# CALCULATING CO$_2$ STORAGE CAPACITY IN AN UNCONFORMITY TRAP FORMED AT THE BACKLIMB OF A FAULT-PROPAGATION FOLD:
THE MAR CANTÁBRICO-E1 DETRITIC RESERVOIR (CANTABRIAN MARGIN, SPAIN)

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PROJECT ALGECO2
OFFSHORE (2012-2015)

Cantabrian Continental Margin
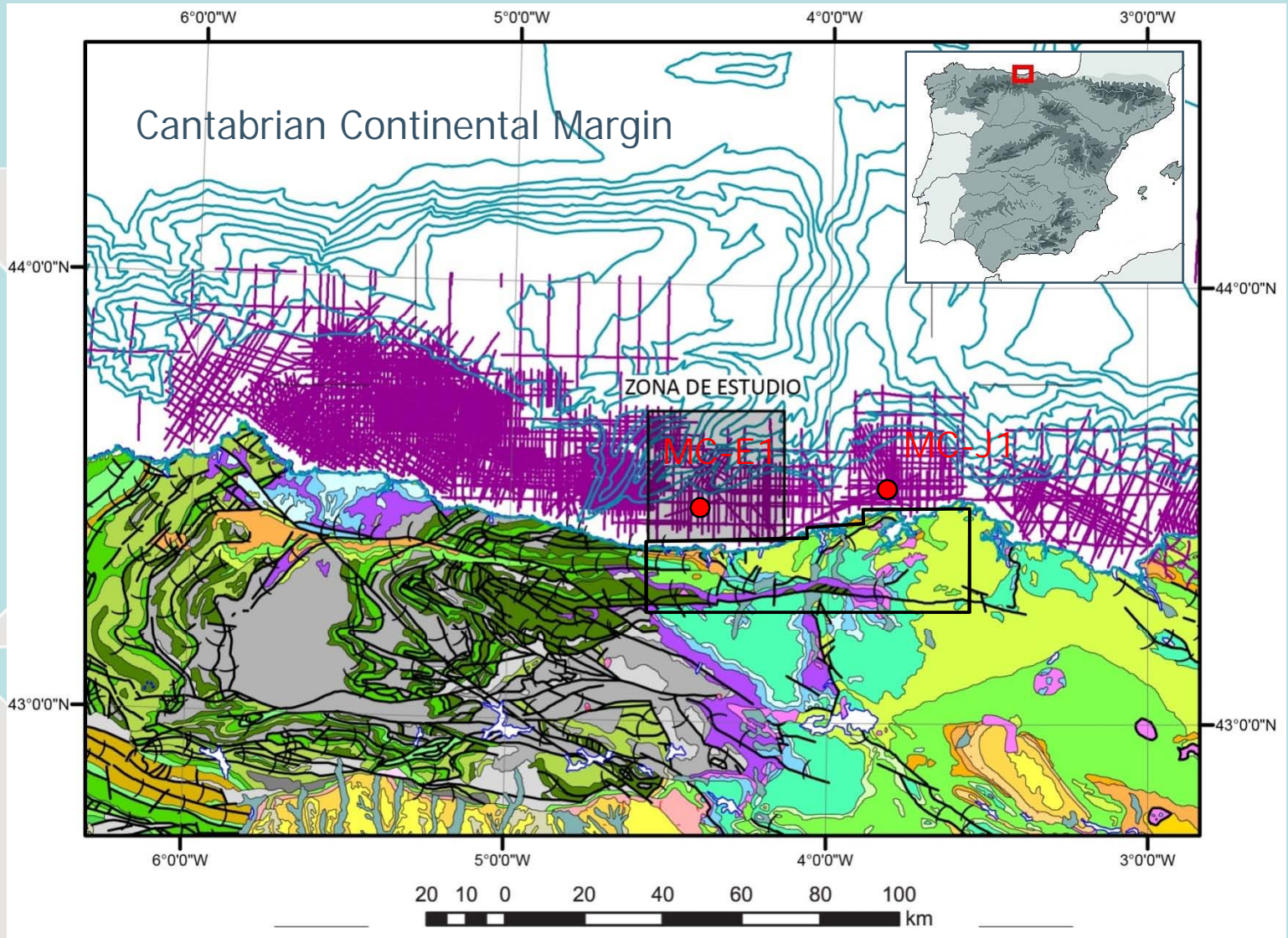
Onshore geology :
1. Represented by means of geological maps and five N-S cross-sections (MOVE software)

