



AREAS ADVERTISEMENT 2022

BOSCONIA NORTE-2D-2021 Seismic Program

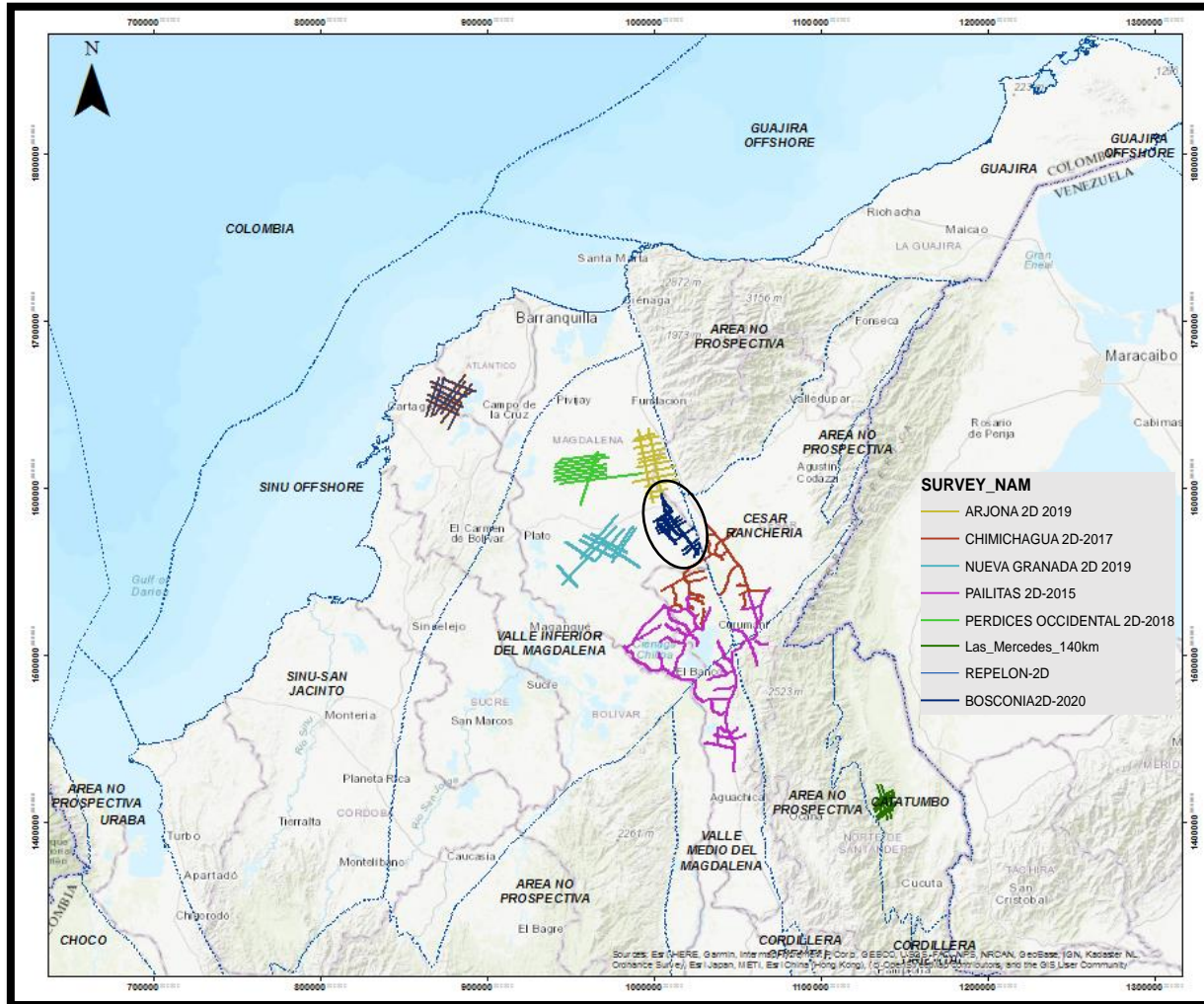
LOWER MAGDALENA VALLEY BASIN

February 4th 2022

Content

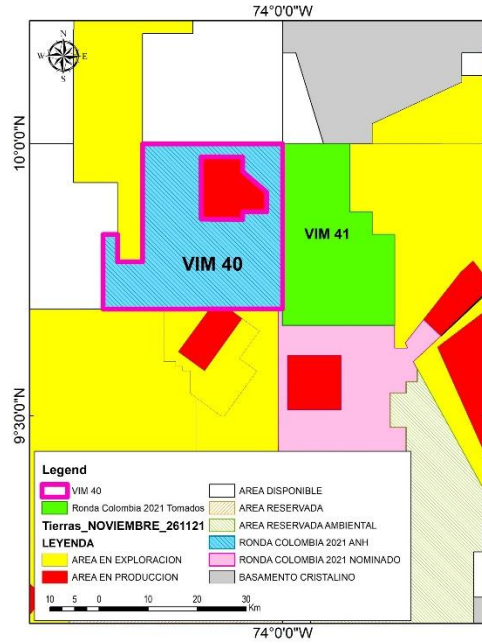
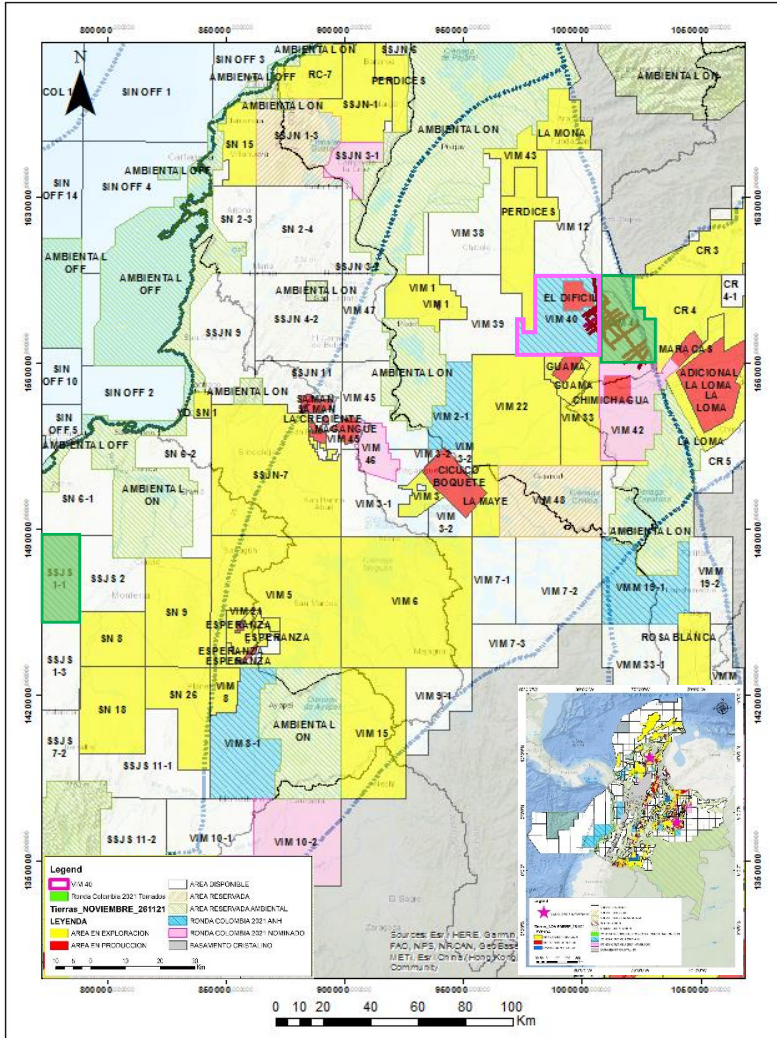
- Introduction
- Infrastructure
- Geological Framework
- Data Base
- Seismic Interpretation
- Prospectivity
- Conclusions

ANH Seismic Surveys

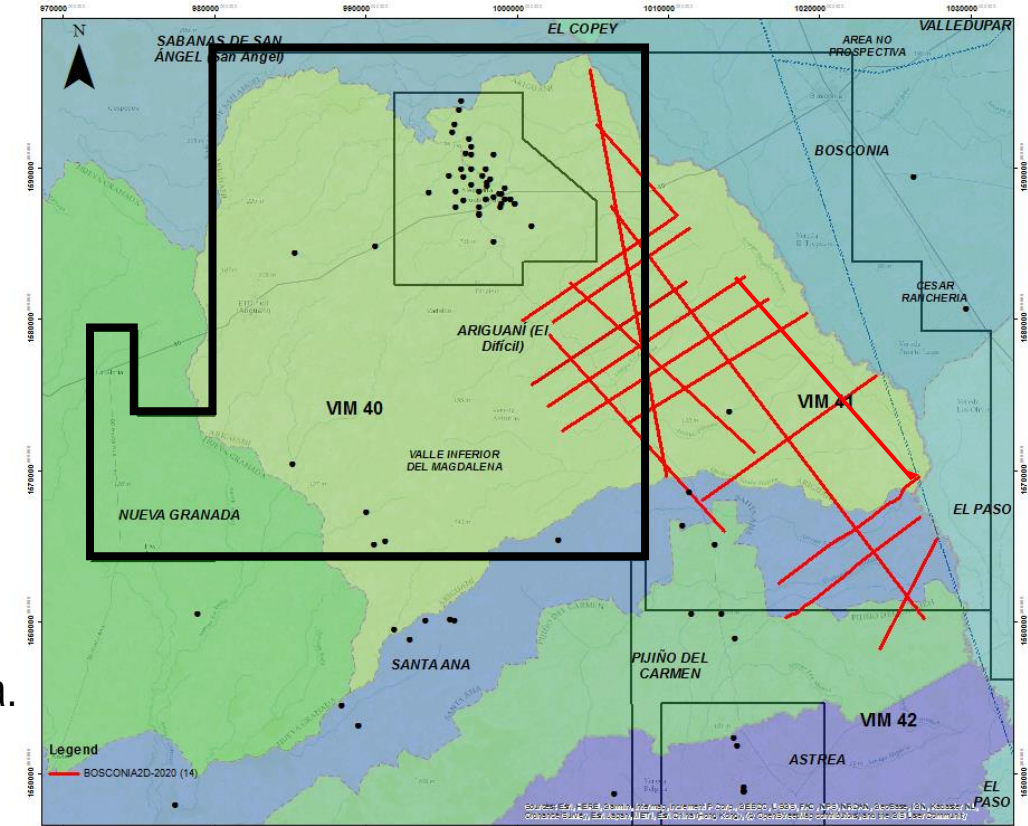


SURVEY	LENGTH (Km)	# LINES
REPELÓN-2D-2021	286	13
PERDICES OCCIDENTAL 2D-2018	295	9
ARJONA-2D-2019	299,8	14
NUEVA GRANADA 2D-2019	279,8	10
BOSCONIA NORTE 2D-2021	216	16
CHIMICHAGUA 2D -2017	395,56	20
PAILITAS 2D-2015	1317,2	52
LAS MERCEDES 2D-2021	137	9

