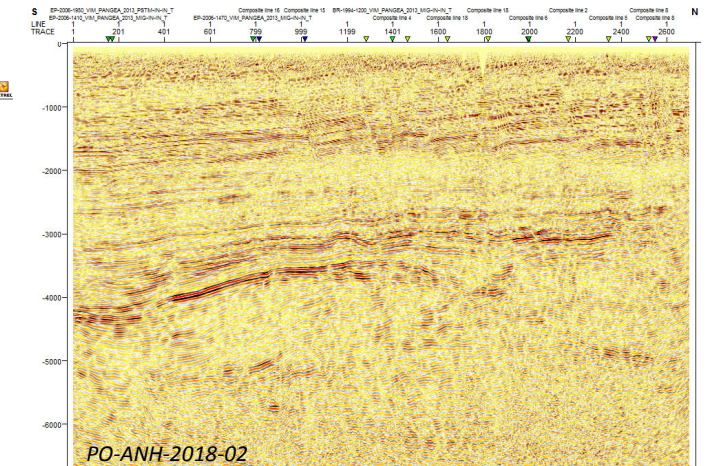
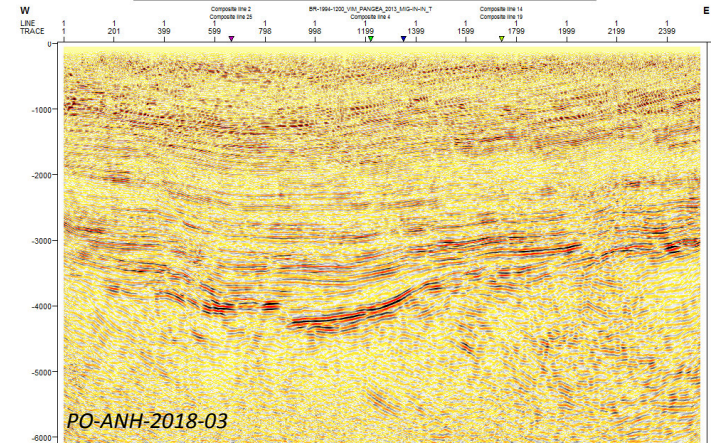
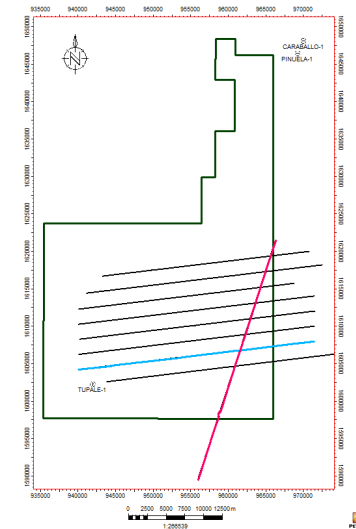
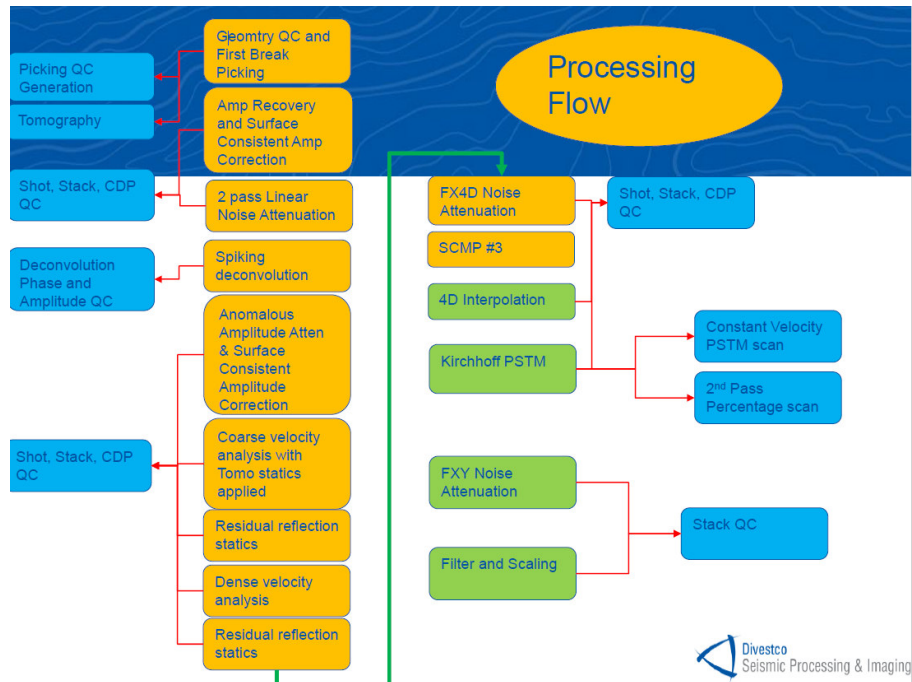
Receivers:

