Nature and Origin of Gas Trapped in Sediments in the Tagus River Ebb-Delta, off Lisbon, Portugal

The TAGUSGAS Project

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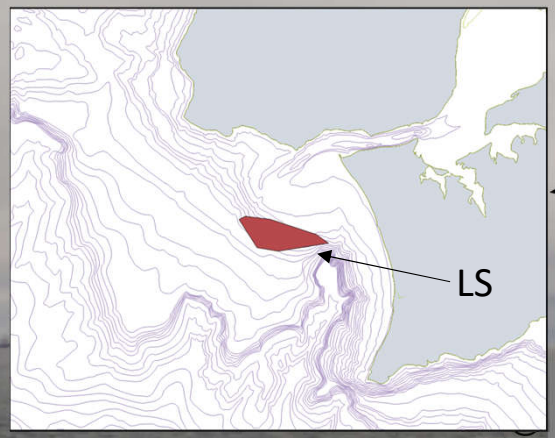
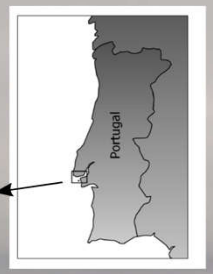
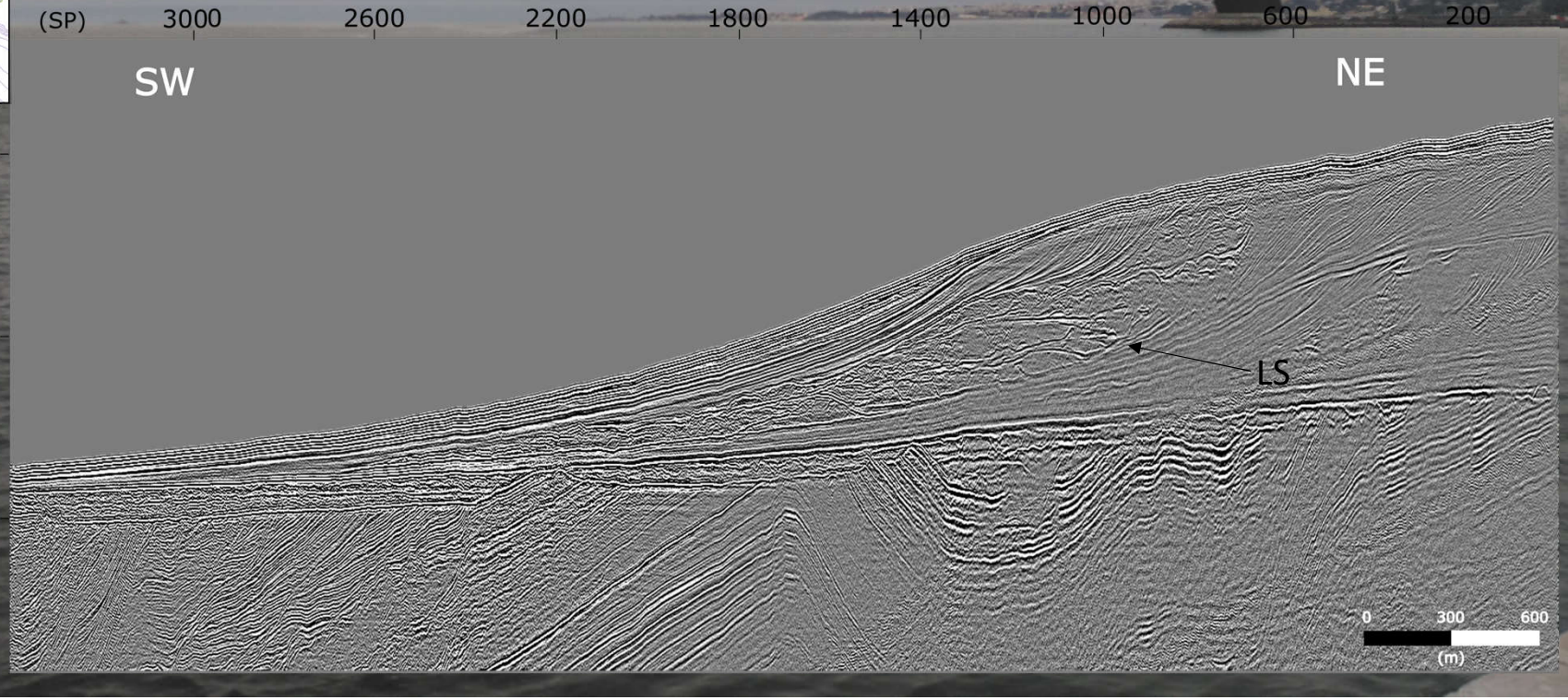
The Problem

