Finding Sweet Spots: An Outcrop-Based Investigation, Eagle Ford Formation, Val Verde County, Texas

Victoria Chevrot and Raphaël Gottardi

School of Geosciences, University of Louisiana at Lafayette, Hamilton Hall, Rm. 323,
611 McKinley St., Lafayette, Louisiana 70503

GCAGS Explore & Discover Article #00314*
http://www.gcags.org/exploreanddiscover/2018/00314_chevrot_and_gottardi.pdf
Posted September 29, 2018.

*Article based on an extended abstract published in the *GCAGS Transactions* (see footnote reference below), which is available as part of the entire 2018 *GCAGS Transactions* volume via the GCAGS Bookstore at the Bureau of Economic Geology (www.beg.utexas.edu) or as an individual document via AAPG Datapages, Inc. (www.datapages.com), and delivered as a poster presentation at the 68th Annual GCAGS Convention and 65th Annual GCSSEPM Meeting in Shreveport, Louisiana, September 30–October 2, 2018.

EXTENDED ABSTRACT

Roadcut outcrops located along U.S. 90 (Val Verde and Terrell County, Texas) of the Cretaceous Eagle Ford Formation (Cenomanian-Turonian), appear to be in the same depositional basin setting as the Maverick Basin (Fig. 1). Not only is the Eagle Ford Formation a self-sourced unconventional shale reservoir, it is also the source rock for the overlying Austin Chalk (Corbett et al., 1991; Friedman and Wiltschko, 1992; Fan et al., 2011). The formation carries between 40–90% carbonate content in some areas of the play, with the shale proportion increasing towards the northeast (Tian et al., 2012). This special characteristic of the Eagle Ford Formation, a high carbonate to clay ratio, makes the formation brittle and susceptible to hydraulic fracturing (Dawson and Almon, 2010).

The studied outcrop (Fig. 2) exposes the transgressive systems tract of the Eagle Ford Formation, which contains the principal reservoir facies in the productive interval in the Eagle Ford play. With the successful production of the Eagle Ford "shale" in the Maverick Basin, the outcrops in Val Verde and Terrell counties have attracted a lot of attention and have been described in several studies since the 2000s, including Peschier (2006), Lock et al. (2010), Donovan and Staerker (2010), Whitcomb (2011), and Donovan et al. (2014, 2015). Distinctive vertical trends have already been studied by Lock (2014). However, the study was conducted on samples collected at predetermined points rather than based upon visual selection of similar lithofacies, hence it is likely that some of the variations in measured values relate to contrasting sediment type and locations within each parasequence. In this study, we expand on Lock's (2014) preliminary work using samples collected at closely spaced intervals.

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Chevrot, V., and R. Gottardi, 2018, Finding sweet spots: An outcrop-based investigation, Eagle Ford Formation, Val Verde County, Texas: Gulf Coast Association of Geological Societies Transactions, v. 68, p. 581–584.

Finding Sweet Spots: an Outcrop Based Investigation (Eagle Ford Formation, Val Verde County, Texas)

Victoria Chevrot[1], Raphaël Gottardi[2]
School of Geosciences: University of Louisiana at Lafayette
[1]victoria.chevrot@outlook.fr ; [2]raphael.gottardi@louisiana.edu

INTRODUCTION

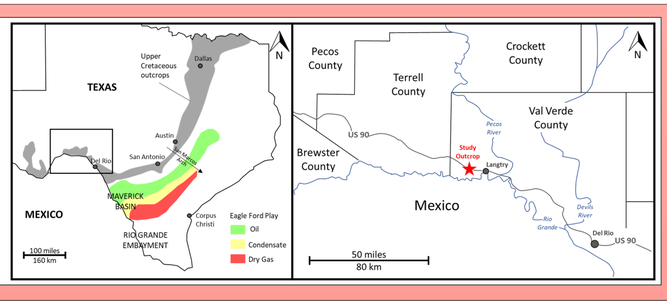
The Eagle Ford Formation is a successful unconventional reservoir, which are often believed to be uniform and monotonous but the reality is different: vertical and lateral heterogeneities exist. Therefore, in these conditions, finding sweet spots, become critical and challenging.