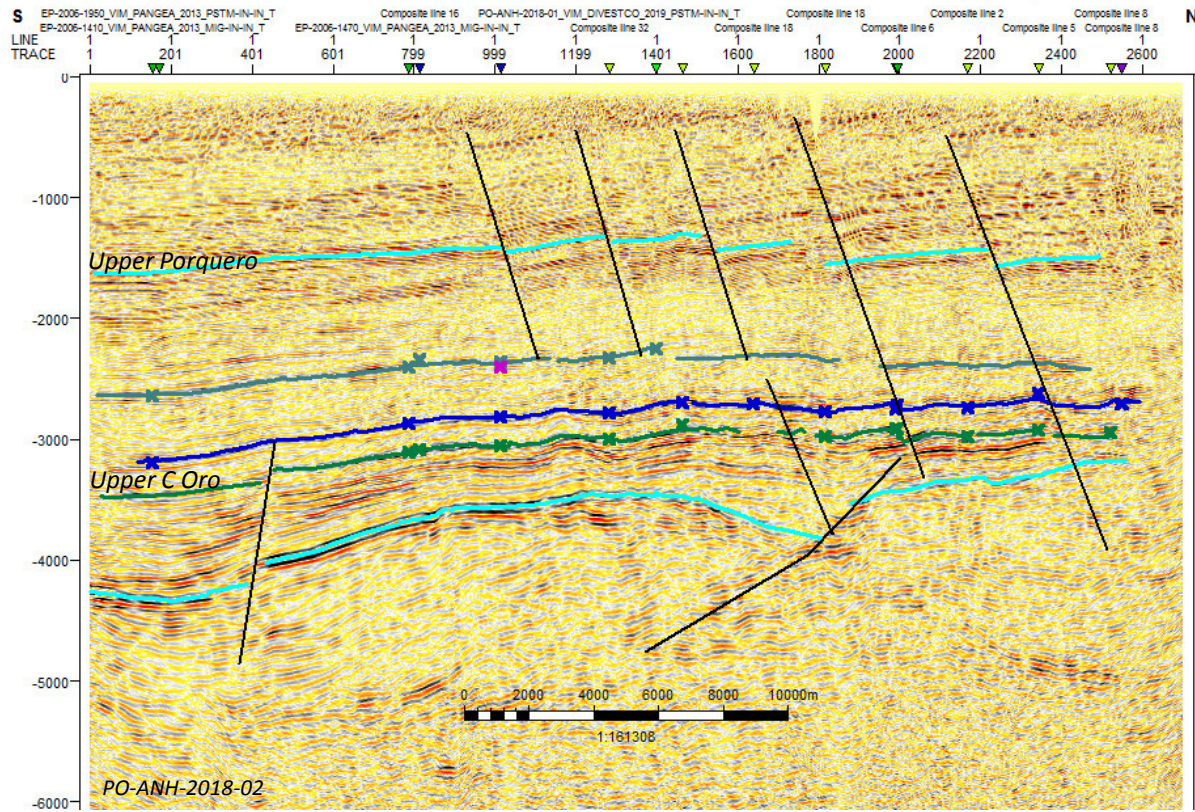
Geophone Type: *Geospace, GS-32CT sensor*
Natural Frequency: *10 Hz*
Channels: *600*
Type of laying: *Roll on/ Roll off*
Nominal Fold : *150*
Receiver Interval: *25 m*
SP: *5917*
Receiving Stations: *11803*

Processed by Divestco (2018)

