First geological interpretations of gas content of coal seam field, Cesar sub-basin, Colombia

Scientific problem

• Colombia is the world’s fifth-largest exporter of low ash, low sulphur thermal coal, (11.300 Btu/lb) (EIA 2016).
• Coal seam gas (CSG) characteristics of the Paleocene Cuervos Formation (Fm) of the Cesar Rancheria Basin, including gas origin, gas generation and retention processes, have not been addressed.

Focus

• This research focuses on understanding how different factors such as depth, coal properties, pressure and temperature influences CSG origin and generation on different geological domains within the sub-basin.

Methods and data

• A total of 44 water and 15 gas samples were collected from 21 wells with multiple-seam completion for stable isotope analysis of δD-CH4, δD-H2O, δ13C-CH4, δ13C-CO2 and dissolved inorganic carbon (DIC), which is a widely used approach for determining gas origin (Golding, Boreham & Esterle, 2013).
• Two clusters of data were analysed separately per compartments (see Figure A) due to the influence of distance between wells and high angle thrusts with sequence repetition.

Preliminary Conclusions

• Gas content with depth for all the data (Figure C) shows an overall positive trend.
• Gas content normalisation to ash and moisture basis with depth (Gas Gradient – Figure D) allowed the identification of locations with high gas content and saturation. (Hamilton, S. K., Esterle, J. S., & Golding, S. D. (2012).
• Scatter in Gas gradient over the study field is apparently masked by maceral composition (not shown).
• High and very high gas gradients classifications are present in all the wells but not all coal seams.
• Descanso compartment (Figure D (3)) shows a non-increase followed by a sharp increase trend around 250 m depth, possibly due to hydrodynamic influence.

References


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