

Basement Control of Some Large Structural Fields in the Rockies: Salt Creek, Madden, Rangeley, Oregon Basin and Pinedale

Gay, S. Parker ^{*1} (1) Applied Geophysics, Inc., Salt Lake City, UT.

Those who are familiar with my work in the Rockies know that I map the locations of basement faults using reprocessed profile-residual magnetic maps. Such maps I have compared over many years with structural geology maps of oil and gas fields and other structures, an effort which has yielded many remarkable results. The more spectacular comparisons are with a number of the giant and supergiant fields in the Rockies, which I will show here in this talk. The typical structural field is an asymmetric anticline that results from reverse, or thrust, reactivation of an underlying fault. Except in areas of thin-skinned thrusting, the underlying fault always seems to be rooted in basement and is part of a pre-existing system of faults that formed when the continents were assembled from fragments of other continents in the Archean and extending up through Proterozoic time and into the Paleozoic.

A particularly interesting observation made with regard to anticlines is that their size depends on the spacing of pre-existing cross-faults. Thus, one may predict, to a degree, the expected size of a new field in undrilled areas. Another interesting observation is that anticlines will sometimes be formed in long chains, so the locations of new, undrilled anticlines can be predicted from the basement fault map.

A few examples from the Midcontinent will show that the conclusions reached here may be applied universally and not just in the Rocky Mountains.