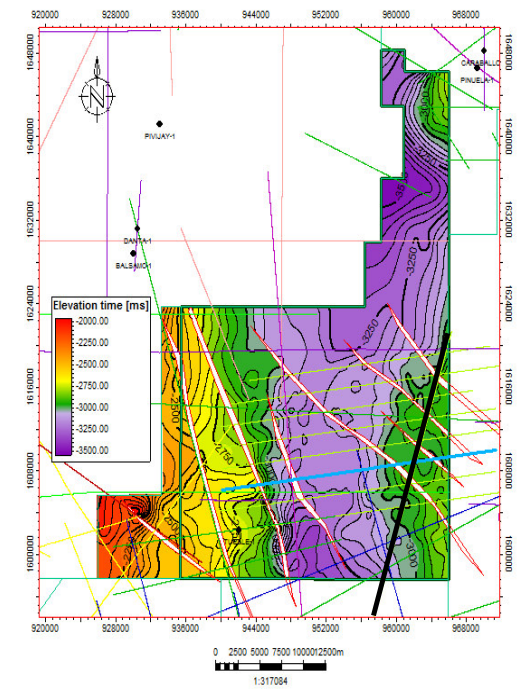
LINE_NAME	Sp's	LENGTH (Km)	LENGTH IN THE VIM 38 BLOCK (Km)
PO-ANH-2018-01	958	49.1	23.2
PO-ANH-2018-02	673	33.6	23.8
PO-ANH-2018-03	631	31.7	26.2
PO-ANH-2018-05	620	30.9	26.1
PO-ANH-2018-07	633	31.7	26.0
PO-ANH-2018-09	633	31.6	26.1
PO-ANH-2018-11	582	26.7	26.1
PO-ANH-2018-13	633	31.6	25.1
PO-ANH-2018-15	554	27.7	22.9
TOTAL	5917	263.3	199.7

