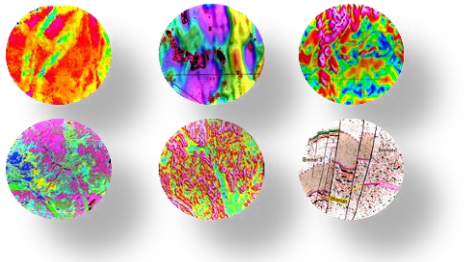


Multi-Physics Interpretation

New Geophysical Technologies, Finding Petroleum

February 24th 2016

Today's Discussion

Company Overview

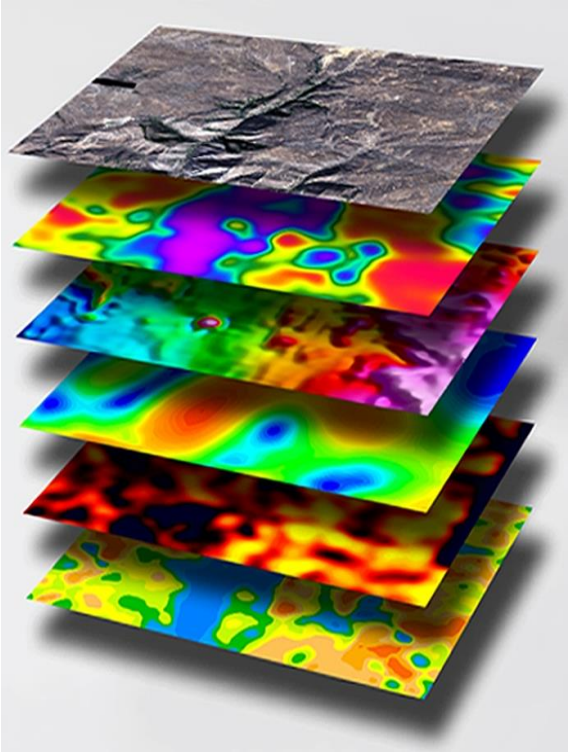
Multi-Physics and Predictive Analytics Overview

Case Studies

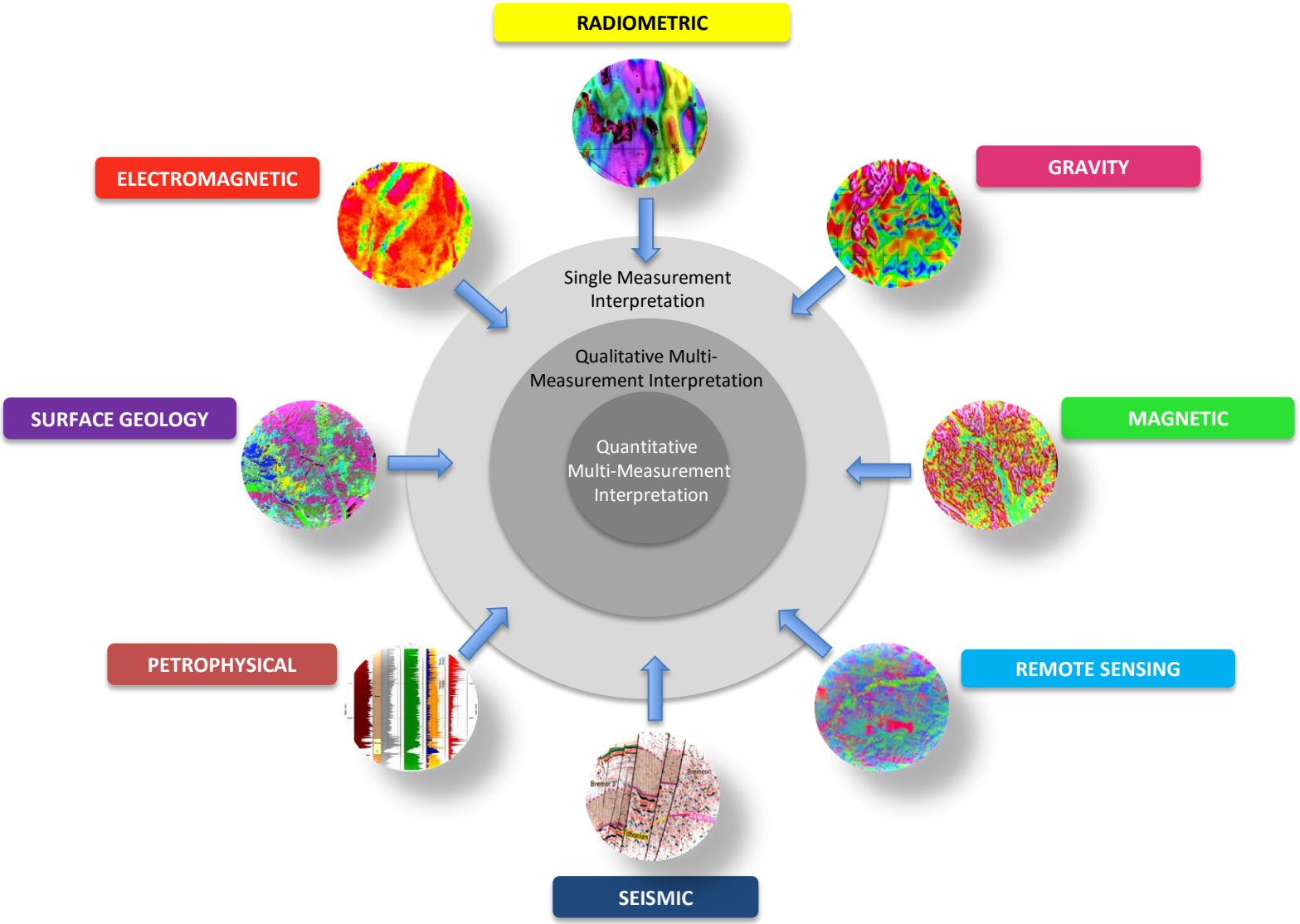
Company Overview

NEOS is at the forefront of natural resource exploration, with a track record of high-impact results

- Specializing in multi-physics data interpretation, integration and predictive analytics; including the merging of seismic and non-seismic measurements
- The fusion and simultaneous analysis of multiple geo-data layers, using “big data” analytics creates a quantum leap in discovering natural resources quickly and inexpensively
- Headquartered in California and well funded by shareholders including Goldman Sachs, Kleiner Perkins Caufield & Byers and Bill Gates
- Expanding business, last year purchased the onshore seismic data processing and imaging group from ION Geophysical – now called the NEOS Seismic Imaging Group (SIG)
- Growing list of multi-client projects for license, including several onshore US, Argentina, onshore Lebanon and a Cyprus project agreed with the ministry

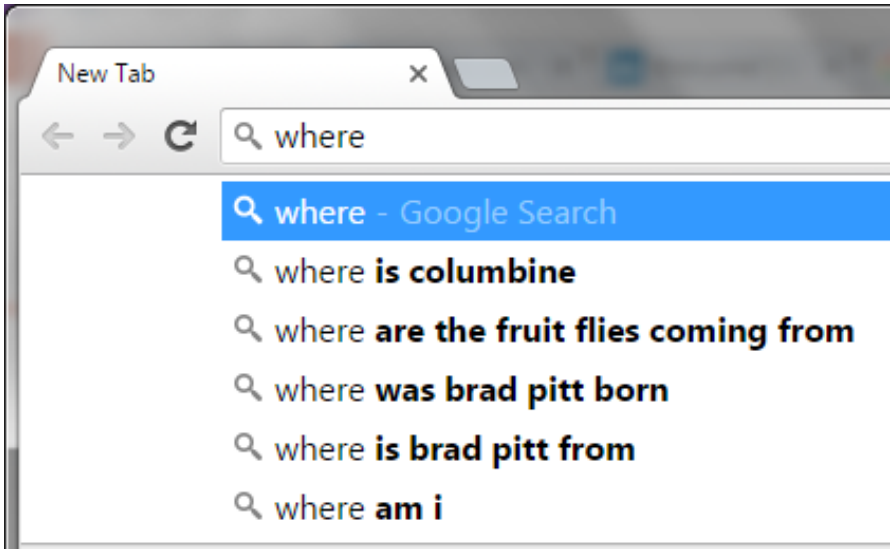


NEOS Technology and Workflow – Multi-Physics

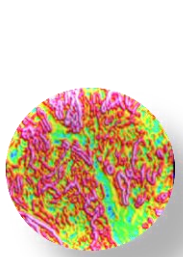
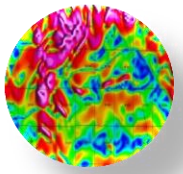
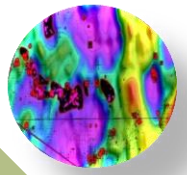
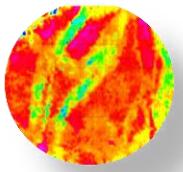
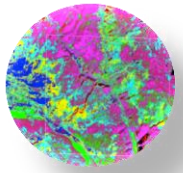
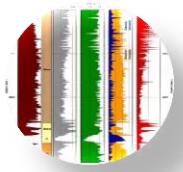
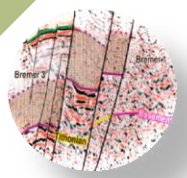


Predictive Analytics
Everyday Applications

- Google search bar
- Car insurance quotes
- Stock trading



Predictive Analytics
NEOS Applications

Input Data

Primary and derived:

Gravity

Magnetic

Electromagnetic

Radiometric

Hyperspectral

…etc.