Location



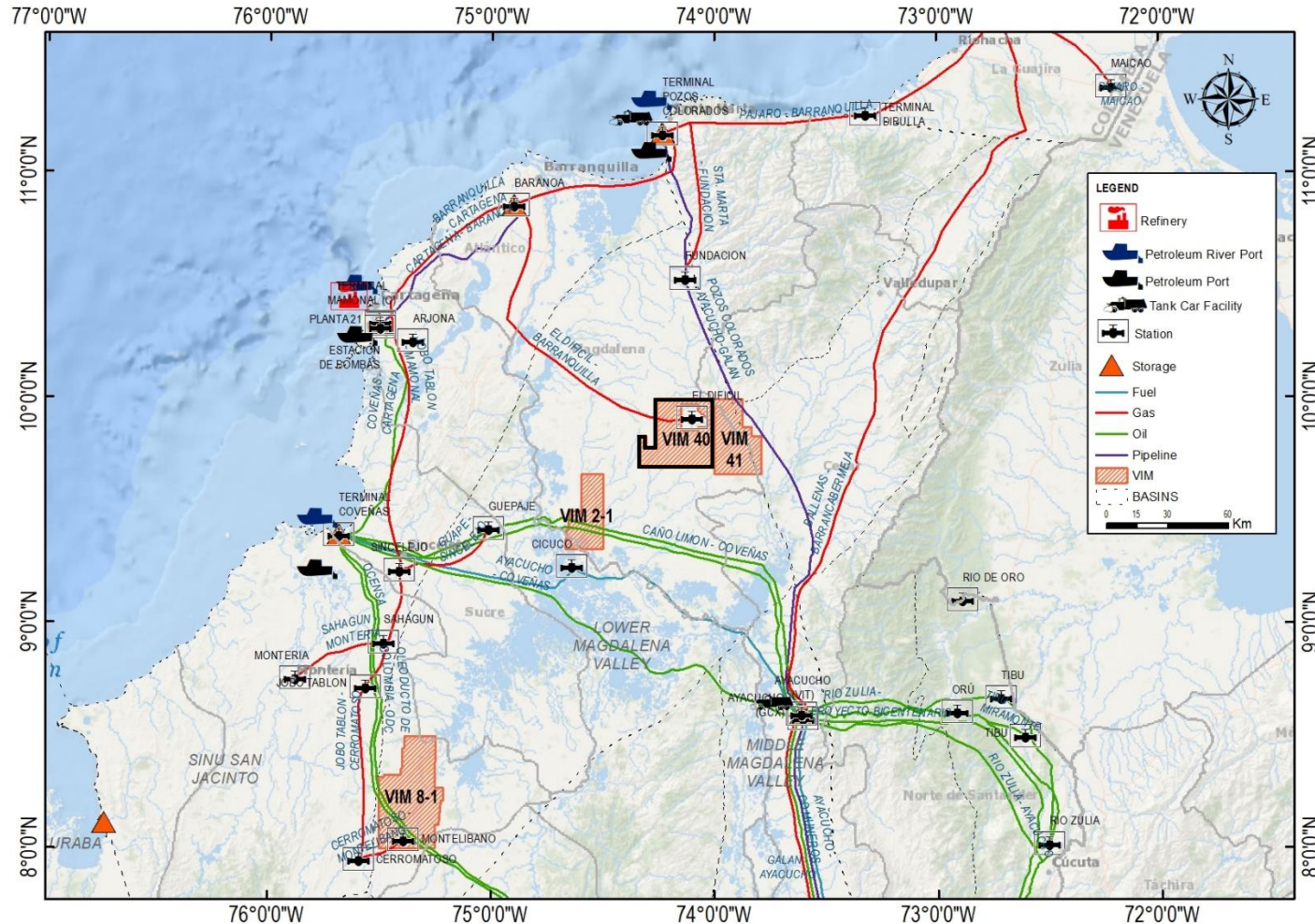
VIM 40 Block Area: 91,266 Ha.



Department	Municipalities	Influence (%)	Corporation
Magdalena (100%)	Ariguani	83	CorpaMag
	Santa Ana	14	
	Pijiño del Carmen	3	

