AGRIO (NEOCOMIAN) PETROLEUM SYSTEMS. MAIN TARGET IN THE NEUQUEN BASIN THRUST BELT. ARGENTINA.

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This paper is focused on the petroleum habitat of the Agrio Fm. (Upper Valanginian-Barremian) in the central sector of the Neuquén Basin inner thrust belt. The area presents frequent oil seeps associated to complex structure, widespread exposure of the stratigraphic column and an extensive volcanic cover. The geochemical evaluation was performed on outcrop and cutting samples from three wells that found non-commercial hydrocarbon accumulations, ChE (Chapúa Este, 1995) 37°14'S, 70°14'W; EV (El Vatro, 1996) 36°42'S, 69°55'W and Pe (Pehuenche, 1996) 35°51'S, 70°12'W. The oil, condensate and gas recovered from different reservoirs were typified in detail and correlated to their sources.

The Agrio Fm. (oil-prone type II to II/III kerogen) is usually divided into three members (Fig. 1): *Superior Mb.*, dark-gray shales with TOC contents up to 2.6% and a thermal maturity ranging from 0.6%Ro in EV to 0.8%Ro in ChE; *Avilé Mb.*, non-marine green shales and fluvio-eolian sandstones representing a Hauterivian lowstand; *Inferior Mb.*, black shales with TOC contents up to 5% and maturity range from 0.67%Ro in the upper part of EV to 1.16%Ro in the lowermost section of ChE. Since the overburden of the Cretaceous-Tertiary column has been similar (~1700 m thickness) in all localities, the higher maturity in ChE is assumed to originate from a thermal anomaly. Three sections with characteristic stratigraphic signatures are recognized in the Inferior Mb. through the study area. These sections as well as the Superior Mb. have distinctive organic facies and geochemical parameters (Fig. 2) that support a reliable stratigraphic correlation along the area. The Lower and Upper sections of the Inferior Mb. show better generating conditions and are ranked as high-quality sources. Not only is the Upper section in the oil window in the three wells, but also the Lower section, except in ChE where it is in the late oil window. The identification of effective generating sections indicated by their bulk geochemical characteristics, thermal maturity and petroleum-source correlation enables to define different petroleum systems, complexly interacting along the area. The Mulichinco (Valanginian) condensate and the Avilé oil in ChE have different sources according to detail C_7 GC and $\delta^{13}C$ data. Biomarkers show that the oil was sourced from the Upper section of the Inferior Mb. while the condensate can be correlated to the Lower section according to GC profiles and thermal maturities. Thus, two petroleum systems can be considered, Upper Section-Avilé and Lower Section-Mulichinco. Further, as reported by biomarkers and maturity analysis, the oils from Troncoso Mb. (Aptian) in EV and from a Tertiary intrusive in Agrio Fm. in Pe were generated in the Lower section of the Inferior Mb. These last two cases can be included within the Lower Section-Mulichinco system despite the different reservoirs. In EV a contribution of Vaca Muerta Fm. (Tithonian-Berriasian) -the most prolific source rock in the basin, here mainly in the late-oil to gas window- cannot be discarded.

Discoveries have shown to be non-commercial up to now due to poor reservoir conditions or non-preserved traps/seals. Better quality of conventional reservoirs, occurrence of non-traditional reservoirs (Tertiary intrusives), and definition of non-depleted structural traps are mandatory for a successful exploration.

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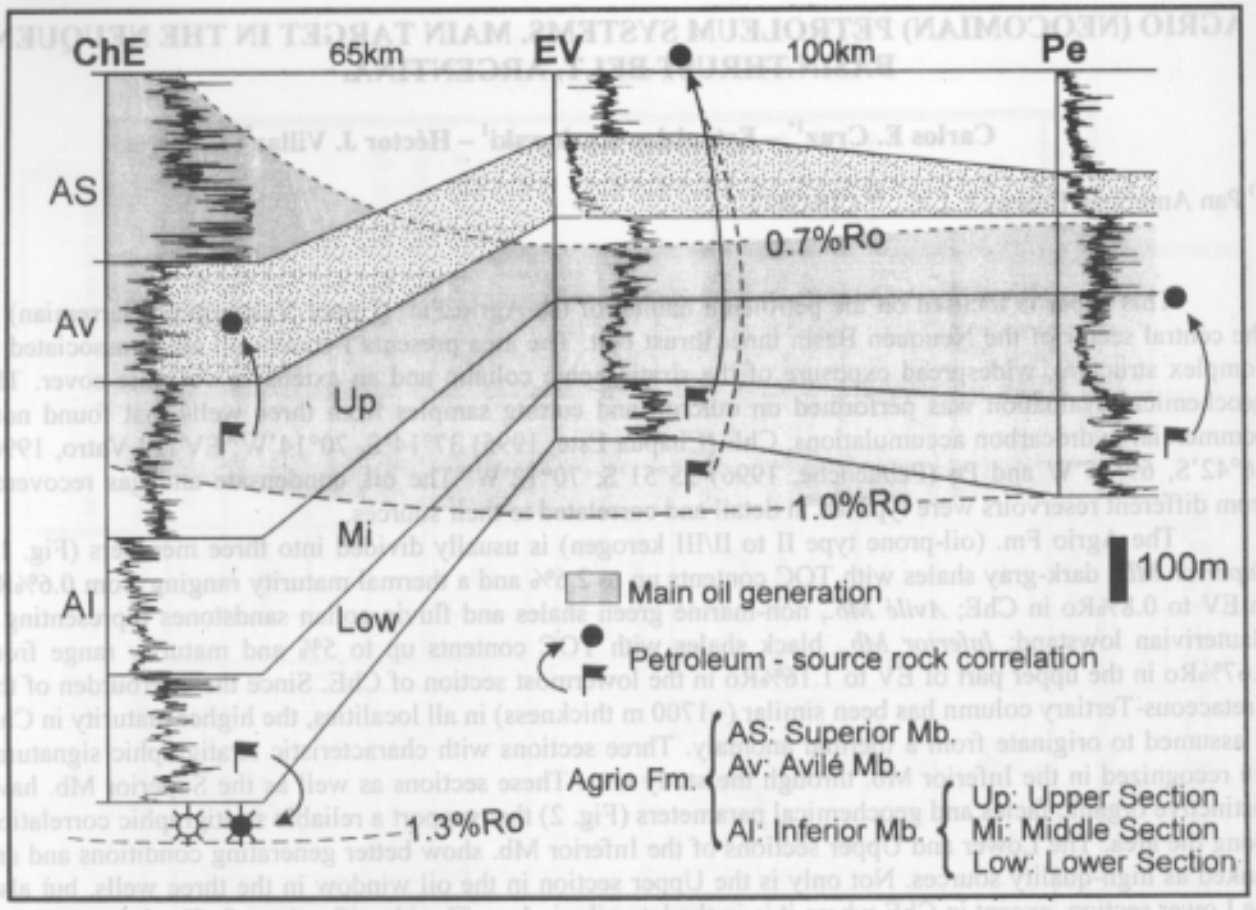

