**Michigan Basin Structural Lineaments Map**

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Until recently there has been little recognition of significant faulting in the Michigan basin. Structure contour and isopach maps for every Paleozoic formation and residual structure contour maps of key marker beds were used to map structural lineaments (faults and monoclines). Residual structure contour maps were made using gravity and magnetics regional trend removal filtering techniques. This allowed regional basin dip removal from structure contour maps revealing subtle structural lineaments. Structural lineaments were confirmed with gravity, magnetics and wells with fault indicators.

In general the structural lineaments have a dominant NW-SE trend with a NE-SW subdominant conjugate set. Whereas in southwest Michigan, structures trend NE-SW. These structural lineaments are due to periodic reactivation of basement faults from multiple orogenic events which propagated up through the Paleozoic section. They appear to have had a complex history of normal, reverse and strike-slip movements. Very similar structural lineament and anticlinal patterns are seen on most Paleozoic formations. Several faults show increased throw with depth indicating syndepositional faulting. The structural lineaments help show that the central basin deep anticlines are offset relative to shallow anticlines in a predictable way.

Similar structural styles can be grouped geographically across the basin and are related to different underlying Precambrian basement structural provinces. The basement provinces consist of a complex network of faults, half-grabens, grabens, and horst blocks of differing lithology, density, thickness, thermal history and different sets of preexisting weaknesses. Thus they would behave differently under extension, compression, overlying basin subsidence and the different Appalachian orogeny stress field orientations. Structural lineaments have significant implications for hydrocarbon and dolomitizing fluids migration, hydrocarbon exploration and carbon sequestration.