

**2D MODELLING OF OIL GENERATION BY IGNEOUS INTRUSIVE BODIES
IN IMMATURE SOURCE ROCKS: ALTIPLANICIE DEL PAYÚN CASE STUDY, NEUQUÉN
BASIN, ARGENTINA.**

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The stratigraphic record of the Altiplanicie del Payún block, in the northern area of Neuquén Basin, Argentina, is intruded by several Tertiary sills and laccolites which reach thicknesses of up to 600 metres. Most of the present-day structures in the area are the response to the deformation caused by the intrusion of these igneous bodies. Since they are mostly of acidic composition, their intrusion temperatures are around 900°C. They are fractured overpressured reservoirs housing productive 20-35°API oil fields.

These bodies are intruded in the Vaca Muerta and Agrio formations. Both units are good oil-prone marine source rocks with 1 to 6 % TOC and an average HI value of 500 mg HC/gr TOC. Pyrolysis, vitrinite reflectance and biomarker analyses show that both source rocks are locally immature ($R_o = 0.45-0.5\%$). Nevertheless, these source rocks show a high degree of thermal maturation over thicknesses of more than 500 meters in the surroundings of the igneous rocks (figure 1).

Recent developments in modelling software (TEMIS 2D) allowed simulating the thermal effects of igneous intrusive bodies in source rocks (figure 2). Modelling of oil generation and migration in this unconventional petroleum system has been developed with satisfactory calibrations of the raw data. However, expulsion and migration dynamics are still difficult to reproduce due to software limitations and a need for a better understanding of the natural processes.

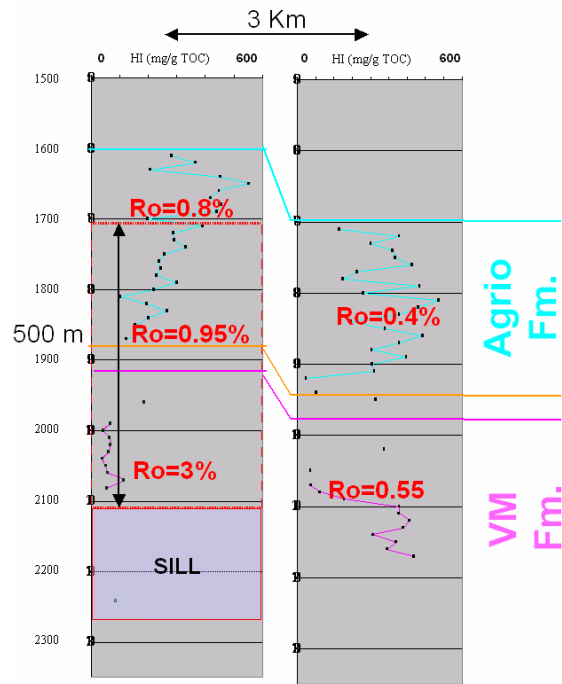


Figure 1. Hydrogen Index and %Ro profiles of two wells showing the thermally affected thicknesses of source rocks.

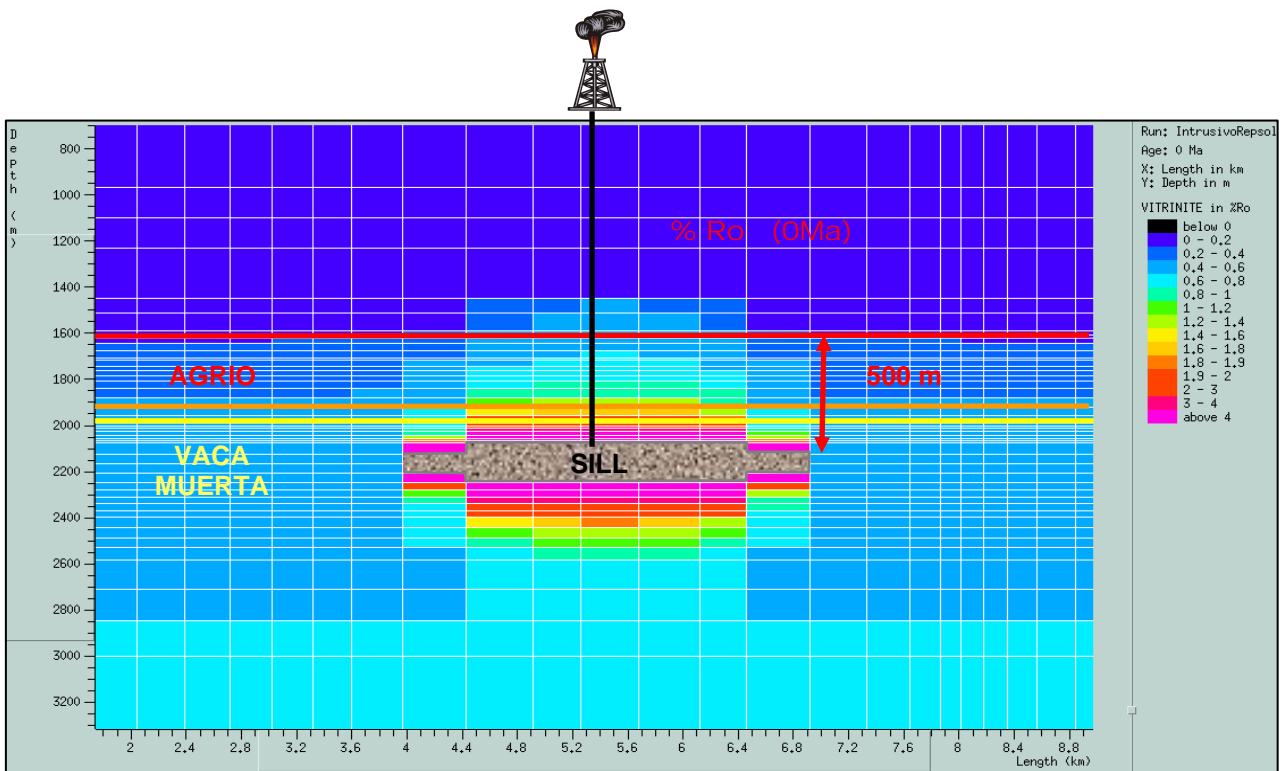


Figure 2. Vitrinite Reflectance calculated from a TEMIS 2D model.