Interpreted:

Isopach (from 3-D model)

Resistivity

Petrophysical

Faults

…etc.

Output Prediction

Deliver additional insight

Classes:
Geology, Play type

Reservoir properties:
Porosity, Net to gross
…etc.

Production:
Gas, Oil, GOR
…etc.

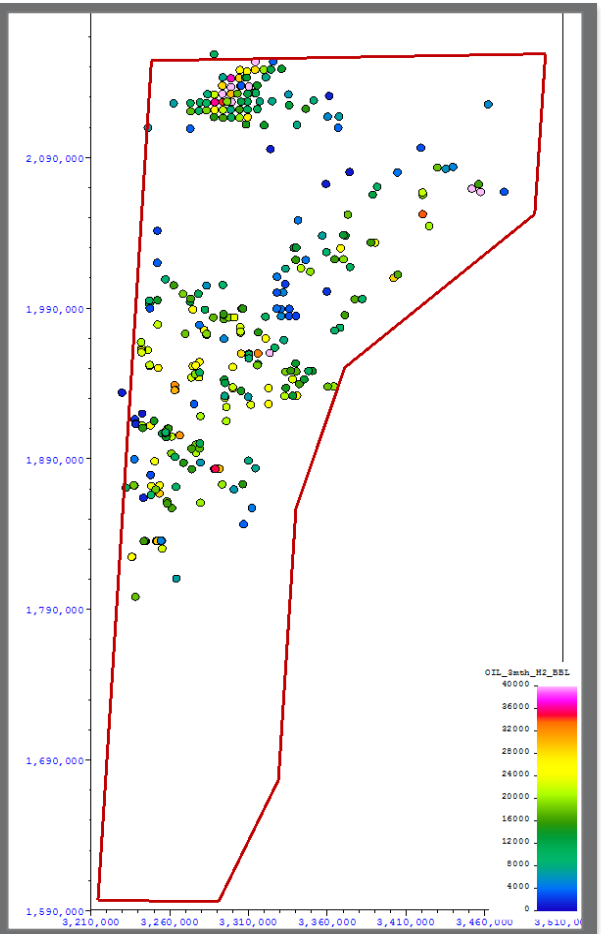
Predictive Analytics in Action
Case Example: DJ Basin, USA

The fundamental question(s)

Why are fields located where they are (in a conventional play)?

Why are some wells more productive (in an unconventional play)?

What 'areas of goodness' should I target with my next round of wells?

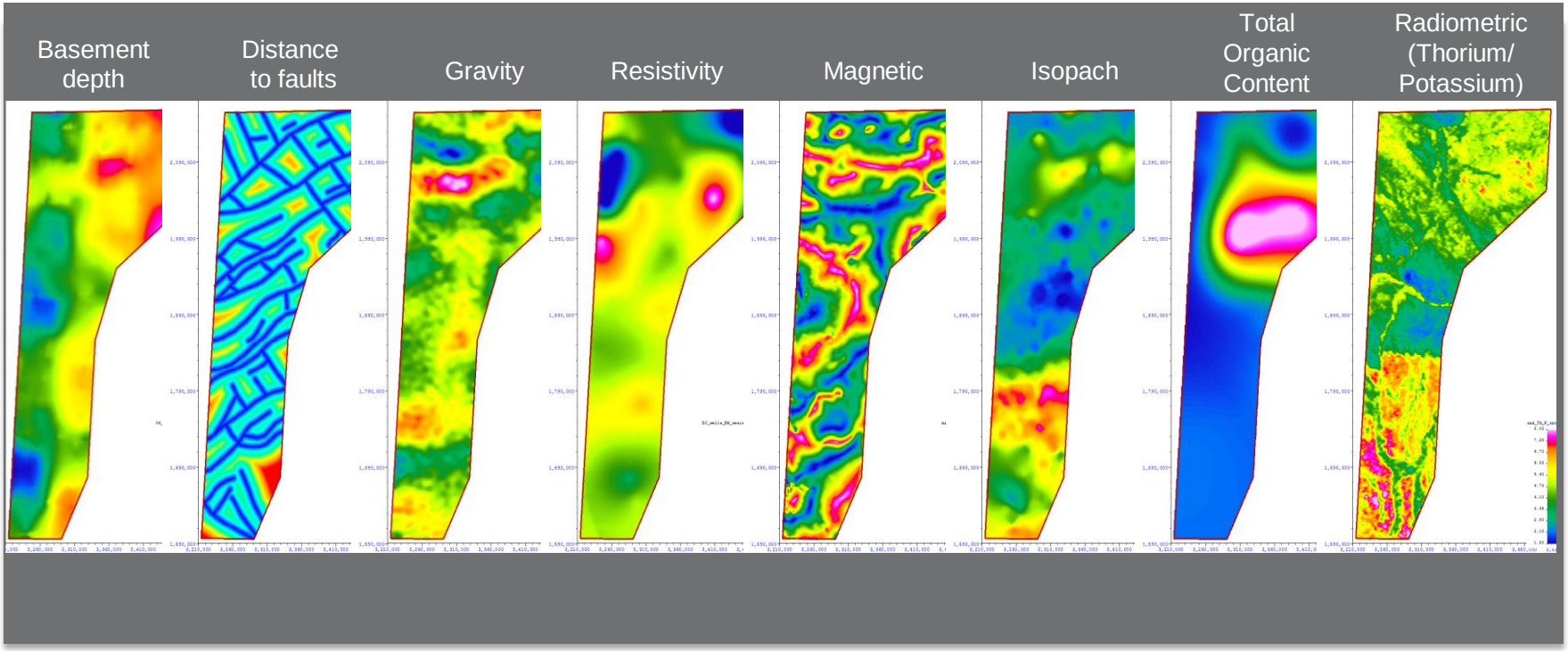


Case Summary

- 7,000 km^2
- Well productivity varied by 25x (from 20 BOPD to 500 BOPD)
- Seismic data alone couldn't explain the productivity differences
- Client wanted to:
  - Optimize its return on drilling
  - Target new high-potential areas for leasing

