

## **STRUCTURAL AND MATURITY MODELLING IN THRUST BELTS, WITH APPLICATION TO THE WESTERN ALPS (FRANCE)**

**Sassi, W., Deville, E. and Mascle, A.**

Institut de Français du Pétrole, BP 311, 92 506, Rueil Malmaison, France

### **ABSTRACT**

Within a joint research project, IFP, Intevp, IMP and Chevron have developed a 2-D modelling software, "Thruspack", to perform maturity studies of potential source rocks in the foothills of thrust belts. The structural analysis consists in building a forward model using two deformation mechanisms: the fault-bend-folding to account for fault related deformation of sediments, and vertical shear to account for basement tilting. From an initial basin stage, the reconstruction of the successive geometries of the thrust belt incorporates the effect of ramps propagations, syntectonic sedimentation, erosion and basement flexuration. In the next stage, the calculation of kerogen transformation is performed. The numerical scheme allows heat transfer by conduction, but also by convection in the case of topography induced water flows. Source rock maturity is finally modelled using first order Arrhenius kinetics.

The case study we will present is from the French Western Alps (Chartreuse and Belledune Massifs) where respectively thin or thick Mesozoic basins have been inverted during the final stage of propagation of the Alpine front (late Miocene-Pliocene). "Thruspack" modelling shows the consequence of both initial basin geometries and related thrust propagation mode on the potential plays in both Chartreuse and Vercors massifs.