Infraestructure

Main Infrastructure



- **Gas Pipeline**

El Difícil – Barranquilla VIM 40

Jobo Tablón – Cerromatoso

Cerromatoso – Montelíbano

- **Oil Pipeline**

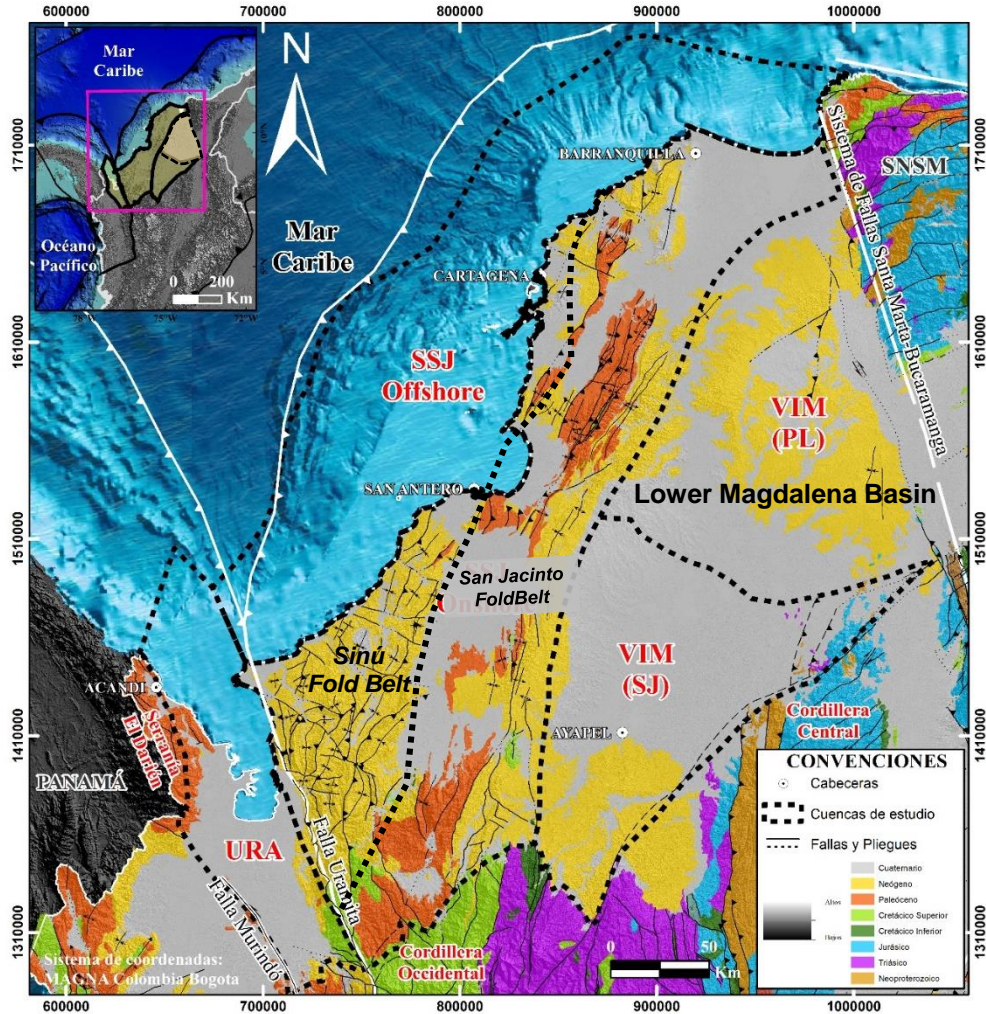
Caño Limón – Coveñas

Oleoducto De Colombia – ODC

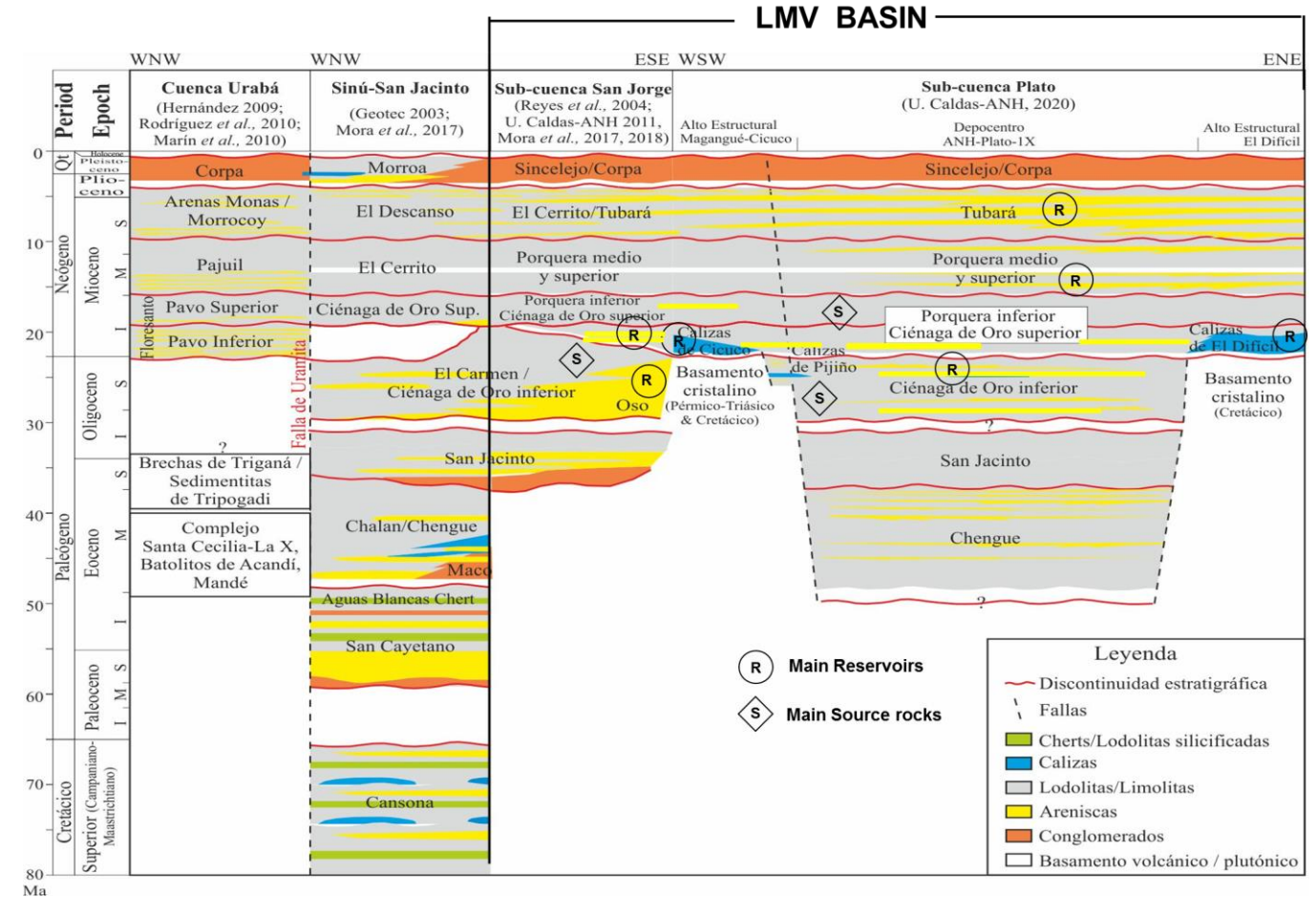
- **Pipeline**

Pozos Colorados – Ayacucho

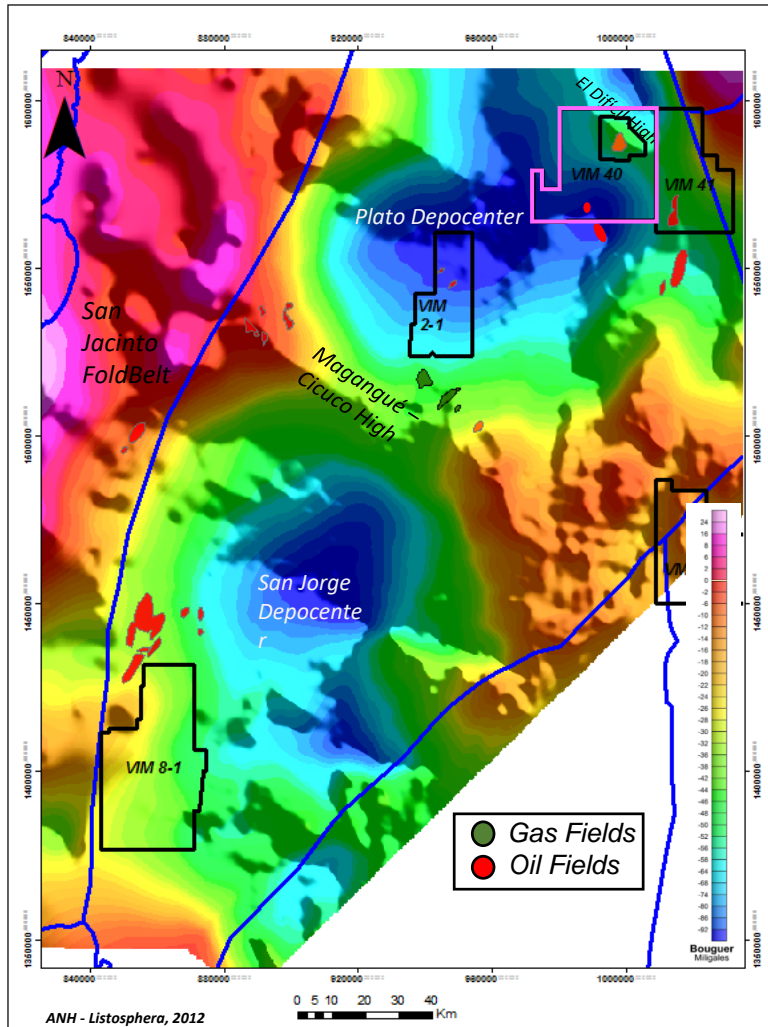
Geological Setting and Stratigraphic Chart



Taken from Universidad de Caldas – ANH, 2020



Bouguer Anomaly Map

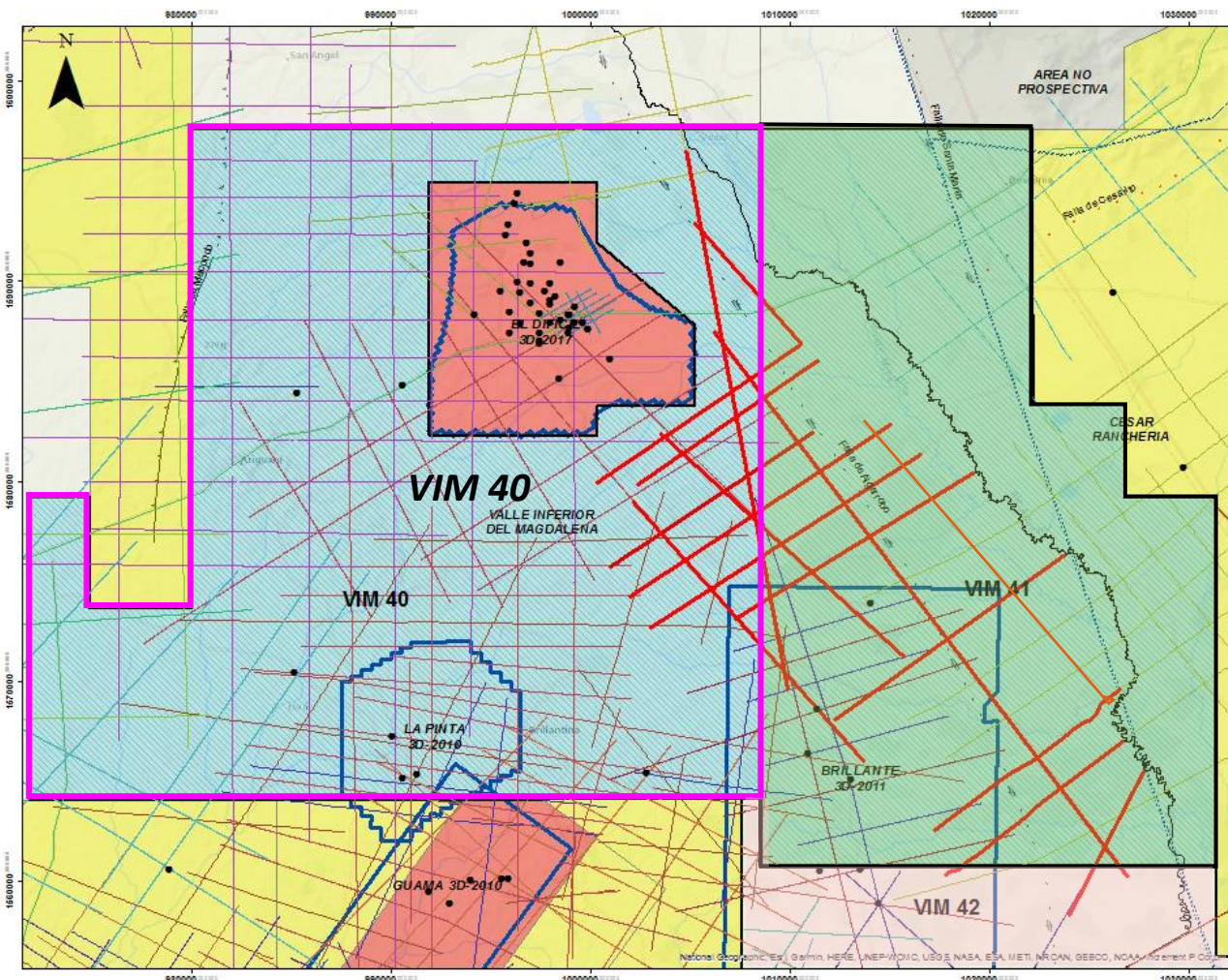


Main Morphological Features in LMV Basin

- The positive anomaly representing the San Jacinto Fold Belt
- El Difícil High
- Plato Depocenter – Basement depths > 7000 m
- Magangué – Cicuco High
- San Jorge Depocenter – Basement Depths > 5000m

DATABASE: Seismic

2D SEISMIC



Legend

- BOSCONIA2D-2020 (14)
- Sismica_ANH**
- SURVEY_NAM**
- ARJONA 2D 2019 (5)
- CHIMICHAGUA 2D-2017 (2)
- NUEVA GRANADA 2D 2019 (8)
- SISMICA2D_EPIS_SGC_2019_03_07**
- SURVEY_NAM**
- BOSCONIA-90 (5)
- BOSCONIA-91 (5)
- CESAR RANCHERIA 2D-2015 (1)
- CESAR VALLEY-79 (12)
- CHIMICHAGUA-90 (4)
- EL BANCO CHIMICHA-89 (4)
- EL DIFICIL-85 (7)
- EL DIFICIL-89 (22)
- EL RETIRO-67 (8)
- EL RETIRO-73 (16)
- EL RETIRO-74 (8)
- GUAMA 2D-2007 (10)
- GUAMITO-91 (28)
- MOMPOS-81 (6)
- MOMPOS-82 (1)
- PERDICES 2D-2006 (4)
- PERDICES 2D-2010 (2)
- PERDICES 2D-2012 (2)
- PIJINO-93 (7)
- PLATO NORTE 2D-2004 (1)
- RETIRO-76 (6)
- SAN ANGEL-76 (9)
- SAN JORGE-74 (4)
- SAN JORGE-75 (1)
- VIM 2D-2017 (2)
- SISMICA3D_EPIS_SGC_2019_03_07 (4)

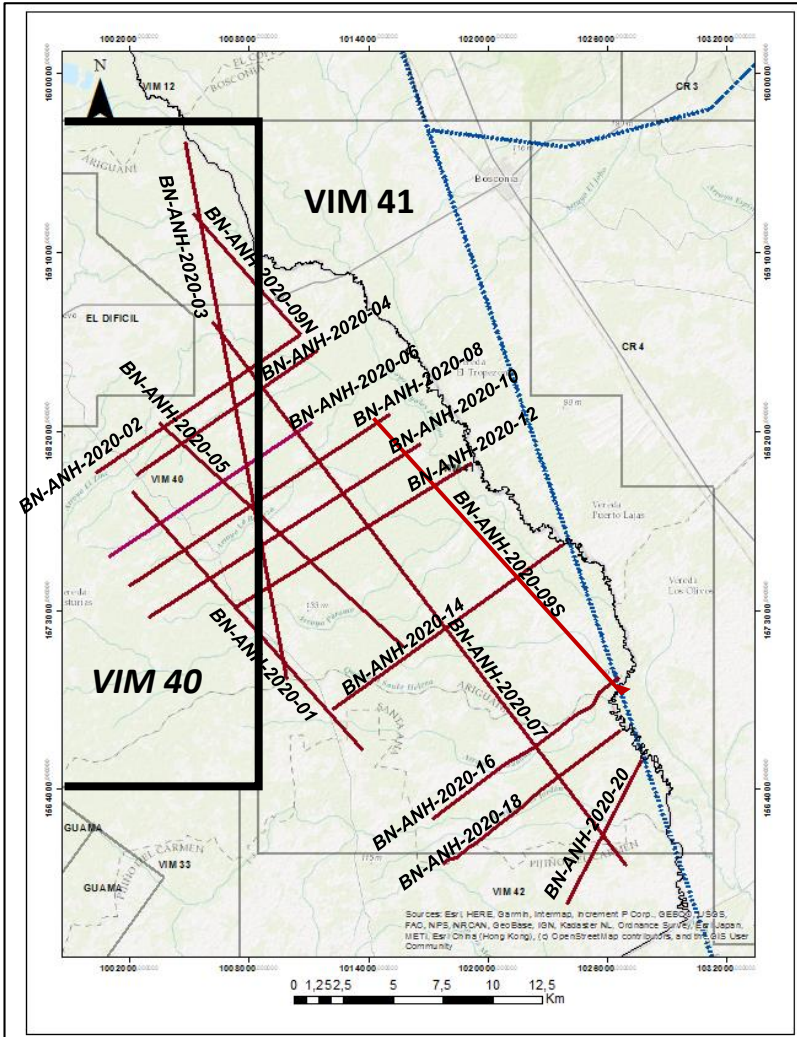
- LEYENDA**
- AREA EN EXPLORACION (8)
 - AREA EN PRODUCCION (3)
 - AREA DISPONIBLE (3)
 - AREA RESERVADA AMBIENTAL (1)
 - RONDA COLOMBIA 2021 ANH (2)
 - RONDA COLOMBIA 2021 NOMINADO (1)
 - BASAMENTO CRISTALINO (1)
 - Ronda Colombia 2021 Tornados