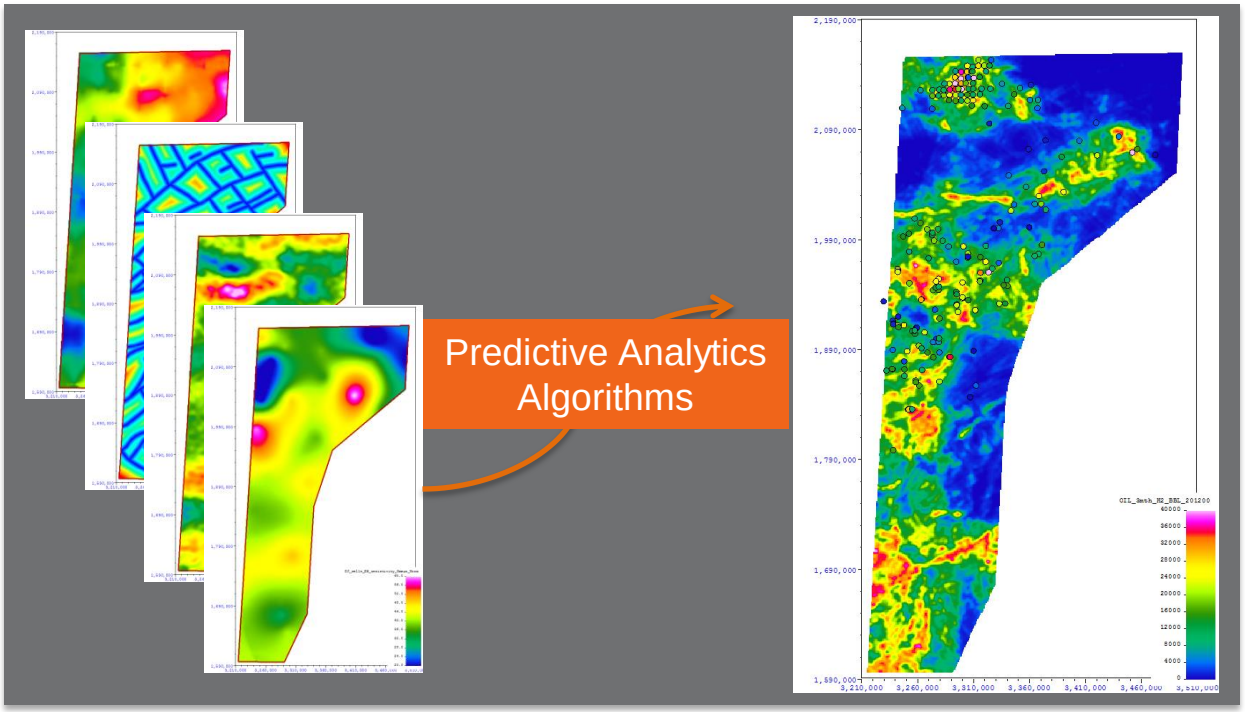
Predictive Analytics

Making Sense of Multi-Physics Big Data



Identify the seismic and non-seismic datasets that correlate with the existing locations of the best (and worst) wells

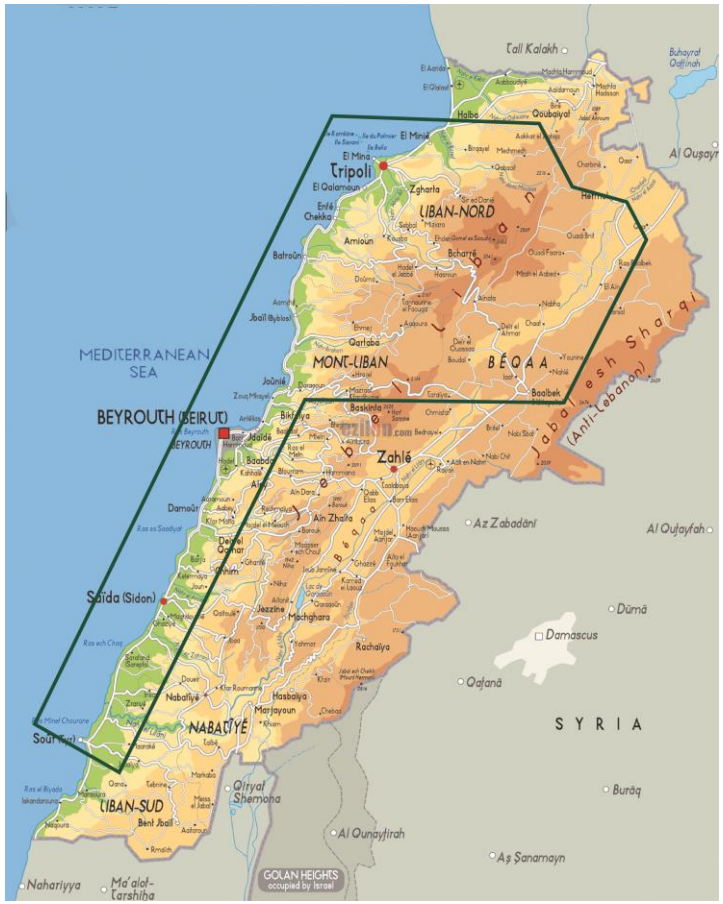
Predictive Analytics
Making Sense of Multi-Physics Big Data

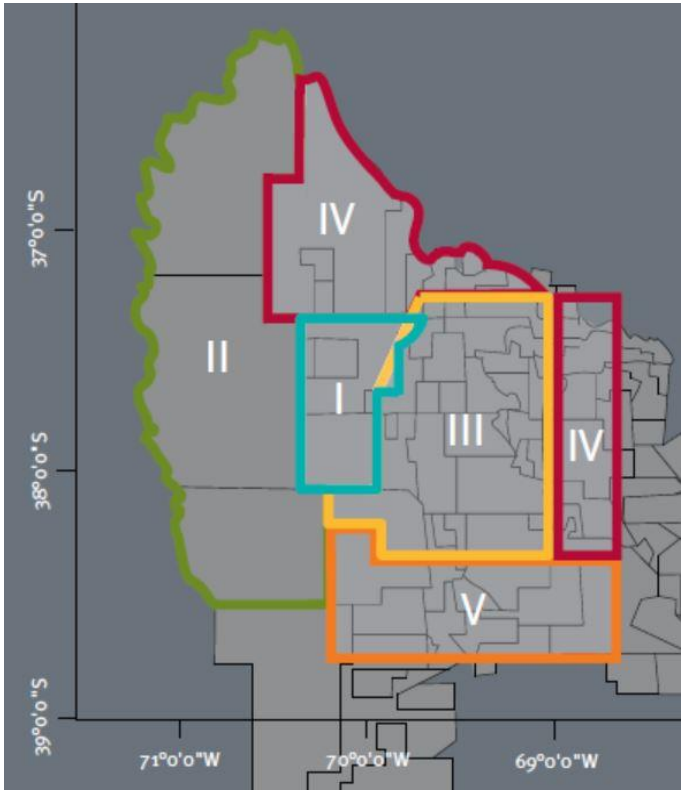


- Warm colors correspond to high prospectivity areas to target with future drilling or leasing activity
- Cool colors correspond to areas to avoid
- In this case, the PreA algorithms identified a large exploration area in the southern portion of the survey even before a single well had been drilled nearby

Apply NEOS's proprietary suite of predictive analytics algorithms to highgrade acreage across the entire area of investigation, even in areas with no well control and no seismic data

NEOS Global Program Case Examples





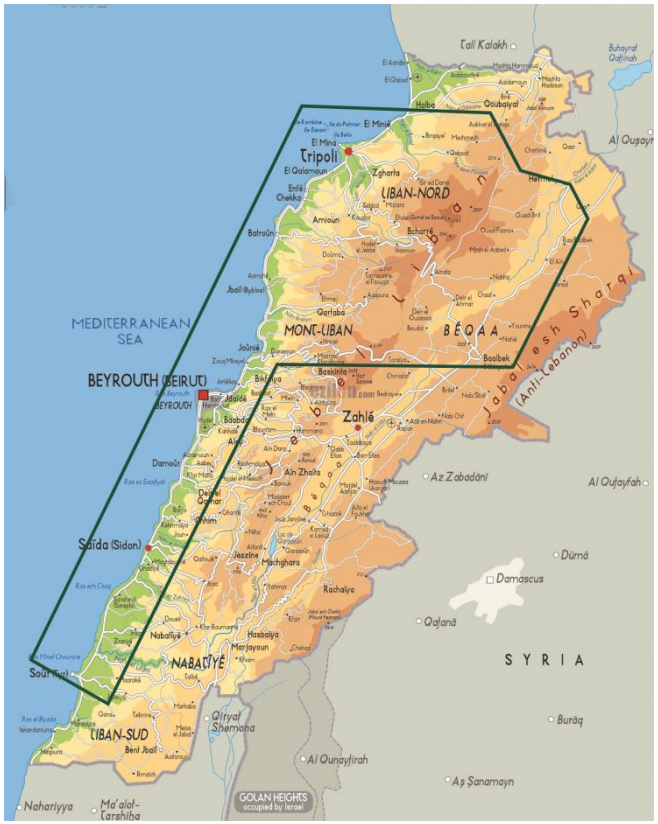
Regional Oil & Gas Prospectivity Assessment
Case Example: Lebanon neoBASIN™ Program

