AAPG Datapages/Search and Discovery Article #90310 ©2017 AAPG/SEG International Conference and Exhibition, London, England, October 15-18, 2017

Using Seismic Inversion and Seismic Stratigraphy as a Combined Tool for Understanding a Small Scale Turbidite System: Gola Field, Pannonian Basin, Croatia

Domagoj Vukadin[1], Kristina Čikeš[1]

[1]Exploration & Production Division, INA Ltd Industrija nafte, Zagreb, Croatia.

ABSTRACT

Goal of the study was to identify and define small scale turbidite system of Upper Miocene retrogradational depositional system in the Drava basin, using seismic inversion and seismic stratigraphy tools, in combination with attribute analysis. The studied seismic volume covers a part of the Drava depression and includes the Gola gas field. The quality of data is crucial for interpreting geology through seismic, therefore, methods of increasing the seismic resolution while preserving the amplitude spectrum and dominant dip were applied. Seismic stratigraphy based analysis greatly assists in the geological constraint or "geovalidation" of interpreted seismic stratigraphic relationships and provides potentially critical insight into stratigraphic and structural problems of nonunique interpretations (Pigott, 2010). The fact that the variability of reflectors characteristics indicated lithology changes within a horizon was taken into consideration. For such small scale turbidites, every seismic reflector contains more than one facies not only horizontally, but also vertically oriented. Therefore, every seismic reflection and its variations in amplitude spectrum in the studied Gola gas field were interpreted as a horizon. Channels were interpreted in such a way that their relative geological age was respected. The sequence of deposition was studied by Wheeler scenes, depositional system was interpreted and the lithology was estimated and correlated with well data. Seismic facies were singled out and interpreted. Additional attributes were analysed to confirm obtained results, such as spectral decomposition attribute, that was used to indicate changes of facies, and coherence attribute which was used to define the main channel flow direction and depositional infill. Results gained from these analyses, such as continuity and spatial distribution of turbidite channels were verified by a seismic inversion (method of deriving seismic parameters, such as acoustic impedance, from reflection seismic data constrained by borehole data (e.g. Sheriff and Geldart, 1995)). Acoustic impedance inversion is applied for reservoir quality characterization, generally lower acoustic implies better reservoir properties i.e. porosity. When unified, interpretations obtained from this workflow lead to an understanding of chronostratigraphic significance of seismic-reflection correlations, and allow a more detailed study of stratigraphic traps and small scale turbidites.