Offshore geology:
1. Compilation of geophysical and geological data

2. Digitalization and georeferencing of seismic sections. Raster to SEGY conversion (MATLAB script IMAGE2SEGY; Farrán, 2008)

3. Load of data in KINGDOM Suite

4. Well log analysis

Methodology

5. Calculation of seismic-velocity profiles

6. Structural contours and surfaces of the main horizons

7. Transfer of data to GOCad, 3D volumetric model, test of trap integrity and storage capacity calculation

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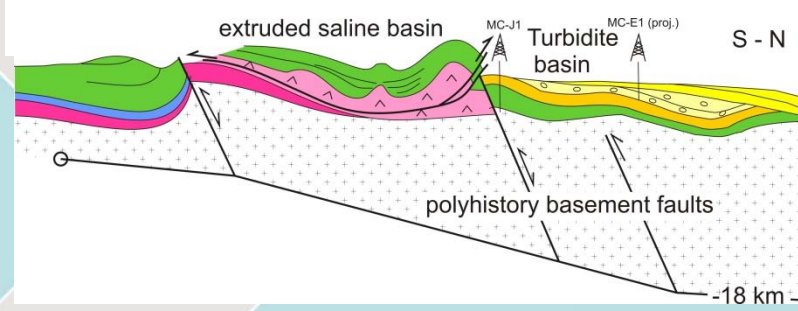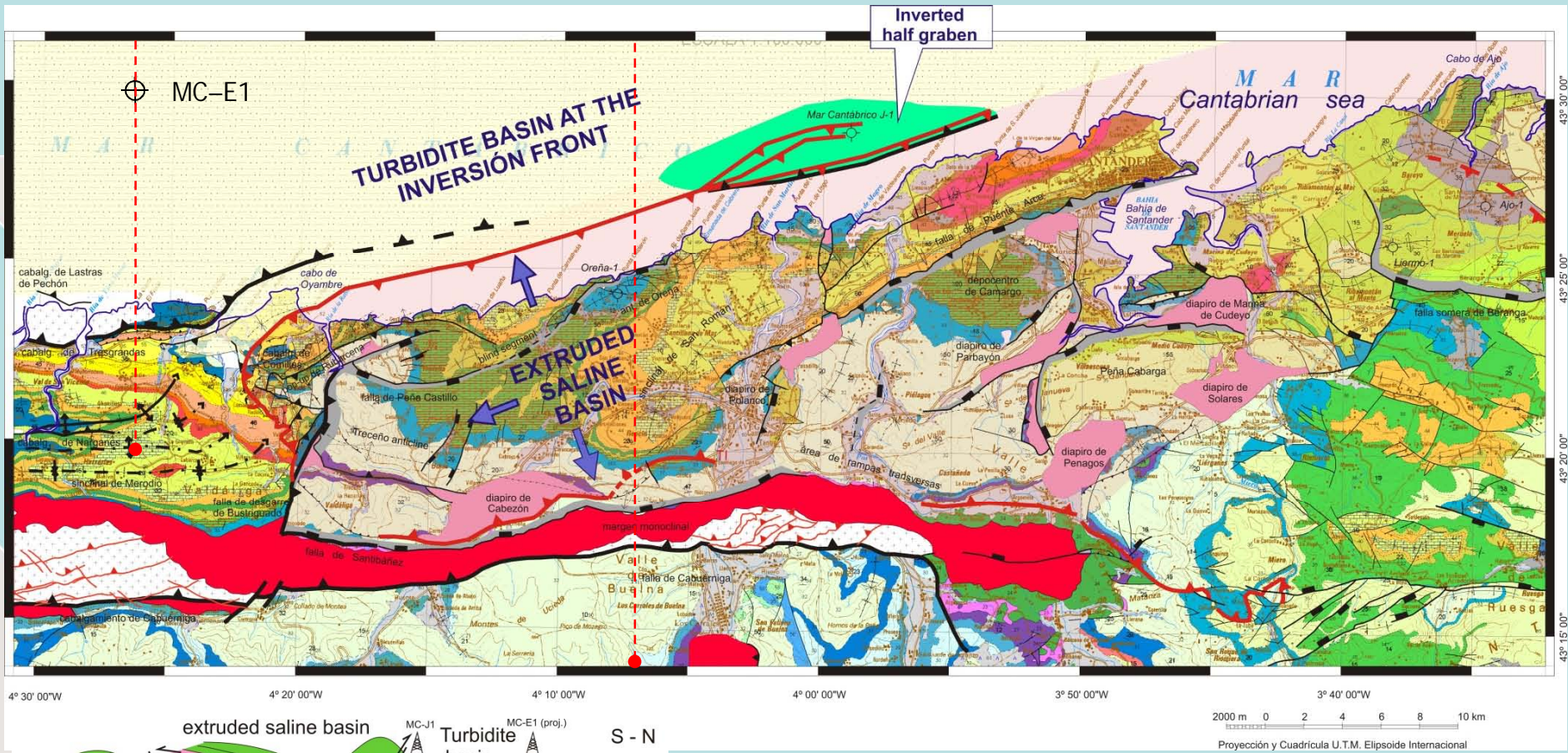
Two contrasting structural styles exist: basement thrusts supporting a thin 'solidary' cover and basement thrusts supporting a 'detached' cover
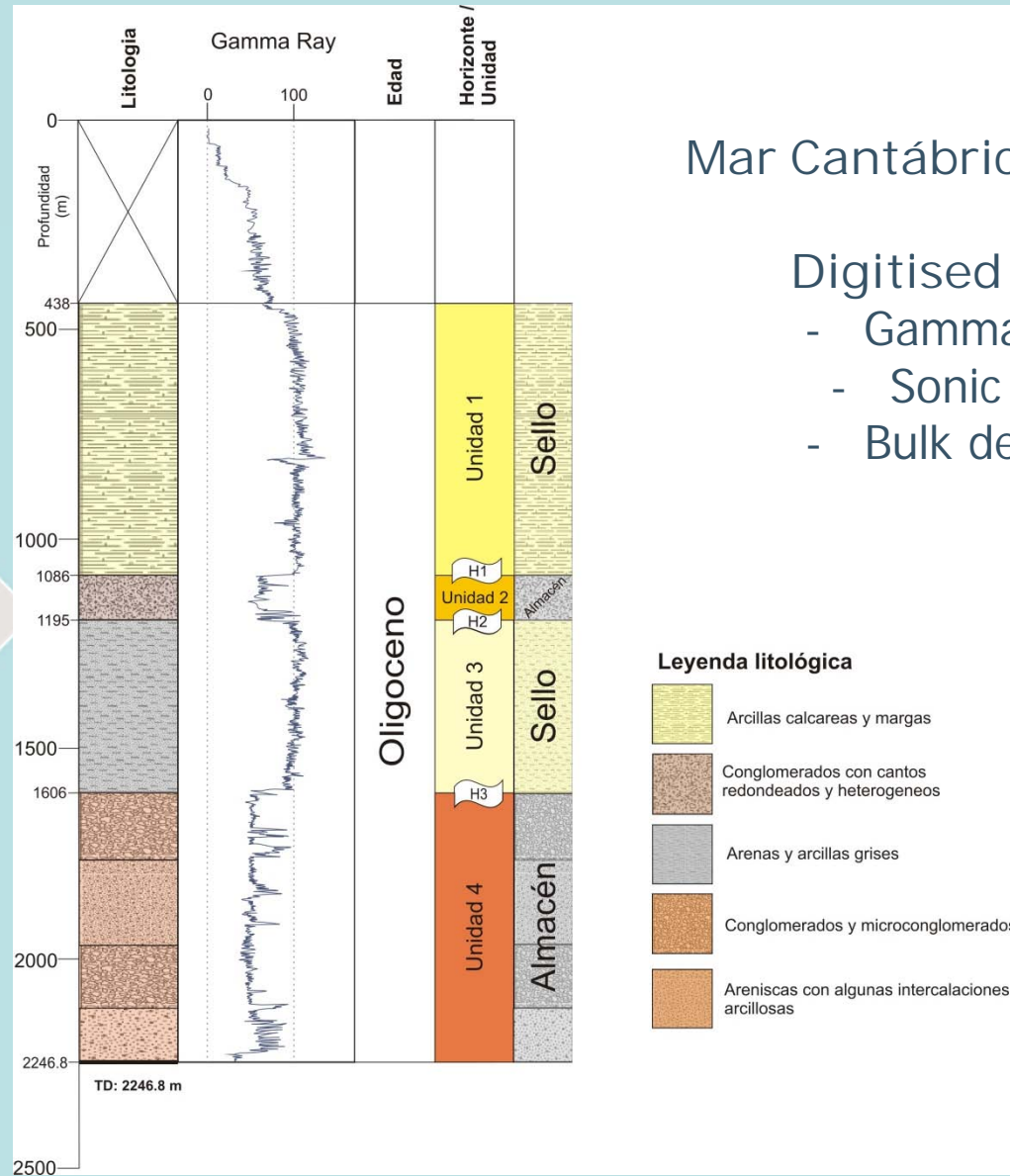
Variscan basement inclined to the north in the backlimb of the anticline
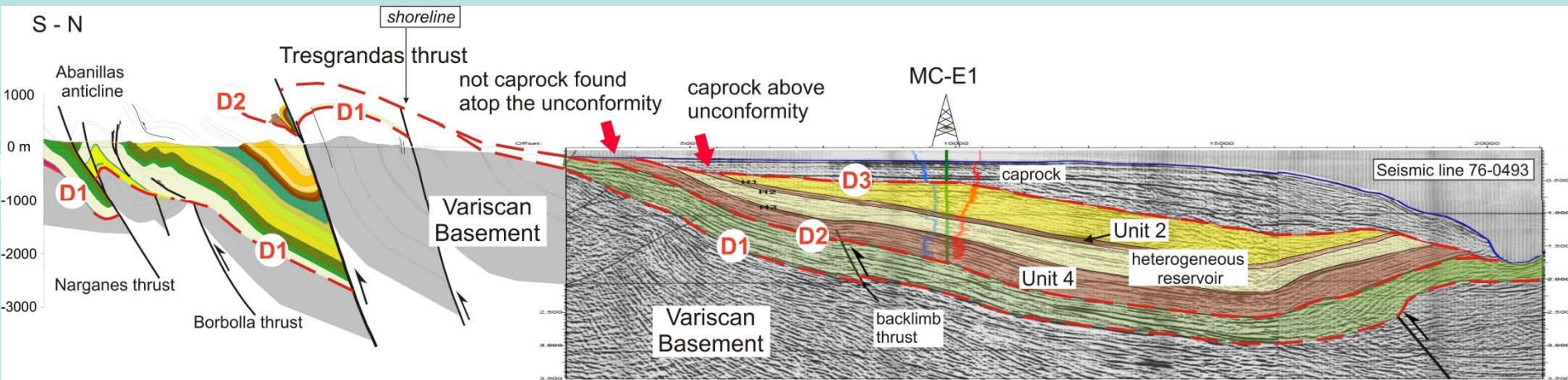
There is a good agreement between the onshore and offshore geology

