Geological Data Scale Integration Through Interactive Visualization for Geological Model Building

Oscar Paesi da Silva, Carla Maria Dal Sasso Freitas, Alexandre Lorenzatti, Mara Abel, Luiz Fernando de Ros, Karin Goldberg

Geological models for reservoir studies are built through interactive integration of information captured in several different scales of analysis. Several software tools support the analysis in each one of these scales, but usually the integration of this information across different scales results in manual work for the geologist. We describe here an approach to support the visualization and interactive data analysis to integrate three scales in which the data is captured by separated systems: meso-, macro- and micro-scales. The meso-scale corresponds to the overview of a set of wells in a 3D space, macro-scale to the individual well logs with associated core description, and the micro-scale is represented by petrographic description. In the meso-scale, the **Reservoir View**, the user can select and plot a set of key wells, having a general view of all available information. The wells, displayed in a 3D space, provide different visualization styles showing the types of data available along the wells. The user can analyze an individual log or switch between logs in the reservoir view to compare the values of the same property across different wells. In the intervals where well has core descriptions, lithological symbols show the lithology and unit boundaries. From this broader view, the user can select a macro-scale of analysis. The **Well View** shows all the information related to an individual well (logs and core descriptions, if available). Core description is based on the concept of facies. Each facies is determined according to lithology, texture and structures, using a standard set of icons and nomenclature for the different attributes. Whenever a petrographic description is available, the user can move into the micro-scale using the **Petrography View.** This view is divided into sections that encompass the petrographic attributes. Textural and structural parameters are represented by icons, and the mineral composition is represented by bar charts. Ternary diagrams are used to represent the rock classification, and photomicrographs associated with the analysis are also shown. In the current version, the visualization environment integrates well log data from LAS files, information stored in Strataledge (core description) and in Petroledge (petrographic description). We believe that this approach will reduce the amount of time specialists spend generating interpretation and reports, thus optimizing the workflow in reservoir characterization.