AREA	SURVEY NAME	TOTAL LENGTH (Km)	LENGTH INTO THE AREA (Km)
VIM 40	ARJONA 2D 2019	112	18
	BOSCONIA-90	84	15
	BOSCONIA NORTE-2D-2021	216	84
	EL DIFICIL-89	565	303
	EL RETIRO-67	46	30
	EL RETIRO-73	205	135
	EL RETIRO-74	89	43
	GUAMA 2D-2007	174	36
	GUAMITO-91	460	345
	MAGDALENA 2D-2013	87	75
	NUEVA GRANADA 2D 2019	218	62
	PERDICES 2D-2006	149	16
	RETIRO-76	43	4
	SAN ANGEL-76	130	25
	SAN JORGE-74	151	22
	SAN JORGE-75	8	6
VIM 2D-2017	237	33	
TOTAL LENGTH	2974	1251	

3D SEISMIC

LA PINTA 3D-2010 (67 Km²)
Area in the Block: 58 Km²

Bosconia Norte 2D-2021



Acquisition Parameters

Acquired by: Vector Geophysical

Record Tools: WTU-508

Sampling rate: 2ms

Record Length: 5 s

Source:

Source Type: Sismigel

Charge: 2700 g

Depth: 10 m

Interval: 50 m

Receivers:

Geophone Type: SG-5 - Sercel

Natural Frequency: 10 Hz

Channels: 480

Type of laying: Roll on – Roll off

Nominal Fold: 120

Receiver Interval: 25 m

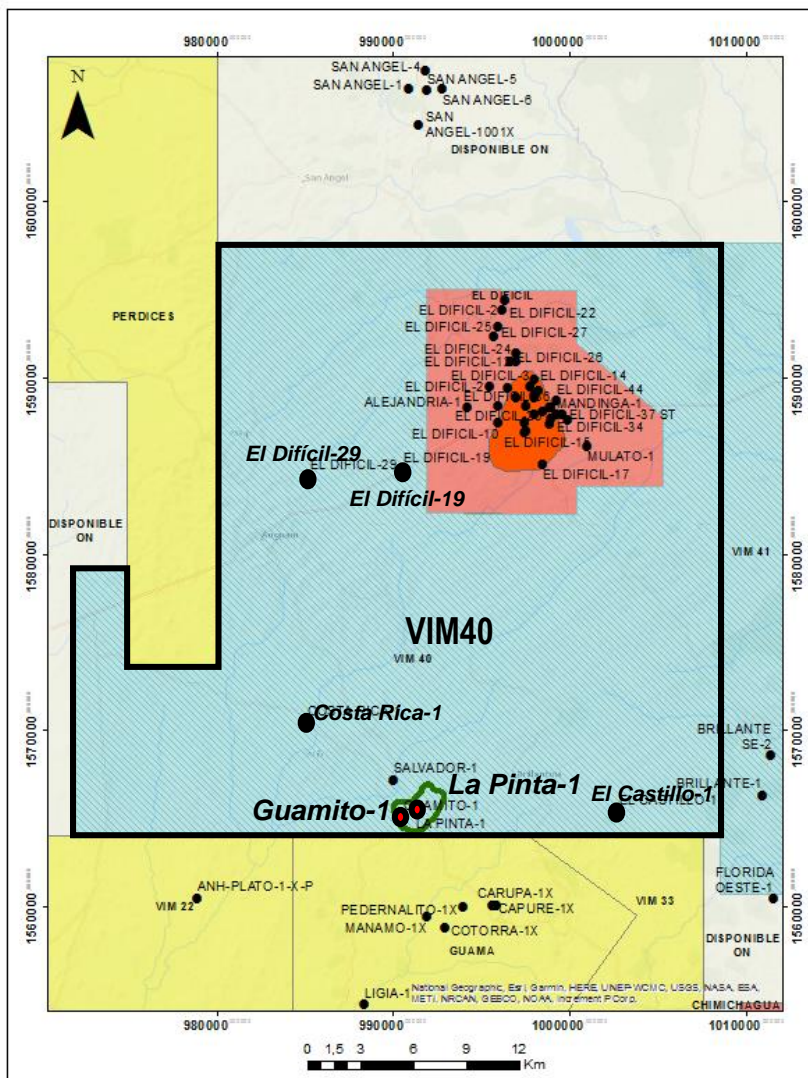
SP: 4917

Receiving Stations: 10703

Processed by Inforpetrol: Deliverables PSTM and PSDM

LINE	SP RANK	LENGTH (Km)	Km with tails	LENGTH IN THE VIM40 BLOCK (Km)	
BN-ANH-2020-01	951	1599	15,45	18,5	9,4
BN-ANH-2020-02	1001	1447	10,28	13,5	7,4
BN-ANH-2020-03	991	2038	25,28	28,7	19,8
BN-ANH-2020-04	1023	1459	9,20	11,0	7,4
BN-ANH-2020-05	731	1295	12,98	19,0	6,7
BN-ANH-2020-06	1001	1443	10,53	13,4	8,9
BN-ANH-2020-07	1001	2281	31,33	36,5	3,8
BN-ANH-2020-08	895	1473	13,90	16,8	7,5
BN-ANH-2020-09N	810	1085	5,83	9,2	4,9
BN-ANH-2020-09S	1309	2039	16,63	18,3	
BN-ANH-2020-10	882	1481	14,43	17,3	6,46
BN-ANH-2020-12	1002	1519	12,25	15,0	1,4
BN-ANH-2020-14	1001	1519	12,20	15,3	
BN-ANH-2020-16	1001	1422	9,90	12,8	
BN-ANH-2020-18	1001	1399	9,43	12,3	
BN-ANH-2020-20	1001	1279,5	6,43	9,3	
TOTAL			216,00	266,77	83,66

DATABASE: Wells



AREA	WELL	TD (ft)	YEAR	COMPANY
VIM 40	COSTA RICA-1	10609	1946	PETROLEOS ARIGUANI S.A.
	EL DIFÍCIL-19	7018	1949	SHELL CONDOR S.A.
	EL DIFÍCIL-29	9516	1950	SHELL CONDOR S.A.
	GUAMITO-1	12060	1975	ECOPETROL S.A.
	EL CASTILLO-1	11976	1980	ECOPETROL S.A.
	LA PINTA-1	11250	2009	PETROLIFERA PETROLEUM COLOMBIA LTD

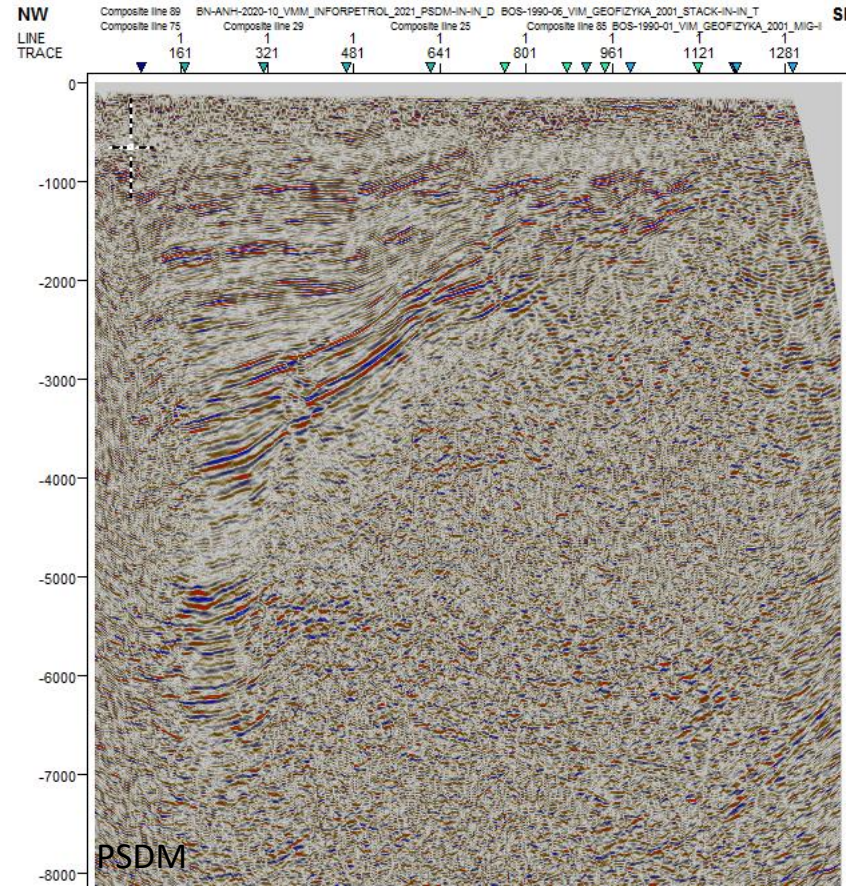
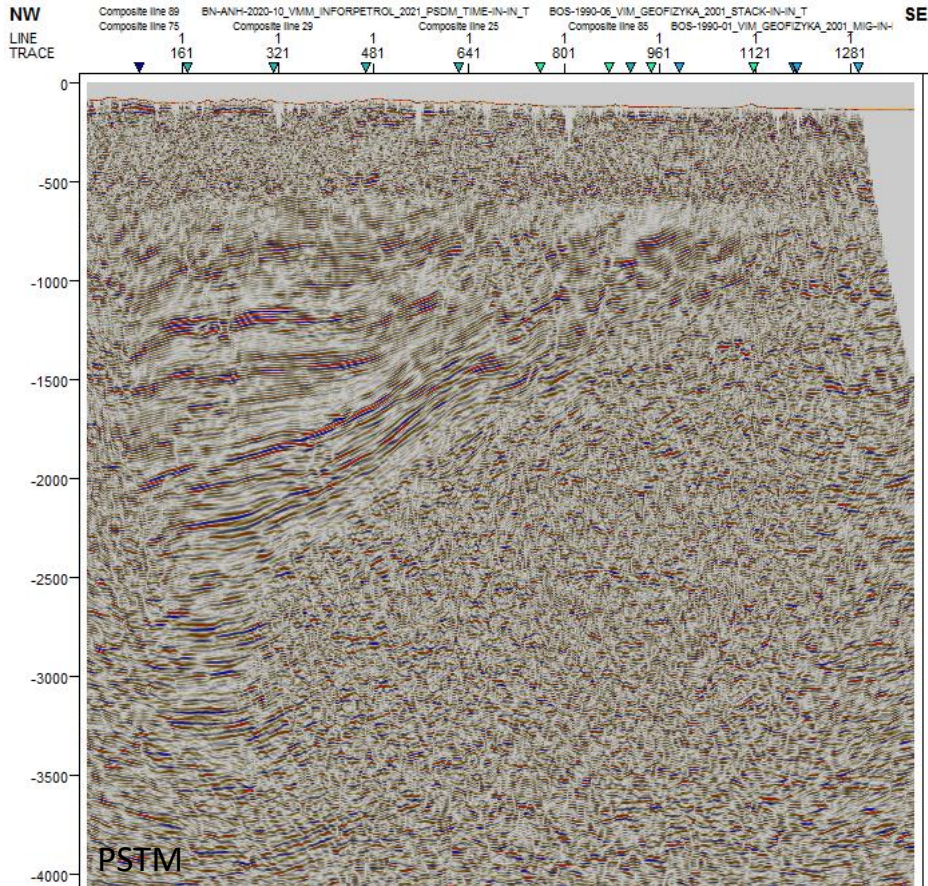
Guamito-1 (1975) (TD 12,060')

- Drilled by Chevron. The well produced gas and condensate in the Intra Porquero Unit and Ciénaga de Oro Fm.
- The well test results indicated presence of liquid and gaseous hydrocarbons at the **Intra Porquero level, 120 BOPD 47.7° API, 750 KSCFD** and at the top of the Ciénaga de Oro Formation 10,200 feet, 406 BOPD 46.9° API/ 1.8 MMSCFD.
- The well was closed on June - 1979, and abandoned in 1984.