D1. Post-Variscan unconformity
D2. Syn-contractional 'alpine' unconformity
D3. Post-contractional unconformity

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Heterogeneous
reservoir with
two non-
communicating
layers

Unit 2
Porosity 12-16%

Unit 4
Porosity 12-14%

Mar Cantábrico E1 well

Digitised logs:
- Gamma Ray
- Sonic Log
- Bulk density

Leyenda litológica

Arcillas calcareas y margas

Conglomerados con cantos redondeados y heterogeneos

Arenas y arcillas grises

Conglomerados y microconglomerados

Areniscas con algunas intercalaciones arcillosas

**The reservoir is the Oyambre Fm (Uppermost Eocene-Oligocene)
exposed at the Merón beach, composed of resedimented fan delta facies: breccias,
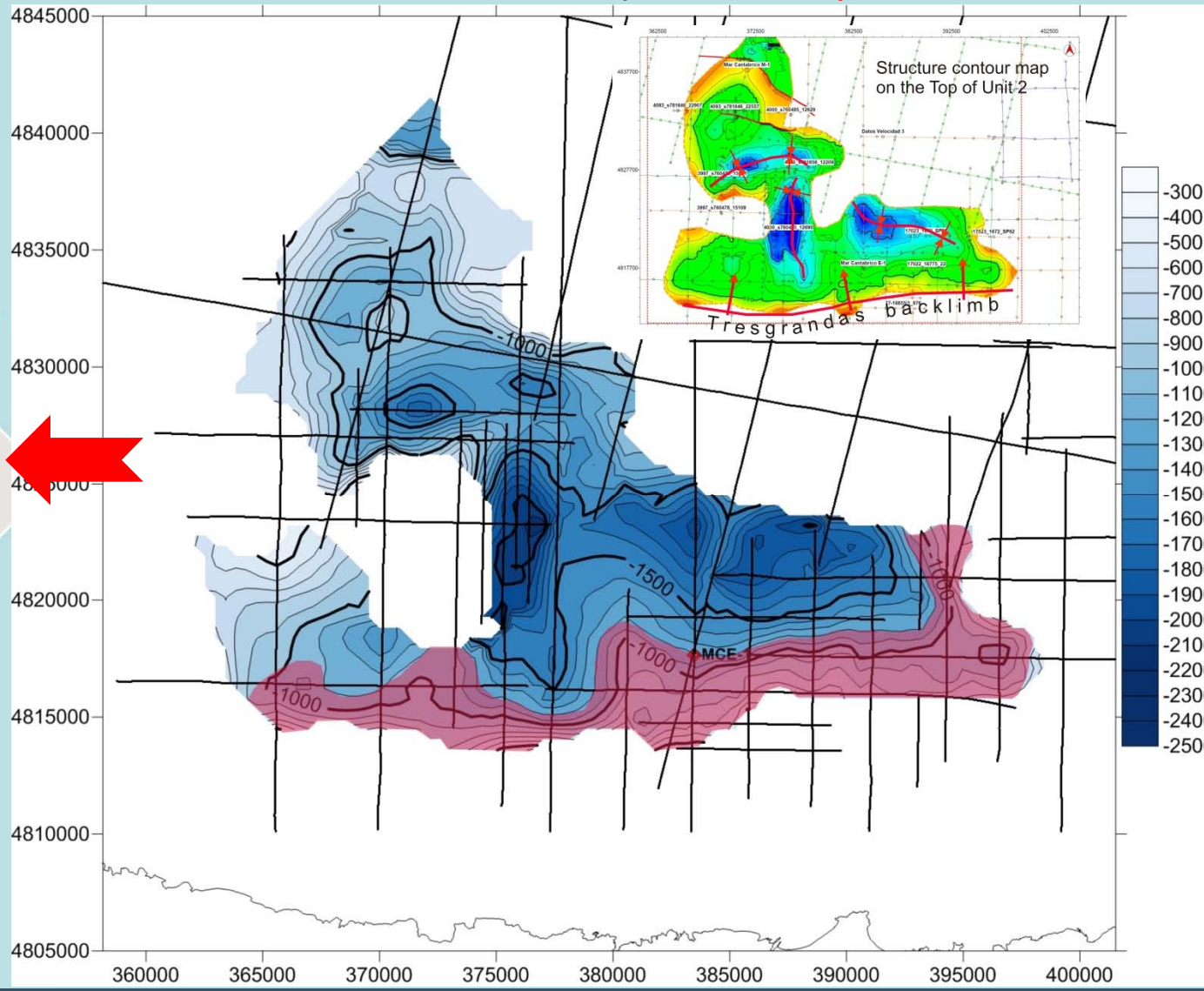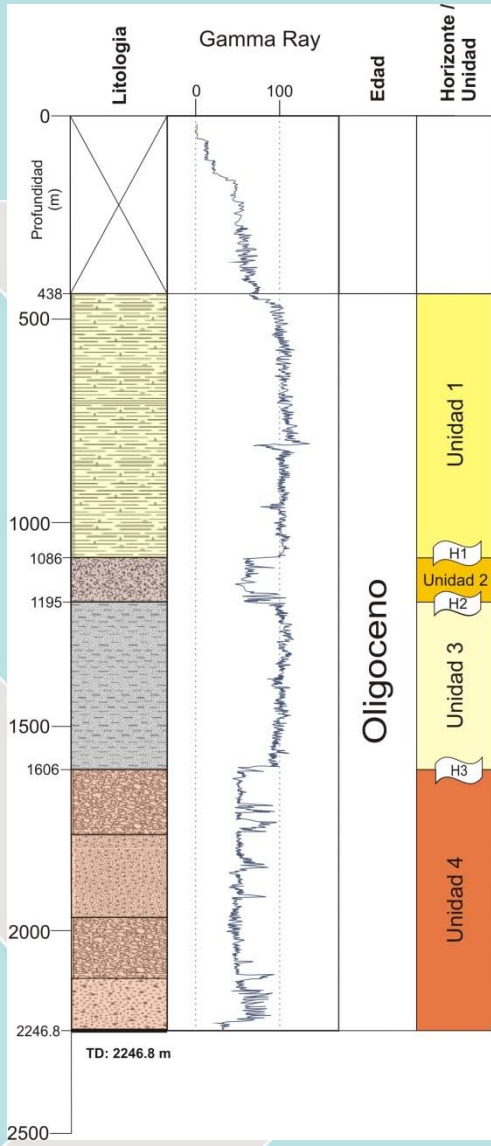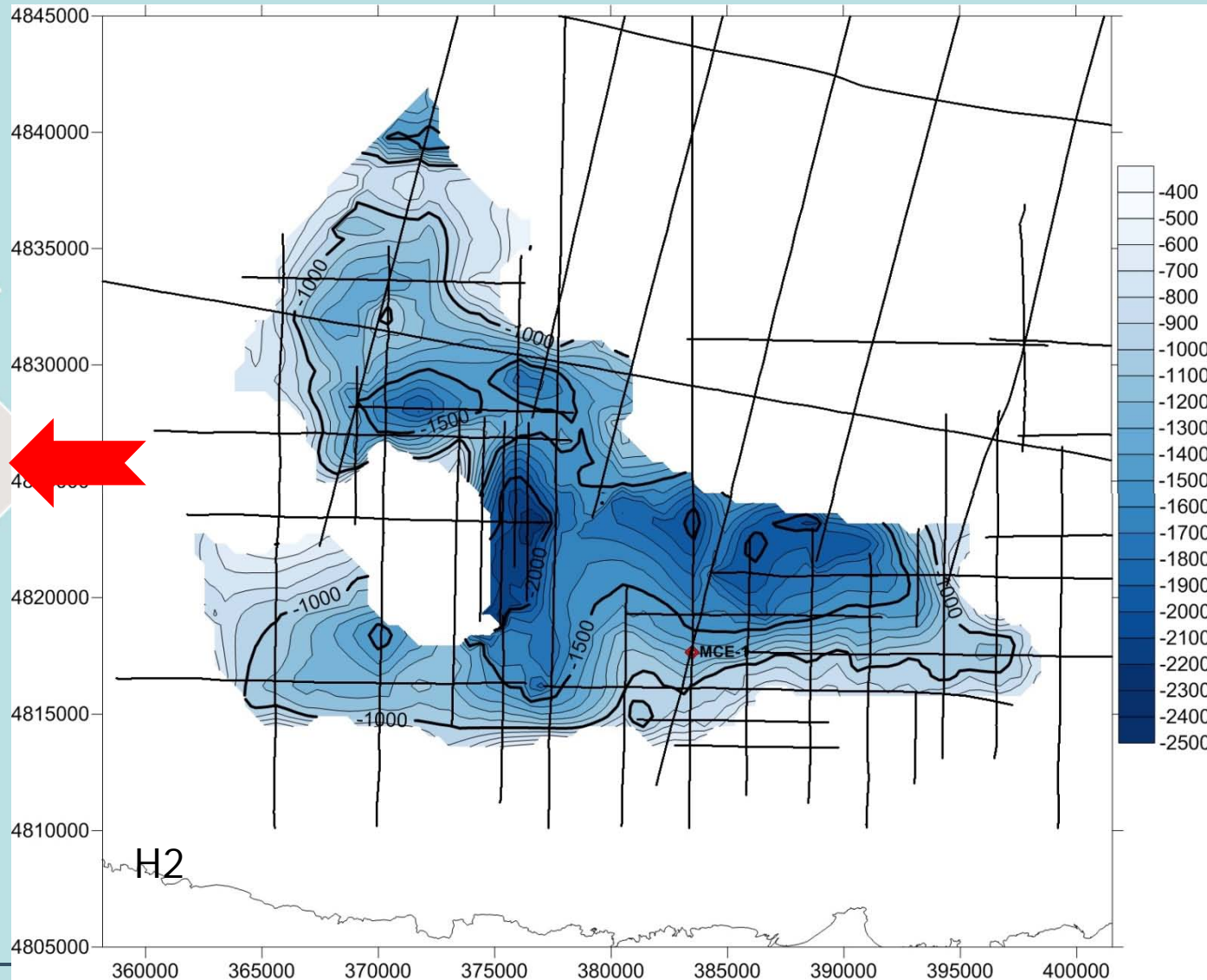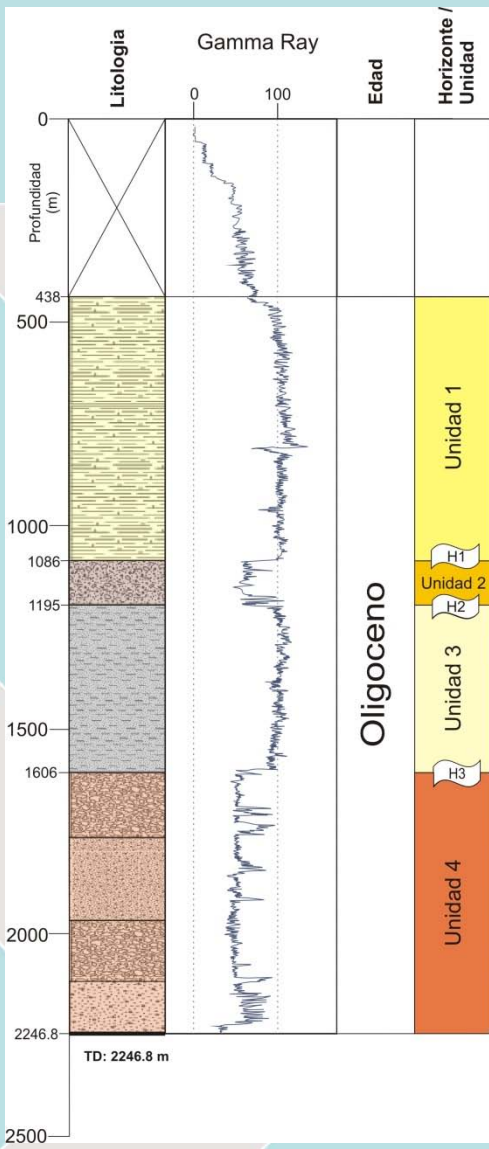conglomerates and megablocks with mixed lithologies**