While Studying the Tagus Delta Landslide (LS)…

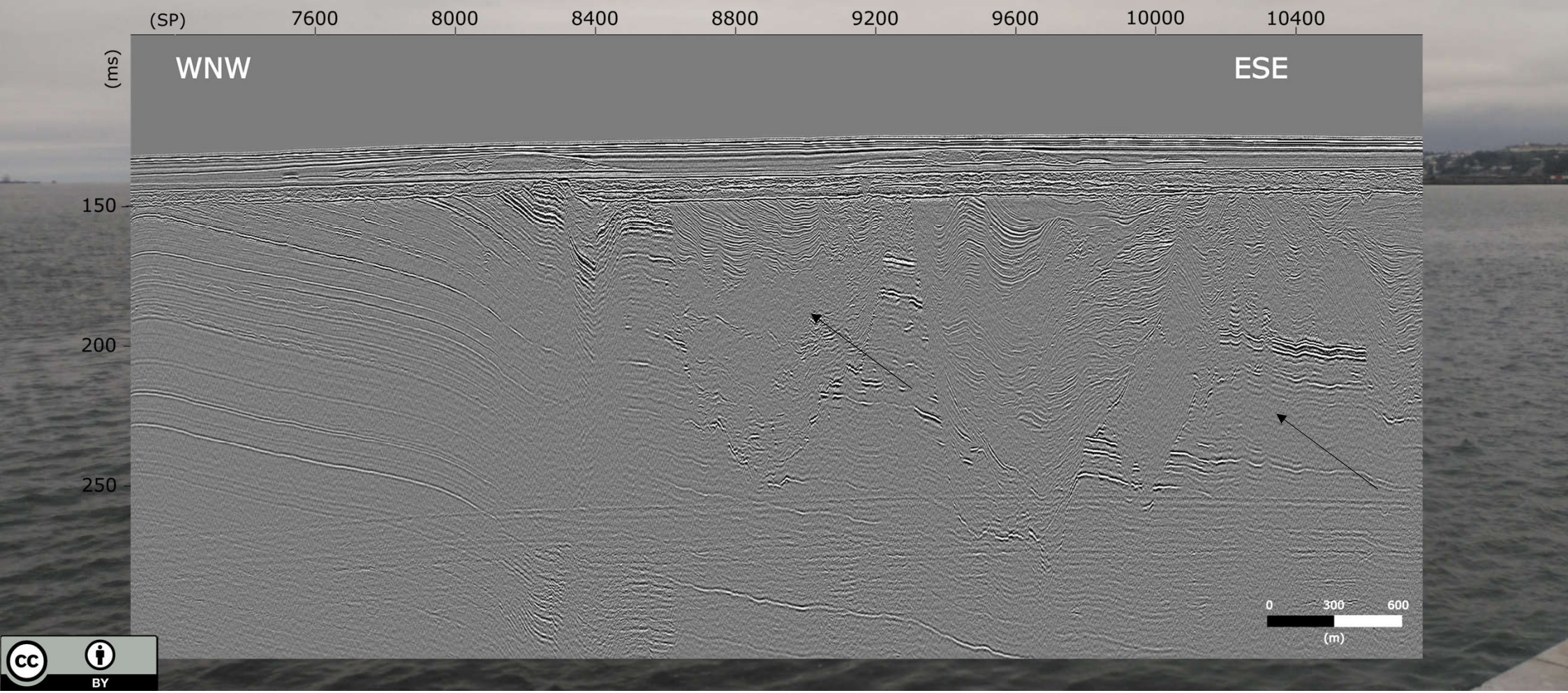






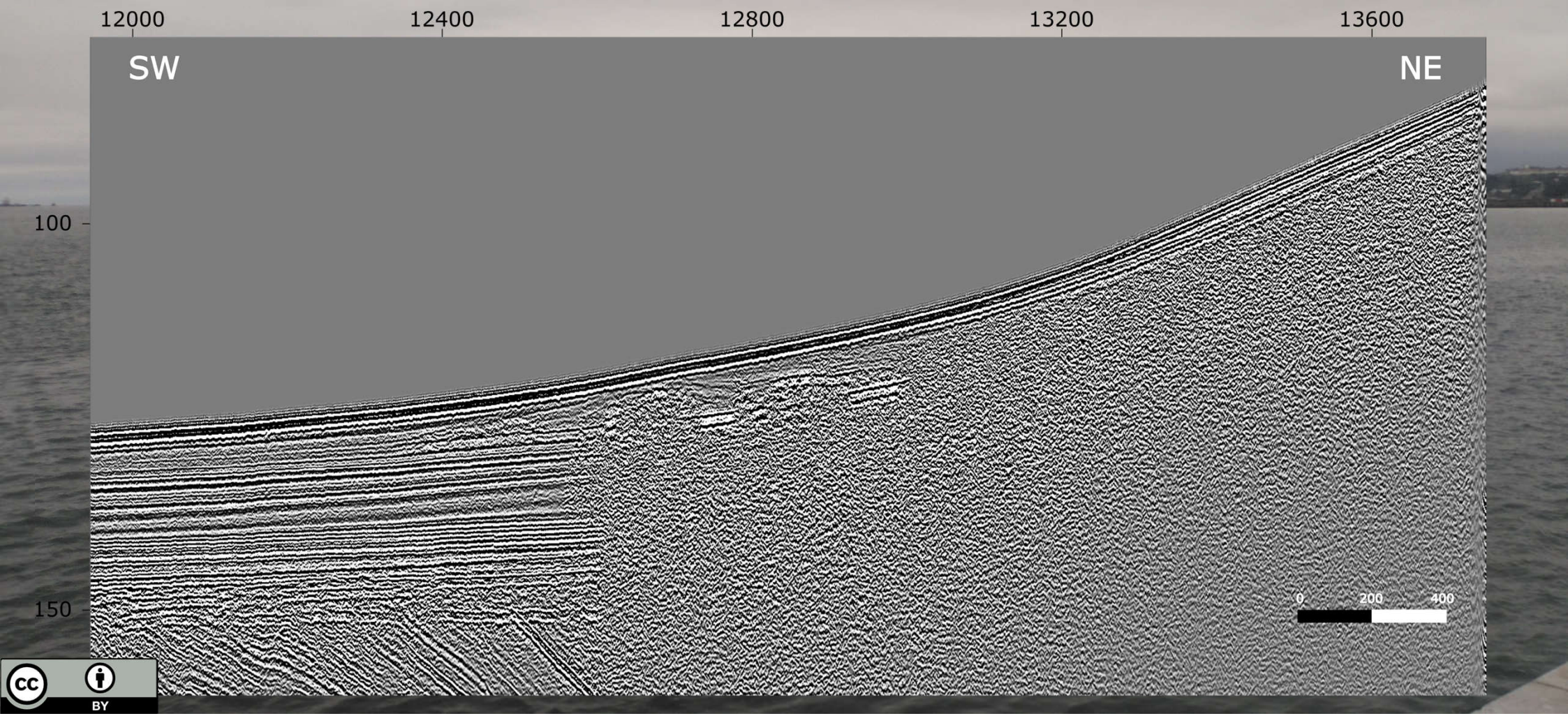
THE PROBLEM

Evidences of Gas in the Sediments Were Found.
The Signal Disturbances Included Acoustic Blanking and Accoustic Turbidity.



