The Minagish Oolite is a major reservoir of Early Cretaceous Minagish Formation of Umm Gudair field, west Kuwait. It is a complex carbonate reservoir characterized by small-scale heterogeneity, primarily related to textural variations and skeletal or non-skeletal allochems. Formation evaluation of the Minagish Oolite has been mainly based on traditional suite of resistivity-density-neutron logs, which are unable to characterize small scale geological features due to limited vertical resolution. Therefore, to overcome this constrain, high resolution image logs were used at this end to improve the reservoir characterization.

In present investigation electrical borehole image, together with conventional logs are used to identify electro-facies and to find textural heterogeneity in Minagish Oolite. Texture analysis is carried out with the help of 2-D self-organized map and multi resolution graph clustering techniques, enabling to capture vertical and lateral textural heterogeneity of the reservoir. Furthermore, image derived permeability helped not only to evaluate reservoir performance but also to identify thief zones, barriers and baffles.

Present study illustrates that high permeability zones are mainly related to the interconnected secondary porosity (vuggy porosity and dissolution channels) or high primary porosity, and not to the fractures. In addition barriers have also been located at different stratigraphic levels and some of them are quite effective in the reservoir, as confirmed by wireline formation pressure measurements.