EUROPEAN ASSOCIATION OF PETROLEUM GEOSCIENTISTS & ENGINEERS

4th Conference and Technical Exhibition

Palais des Congrès

Paris, France

1 - 5 June 1992

Technical Programme and Abstracts of Papers

(Oral and Poster Presentations)

Hall F

WEDNESDAY MORNING 3 JUNE **ROOM 63**

Reservoir Characterization and Fluid Flow
Chairman: H. Dronkert

* denotes speaker

GEOLOGICAL MODELLING OF ANCIENT MEANDER BELTS AS POTENTIAL HYDROCARBON RESERVOIRS, LORANCA BASIN, CENTRAL SPAIN (F-17)

M. Díaz-Molina,
Facultad de C. Geológicas (UCM), Instituto de Geología Económica (CSIC), 28040 Madrid, Spain.

Modelling of hydrocarbon reservoirs currently represents one of the most important challenges for the oil industry and is necessary to optimize exploration and production techniques. The prediction of external and internal geometry of the reservoirs as well as the distribution of porosity, permeability, fluid-flow barriers and pay intervals are especially critical in environments where the distribution and continuity of the sand bodies can be highly complex. This is the case in meander stream systems, generators of potentially excellent quality reservoirs which nevertheless frequently show a puzzling 3D distribution of the different parameters. On this basis, priority should be given to learning about these types of potential reservoirs from surface data, which are later extrapolated to blind basins.

Geological modelling focused on reservoir description and on progressive mathematical modelling, is here based on detailed reconnaissance of continental deposits (Upper Oligocene–Lower Miocene) exposed in the Loranca Basin, central Spain. Tertiary deposits partially cover a thin-skin thrust belt of detached Mesozoic sedimentary rocks, as shown in the interpretation of the regional seismic lines. The studied portion of meander-belt sediments, a fragment of the Tórtola Depositional System is located on the eastern limb of the Huete ramping anticline. Synsedimentary structural control is documented by meandering channels running parallel or subparallel to the south–north main structural trend.

An 800 m long exposure covering a stratigraphic interval of 115 m was selected to form a cross-sectional panel. Exposure geometry allowed partial 3D observation and detailed mapping of the sandstone bodies. Isolated or stacked sand facies were deposited as meander loops, channel fills and marginal overbank deposits. Recognized point-bar sequences show the presence of ripple composite bars throughout the sequence, differing from the classic model in which ripples are located in the upper part. Correlations were mainly based on continuous or partially continuous distinctive stratigraphic levels such as lacustrine carbonates and palaeosols.

Reconstruction of sandstone bodies in the cross-section was aided by interaction with mapping of the flood plain elements integrating each of the aggradational units. Superposition of the mapped meander belts allowed a 3D