Used Fuel Disposition Campaign

Evaluation of Technical Siting Guidlelines using the Regional Geology GIS Database

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Las Vegas, Nevada

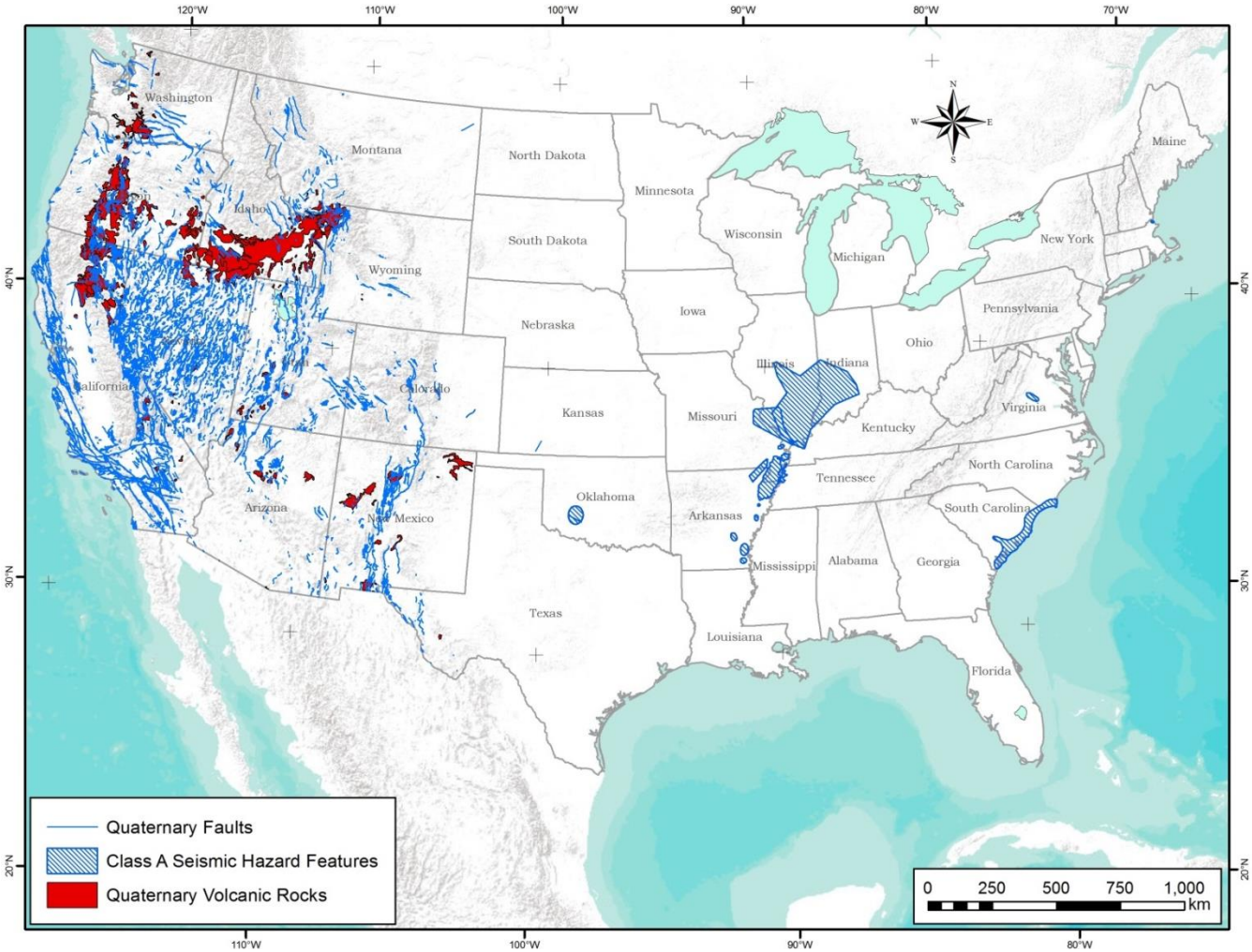
June 10, 2015

LA-UR-15-24686

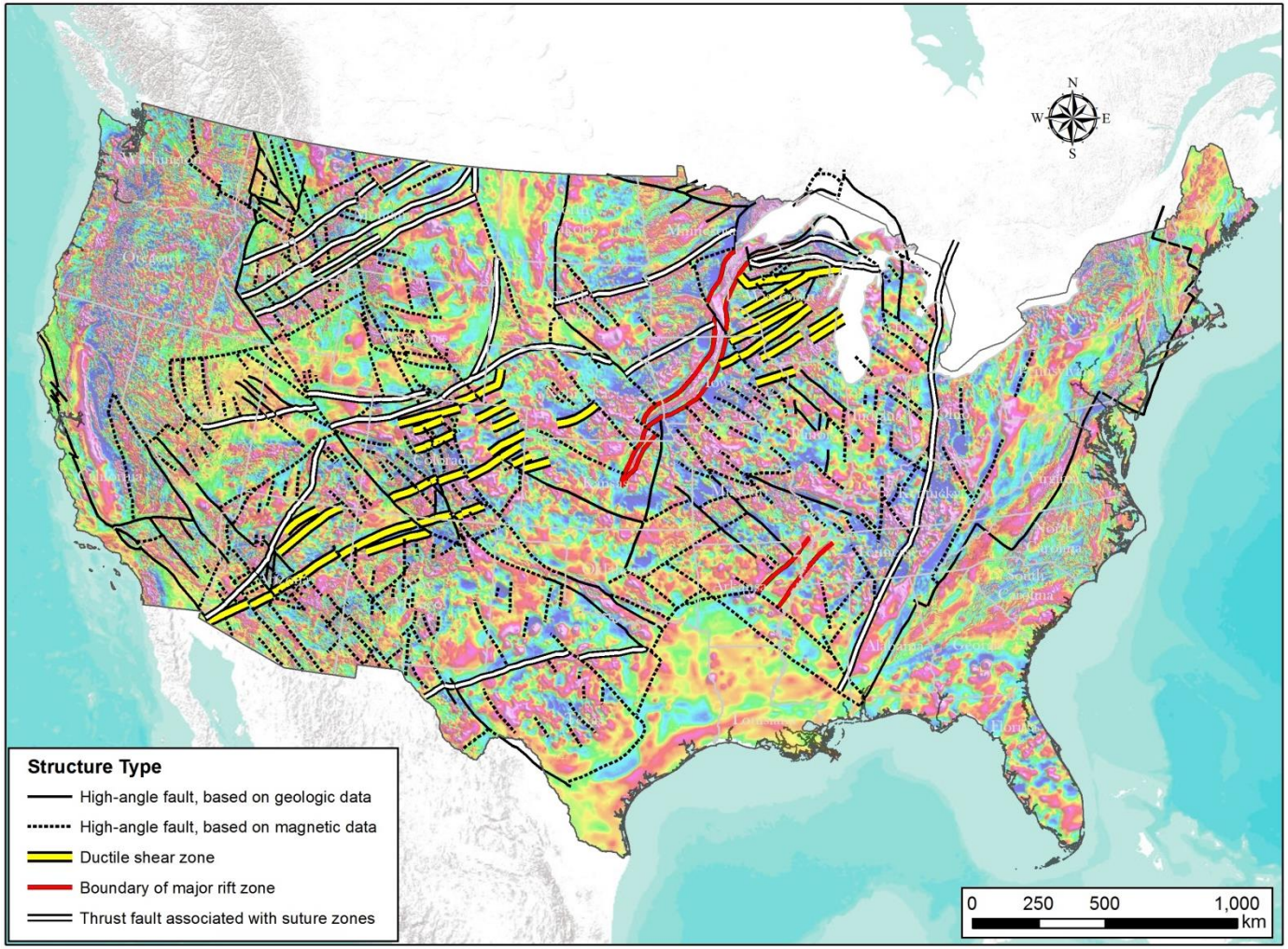
Data Robustness for Siting Guidelines

- Evaluate proposed DBH sites against siting guidelines with confidence that available data related to guidelines are robust
- How do data collected or compiled at different scales compare?
- Focused on data for depth to crystalline basement as a key go/no-go siting guideline for a DBH Field Test
- Crystalline basement guideline has components that are both vertical (absolute depth) and horizontal (local basement depth variability)