GOAL OF THIS PROJECT

Determine lateral and vertical trends in an outcrop of the transgressive system tract of the Eagle Ford Formation, as exposed in outcrop.

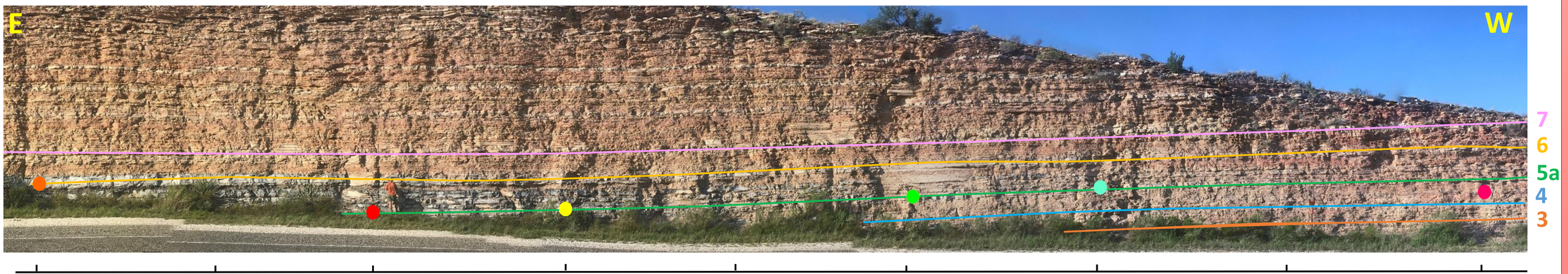
AREA OF STUDY

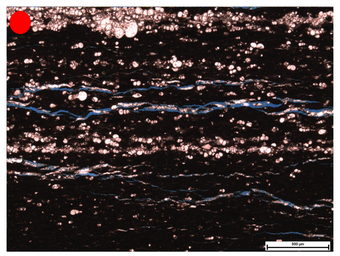
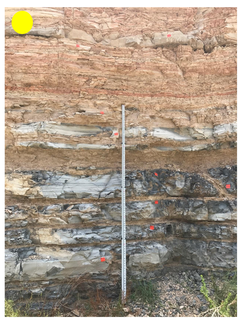
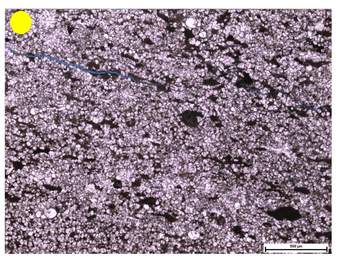
Located along U.S. 90, the study outcrop exposes the Middle Member (facies B) of the Eagle Ford, which contains the principal reservoir facies in the productive interval in the Eagle Ford play.
The outcrop consists of marls interbedded with limestone beds.

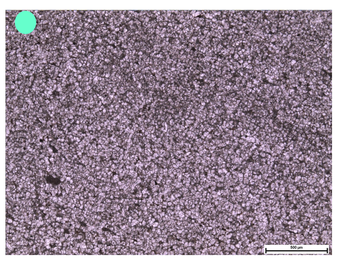
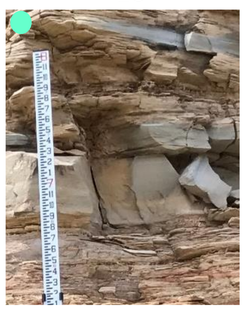
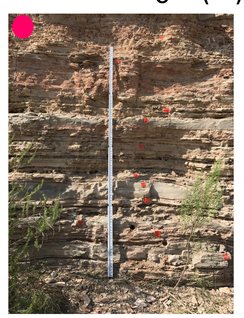