La Pinta-1 (2009) (TD: 11,250')

- Drilled by Petrolífera Petroleum Limited. The well produced from the Upper Porquero and Ciénaga de Oro Formations since Dec-2011 to Jan -2012.
- The well produced in the interval (7804'- 7834') at the Upper Porquero Unit; with a total production of 3.755 Kscf and 942 Bbls of condensate. The last accumulated production reported was **3,176 bbls of oil, 524 bbls of water and 12,643 kscf of gas**.
- The La Pinta-1X Well was in a period of short production tests from 6 December 2011 until January 23, 2012, during the 23 days of the first semester an average production of 163.29 MSCF was recorded, 0 MSCF sold and 163.29 MSCF burned. **All the facilities of the field were removed and the itself was left closed** with a pipe tip plug. The definitive abandonment was carried out in 2013.

Processing Results

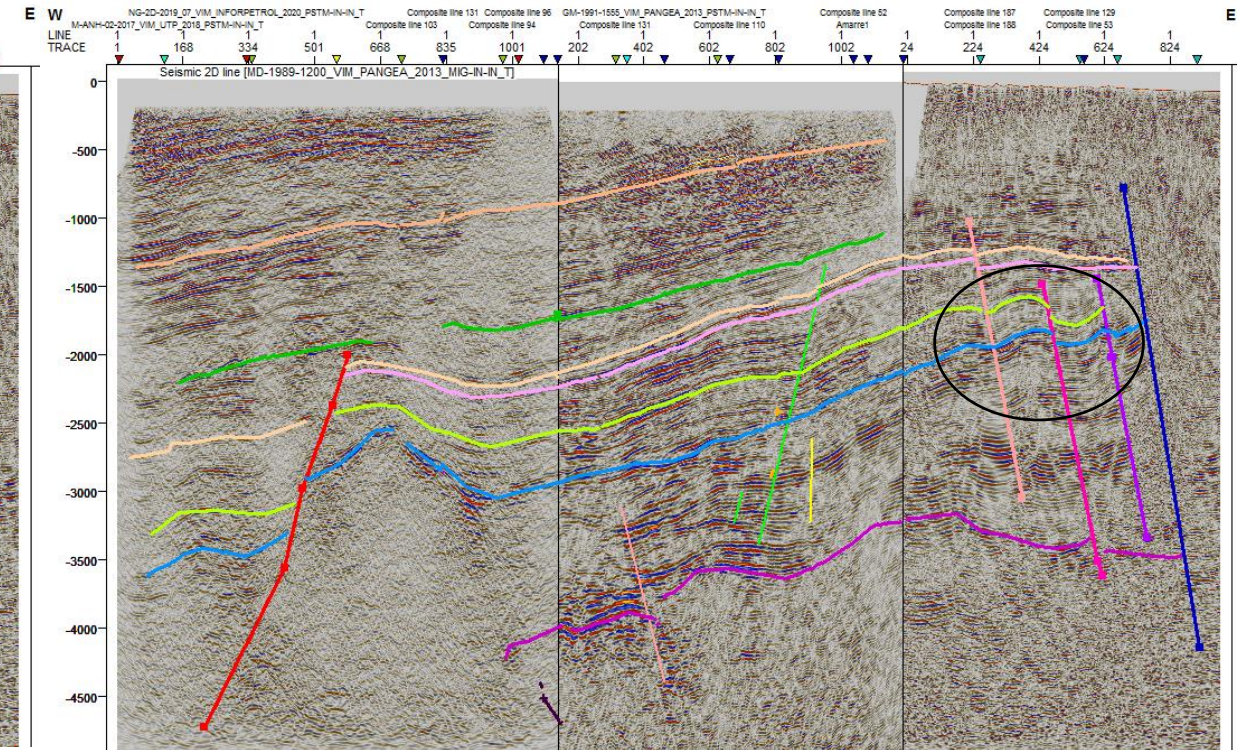
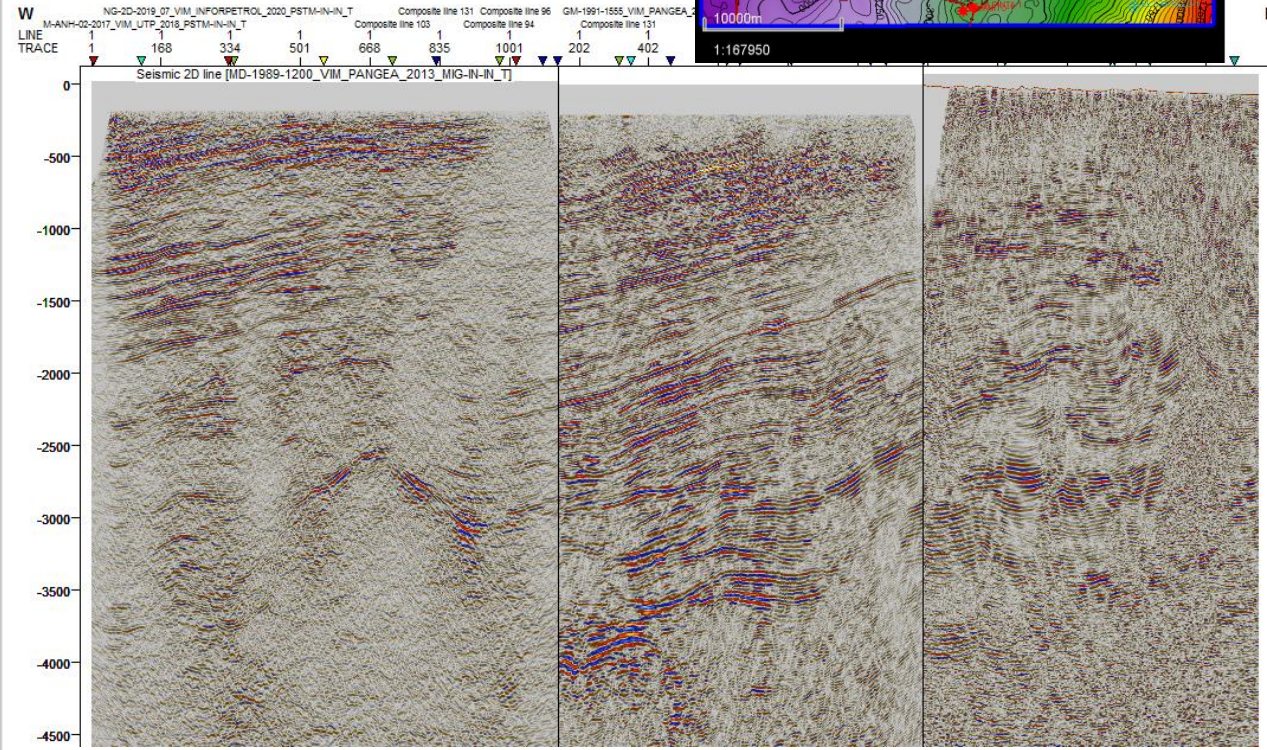
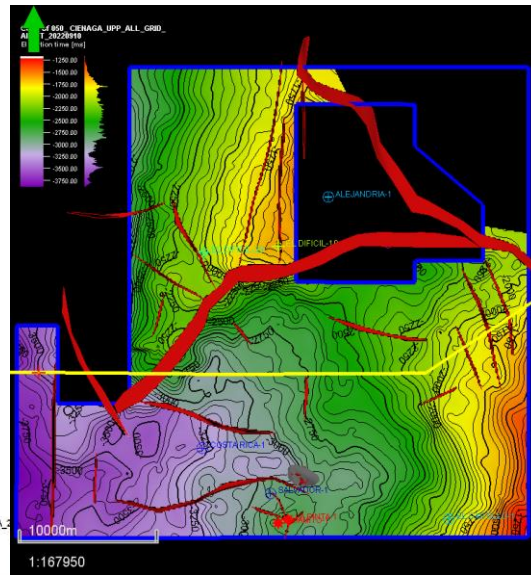


SECUENCIA DE PROCESAMIENTO:
 DATUM: 200 m.s.n.m VELOCIDAD DE REEMPLAZAMIENTO: 2000 m/s
 SISTEMA DE REFERENCIA: BOGOTA-MAGNA.
 01.CONVERSION DE DATOS A FORMATO INTERNO SEIS_SPACE. 02.GEOMETRIA.
 03.ASIGNACION DE GEOMETRIA. 04.ATENUACION DE RUIDO. 05. PRIMEROS AR
 06.RECUPERACION DE AMPLITUDES (TAR). 07.AMPLITUD CONSISTENTE EN SUP
 08.DECONVOLUCION. 09.ESTATICAS DE REFRACCION.
 10.ANALISIS DE VELOCIDAD 1. 11.ESTATICAS RESIDUALES 1.
 12.ANALISIS DE VELOCIDAD 2. 13.ESTATICAS RESIDUALES 2.
 14.PSTM. KIRCHHOFF (1RA IT.) 15.ANALISIS DE VELOCIDAD 1
 16.PSTM. KIRCHHOFF (2DA IT.) 17.APILADO
 18.FILTROS Y ESCALARES