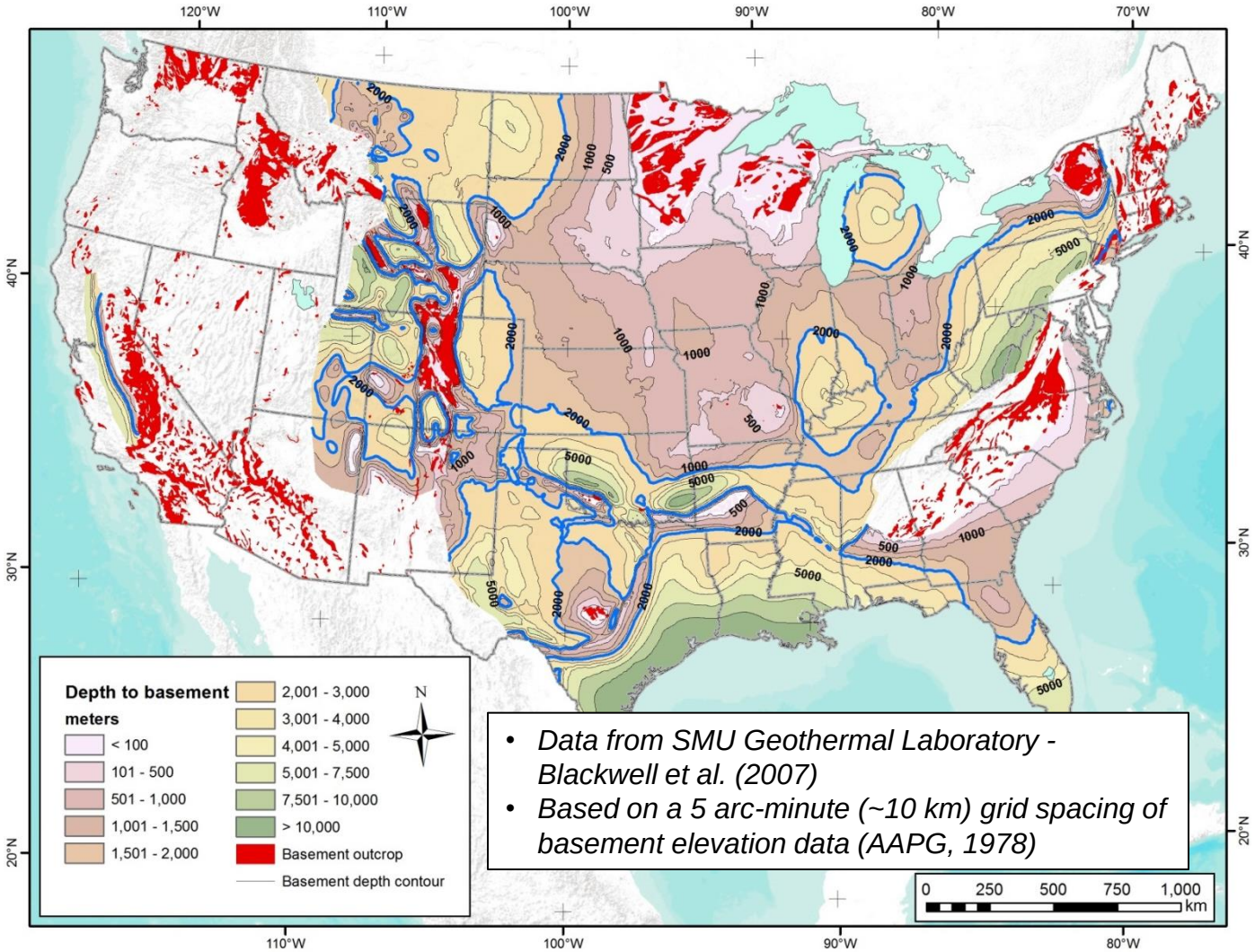
Distribution of Quaternary Faults and Volcanism



Older Structural Features in Basement

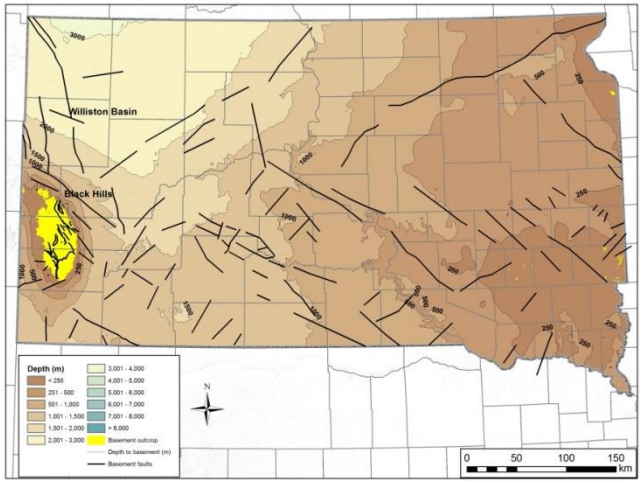


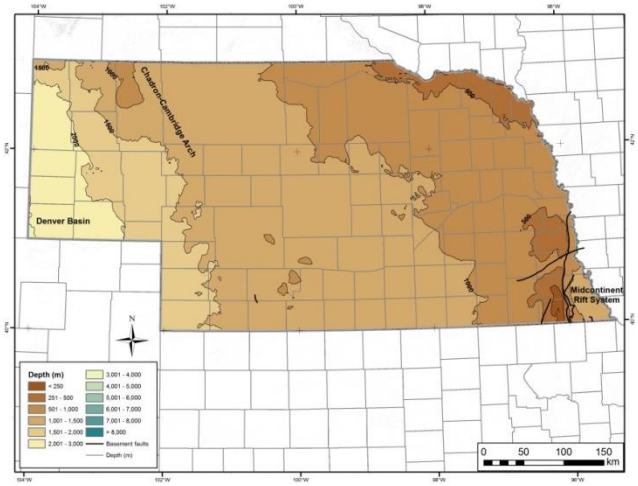
Depth to Basement – National Scale

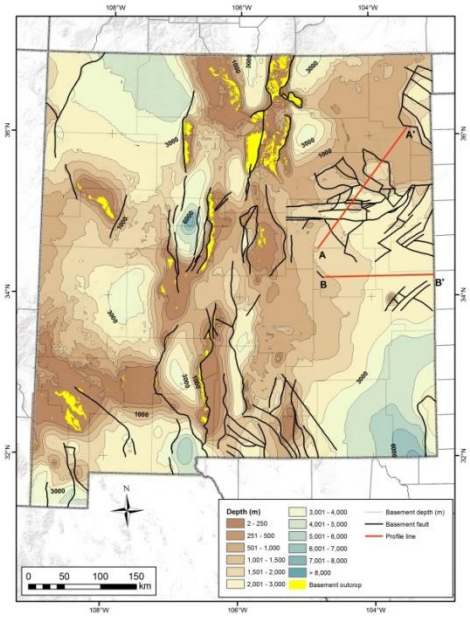


- *Data from SMU Geothermal Laboratory - Blackwell et al. (2007)*
- *Based on a 5 arc-minute (~10 km) grid spacing of basement elevation data (AAPG, 1978)*