Linea 480
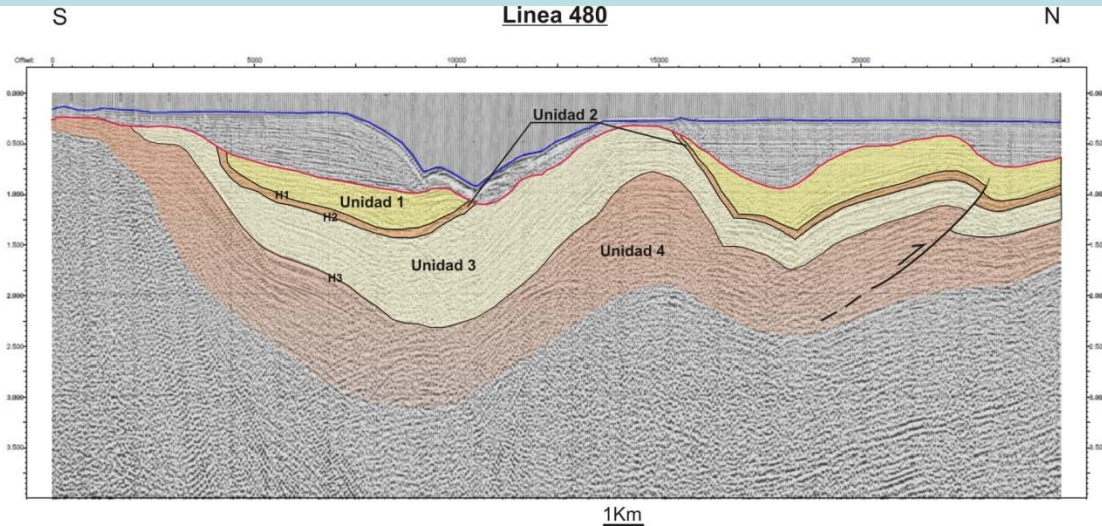
Only the Unit 2 is considered as a sealed reservoir for CO_2 injection