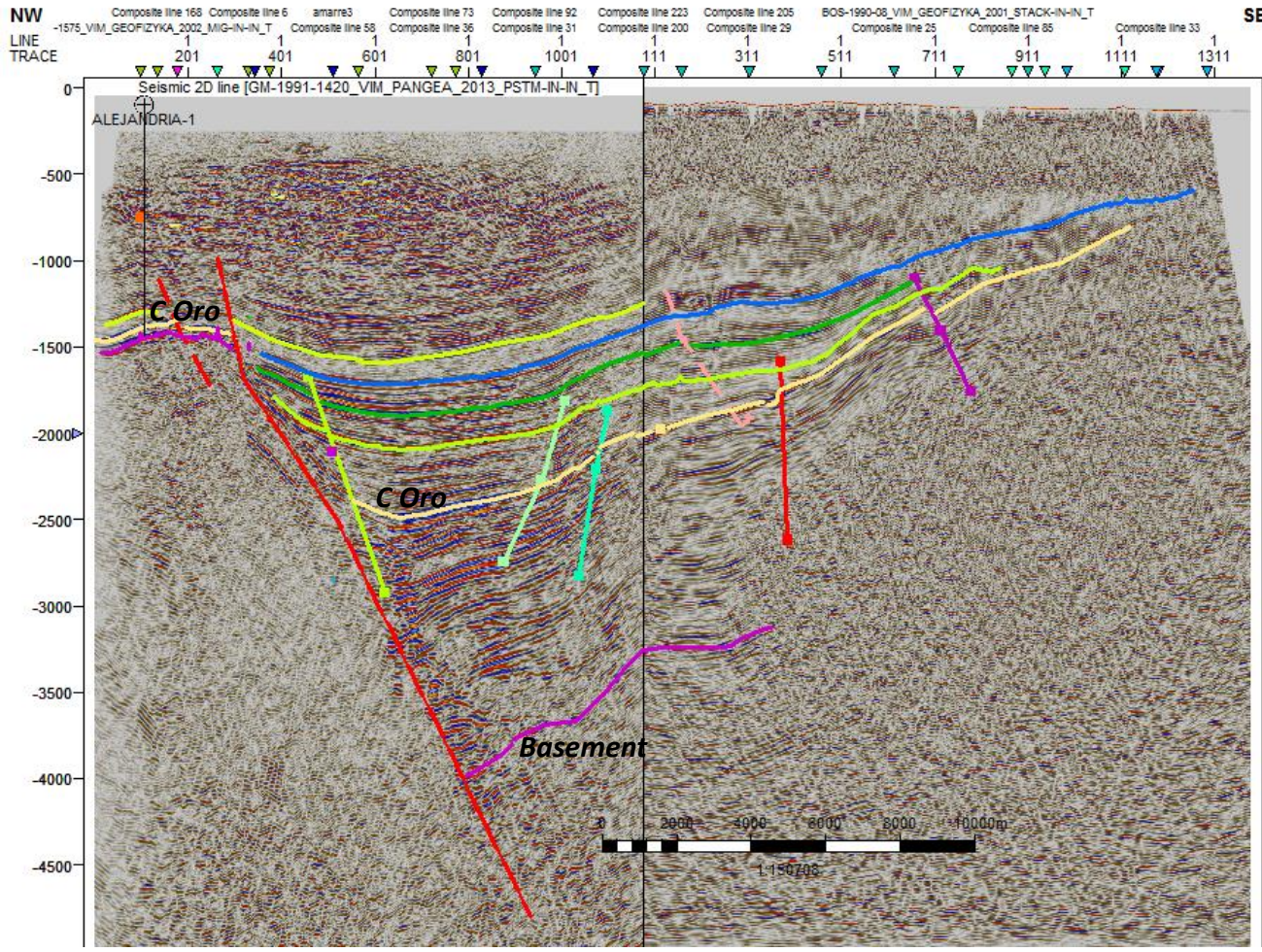
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 10.ANALISIS DE VELOCIDAD 1. 11.ESTATICAS RESIDUALES 1.
 12.ANALISIS DE VELOCIDAD 2. 13.ESTATICAS RESIDUALES 2.
 14.CONSTRUCCION MODELO ESTRUCTURAL
 15.CONSTRUCCION DE VEL INTERVALICA(USANDO VEL PSTM RMS Y MODELO ESTRUCTURAL)
 16.PSDM 1A ITERACION 17.ANALISIS RESIDUAL DE VELOCIDADES SOBRE GATHER_PSDM
 18.TOMOGRAFIA (1A ITERACION) 19. PSDM SEGUNDA ITERACION
 20.APILADO 21. CONVERSION A TIEMPO 22.FILTROS Y ESCALARES
 DATUM DE ESTE SEGY: 200 m.s.n.m VELOCIDAD DE REEMPLAZAMIENTO: 2000 m/s
 END OF EBCDC

Seismic Interpretation

Composite Line W-E



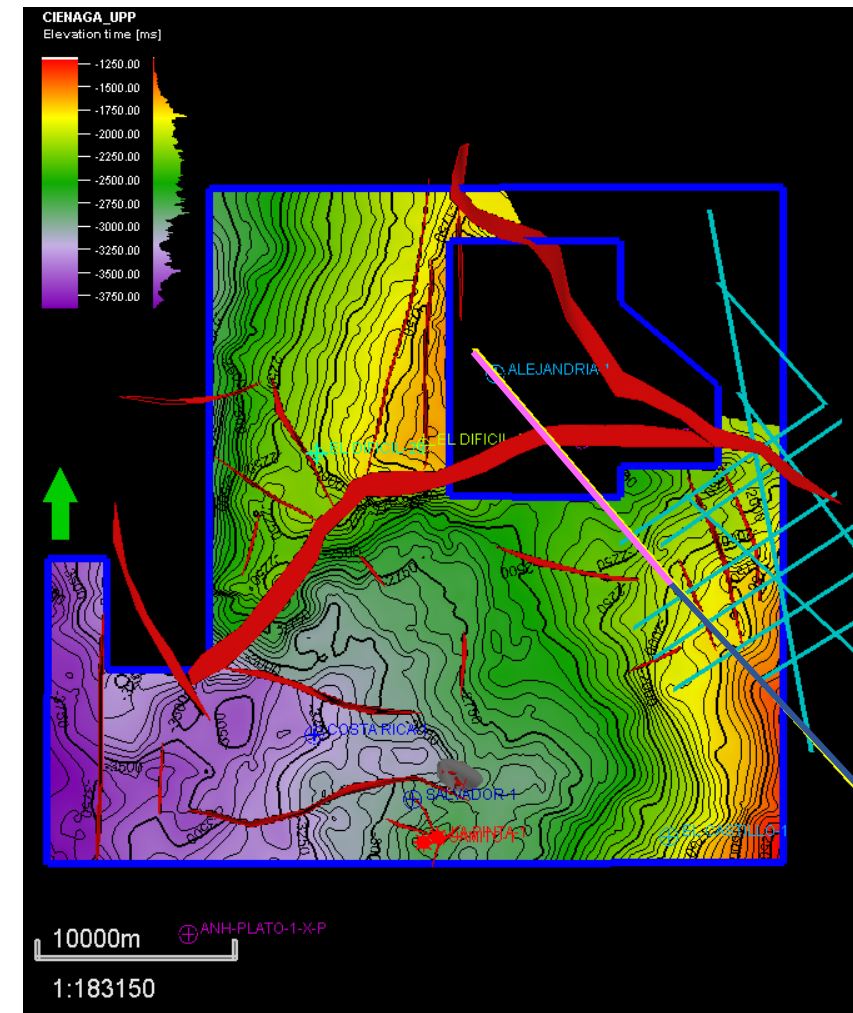
Seismic Interpretation



GM-1991-1420

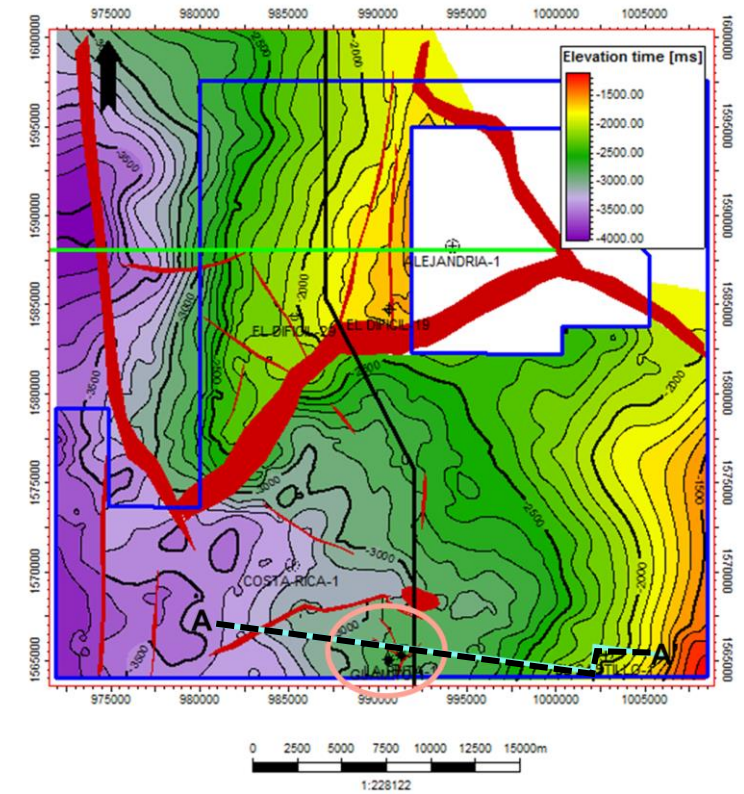
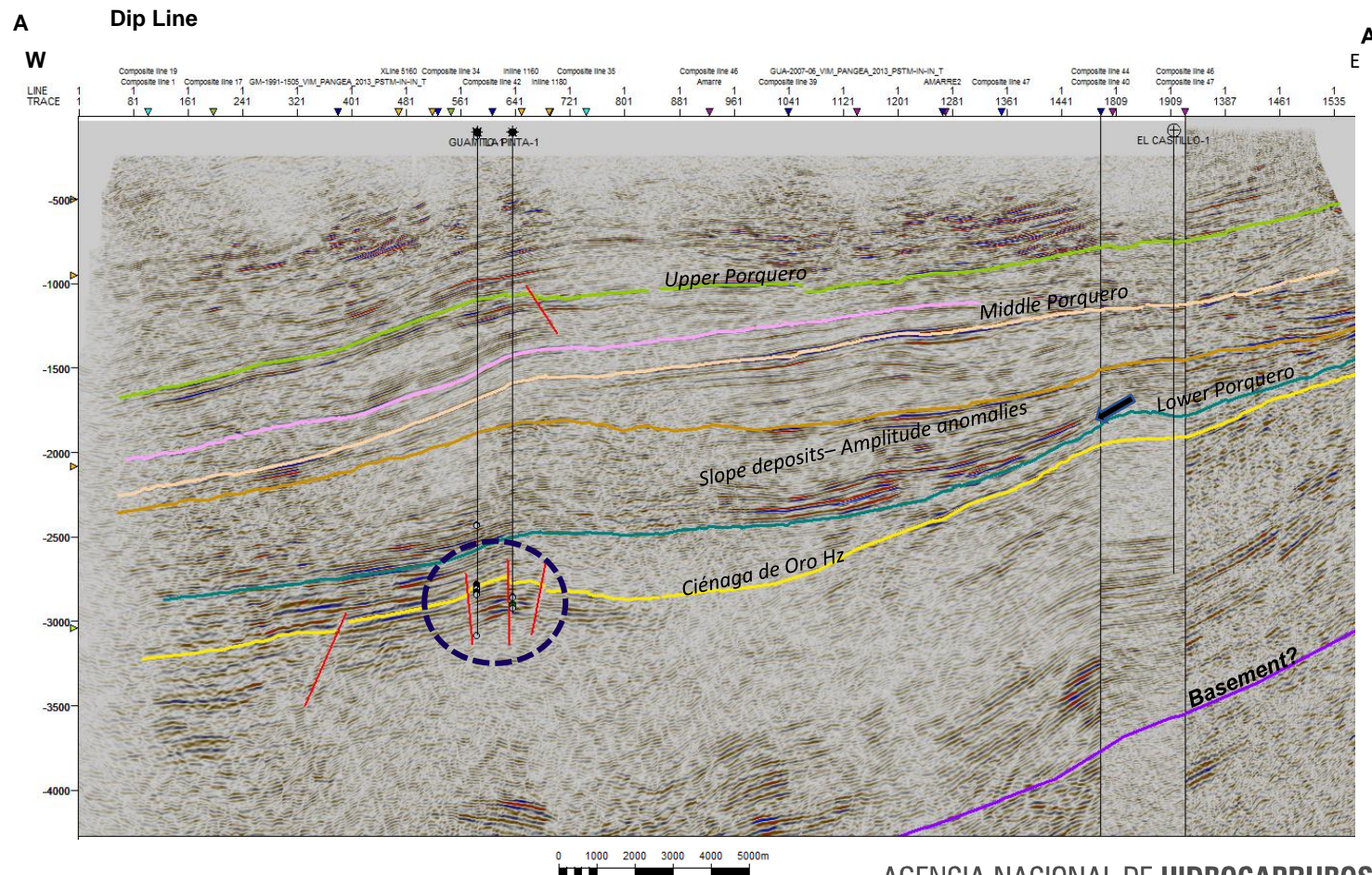
BN-ANH-2020-01

