

## **The Mountain Front Fault and its Impact on Exploration in Kurdistan, Zagros Fold and Thrust Belt**

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The Zagros fold and thrust belt lies on the boundary of the Arabian and the Eurasian Plates. It is orientated SE to NW and runs from the Arabian Sea in south-eastern Iran to the Taurus fold and thrust belt on the Iraq Turkish Border. It is made up of three zones of variable width that run sub parallel with the Main Zagros Suture. The most proximal zone to it is the High Zagros, which is followed by the Zagros Foreland and the Zagros Foredeep progressively as you progress towards the Mesopotamian block on the Arabian plate. Together they make up a zone of deformation about 300 km. wide and 2,000 km. long.

The structural style of the area is the result of the Cainozoic continental collision between the two plates. The direction of transport is NE to SW. This fold and thrust belt is complicated by the interaction of an old deep seated strike slip system that runs NE to SW. It originates in the autochthonous basement of the Mesopotamian block in front of the Zagros and is seen as major lateral discontinuities and minor fracture swarms through out the Zagros Foreland and Foredeep.

The width of the Foreland zone is variable. In map view there are two prominent re-entrants defined by the mountain front fault. These are the Dezfur and the Kirkuk embayments. Both of these structures play a prominent part in defining the potential for oil and gas exploration.

To provide a regional geological setting in which exploration can progress a deformation model was needed. This was determined by drawing a regional cross section across the Mountain Front Fault that defines the boundary between the Foreland and Foredeep Zones in the Kirkuk Embayment. It was built incorporating remote sensing, geological field mapping and modern seismic. The section drawing and balancing software Move 2010\* was used. This allowed the incorporation of the surface data and the seismic, in both depth and time, into one usable model.

On a regional scale the cross section had to address the concerns of thick versus thin skinned tectonics. This modelling resulted in a complex deformation model. It provided some answers as to the large scale thick versus thin skinned discussion. At a more local level a variety of decollement surfaces are found in the fold belt dominated by detachment folds. In addition we have examples of out of sequence thrusting with hinterland vergent thrust defining a triangle zone.

\* Move 2010 is produced by Midland Valley Exploration, Glasgow, Scotland