Objectives
To acquire geophysical datasets in a frontier area to better understand the geologic features, regional fault and fracture networks and to highgrade play locations throughout the AOI based on the abundant regional analogues including onshore Syria, onshore Levant and the Eastern Mediterranean offshore successes of recent years

Location
Onshore & Near-Shore Lebanon

Area
6100 sq km

Key Technologies
- Hyperspectral (onshore only)
- Magnetic
- Gravity
- Electromagnetic (EM)
- Radiometric (onshore only)
- Predictive analytics



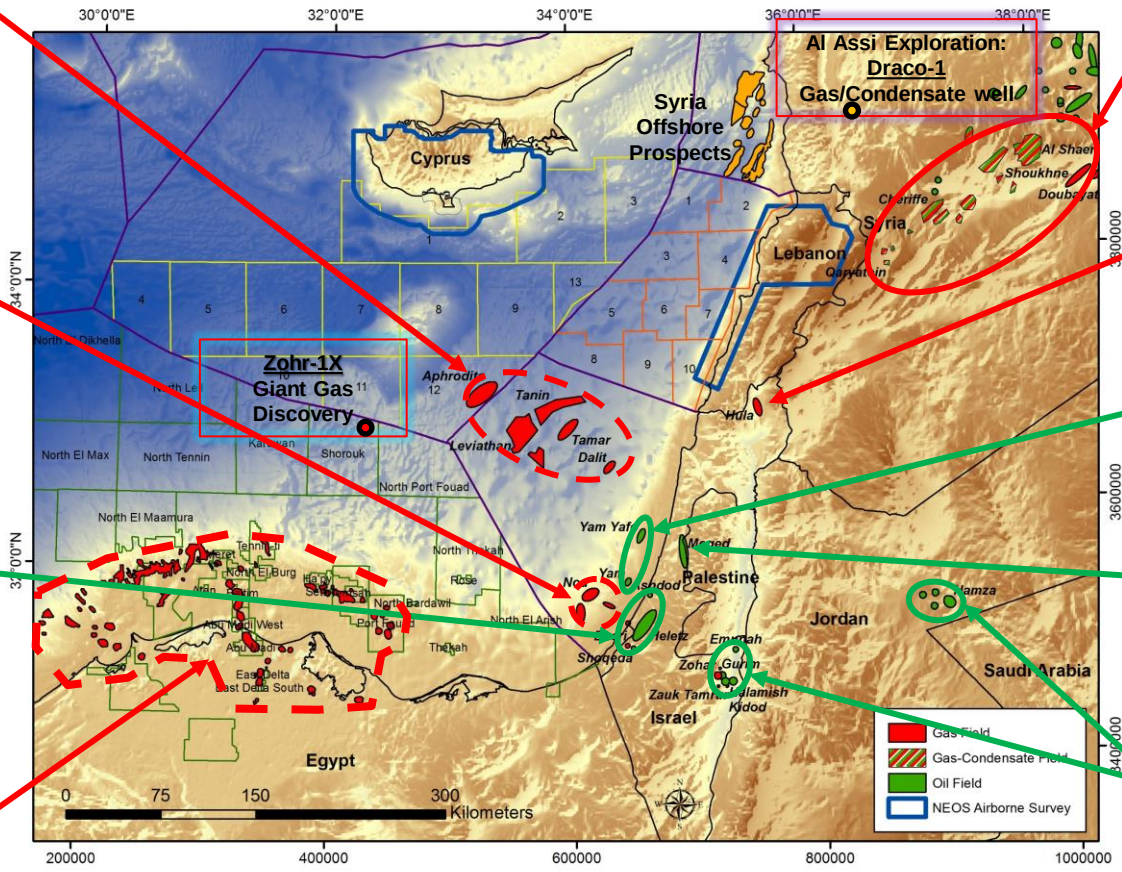
Eastern Mediterranean Regional Prospectivity

Gas
Reservoir: Miocene
Source: Oligocene, Cretaceous & Jurassic

Gas
Reservoir: Pliocene, Miocene, & Oligocene
Sources: Oligocene, Cretaceous & Jurassic

Oil & Gas
Reservoir: Jurassic
Source: Lower Cretaceous & Jurassic

Gas
Reservoir: Miocene
Source: Oligocene, Miocene, Cretaceous



Condensate
Reservoir: Triassic (gas) & Paleozoic (condensate)
Source: Lower Triassic, Permian & Carboniferous

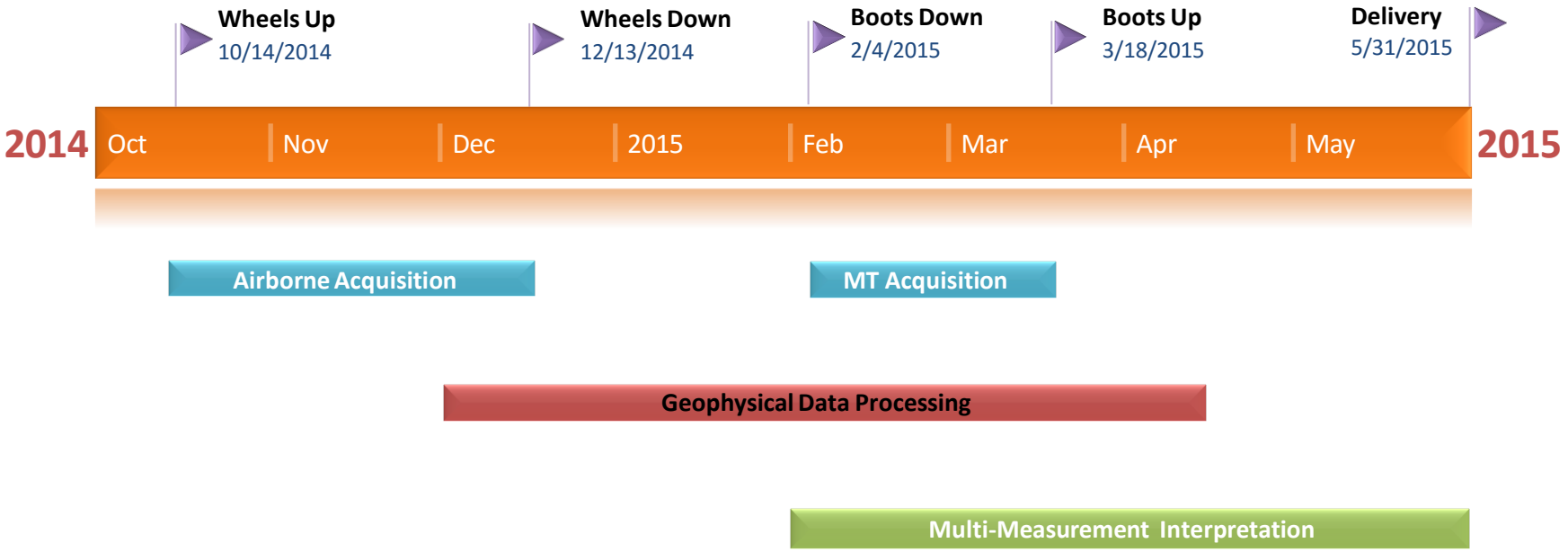
Gas
Reservoir: Jurassic
Source: Jurassic

Oil
Reservoir: Jurassic
Source: Triassic

Oil
Reservoir: Jurassic
Source: Triassic & Silurian

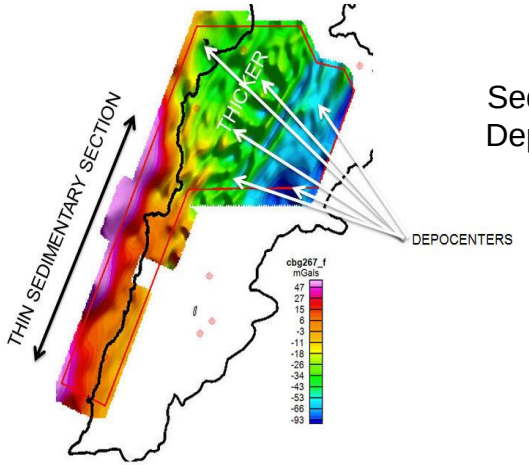
Oil & Gas
Reservoir: Cenozoic & Cretaceous
Source: Cretaceous

