# **MATURATION -- MODELED and MEASURED**

Maturation modeling using inferred geothermal gradients, surface temperatures, and projected original thicknesses indicates that Ordovician strata are in initial stages of oil generation. Pennsylvanian strata above are immature with repect to oil generation. Rock-Eval data confirm the results obtained by maturation modeling. Considering that Ordovician strata are in initial stages of oil generation, maturation will be maximized where potential source rocks are buried deepest -- likely along the axis of the basin.



# **EXTENT of POTENTIAL SOURCE ROCKS**

Devonian-Mississippian Chattanooga Shale and Upper Ordovician Maquoketa Shale decrease in thickness northward in the Salina Basin. The only persistent potential source rocks are shales associated with the Middle Ordovician Simpson Group.





# **ORGANIC CONTENT of POTENTIAL SOURCE ROCKS**

Greatest total organic carbon (T.O.C.) is generally in Pennsylvanian shales, but these rocks are immature with respect to oil generation within the Salina Basin. Ordovician shales, such as those within the Simpson Group, have sufficient organic content to be viable source rocks.







### EXPLORATION TARGETS

Many late Mississippian-early Pennsylvanian structures in the southern part of the Salina Basin are associated with reactivation of the faulted margins of the Precambrian Midcontinent Rift System (MRS). **Exploration efforts** could search for analogous structures along the northwestern margin of the MRS in Mitchell and Lincoln counties, where the MRS crosses the axis of the Salina Basin.

## CONCLUSIONS

the basin.

# AEROMAGNETIC MAP of KANSAS

reduced to pole, with second vertical derivative calculated, vertical illumination



(from Xia and others, 1995)

- . Most of the petroleum trapped in the southern end and flanks of the Salina Basin likely migrated in from the south through long-distance migration.
- 2. The Salina Basin is in a migrational "shadow zone". A different exploration strategy therefore has to be applied to this basin.
- 3. With a low heat flow and temperature gradient, most strata in the Salina Basin are immature with respect to oil generation.
- 4. Thermal maturation of potential source rocks will be maximized along the axis of
- 5. The most laterally persistent potential source rocks are organic-rich shales in the Middle Ordovician Simpson Group.
- 6. Ordovician source rocks have generated commercial quanitities of petroleum in the Forest City Basin and southern Salina Basin.
- 2. Structural traps containing Ordovician-type oil could be in Lincoln and Mitchell counties, where the Midcontinent Rift System crosses under the axis of the Salina Basin. These structures will trend northeast-southwest and would be caused by Phanerozoic reactivation of Precambrian structural trends.
- 8. Drilling in the Salina Basin is sparse, and structures fitting this exploration concept have not yet been adequately defined or tested.



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