updip spill point

Linea 76-0493
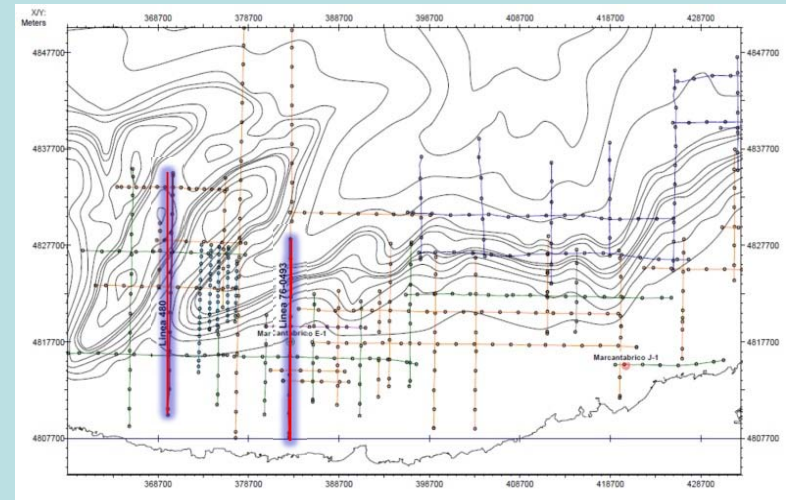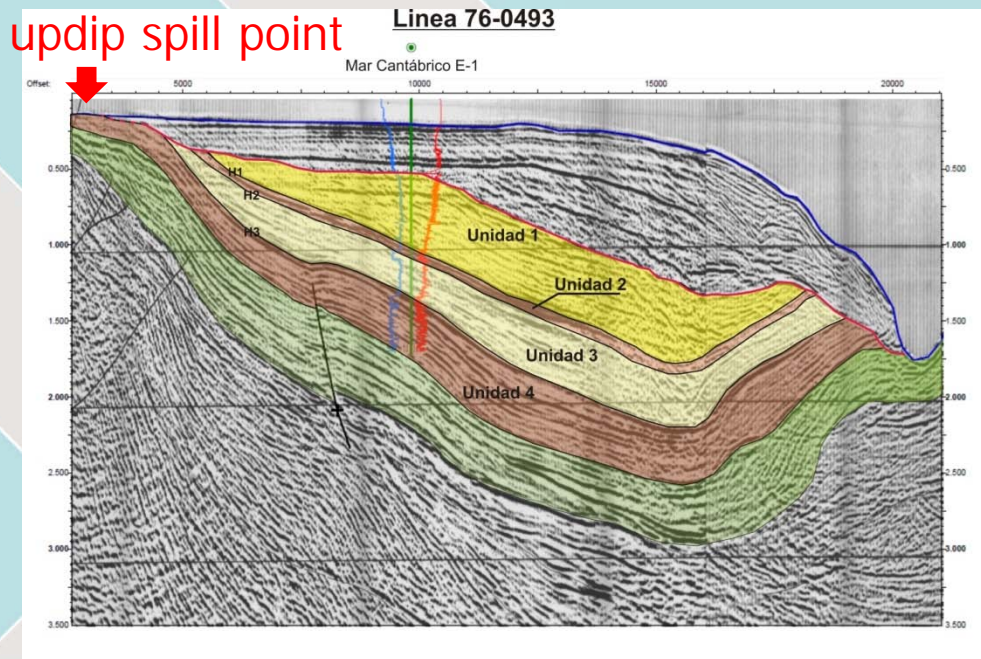
Structure contour map of the top of Unit 2

Structure contour map of the Base of Unit 2

Unit 2. CO_2 storage parameters

Rock volume (m3)	8667,920E+06
Pore volume (m3)	938,720E+06
CO_2 storage capacity (tn)	704,040E+06
CO_2 efficient storage capacity (tn)	211,212E+06

The pore volume is used to calculate the CO_2 storage capacity at the pressure and temperature appropriate for the injection depth.
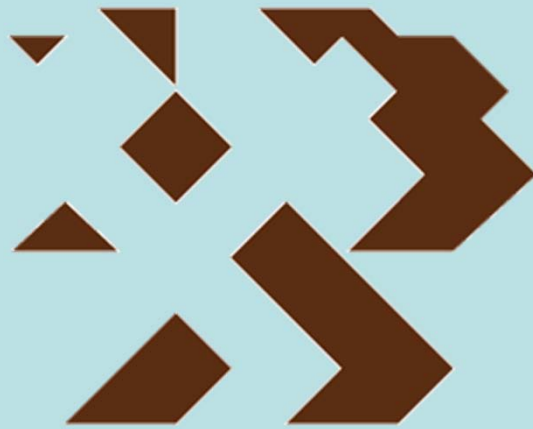
The efficient storage capacity obtained after applying a correction factor of 30% is of two hundred and eleven millions of tons.

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Conclusions

The MC-E1 borehole drilled a heterogeneous reservoir in the syn-contractional Oyambre Fm, at the backlimb of a fault-propagation fold.

The reservoir is formed by two non-communicating conglomerate layers separated by marls and claystones. Only the thinnest (109 m) is sealed by the caprock defining an unconformity trap.

The available data indicates that the MC-E1 well is a suitable candidate for geologic CO_2 storage with an efficient capacity of 211.212E+06tons.

Thank you!