Depth to Basement Maps – State or Basin Scale

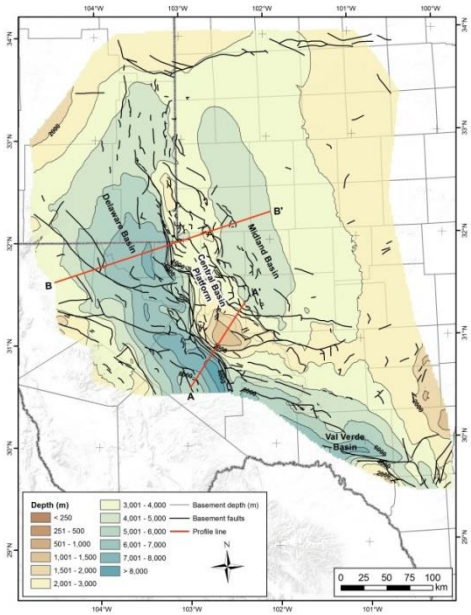






Control on basement depth depends primarily on the density and locations of borehole data

Data:
McCormick et al. (2010)
U. Nebraska, School of Natural Resources
Broadhead et al. (2005)
Ruppel et al. (2009)



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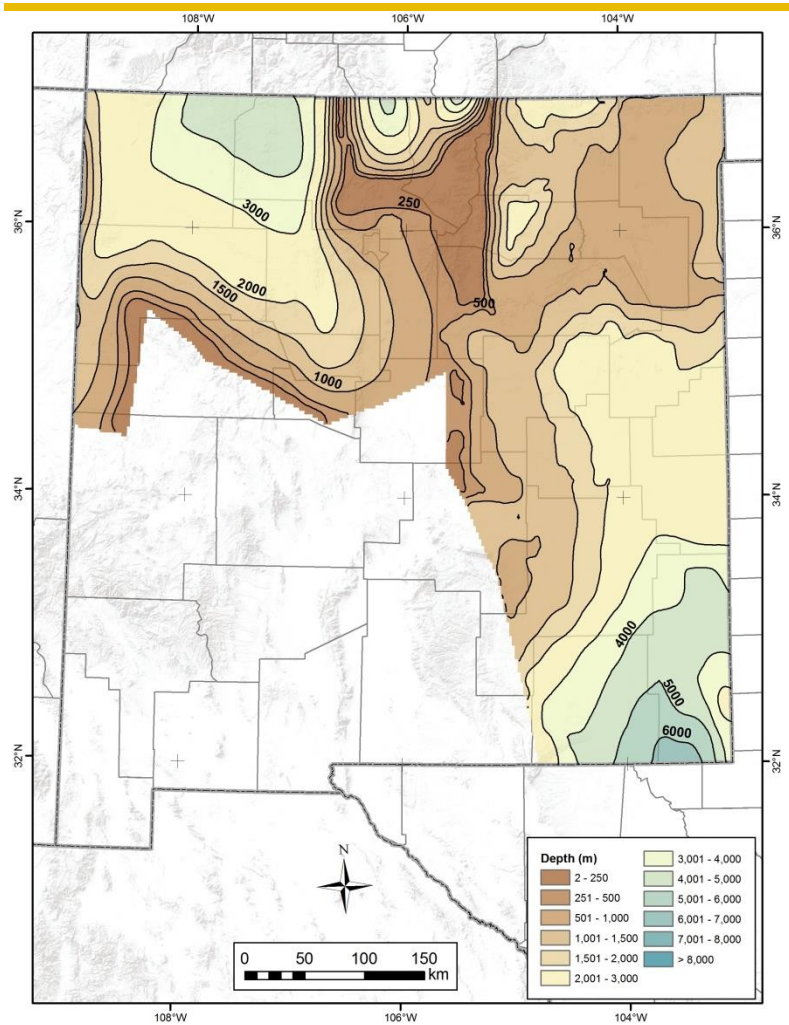
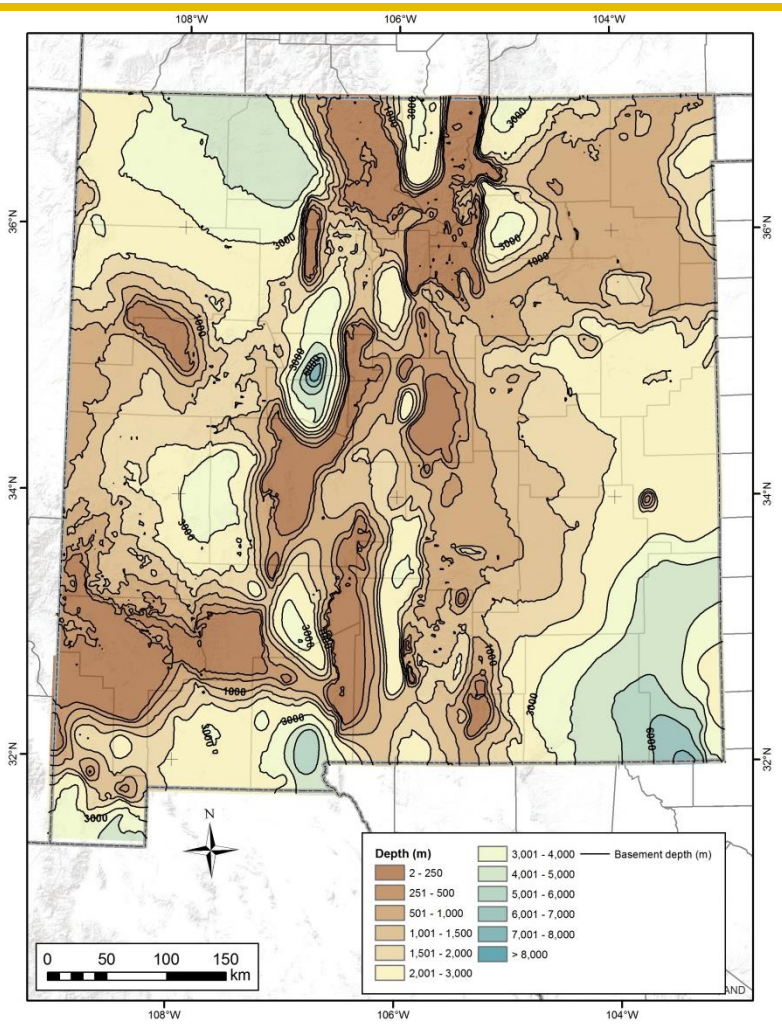
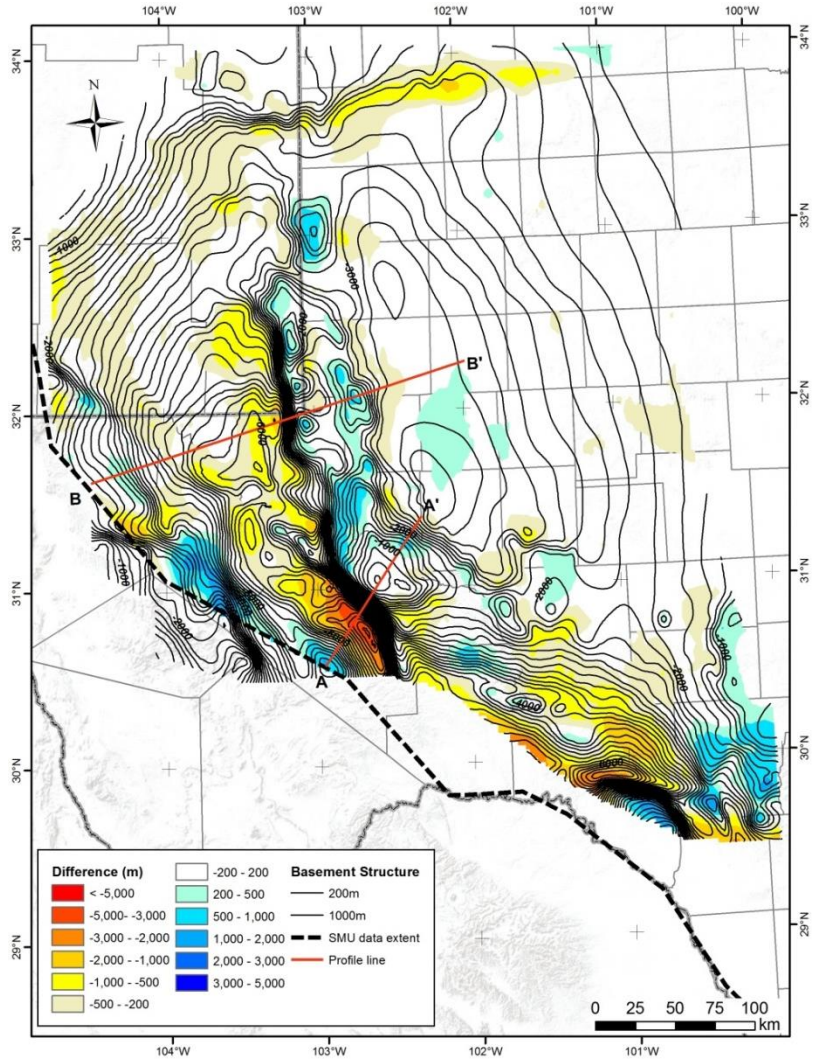
Depth Data at National and State Scales