Perdices West: Processing Sequence - Divestco

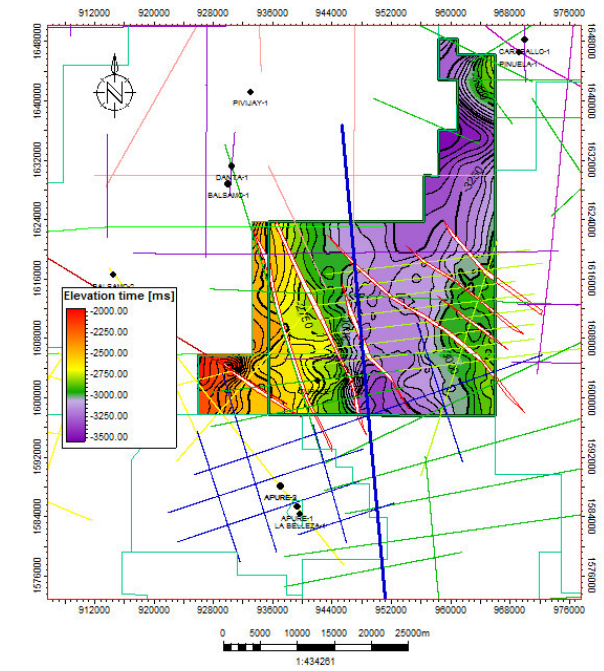
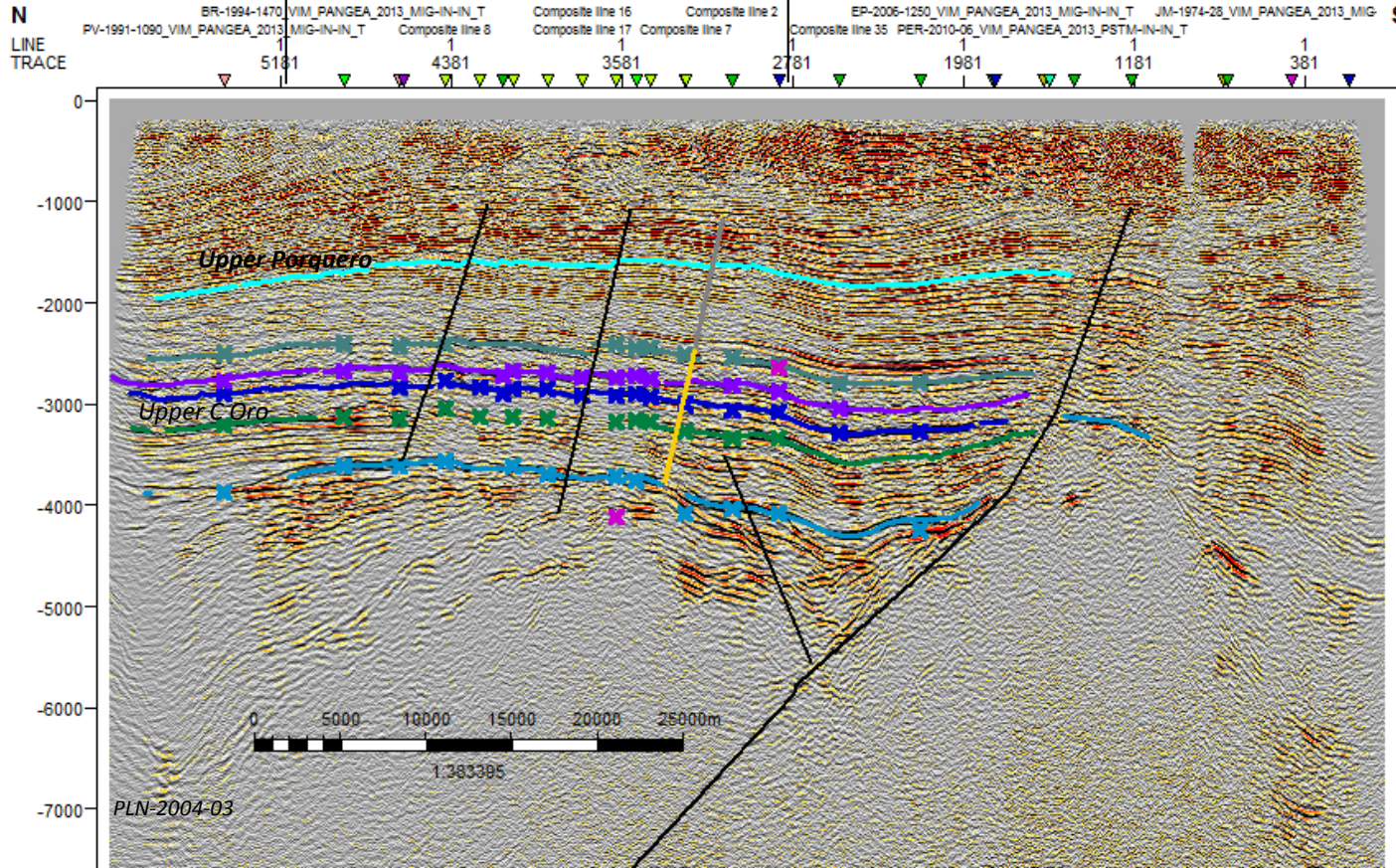




TWT Map Upper Ciénaga de Oro Fm.