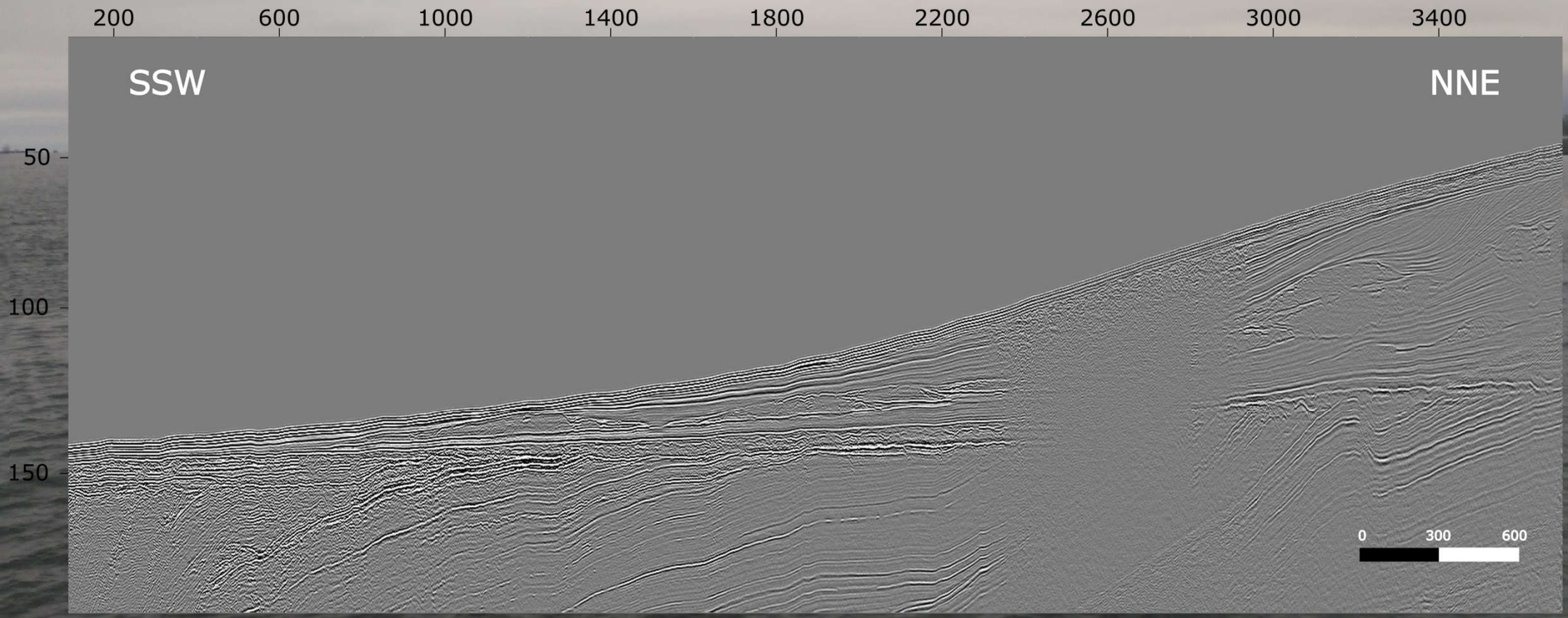
THE PROBLEM

In Some Sectors Free Gas is Present in the Sediments of the Landslide (1/2)



