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Abstract Title: Predicting TOC, Organic Porosity and Gas Retention Distribution in a Shale-gas System

Abstract: Natural gas generated by thermal maturation of organic matter is for a part expelled and, for another part, retained in the source rock itself. The production of this retained part is the goal of the gas shale EP projects. It is now known that this gas is for a part free in the porosity and fracture network of the source rock but also adsorbed on the shale matrix and on the kerogen. Natural gas adsorption capacity is pressure and temperature dependant but for a kerogen it is also almost a linear function of its organic content (TOC). During the maturation of a source rock, the organic matter is transformed to fluid hydrocarbon; as a result its TOC decreases and some porosity, now commonly called organic-porosity, appears and quickly increases. For a source rock with an initial TOC of 7%, the porosity created within the kerogen during maturation could reach 5%. Shale being low porosity rock, this additional organic porosity is far from negligible in comparison to the matrix one. The observation of growth of the organic porosity is now possible thanks to high resolution (nanoscale) microscopes.

Understanding, and so prediction, of the effect of burial (i.e. pressure and temperature increases) on the adsorption capacity and porosity is therefore a complex topic that will be discussed during this presentation.