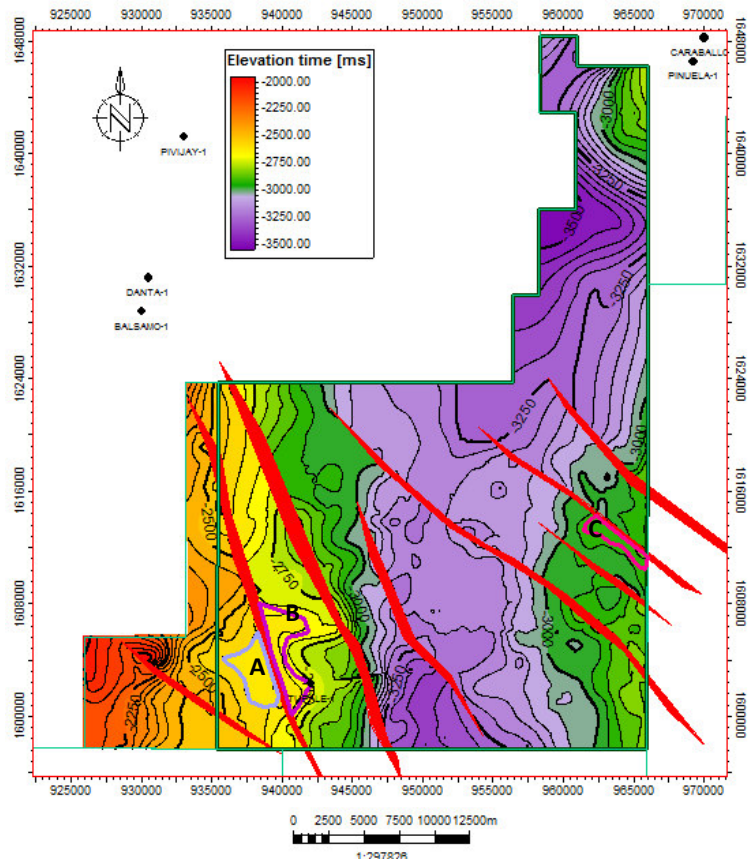


VIM 38 Area



Prospectivity

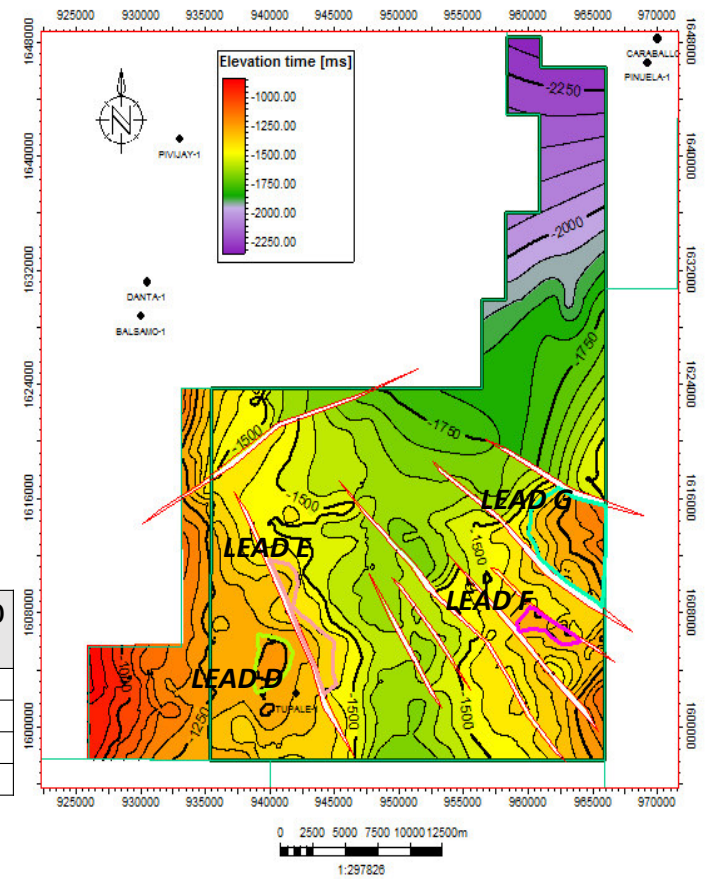
Ciénaga de Oro Formation



LEAD	HIGH ESTIMATED AREA (Acres)
LEAD A (Sandstones)	2800
LEAD B (Sandstones)	2360
LEAD C (Sandstones)	1085

LEAD	HIGH ESTIMATED AREA (Acres)
LEAD D	2125
LEAD E	2890
LEAD F	1210
LEAD G	7900

Upper Porquero Formation



Conclusions

- The VIM 38 area has twelve 2D seismic programs, with a length of 551 Km. This surveys have been acquired since 1976 and the most recent program is Perdices Oeste 2D-2018, acquired by Petroseismic.
- The seismic program Perdices Oeste 2D-2018, is located in the northwest of the LMV basin in the Magdalena department, within the area reserved by the ANH, VIM 38 area. Corresponding to 266 Km of length, distributed in 9 seismic lines, 8 dip lines and 1 strike line, with a 5917 source points and 11803 receiver stations.
- One exploratory well have been drilled in the VIM 38 area, which is Túpale-1, drilled in 2010 by Ecopetrol. 1944, had strong gas shows, but the tests results were salt water in the Ciénaga de Oro Fm.
- Different types of plays were identified, associated with stratigraphic plays to lower levels of Ciénaga de Oro Fm controlled by the basement configuration. Structural traps that involve the Upper Porquero with amplitude anomalies and structural closures involved the Upper Ciénaga de Oro Formation.
- A high estimate areas have been calculated for three leads associated to Upper Ciénaga de Oro Formation and four leads for the Intra Upper Porquero Unit.