三次元地質モデリングへの堆積学的要素の適用：近年動向のレビュー
Recent trend review on the input of sedimentological factors into 3D geologic modeling

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This paper reviews a recent trend on the input methodology of sedimentological factors into three-dimensional (3D) geologic and facies modeling especially for the purpose of petroleum potential evaluation. Because the sedimentological factors are crucial for simulating the precise facies and property distributions, it is important to input the sedimentological factors into 3D geologic modeling precisely and efficiently. Earlier stage 3D geologic modeling had tended to be by means of simple kriging and two-point geostatistics using variograms between the hard data points such as well locations. These two-point geostatistical simulations, such as sequential Gaussian and indicator simulations, cannot accept any sedimentological information such as the shape of the sediment body and facies concept. After the mid 1990's, trial on the input of sedimentological factors into 3D geologic modeling has been continued, and new methodology has been proposed until now, including the object-based modeling, multi-point geostatistics, process model-based modeling, process-aided modeling, surface-based modeling, and event-based modeling.

The object-based modeling is a stochastic simulation based on a sediment body object such as a lobe and meandering channel, which size, dimension and orientation trend are set using known information. The multi-point geostatistics is a stochastic simulation using a pixel-based training image of a sediment body, and utilizes data points as hard data. This method has much advantage because of the mixture of object-based and two-point geostatistical modeling. The process model-based modeling is a simulation based on the forward process model using reasonable algorithm matching actual sedimentary processes. The process-aided modeling is a modeling using sedimentary process algorithm and experimental results, and is useful for creating a training image of the multi-point geostatistics. Surface-based modeling is the simulation based on a depositional surface, which dimension is determined on the basis of known information. In this simulation, the feeder point is fixed, and the stacking pattern is simulated using the compensational stacking algorithm. The property inside the surface is simulated using two-point geostatistics.

キーワード：sedimentology、3D modeling、geostatistics
Keywords: sedimentology, 3D modeling, geostatistics