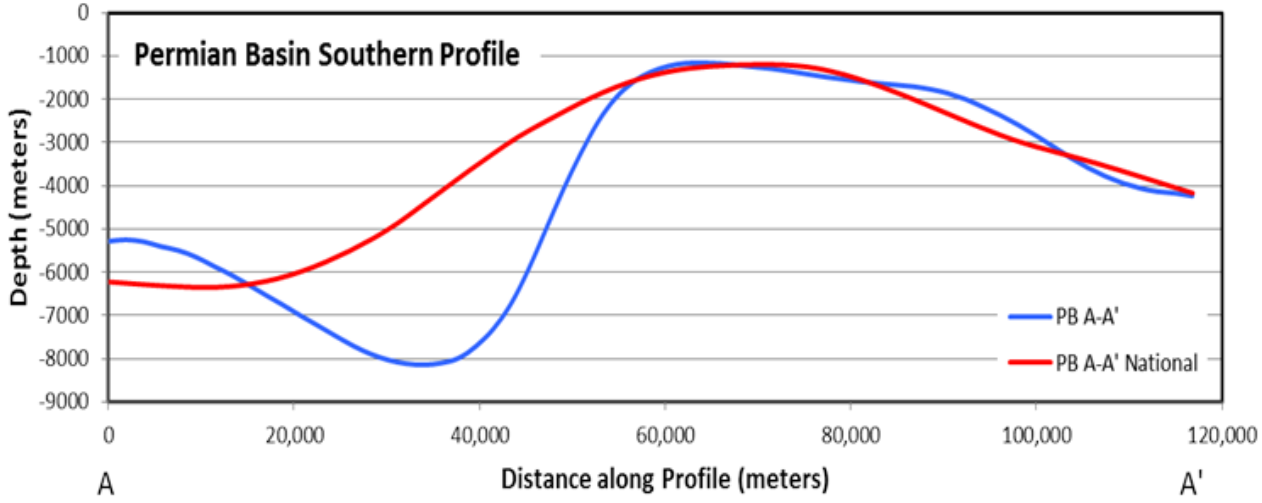
Differences in resolution and coverage between SMU national data and NM state data

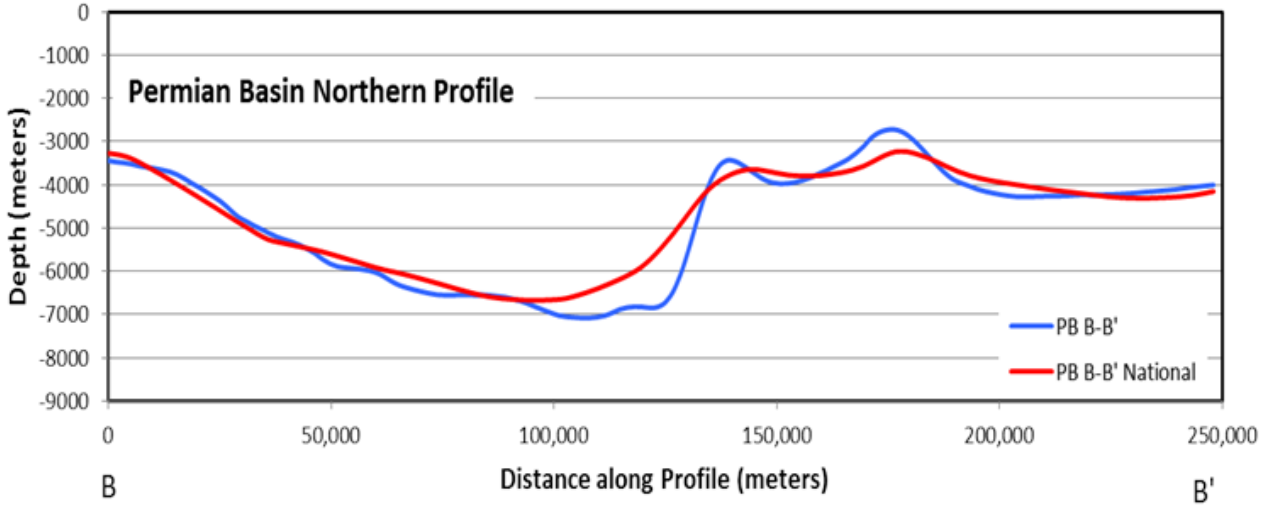
Permian Basin Difference Map



- Calculated by subtracting state-scale map from national map on cell by cell basis
- The largest differences in depth correlate with areas of high basement elevation relief as indicated by spacing of contour lines
- Depth profiles are used to visualize basement depth differences and interpret the differences between national and basin or state-scale maps