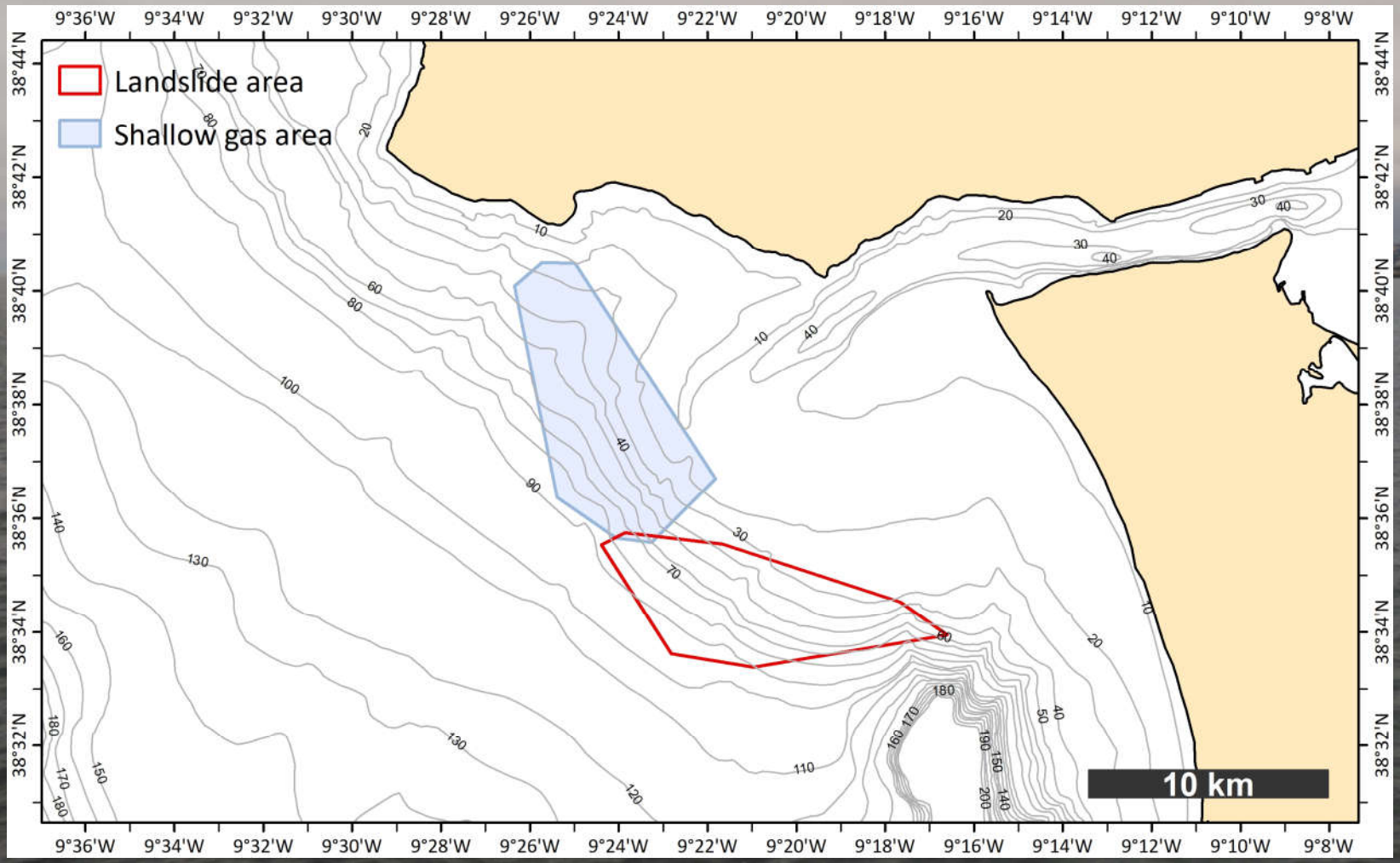
THE PROBLEM

In Some Sectors Free Gas is Present in the Sediments of the Landslide (2/2)



THE PROBLEM

The free gas are does not overlap the landslide area



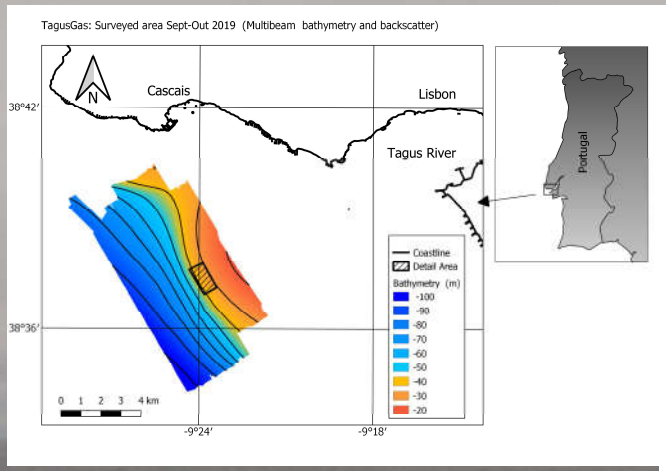
The Questions

a) What is the nature and origin of the gas?
b) Does the overpressured gas contribute to sediment instability?
c) What are the geotechnical characteristics of the sediments and what is their factor of safety?
d) How old is the Tagus delta landslide?
e) What is the potential size of a tsunami generated at the Tagus delta, how does it propagates and what are the effects in the adjacent coastal areas?

