Solid Earth Discuss.,
https://doi.org/10.5194/se-2019-104-SC1, 2019

Interactive comment on "An automated fracture trace detection technique using the complex shearlet transform" *by* Rahul Prabhakaran et al.

Stephen Laubach

steve.laubach@beg.utexas.edu

Received and published: 24 June 2019

This is a valuable and interesting contribution. Studies of outcropping reservoir successions - outcrop analogs - are a useful way to obtain distributed two- and three-dimensional rock data that are lacking in borehole-based observations and that encompass features below the resolution of seismic methods. Outcrops are thus a source of information on the likely attributes of fractures in the subsurface. This paper is an example of recent developments in rapid, automated image-based collection and analysis of fracture sizes, patterns and interconnections that are beginning to supply from outcrops valuable input for fracture models that go beyond fracture trace data painstakingly collected the old fashioned way.

I think, however, that it would not detract from the contribution presented in this paper, to mention a fundamental challenge facing remote/automatic extraction of fracture trace data from outcrop. If fractures are open or otherwise topographically prominent and make nice, detectable features, then all is well and only more efficient detection and extraction is needed. But open and topographically prominent may not be the case for many of the outcrop fractures that are the best subsurface analogs. Fractures that are open in in the subsurface are the ones we want to know about, for their effects on fluid flow and rocks strength, but fractures that become cemented shut in the subsurface may be provide the most reliable guides to subsurface patterns: these are 'fossilized' versions of the fractures were interested in. Such fractures are frequently the easiest to interpret as representative of the subsurface (e.g., can be separated from near-surface noise), they may by virtue of their fill history be the easiest to determine timing, origins, and to relate to specific targets in the subsurface (e.g., Ukar et al., 2019) and they commonly make the largest pavements (since there is no fracture porosity for plans to latch on to). But because they are filled, they are likely the least visible, or may be invisible, to remotish imaging.

Many of these issues are discussed with examples by Ukar et al. (2019).

Ukar, E., Laubach, S.E., Hooker, J.N., 2019. Outcrops as guides to subsurface natural fractures: example from the Nikanassin Formation tight-gas sandstone, Grande Cache, Alberta Foothills, Canada. Marine & Petroleum Geology, 103, 255-275. doi.org/10.1016/j.marpetgeo.2019.01.039

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