Lebanon neoBASIN – Timeline

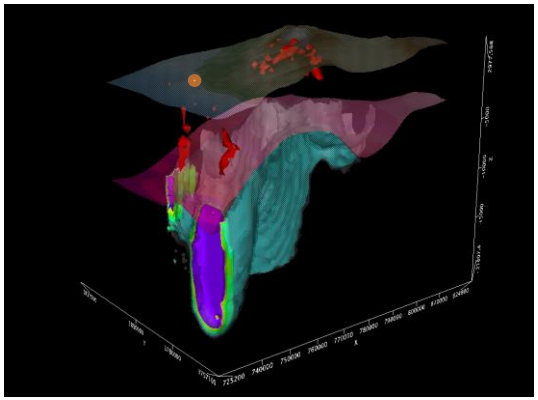


Lebanon neoBASIN Program

Interpretive Products

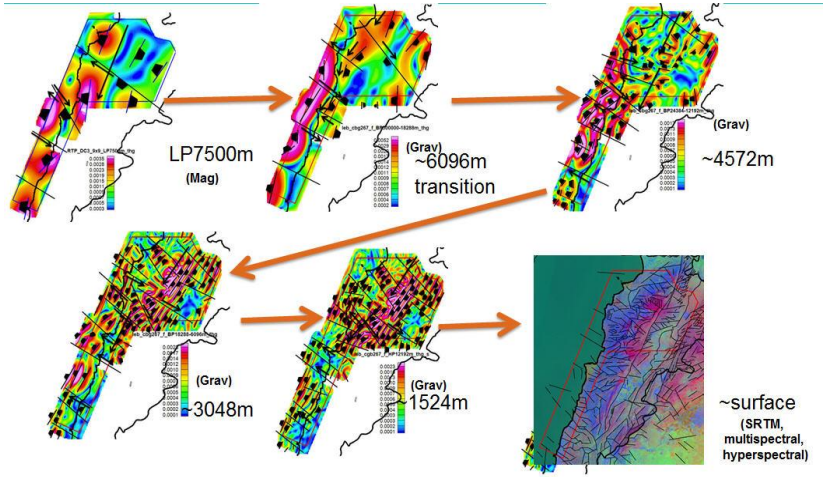


Sedimentary Depocenters

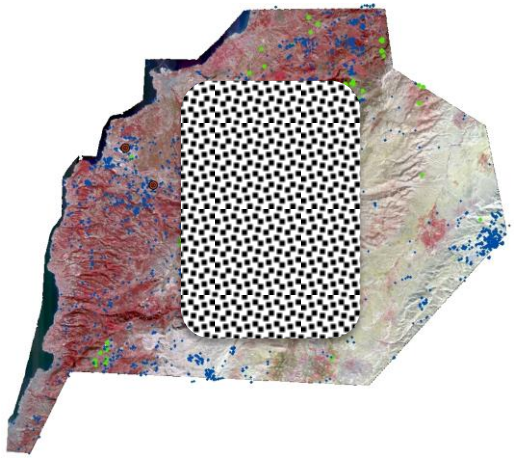


Basement-to-Surface Intrusions

Basement-to-Surface Structure

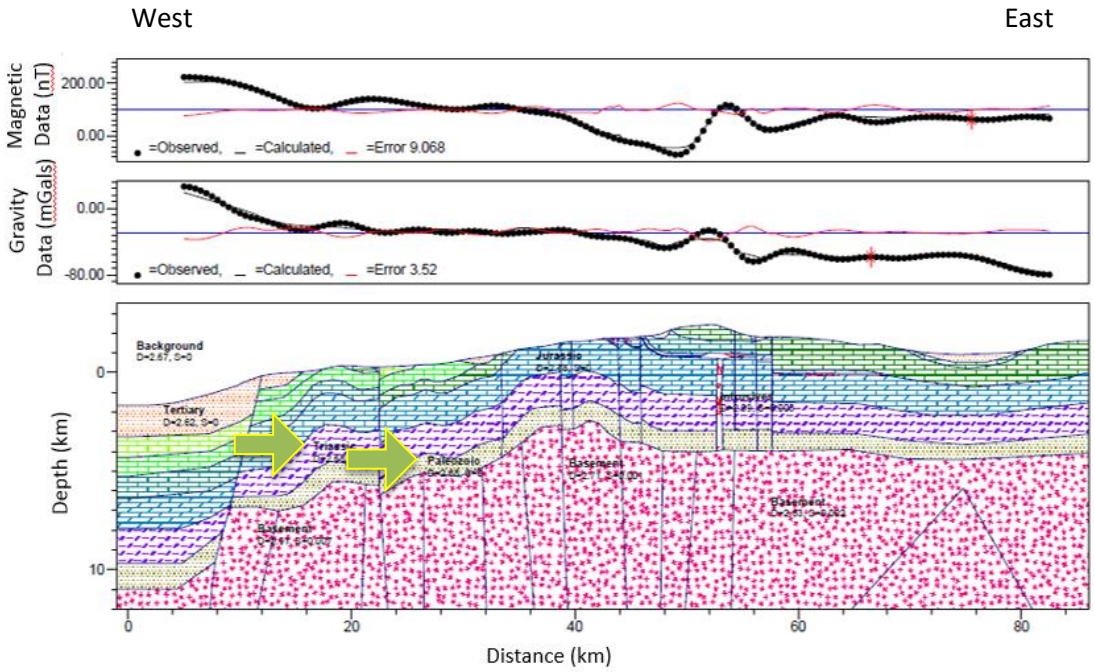


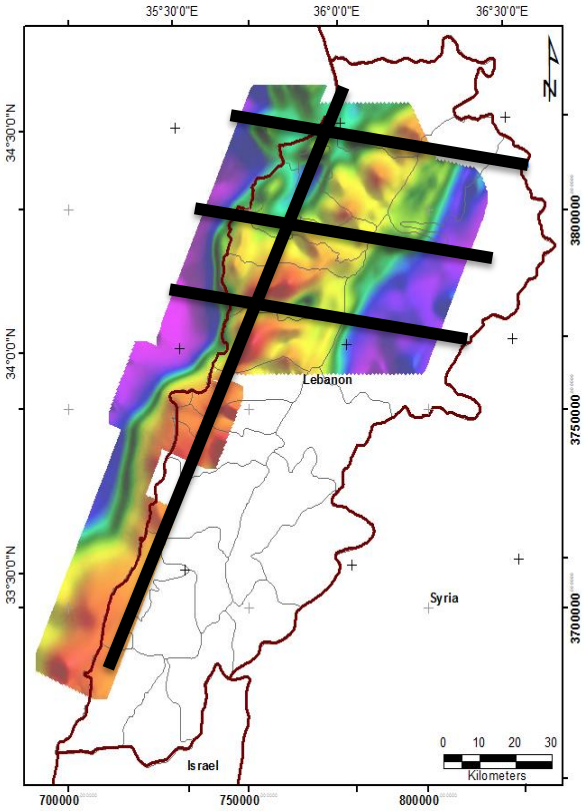
Oil Seeps & Indirect Hydrocarbon Indicators



Lebanon neoBASIN Program
Data integration

- Integration of gravity, magnetic, surface geology and regional knowledge to create 2-D structural models throughout the AOI
- These 2-D models are extrapolated in 3-D using the entire data coverage
- EM data also integrated in this way