The Approach

a) Detailed multibeam bathymetry, backscatter and magnetic surveys
b) Study of the sediments
   - Textural
   - Geochemical
   - Pore-water Geochemistry
   - Age determination
   - Geotechnical characterization
c) Numerical modelling of the submarine landslide originated tsunami

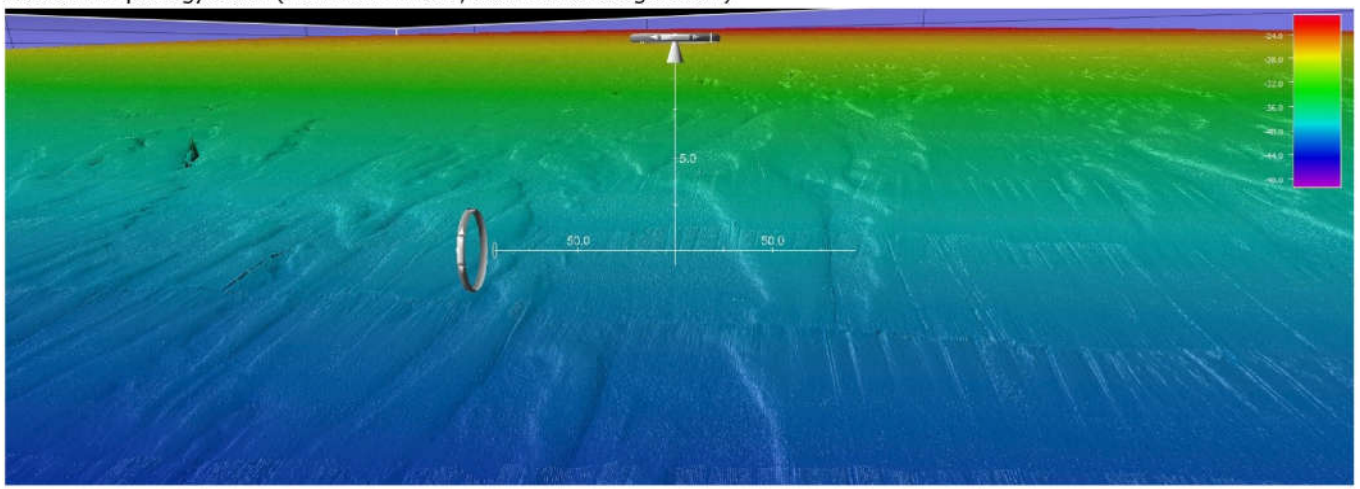
First Results



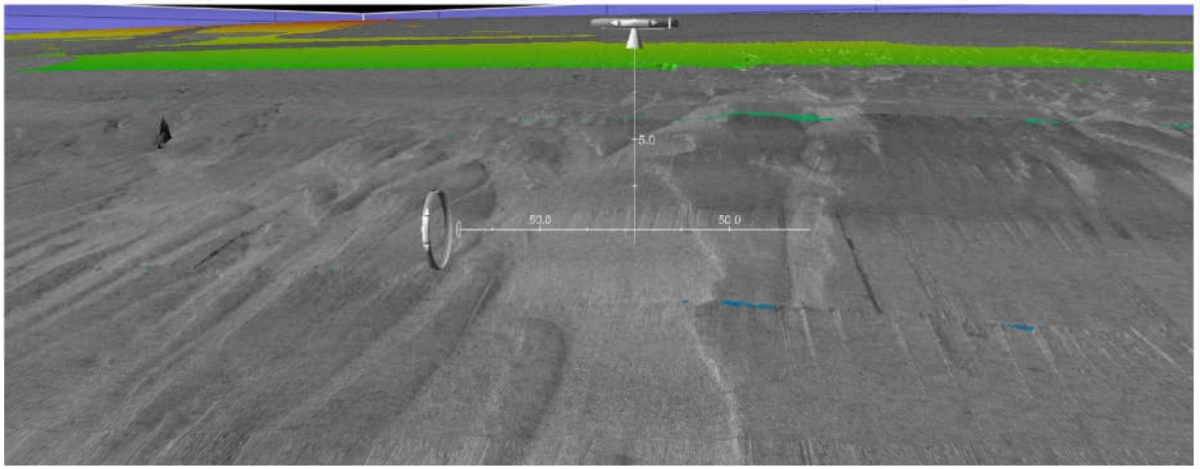
- Flat monotonous morphology, with a backscatter signal compatible to silts or muddy fine sands.
- Linear high backscatter patches correspond to slightly coarser sediments.

