June 28, 2018

"African transcontinental shear systems as models of intraplate block faulting: a new way to look at the Ancestral Rockies or Laramide uplifts?"

Abstract

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Arrays of fault blocks are common within continents, and often far from plate margins. These kinds of features have happened at least twice in the North America. The Ancestral Rocky Mountains of the late Paleozoic vintage stretch from the edge of the Ouachita orogenic belt in the Southern Oklahoma 'aulacogen' to northern Colorado, and the Laramide block uplifts overlap them and stretch from Mexico to Montana. These were both 'compressive' systems in the forelands of orogenic belts. Comparable fields of extensional basins can also be loosely aligned in belts. The 'failed arms' of two plate triple junctions in Africa are good examples: the East African Rift system and the Central African Rift and Shear Systems. The geometries of all of these arrays to one degree or another involve transfer faults that connect individual elements of the systems as both intra- and inter-basinal faults that exploit pre-existing defects in the crystalline basement, pre-existing lineaments, or basement terrane boundaries. At their extreme, sometimes these transfer fault systems assume impressive proportions and constitute regional 'mega-shears'. They mimic wrench fault systems in many details of their geometry, but insofar as they only accommodate the net extension or compression of the overall system, they do not necessarily display a consistent sense of offset or accumulate much net strike-slip offset like plate transforms. We will show how these systems work and how they relate to petroleum deposits; the carry considerable conventional or unconventional potential for indigenous onshore oil production and/or gas to power projects We focus on the Central African Shear Zone and a new example we proposed called the Southern Africa Trans-Africa Rift and Shear System ('STARSS'). The latter connects the Karoo rift basins in East Africa to some cryptic basins in Namibia via a family of lineaments that have been known for some time, but whose post-Precambrian significance has not been widely appreciated. Interestingly, STARSS were activate in a foreland during the late Paleozoic and connected the Atlantic and Indian arms of the Gondwana breakup during the Cretaceous.

Our Presenter

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Jim Granath is a petroleum exploration consultant here in Denver—one of the myriad structural geologists we have. He worked for Conoco before its merger with Phillips in research and in international and new ventures projects before becoming a consultant in 1999. He had short stints with Forest International and Midland Valley Exploration here in town, when they existed! Forest rescued him from Houston. He has his college degree from the Univ. of Illinois in Champaign and his PhD from Monash University in Australia.