AAPG International Conference
Barcelona, Spain
September 21-24, 2003

Vladimir Pisetski[1], Stanislav Kopunov[2], Tom Guidish[2] (1) Trans Seismic International, Los Angles, CA (2) Geodata Consulting, Houston, TX

Dynamic Fluid Method (DFM) of Delineating Areas of Overpressure and Decompression in Sedimentary Media. Its Significance for Fluid Dynamics

Estimating pressure variability throughout a given field is one of the key parameters in determining fluid dynamics of a field. Assuming that sedimentary media are non-continuous - discrete or fractured - helps our understanding of a mechanism of a basin's reaction to neo-tectonic processes. Rock stress would be distributed heterogeneously in such discontinuous media forming areas of overpressure and under-pressure in a basin. We believe, that all sedimentary basins are presently active, and each reacts heterogeneously to the basement's movement. These modern changes or neo-tectonics are small in terms of genesis, however, they are significant for the fluid that exists within these media (the state of the rock - the distribution of the rock stress and its slightest changes would dramatically affect light substances like gas, oil and water that flow in the rock). So, even small anomalies of rock stress distribution determine the pattern of fluid migration and accumulation.

We extract the gradient of stress as a relative value (relative to the total ground or lithostatic pressure). It is found through a seismic attribute analysis (a patented process). The seismic attributes - instantaneous amplitudes and instantaneous frequencies - are put through the steps of the Dynamic Fluid Method (DFM) transformation which we present in this paper. The relative value of pressure P is determined as their function and it gives a value that is different from the normal lithostatic pressure and has a positive sign. This corresponds to the condition of decompression/ under-pressure or an area of low rock stress. It is those areas of decompression that are most likely to house an inflow of the fluid. Recent applications of the DFM process for identifying areas of overpressure and decompression and subsequent modeling of patterns of fluid dynamics are presented.