TagusGas multibeam and backscatter survey (Sept-Oct 2019)

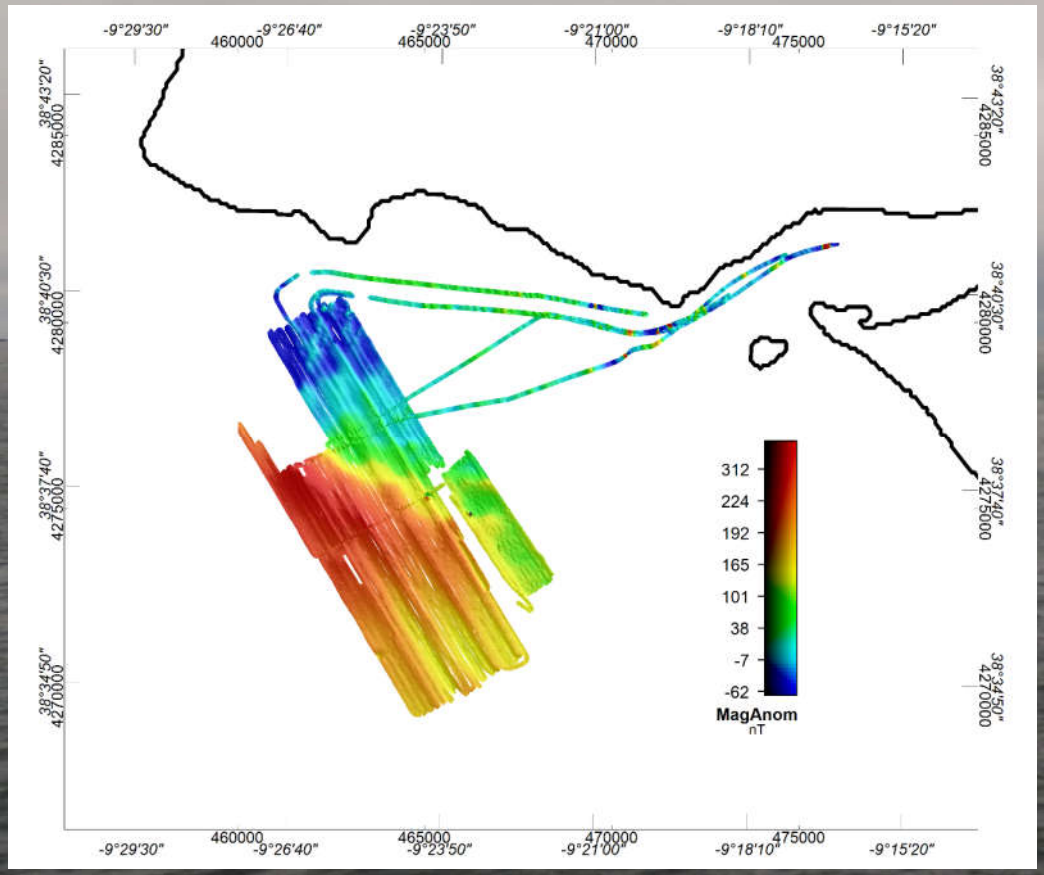
Seabed morphology detail (view from W to E, 10x vertical exageration)



Acoustic backscatter drapped over bathymetric surface (view from W to E, 10x vertical exageration)



First Results



The magnetic survey allows identifying, even before main processing steps:

- A major positive anomaly to the NW, that is related to the Cabo Raso anomaly (Neres et al 2014; 2016);
- Linear anomalies that were not resolved before and likely correspond to dyke-like bodies;
- Local dipolar anomalies that are likely related to shipwrecks or alternatively to other types of sunk objects.

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