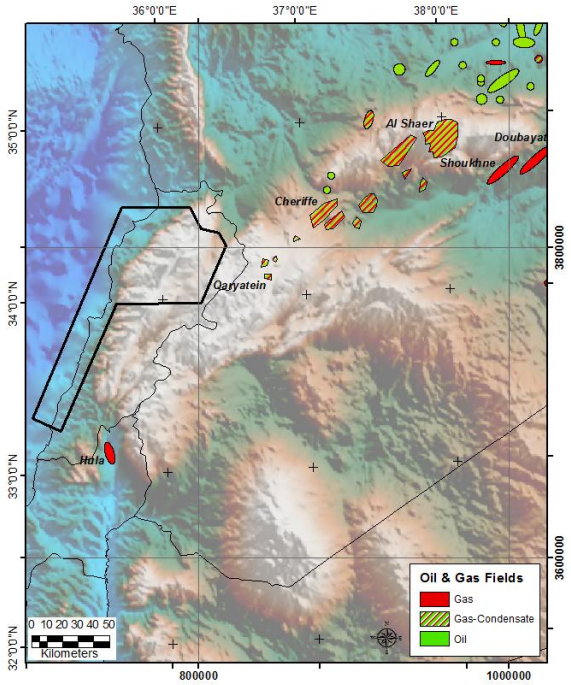


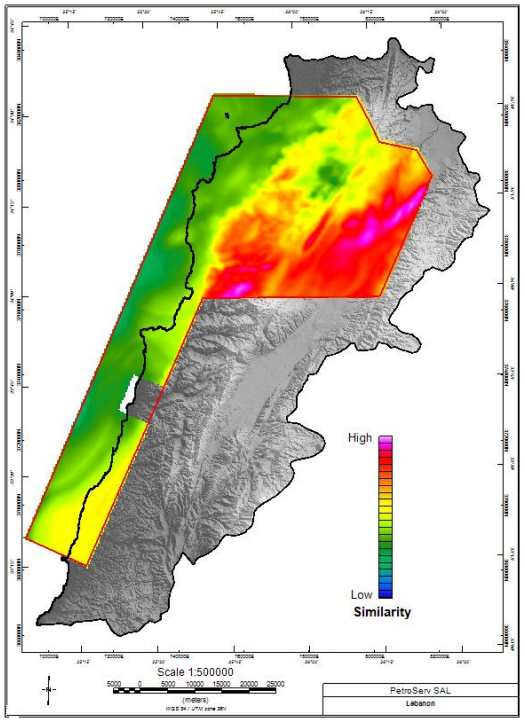
Lebanon neoBASIN Program
Predictive Analytics

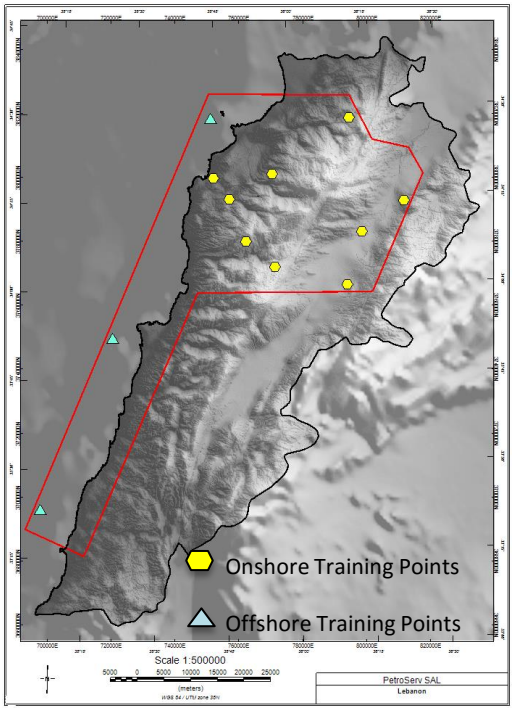
1 - Use public data to identify G&G attributes that correspond to known onshore Triassic fields in Syria

2 - Identify similar G&G attributes in the onshore Triassic in Lebanon
(Cursory scan using predictive analytics)

3 - NEOS interpreters analyze all geo-data and interpretive products to pick the most prospective Triassic drilling locations* (Training Points)







*Example inputs into training point selection:
Oil Seeps, IHIs, Interval Thickness, Burial Depth, Thermal Gradients, Subsurface Structure, Faulting, Lack of Intrusive Complexes

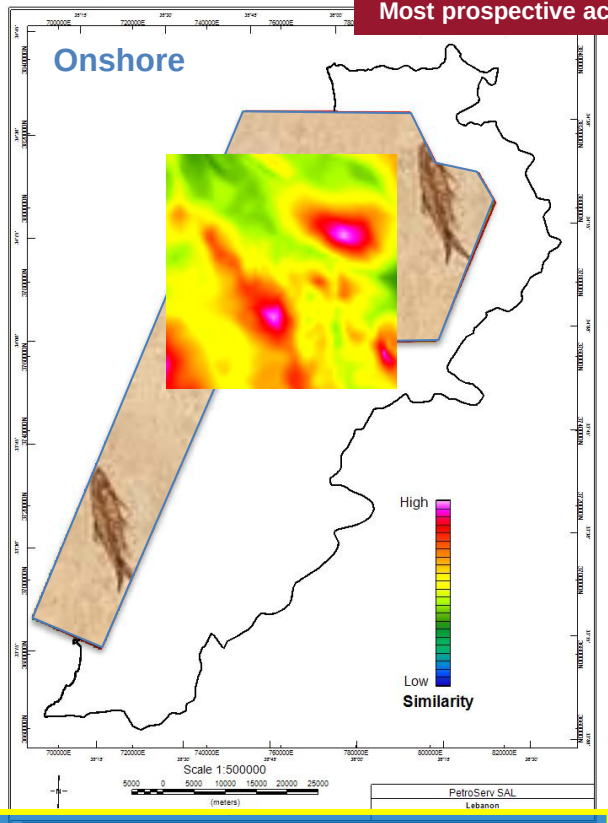
Lebanon neoBASIN Program
Predictive Analytics

4 – Identify the measurements, attributes and interpretive products that are most correlative with the selected training points

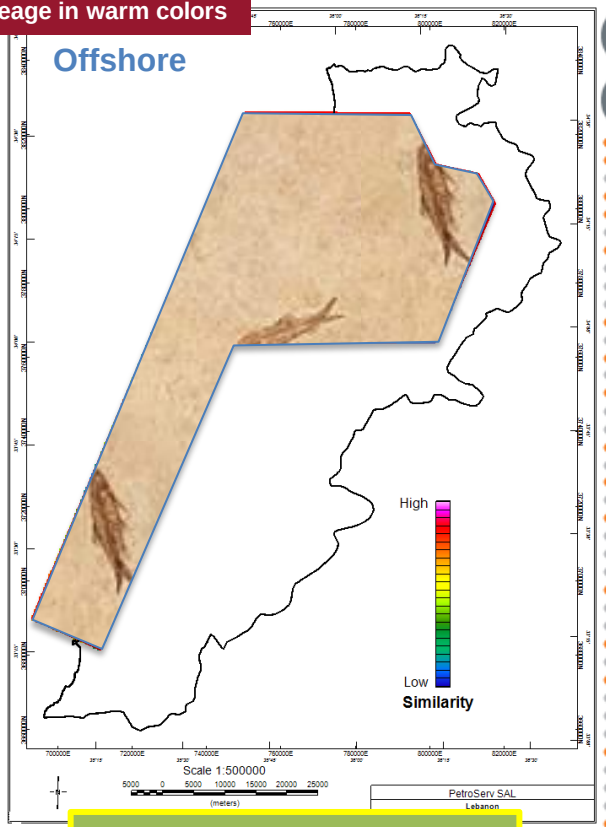
5 – Use predictive analytics to assess similarity of the Triassic acreage to the training points throughout the entire area of investigation

Some of the Predictor Datasets
Surface topography
Surface lineaments & fault expressions
Deep basin gravity (and rock density variations)
Magnetic susceptibility
Fault density in the Triassic interval
Triassic burial depth
Triassic thickness
Triassic interval hydrocarbon volumetrics
Seismic attributes (offshore data only)

Most prospective acreage in warm colors



Onshore Triassic Palmyride (Syria) Analog



Offshore Triassic 'Deep Gas'

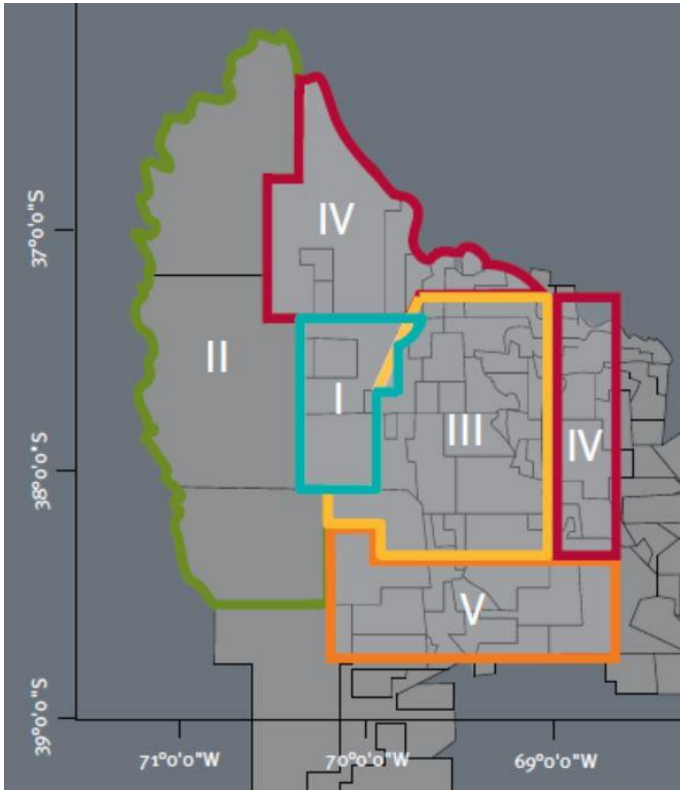
Acreage Highgrading in Argentina
Case Example: Neuquén neoBASIN Program, Phase III

Objectives
To help E&P operators highgrade their existing acreage positions by better understanding basin scale geologic features, regional fault and fracture networks, volcanic placement and the thermal maturation history and relative hydrocarbon generation potential of the area.

