EAGE

AP43

Reservoir Modelling from Interpretation of 3D Virtual Outcrops & Field Data - A Case Study from the Upper Sarvak Fm, Chenareh Gorge, Lurestan, Iran

G. Casini* (StatoilHydro), S. Homke (StatoilHydro Research Center), J.C. Embry (StatoilHydro Research Center), T.L. Scarrott (StatoilHydro Research Center), I. Romaire (Institute of Earth Sciences), N. Fernandez (Institute of Earth Sciences), D.W. Hunt (StatoilHydro Research Center), N. A.H. Pickard (StatoilHydro), I. Sharp (StatoilHydro Research Center), M.R. Jamaledini (StatoilHydro), A. Jahanpanah (StatoilHydro), F. Livbjerg (StatoilHydro), C. Mehl (CSIC), M. Jalili (NIOC), L. Aghajari (NIOC) & J. Verges (CSIC)

SUMMARY

Although very important for reservoir characterisation and modelling, matrix and fracture heterogeneities are generally poorly incorporated into reservoir models. Indeed, modelling of subsurface reservoirs is often exclusively based on well log and seismic data, which are not able to capture many of the heterogeneities characterizing matrix and fracture properties across the reservoir. The analysis of reservoir outcrop analogues plays a key role for the characterization and modelling of matrix and fracture heterogeneities, especially when well log and seismic data are limited or of poor quality. A case study of reservoir heterogeneity characterization and modelling based on integration of fieldwork and 3-D virtual outcrop interpretation is presented.

The case study is located in the Chenareh anticline, Simply Folded Belt of the Zagros Mountains, Lurestan, Iran. Along the Chenareh Gorge, the Upper Sarvak-Ilam stratigraphic section of the Bangestan Group is spectacularly exposed. The gorge cuts entirely across the Chenareh anticline allowing continuous fracture and matrix characterisation from backlimb to forelimb. The section, Cenomanian – Turonian in age, has been extensively studied both in the field and through interpretation of high resolution 3-D photorealistic models based on LiDAR technology (up to 0.05 m resolution) and QuickBird satellite imagery (0.70 m resolution).

Data from extensive fieldwork along the gorge and surrounding areas permit detailed characterisation of matrix and fracture heterogeneities across the anticline. Facies, pore type and sequence stratigraphy have been characterised in the field and through the analysis of samples collected systematically along the measured section. Data on fracture and fault network geometry have been also collected systematically through the whole stratigraphic interval. Fieldwork data have been integrated with data manually and automatically extracted from 3-D photorealistic models based on LiDAR technology and QuickBird satellite imagery. The use of high-resolution 3-D photorealistic models allows quick collection of high-quality data for quantitative and qualitative analysis of matrix and fracture heterogeneities. Integration of fieldwork and 3-D virtual outcrop interpretation was fundamental for modelling matrix and fracture heterogeneities of the Chenareh Gorge fractured reservoir analogue.