

## **Exploration Below the Thrust-Belt of the Eastern Alps: The Last Frontier in a Mature Basin**

**Hans-Gert Linzer<sup>1</sup>, Ulrike Exner<sup>1</sup>, and Gerhard Wiesmayr<sup>1</sup>**

<sup>1</sup>G&G, RAG, Vienna, Austria.

### **ABSTRACT**

Hydrocarbon exploration in the foreland basin of the Eastern Alps started in 1955 with findings of oilfields in the Eocene basal sequence and the autochthonous Mesozoic sequences. Gasfields were discovered in Oligocene to Miocene basin sequences. More than 1000 wells have been drilled in the Austrian part of the Molasse basin, while the overthrust part is still underexplored. From the late 1960s to the early 1990s, several attempts have been made to explore the imbricated Molasse basin and the thrust belt. Although the exploration process was always constrained by falling oil prizes and insufficient data, proof could be found for a working hydrocarbon system in the overthrust foreland basin with its autochthonous Mesozoic sequences, the imbricated Molasse and the thrust belt. Meanwhile, the significant improvements in processing seismic data helped to illuminate complex structures in regional 3D seismic surveys covering the Molasse imbricates. Back to the roots, surface geology mapping, hydrocarbon seep analysis and revision of old data were essential to create regional geological subsurface models. The moderately folded and imbricated parts of the foreland basin form the intermediate link between the foreland and the intensely folded parts of the hinterland. Lateral, fold-parallel movements of the thrust belt affected foreland basin structures. Late-stage asymmetric uplift of the foreland basin probably caused a realignment of filled-to-spill structures. The foreland basin of the Eastern Alps evolved during late Eocene times. Continental collision of the advancing Alpine nappes caused a short period of shallow marine deposition followed by an Early Oligocene sudden deepening of the foreland basin by flexural loading and deposition of source rocks. These source rocks were redeposited by extensive submarine mass movements in the central part of the Early Oligocene basin towards the hydrocarbon kitchen below the thrust belt. The total amount of generated hydrocarbons was significantly increased by this process. Below the thrust belt, the target reservoirs are overthrust Early Oligocene channels, within the thrust belt fractured Triassic carbonates. The major exploration challenge is the definition of valid structures and reservoirs below and in the thrust belt.