Location
Central Neuquén Basin, Argentina

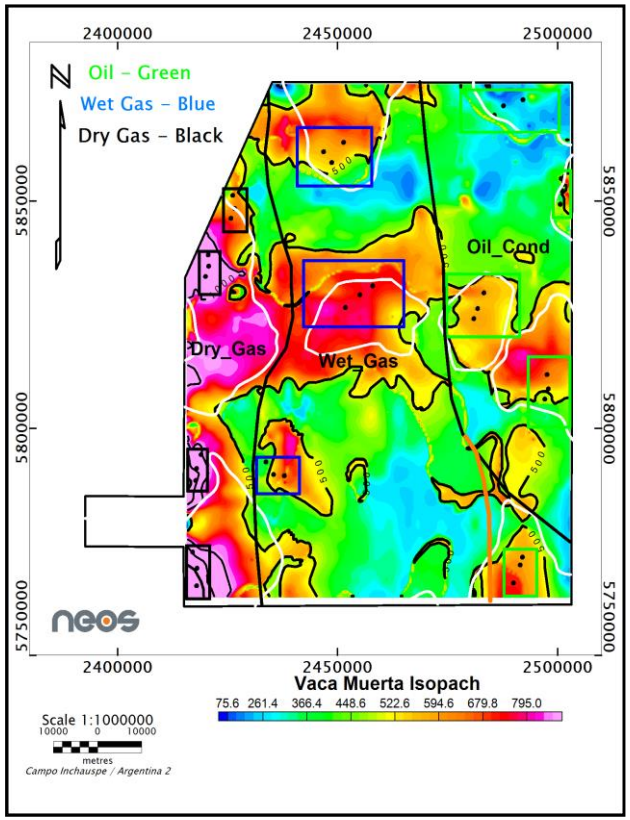
Area
9961 sq km

Key Technologies
- Magnetic
- Geochemistry
- Gravity
- Hyperspectral
- Seismic reinterpretation
- Predictive analytics