Ciénaga de Oro TWT Map



VIM 40 Seismic Interpretation

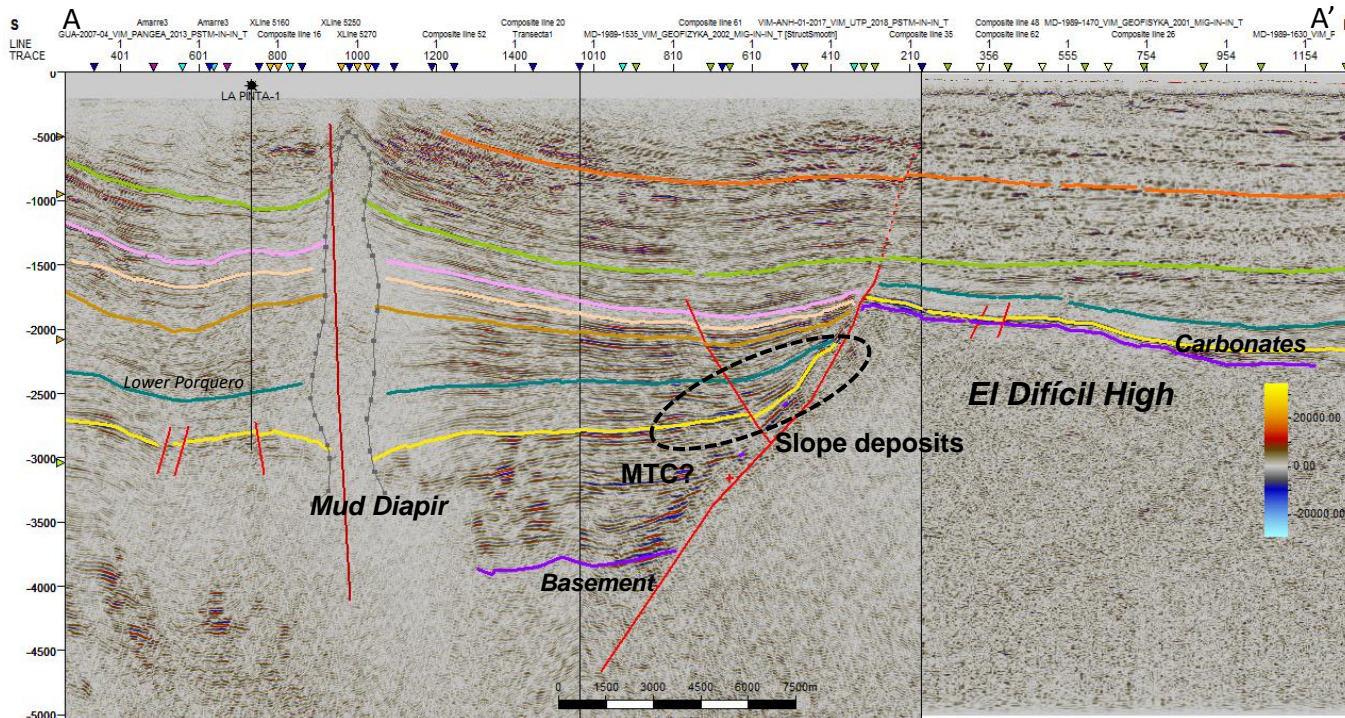
- PLAYS
- Structural: Faulted Anticline (Ciénaga de Oro. Fm.)
- Stratigraphic: Amplitude Anomalies with downlap patterns (slope deposits - IntraPorquero levels).



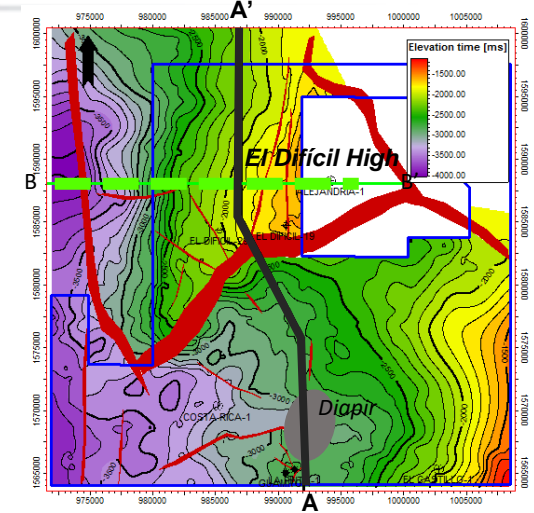
Seismic Interpretation

- PLAYS
- Folding related to diapirism dynamics
- Carbonates of Early Miocene age over basement paleohighs controlled by normal faults
- Slope deposits involved into growth strata (mass transport complex - MTC) – High amplitudes with lobular geometry
- Stratigraphic traps (onlaps and pinch outs)

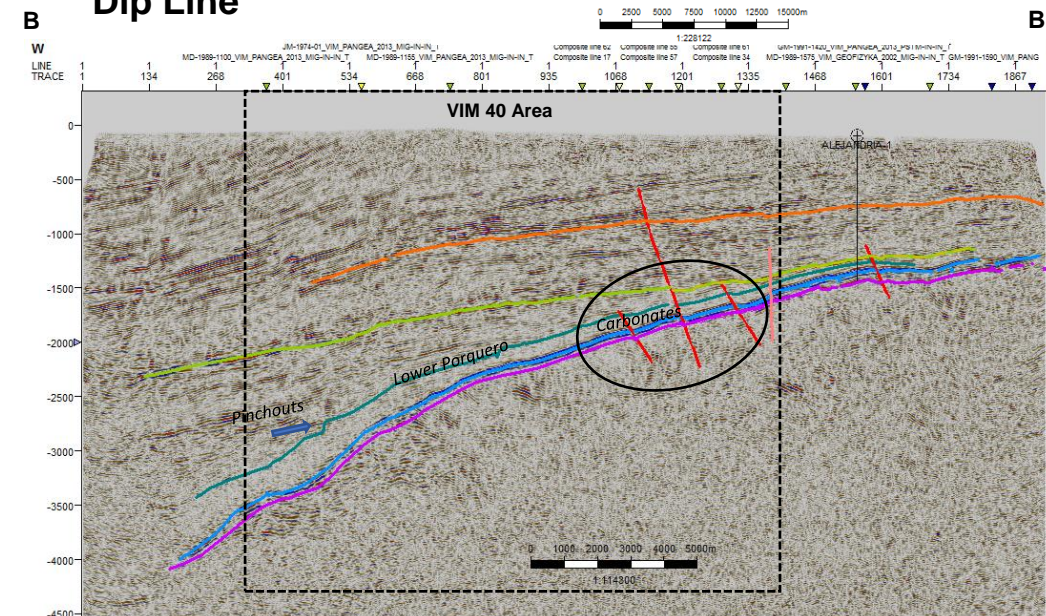
Strike Line



TWT Map Ciénaga de OroTop



Dip Line

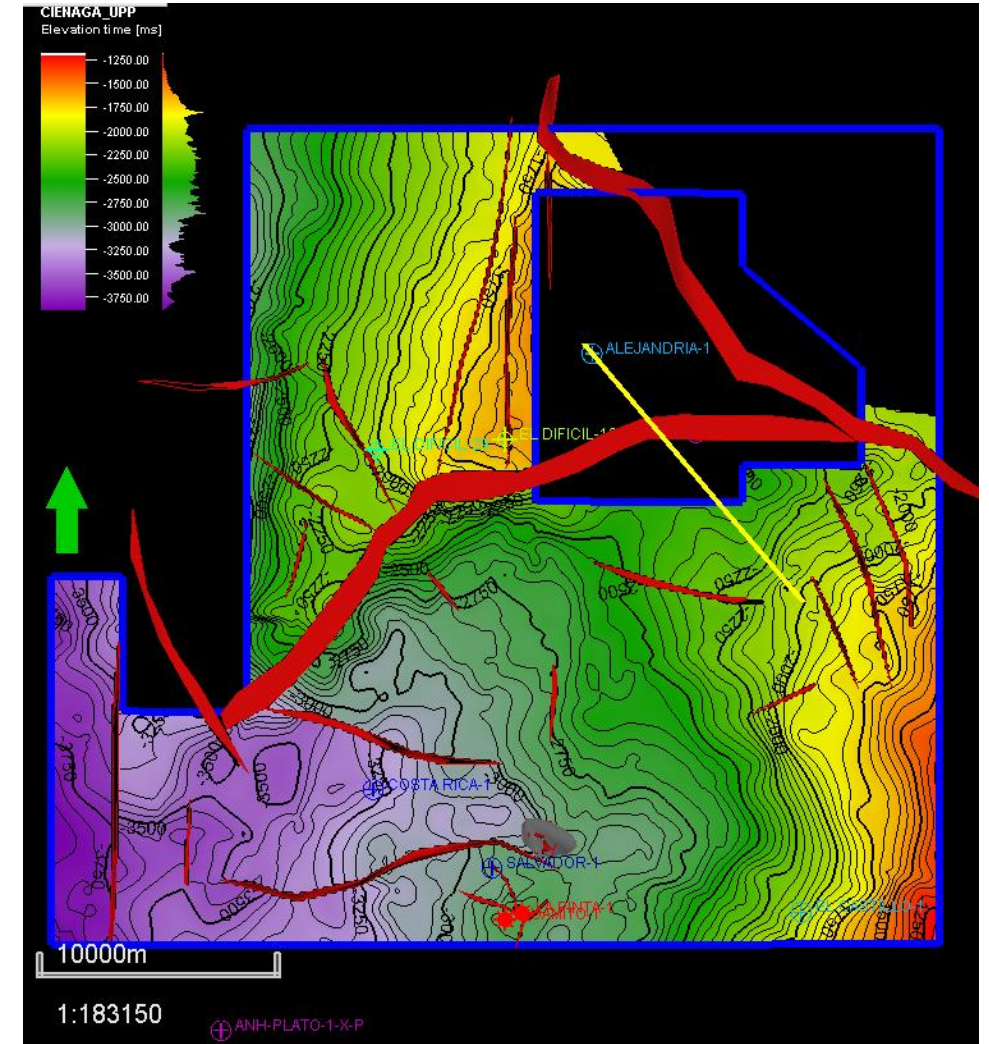
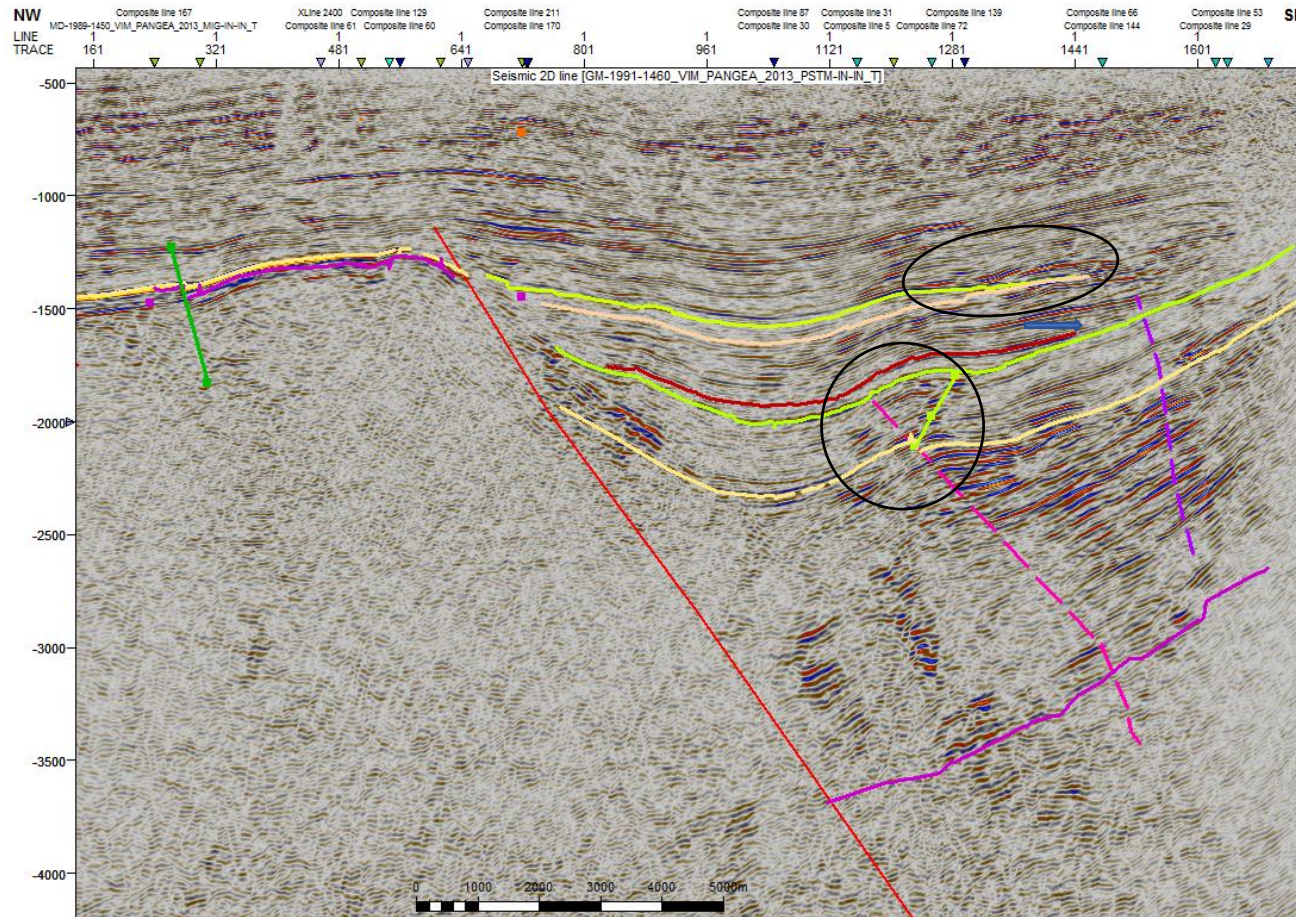


