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Diagenetic zonation in hydrocarbon reservoirs using well log data, a case study from South Pars, offshore Iran

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Determination of quantity and type of diagenesis is one of the most important points in hydrocarbon reservoirs studies. In spite of this fact, there is no any accurate, applicable and valid method for diagenetic zonation. Using clustering of log data, diagenetic zonation is considered here in the largest gas field in the world, South Pars, offshore Iran. Uniform trend of sonic log in probabilistic scale with others, shows that logs combination is useful. So, sonic, density, PEF and neutron logs considered using log data clustering. Distance between all pairs of data is determined and pairs with minimum distance combined together. Small clusters joint to bigger ones. This process will continue until all data gathered together. The process is stopped in user defined distance. This method examined here for the first time and so compared with diagenetic data derived from thin sections. Diagenetic zonation was done on thin sections based on diagenesis advancement and types. Comparison between log diagenetic zones with zones derived from thin sections, shows very high reliability of used method. Due to use only of log data, this method can be applied in most of the reservoirs. Quantity nature of the method in combination with very high accuracy and validity, make this method one of the most powerful ways for diagenetic zonations in hydrocarbon reservoirs.