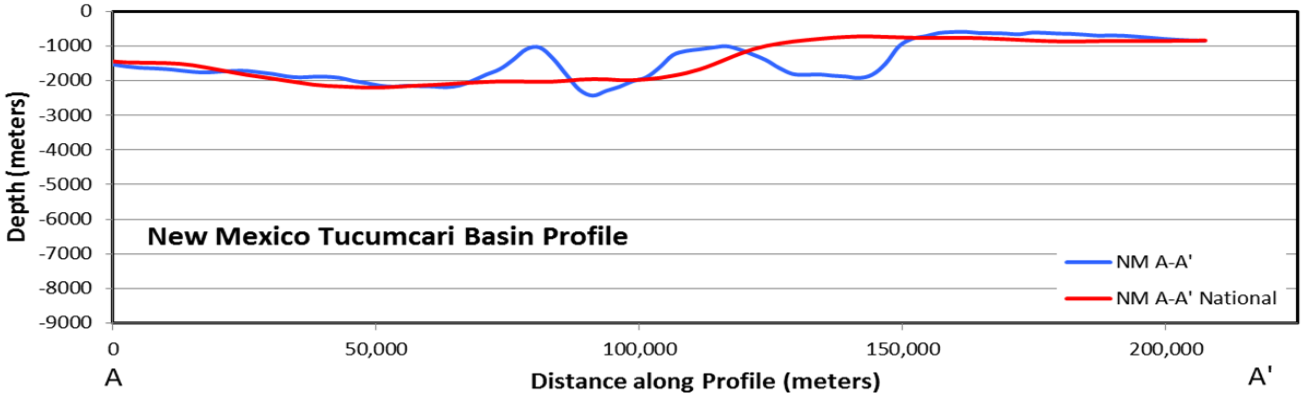
Permian Basin Depth Profiles

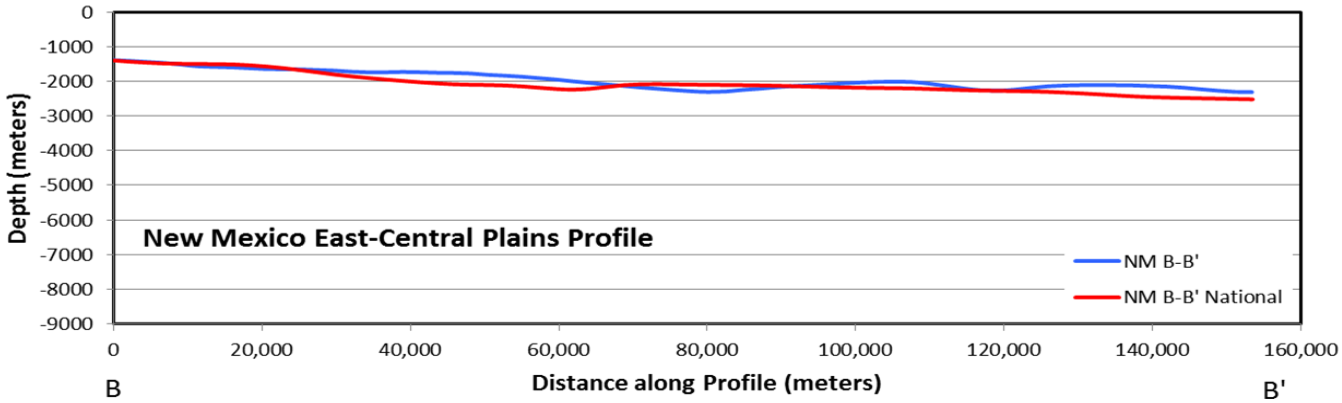




- National profile is smoothed relative to profile of basin-scale data
- Consistent with a larger 5 arc-minute grid spacing of the national map and the level of detail that it was intended to convey

