

Used Fuel Disposition Campaign

Evaluation of Technical Siting Guidelines using the Regional Geology GIS Database

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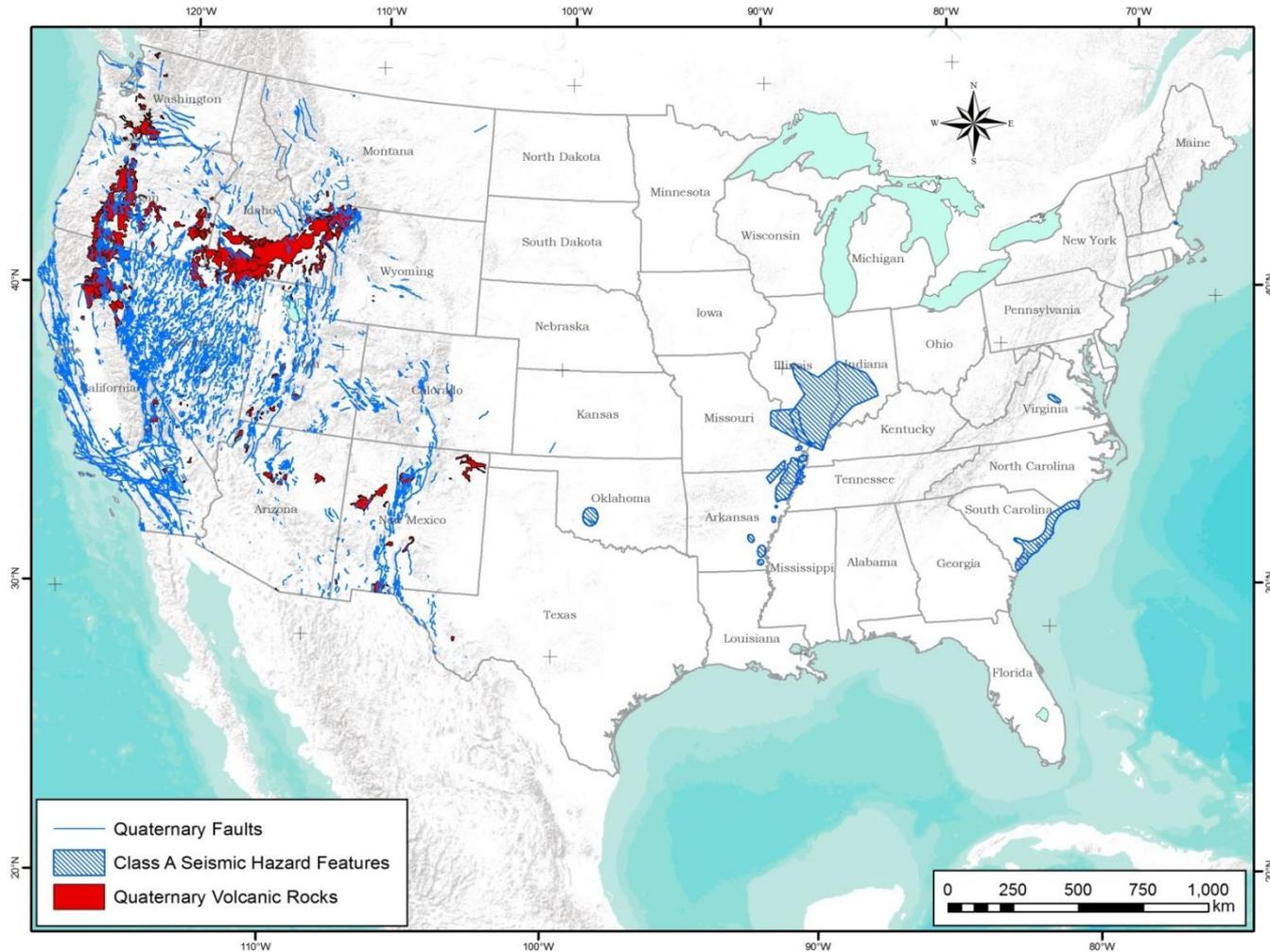
LA-UR-15-24686

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)