Figure 1

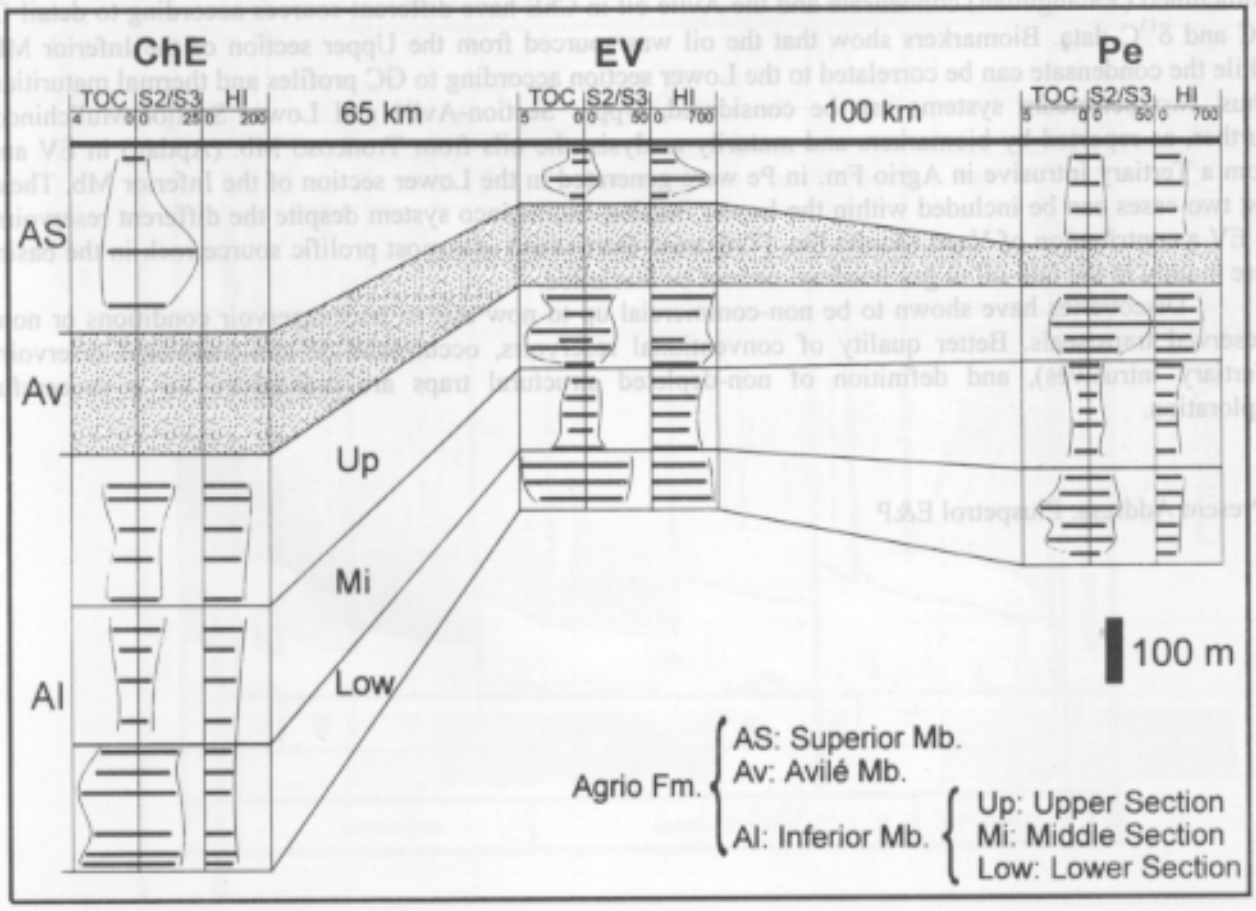

Figure 2