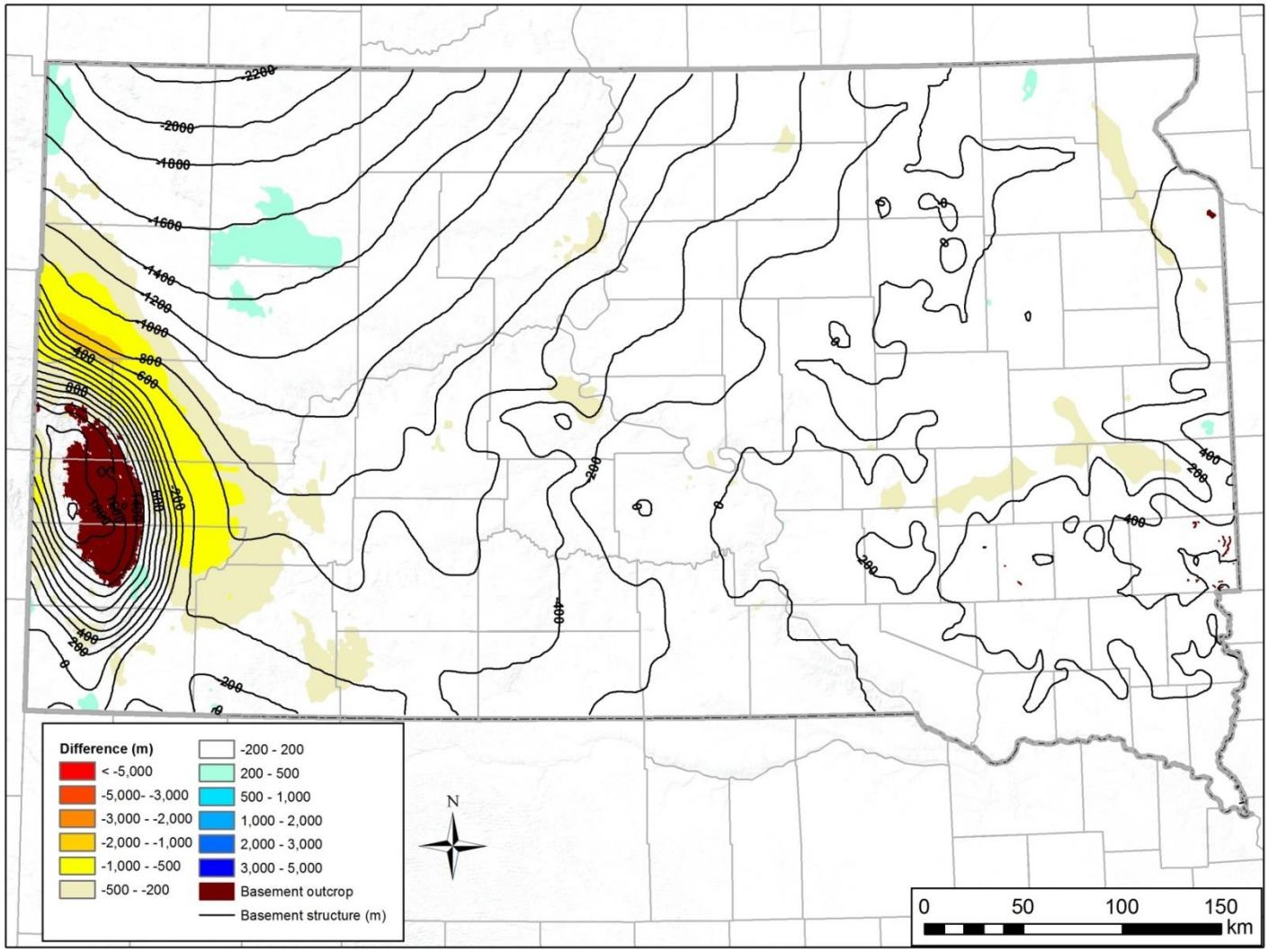
New Mexico Depth Profiles



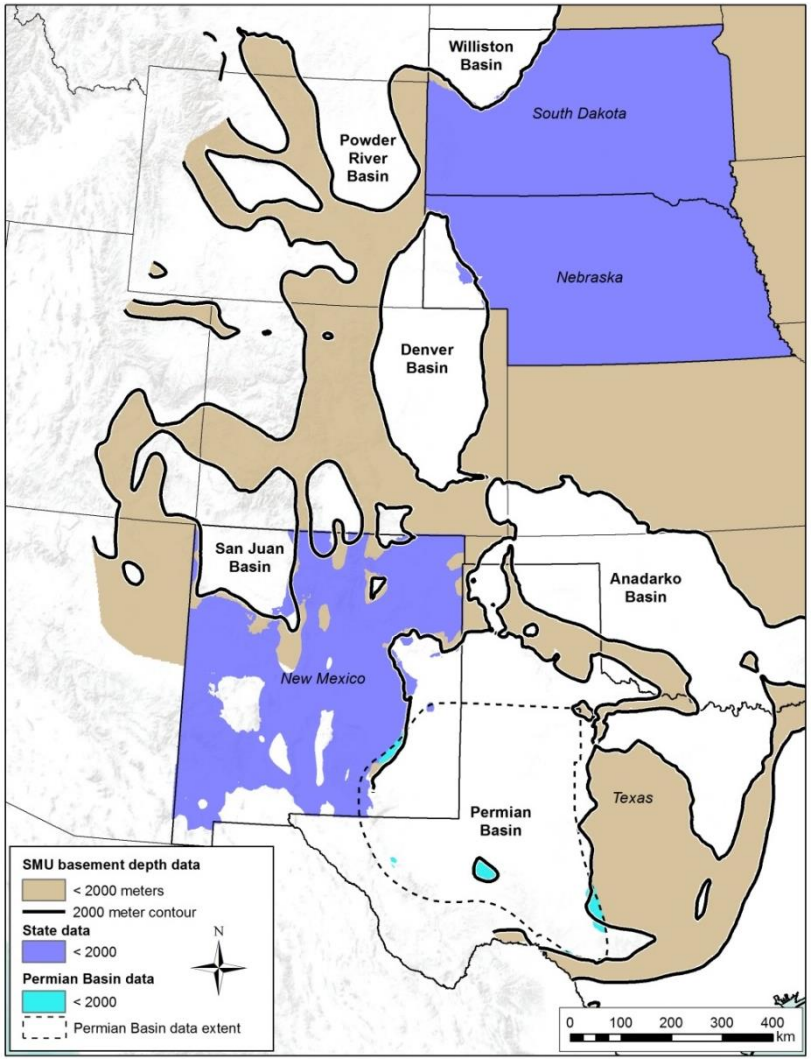


- In areas of moderate relief, national map does not capture full detail of depth variations (> 1km difference)
- In areas of minimal relief, agreement is very good (~± 200 m), comparable to majority of areas in states such as Nebraska and South Dakota

South Dakota Difference Map



Comparison of 2 km Depth Contour



- Overall, the agreement in the location of the 2 km depth contour is good for the areas we evaluated
- Maps at different scales also agree well on the overall extent of areas with basement at < 2 km depth, particularly in regions with little basement relief
- Areas with a large amount of basement relief show the least agreement, but these are areas that would generally be avoided because of basement structural complexity
- Access to actual borehole data will be important in some areas