Mapping directional variations in seismic character using GLCM-based attributes

EICHKITZ, C.G., AMTMANN, J., SCHREILECHNER, M.G.

Joanneum Research, Geophysics and Geothermics, Roseggerstraße 17, 8700 Leoben, Austria

Textural attributes describe the spatial arrangement of neighboring amplitudes values within a given analysis window. We have chosen a statistical texture classification method, grey level co-occurrence matrix (GLCM) and its derived attributes, to produce a semi-automated description of the spatial arrangement of seismic facies. The GLCM is a measure of how often different combinations of neighboring pixel values occur. Calculation of three-dimensional GLCM-based attributes can be done in 13 space directions. In this project we test the application of directional GLCM-based attributes for the detection of seismic anisotropy within paleo-river features. The results of GLCM-based attribute calculation differ depending on chosen GLCM parameters (number of grey levels, analysis window, and direction of calculation). In this work we specifically focus on the direction of calculation and keep the other parameters constant for all calculations. The workflow is first tested on a 2D training image and later run on a real data example from the Vienna Basin. We detect directional changes in the seismic character by using directional calculated GLCM-based attributes. Within the channel features most spatial variation in seismic character can be found in the first diagonal direction (northeast-southwest). In contrast to this, we see lowest spatial variations in Crossline direction.