

**AAPG International Conference
Barcelona, Spain
September 21-24, 2003**

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Chemostratigraphy and its Role in an Integrated Stratigraphic Methodology: A case study on Cambrian to Permo-Carboniferous Sequences from South and Central Oman

As correlation of the fluvial Cambrian (Haima Supergroup) and glacial Permo-Carboniferous (Gharif Formation (Late-Early Permian) and Al Khlata Formation (Permian-Carboniferous) oil reservoirs in South and Central Oman is extremely difficult using traditional methods, chemostratigraphy is employed to develop zonations and correlations for 19 wells penetrating these reservoirs. The technique utilises an inorganic geochemical dataset for 25 major and trace elements acquired from >600 samples, mostly sandstones. Stratigraphic variations in Zr, Ti, Cr, Nb and P are corroborated by heavy mineral data.

Chemostratigraphy enables the main 'Haima', 'Al Khlata' and 'Lower Gharif' reservoir units to be differentiated and correlated on the reservoir-scale and subregionally. In the Nimr and Marmul Fields, the Haima-Al Khalata unconformity is now redefined, which consequently impacts on the production behaviour of the reservoirs and the integration of chemostratigraphy, heavy mineral analysis, palynology and palynofacies studies has greatly improved sandbody correlations in the Marmul Field. Furthermore, complex stratigraphic relationships between lithologically similar incised valley fill deposits of the Al Khlata Formation are now resolved, thereby augmenting not only the interwell correlation scheme but also productivity predictions.