Stratigraphic Traps Detection Through Surface Geochemical Exploration: Examples from Argentina

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Traditional geological tools such as seismic and surface and subsurface information provide data on the structure of traps and reservoirs, but generally do not provide information on the hydrocarbon content.

Light hydrocarbons (C1-C4) seep to surface from a hydrocarbon accumulation. For that reason, the presence of hydrocarbons in surface indicates the presence of hydrocarbons in subsurface. A map of hydrocarbon microseepage is probably the most powerful tool to detect stratigraphic traps. What are the steps to follow to have positive results? a) Correct identification of hydrocarbons in soil, b) correct mapping of hydrocarbons in soil, and c) correct integration of geological, geophysical and geochemical information.
Point a) involves the use of a technology powerful enough to identify in soil microscopic fractions of hydrocarbons migrated from the reservoir. Point b) involves choosing an appropriate grid sampling pattern that allows detailed mapping of the hydrocarbon microseepage anomaly, and point c) involves ensuring that the geochemical anomaly identified in previous steps is related to migration from the reservoir and not by other migration pathway, for example through faults.

Over a total of 24 exploratory wells drilled in Argentina in the last 3 years, the correct application of these principles has resulted in more than 90% of exploration success in the search for stratigraphic traps. In this paper two examples of this kind of traps that were discovered through their surface geochemical expression are presented, as well as the main causes of ambiguity and interpretation failures.