

**A new approach for the understanding of the evolution of petroleum systems in fold and thrust belts:
Case studies in the Alberta and Eastern Venezuelan foothills.**

Frederic Schneider (IFP), Patrick Wojciak (Beicip Inc)

We present a new approach to better understand the evolution of petroleum systems in a fold and thrust belt, and to evaluate the hydrocarbon potential in such complex areas. This new approach is based on a 2D basin modeling software (Ceres[®]), that accounts for the role of faulting in deformation and its impact on both the pressure regime and hydrocarbon migration.

Basin modeling aims at reconstructing the time evolution of a sedimentary basin in order to make quantitative predictions. However, most of the basin models do not handle complex geometries such as the those found in foothills settings.

The classical work flow to perform this new type of study is composed of three main stages. First is the building of the present day section. Then comes restoration, where the section is restored back in time; the geometry at different ages can be provided by any cross-section balancing software, including an estimation of erosion. The third and final step is the forward simulation.

This methodology is tested on two case studies: one section in the Alberta foothills and a second in the Eastern Venezuelan foothills. In both cases, results in terms of thermal maturity and pressure evolution are presented. Ultimately, sensitivity tests on hydrocarbon migration were performed in order to understand the interaction between trap formation and hydrocarbon generation/expulsion, and to determine the key factors that control hydrocarbons accumulations in prospective structures.