

the results are generally obligated to honor the observed data. The interpolation algorithm is responsible for providing the best estimate at every mesh location and the simulation algorithm is responsible for capturing the inherent variability, providing the basis for an uncertainty analysis.

[0005] Many aspects of conventional geocellular modeling involve technology that is not well understood such as, for example, mesh design and volume support, stochastic principles including spatial modeling and algorithm selection, appropriate methods for capturing the space of uncertainty and how to integrate the “human” factor in the model. In addition, many conventional geocellular modeling techniques or workflows are based on modeling a reservoir volume when only a portion of the reservoir volume is of interest. Other conventional geocellular modeling techniques or workflows are based on modeling a reservoir volume, in piece-meal fashion, using multiple subsets that collectively cover the entire reservoir volume. In either case, the techniques and workflows are unnecessarily time consuming and often bear less than desirable results. Each of these issues can significantly impact reserve estimation by their effect on dynamic modeling and risk assessment.

SUMMARY

[0005a] In an aspect, there is provided a method for geocellular modeling, which comprises: populating one of each cell and each point without a real property value in each subset selected from a respective one of a geocellular mesh and an array of points with one of an interpolated property value and a simulated property value using all data from one of the geocellular mesh and the array of points; converting one of the interpolated property value and the simulated property value in each one of the cell and the point in each selected subset to a point set using a computer processor; and populating one of each cell and each point without a

real property value in the respective one of the geocellular mesh and the array of points only outside each selected subset with one of an interpolated property value and a simulated property value using the data and the point set associated with each respective selected subset.

[0005b] In another aspect, there is provided a non-transitory program carrier device tangibly carrying computer executable instructions for geocellular modeling, the instructions being executable to implement: populating one of each cell and each point without a real property value in each subset selected from a respective one of a geocellular mesh and an array of points with one of an interpolated property value and a simulated property value using all data from one of the geocellular mesh and the array of points; converting one of the interpolated property value and the simulated property value in each one of the cell and the point in each selected subset to a point set; and populating one of each cell and each point without a real property value in the respective one of the geocellular mesh and the array of points only outside each selected subset with one of an interpolated property value and a simulated property value using the data and the point set associated with each respective selected subset.

[0005c] In yet an another aspect, there is provided a non-transitory program carrier device tangibly carrying computer executable instructions for geocellular modeling, the instructions being executable to implement: populating each cell without a real property value in each subset selected from a geocellular mesh with one of an interpolated property value and a simulated property value using all data from the geocellular mesh wherein each cell represents a volume with at least three sides; converting one of the interpolated property value and the simulated property value in each cell in each selected subset to a point set; and populating each cell without a real property value in the geocellular mesh only outside each selected subset with

one of an interpolated property value and a simulated property value using the data and the point set associated with each respective selected subset.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The present disclosure is described below with references to the accompanying drawings in which like elements are referenced with like reference numerals, and in which:

[0007] **FIG. 1** is a flow diagram illustrating one embodiment of a method for implementing the present disclosure.

[0008] **FIG. 2** is a plan view of a geocellular mesh illustrating steps **102**, **104** and **106** in **FIG. 1**.

[0009] **FIG. 3A** is the geocellular mesh in **FIG. 2** illustrating step **108** in **FIG. 1** with a