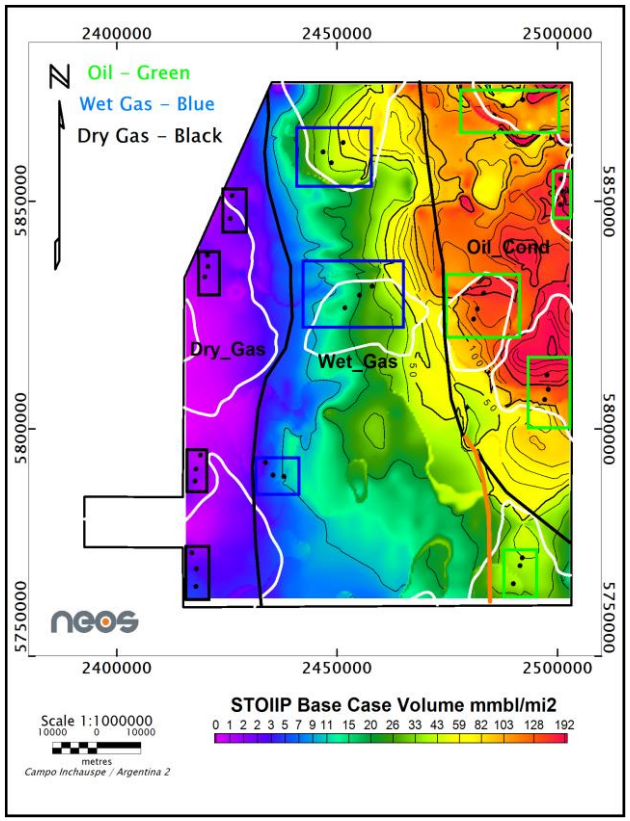


Neuquén neoBASIN Program
Volumetric Results

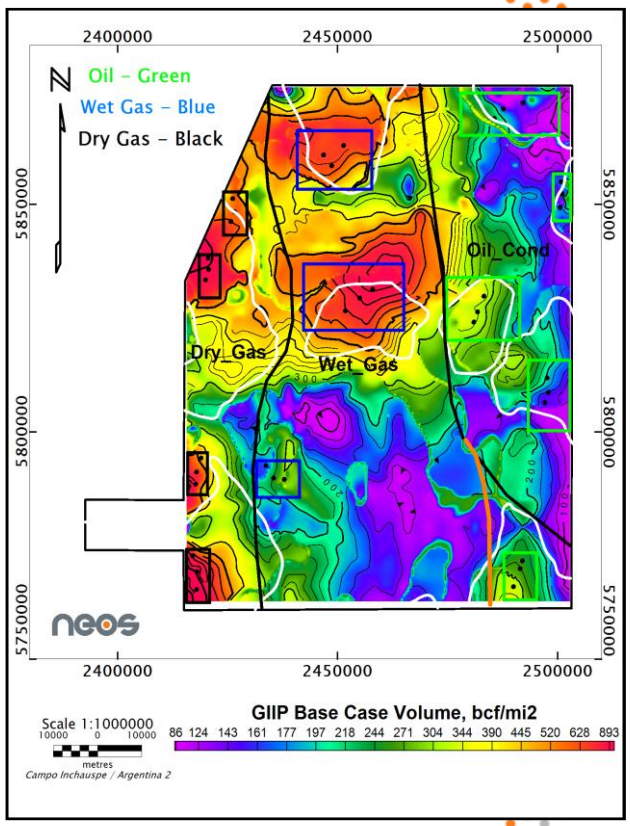
Vaca Muerta Isopach



Base Case STOIIP

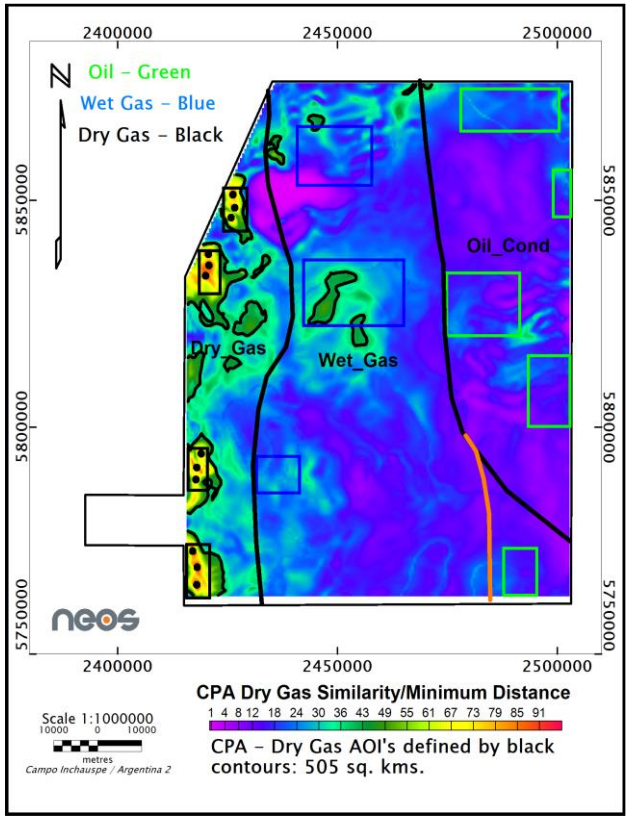


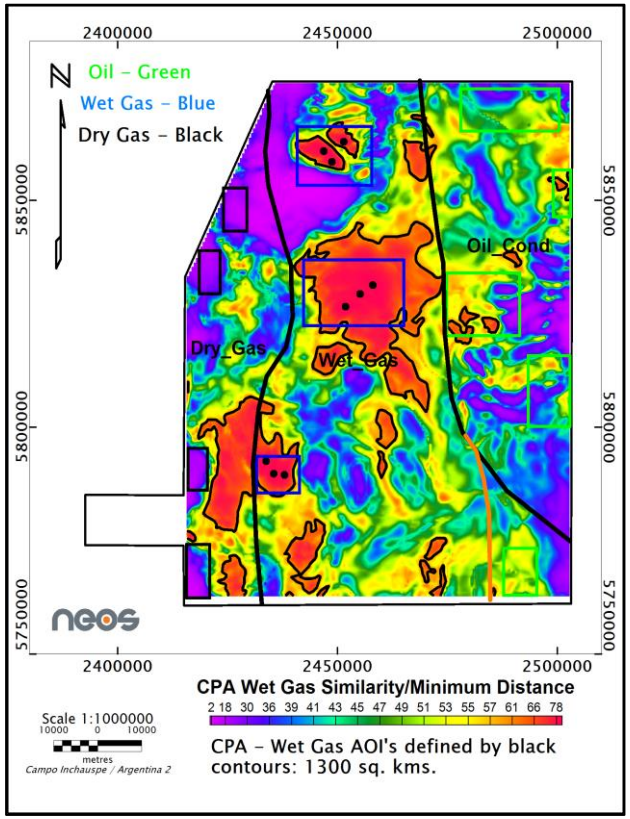
Base Case GIIP

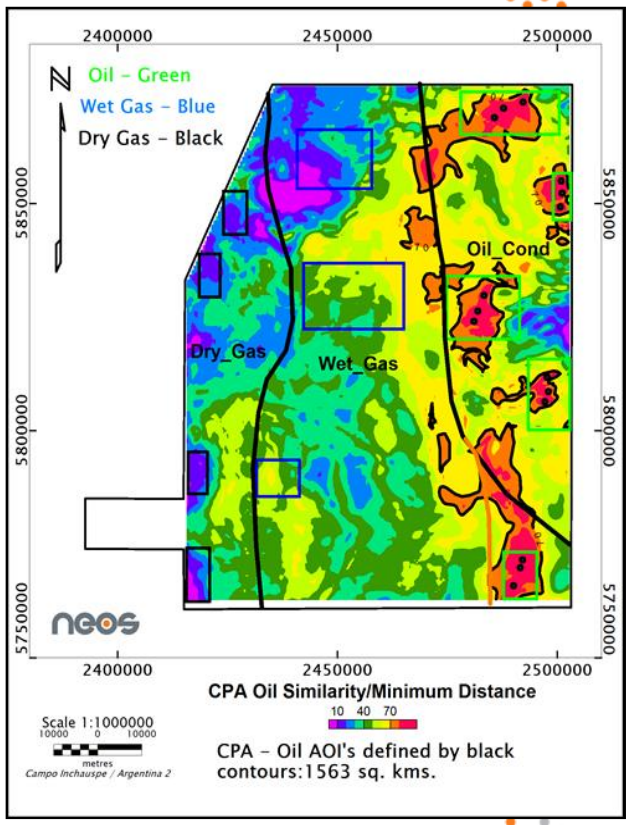


Neuquén neoBASIN
Lead Areas

Significant areas of interest are defined by CPA





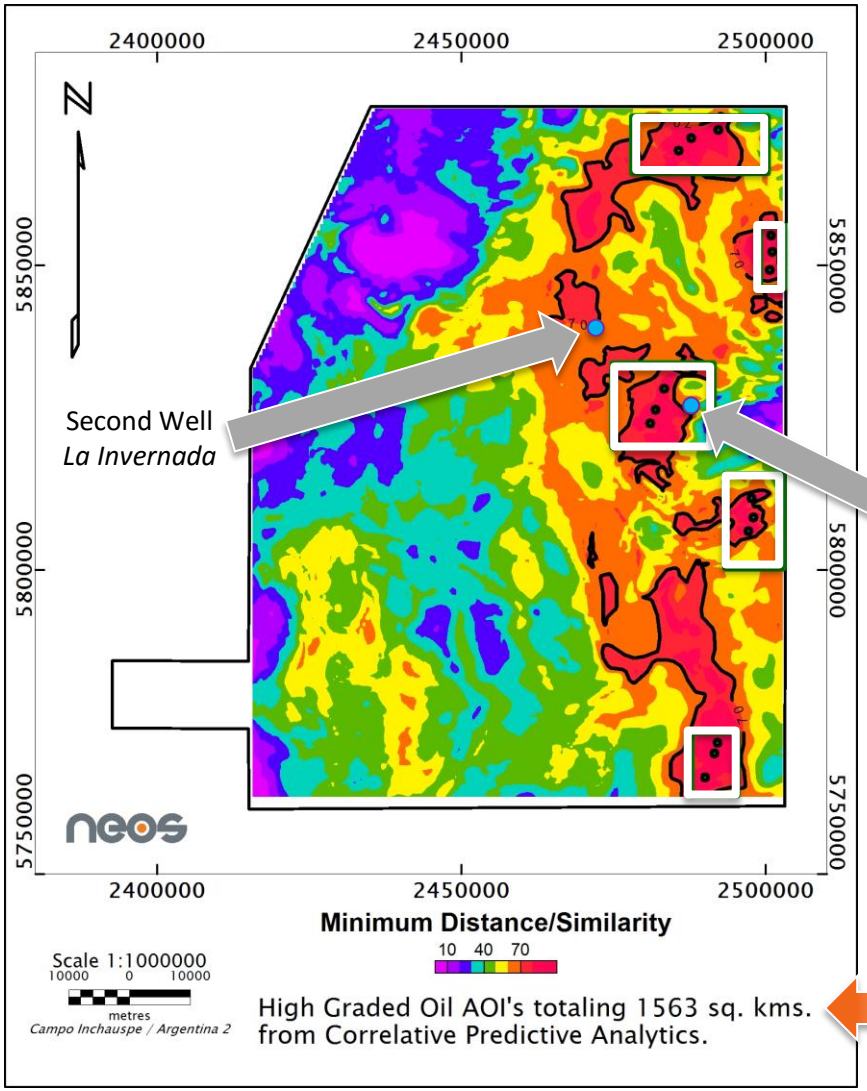


Dry Gas AOI: 505 km2

Wet Gas AOI: 1300 km2

Oil AOI: 1563 km2

Neuquén neoBASIN
Drilling Results



Neuquén Basin, Argentina

"NEOS's technology and methodologies are helping us to cost-effectively fast-track our decision process in our exploitation of the Neuquén Basin"

Daniel de Nigris, General Manager
ExxonMobil Exploration Argentina

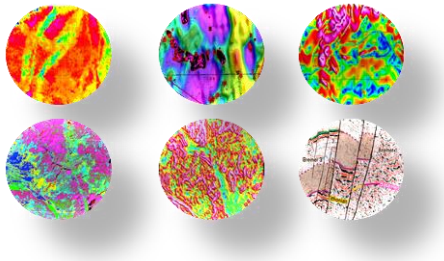
Announced discovery well
Bajo de Choique 2

The best initial production rate of all Vaca Muerta wells drilled to date

Helped XOM focus on the Top 15% most prospective acreage for liquids production

Conclusions

- NEOS uses multi-physics interpretation and integration to better understand the subsurface
- The different physical properties image the same geology but from different perspectives
- Predictive analytics allows us to provide statistical, quantitative answers to play identification, volumetric analysis and acreage highgrading questions while utilizing all available datasets within an AOI
- The Lebanon neoBASIN program has identified a working petroleum system in the country and highgraded frontier acreage using multi-physics, identifying leads based on regional analogues, to provide a ‘leg up’ to entry into the country and subsequent exploration
- The Neuquén neoBASIN program has highgraded acreage in a mature basin and provided operators maps of the likelihood of encountering high production rates of oil, wet gas or dry gas in specific intervals



THANK YOU FOR YOUR TIME