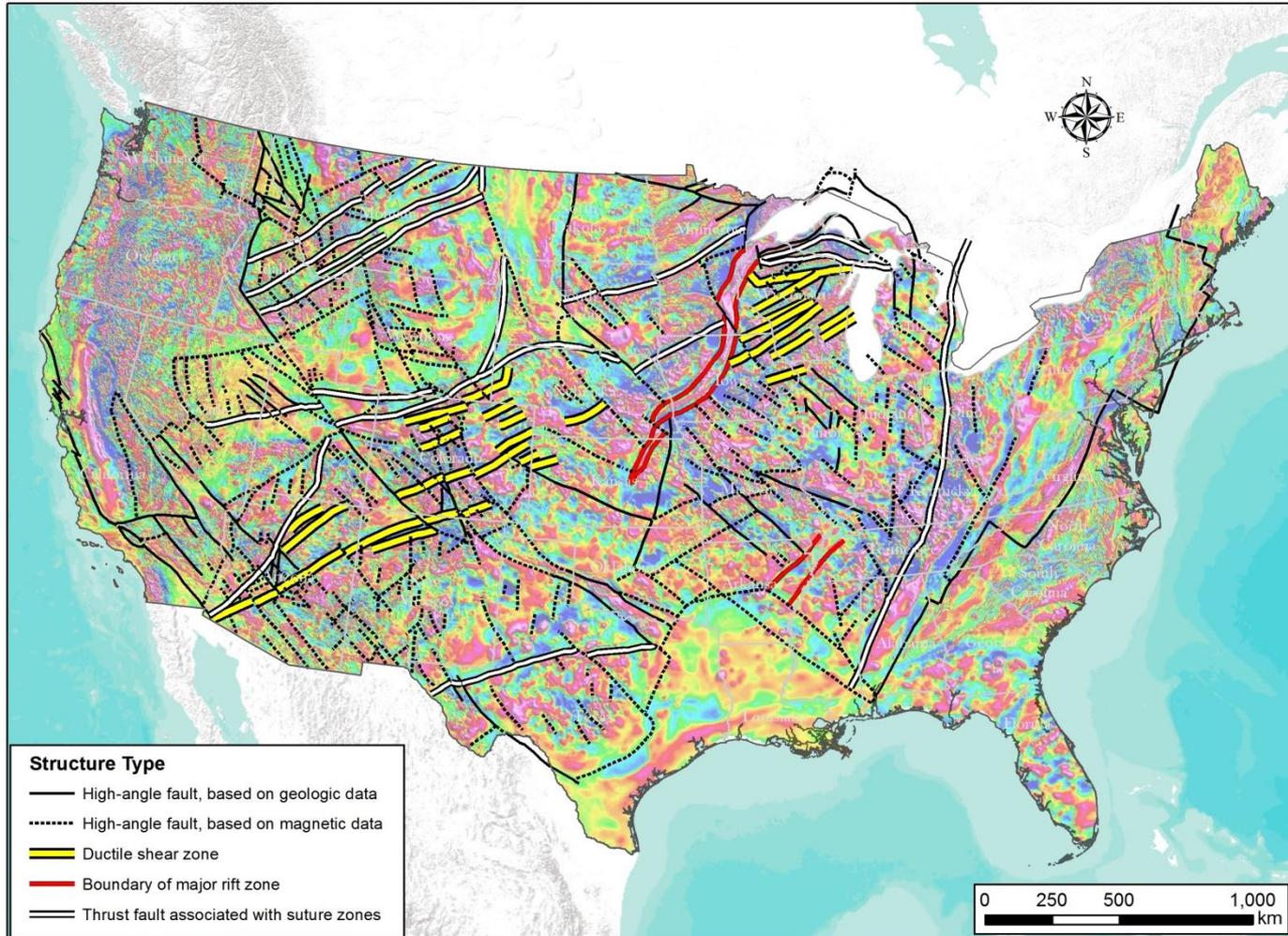
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Distribution of Quaternary Faults and Volcanism



