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Seismics-electrics Joint Interpretation in a gypsiferous context.

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The main objective of this study is to improve the geophysical characterization resulting from a shallow 3D high resolution travel-time tomography survey (500x500m). This survey was acquired in Villar de Cañas (Cuenca, Spain) in late 2013 and early 2014. Lithology down to 150 m depth in this site is characterized by endorheic sediments, mainly siltstone and gypsum. After processing the tomography data, the velocity model showed a good correlation with geology models and borehole data except for the siltstone-gypsum transition. The model involves two lithological limits: the “transition layer - massive gypsum layer” (well resolved by a relatively high velocity contrast) and the “siltstone layer - transition layer” (constrained only in the central part of the model by a relatively low velocity contrast).

As electrical resistivity is able to characterize shale-gypsum transitions, we complemented the seismic data with results from a collection of 2D ERT surveys, for which we build a new 3D grid with 2 parameters by node: velocity and resistivity. In order to derive a geological interpretation, we apply a statistical classification method (Linear Discriminant Analysis) to the new bi-parametric grid, using reference

classes from well logs. This process results on a final 3D lithological model with less ambiguity and thus with a better definition of the two limits under discussion. Our study shows that the integration of seismic and electric methods significantly improves geological characterization in a gypsiferous context.