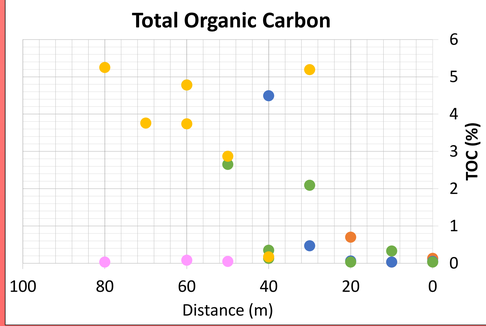
METHODOLOGY

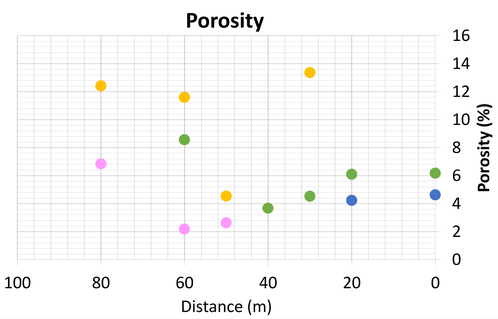
- 78 samples collected along 9 vertical transects spaced away from 10m.
- Petrographic thin sections analysis.
- Rock Eval: TOC and kerogen type.
- Porosity and permeability.
- XRD: ratio of clay, quartz, feldspar and calcite; brittleness index.
- Chemostratigraphy with XRF.

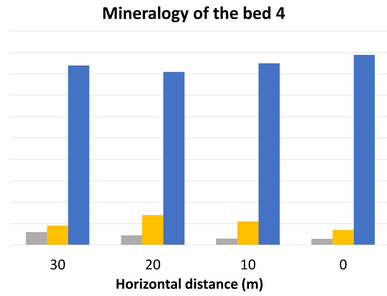


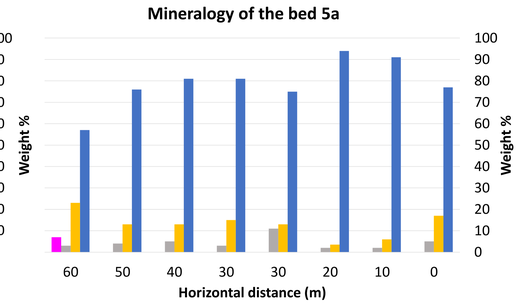





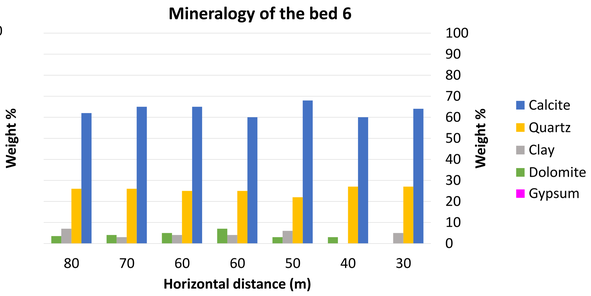















FIRST CONCLUSIONS

- The lithology of the limestone beds varies laterally. The content of calcite decreases toward the east of the outcrop, where the texture becomes « shalier ».
- Porosity increases toward the east side.
- TOC increases toward the east side.

FUTURE WORK

- XRF: trace elements, proxies for paleo-productivity and redox conditions.
- Brittleness index based on the XRD data.
- Correlation of all the data.

REFERENCES

- Donovan, A., Staerker S. T., Gardner R., Pope M., Pramudito A., and Wehner M., 2016, Findings from the Eagle Ford outcrops of west Texas and implications to the subsurface of south Texas: in J. A. Breyer, ed.,The Eagle Ford Shale: A renaissance in U.S. oil production: AAPG Memoir 110, p. 301–336.
- Lock, B. E., 2014, The Eagle Ford Formation in outcrop, West Texas: Depositional and diagenetic trends in the transgressive systems tract: Gulf Coast Association of Geological Societies Transactions, v. 64, p. 265–276.
- Peschier, L., 2006, The depositional environment of the Boquillas Formation, West Texas: M.S. Thesis, University of Louisiana at Lafayette, 81 p.