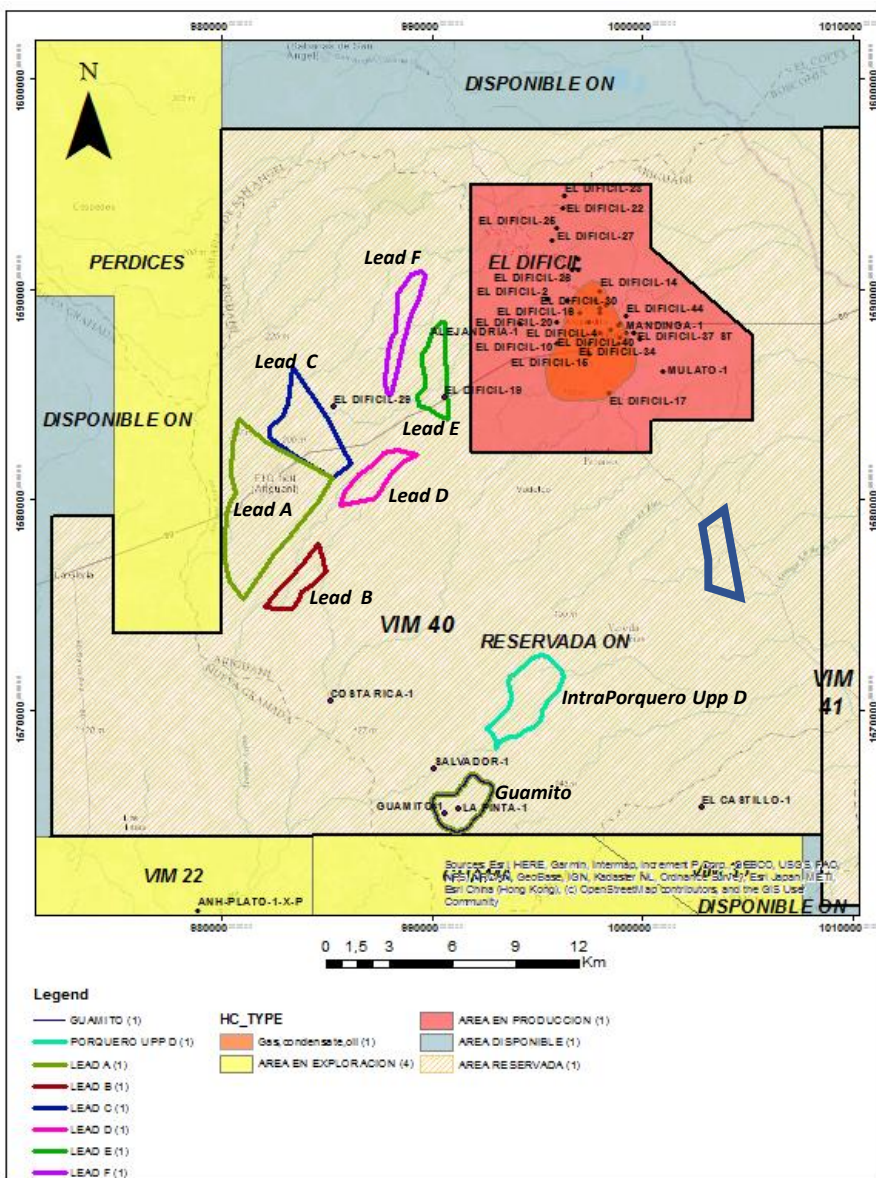
Seismic Interpretation

PLAYS

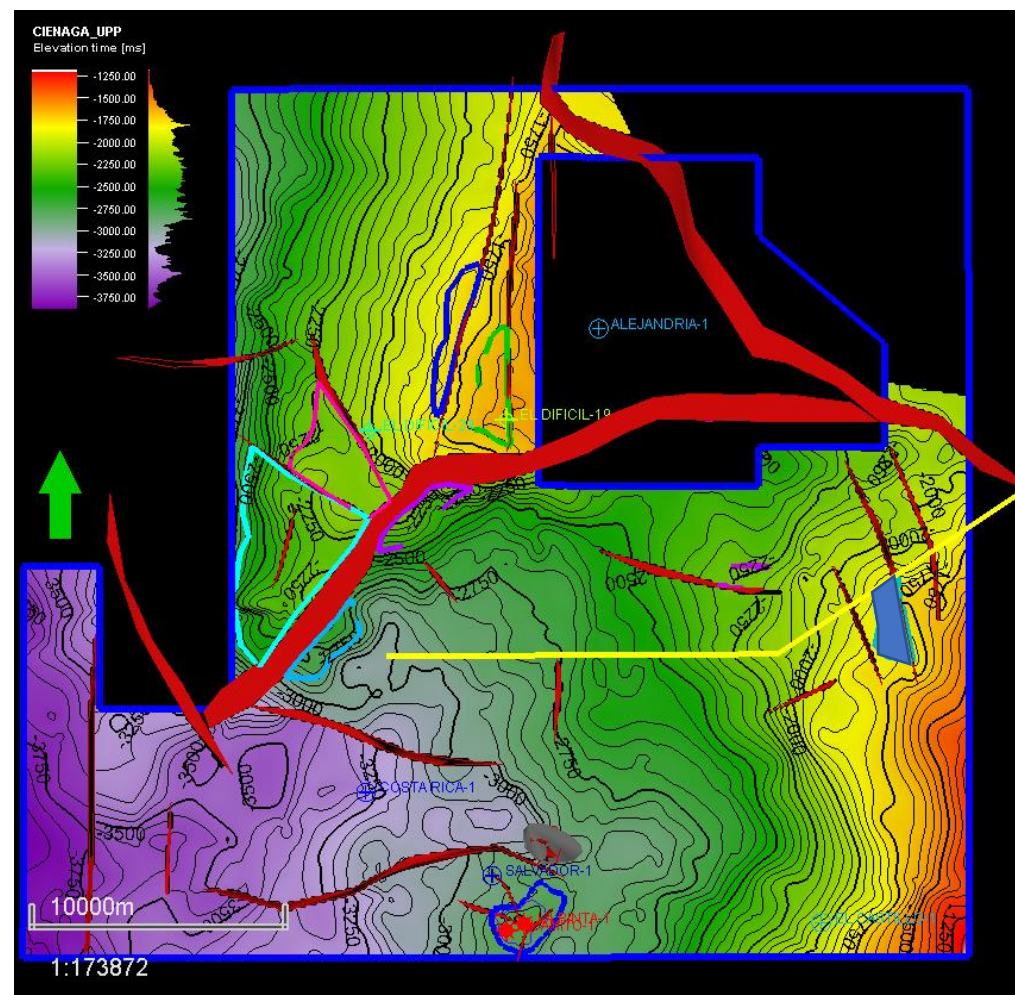
Structural: Faulted Anticline (Ciénaga de Oro. Fm.)

Stratigraphic: Amplitude Anomalies with downlap patterns





Ciénaga de Oro TWT Map



Areas Ciénaga de Oro Fm:

- Guamito – La Pinta: 1111 Acres**
- Lead A: 5588 Acres**
- Lead B: 804 Acres**
- Lead C: 2251 Acres**
- Lead D: 877 Acres**
- Lead E: 1053 Acres**
- Lead F: 945 Acres**
- Lead G: 730 Acres**

Conclusions

- The seismic program Bosconia North 2D – 2020 is located in the northeast of the LMV basin in the Magdalena department, corresponding to 216 Km of length and it was acquired by the ANH and Enterritorio between the months of July and september of 2021.
- The Bosconia North 2D-2020 seismic program consists of 16 seismic lines, 10 dip lines and 6 strike lines, with a 4917 source points and 10703 receiving stations. These lines are located in the VIM40 and VIM41 areas.
- The VIM 40 area has seventeen 2D seismic programs with a total length of 1251 Km. This surveys have been acquired since 1967, and the recent programs are Arjona 2D-2019, Nueva Granada-2019 and the most recent is Bosconia Norte 2D-2021.
- Six exploratory wells have been drilled in the VIM40 area, where the wells Guamito-1 and La Pinta-1 had gas and oil production. The Guamito-1 well presented several hydrocarbon shows during drilling, and indicated presence of liquid and gaseous hydrocarbons at the Intra Porquero level 8,750 feet, 120 BOPD 47.7° API/ 750 KSCFD and at the top of the Ciénaga de Oro Formation 406 BOPD 46.9° API/ 1.8 MMSCFD.
- The La Pinta-1 well tested oil at Porquero 10,200 feet, 80 BOPD 44° API and at the Ciénaga de Oro 152 BOPD 41° API. **The well produced in the Upper Porquero Unit; with a total production of 3.755 Kscf and 942 Bbls of condensate. The last accumulated production reported was 3,176 bbls of oil, 524 bbls of water and 12,643 kscf of gas.**
- VIM 40 have stratigraphic and structural traps, related to extensive dynamics and structural inversion. That involves the Ciénaga de Oro Formation and Intra-Porquero Units.