

## **STRATIGRAPHIC CONTROL ON SOURCE ROCK DISTRIBUTION**

HUC, A.Y. and VAN BUCHEM, F.S.P. Institut Français du Pétrole, Rueil, France

The abundance of sedimentary organic matter varies at all time scales throughout the stratigraphic record. This variability has to be considered in the context of the hierarchical organization of the sedimentary system. At the 1st order scale (30 M y), two periods (Silurian-lower Permian and upper Jurassic-middle Cretaceous) host up to 80% of the known source rock. The apparent relationship between these periods and 1st order high stands of sea level, which are tectonically induced, suggests the role of two main driving mechanisms: a) increase in CO<sub>2</sub> pressure in the atmosphere due to increased volcanic activity. b) eustatic sea level rise. High PCO<sub>2</sub> stimulates primary production on land, and promotes more aggressive chemical weathering of rocks, enhancing the nutrient supply. The general sea level rise induces flooding of large continental shelf areas. Resulting epicontinental seas are shallow, reducing the residence time of organic matter in the water column, and preservation is enhanced. At the 2nd order (3-30 M y), six specific stratigraphic intervals are characterized worldwide by relative enrichment in organic matter. These episodes are associated with high stands of global sea level. At the 3rd order (0.5-3 M y), the control is still global but local conditions become determinant. It is at this order that specific source rock occurrences are usually defined. At the 4th and 5th order scale (20,000 y- 3 M y) cyclic sedimentation results from high frequency orbital forcing. If general conditions are favorable (mainly controlled by lower order sequences), the impact of these changes is a high frequency organic signal, whose particular expression strongly depends on the local sedimentary environment.