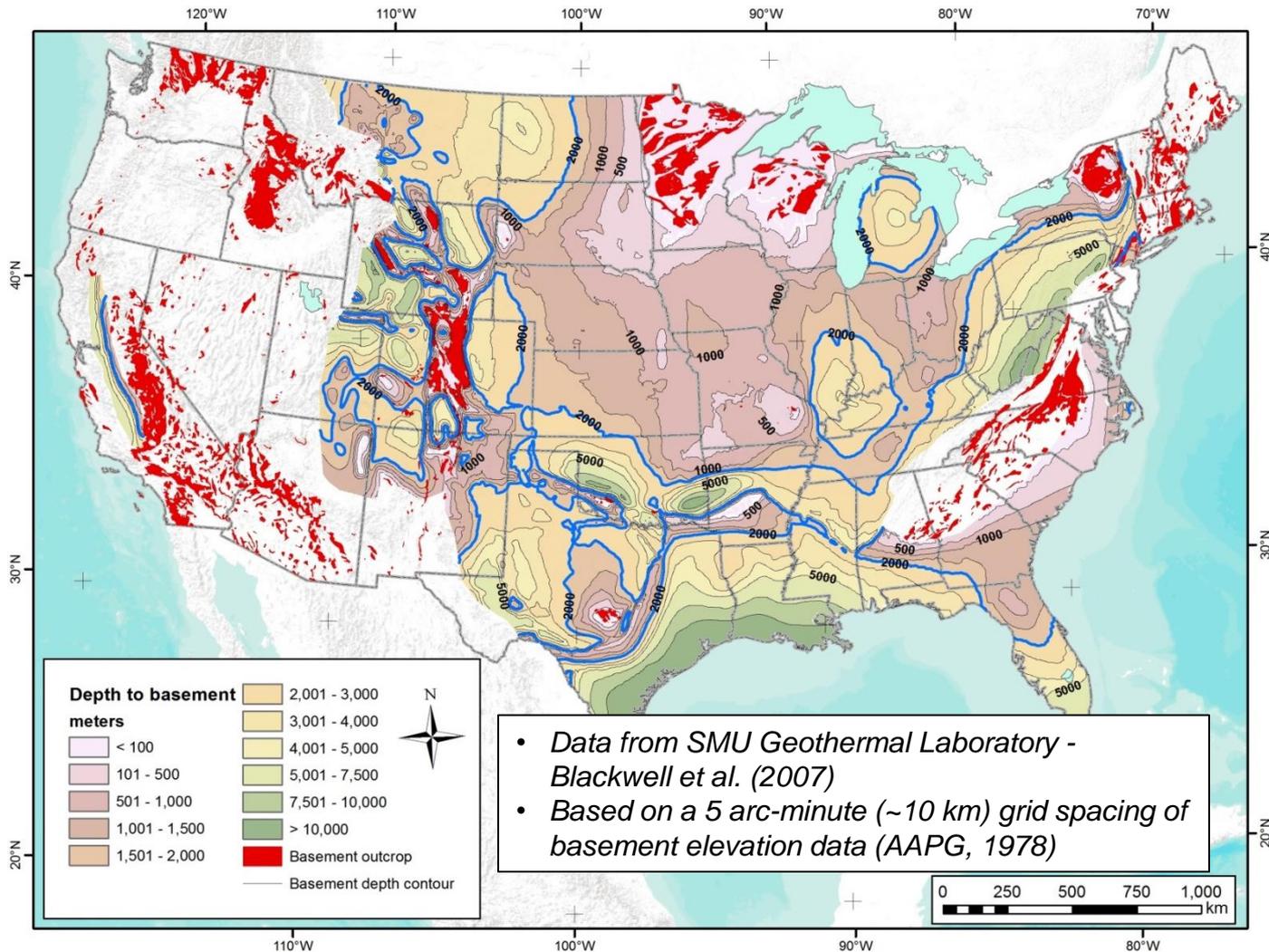
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Older Structural Features in Basement



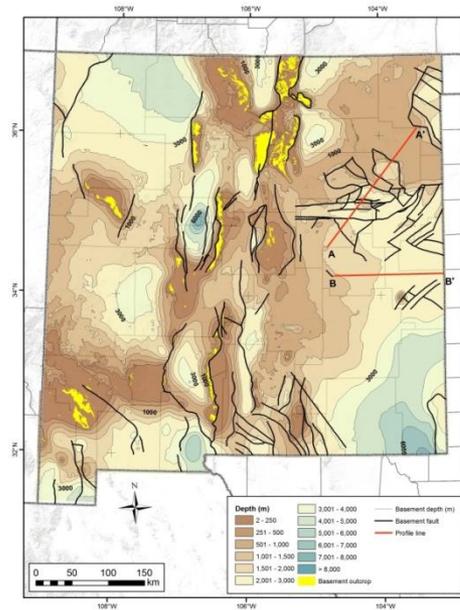
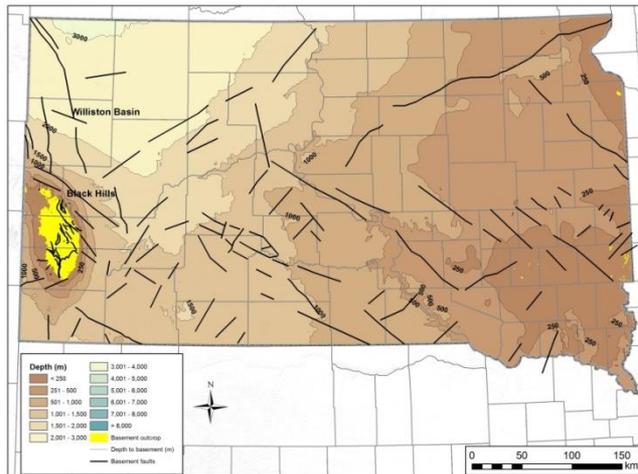
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Depth to Basement – National Scale

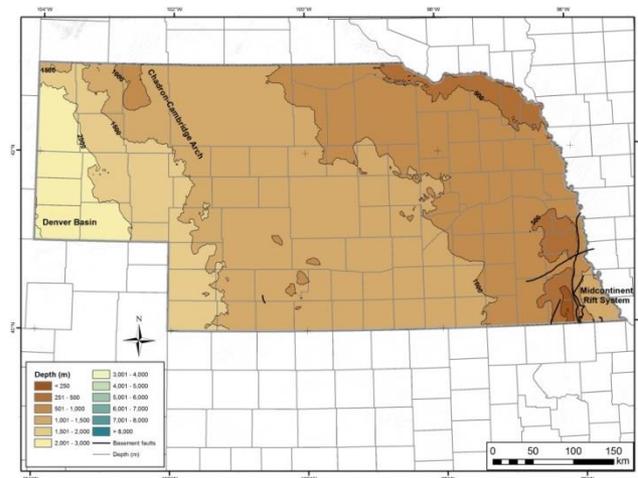


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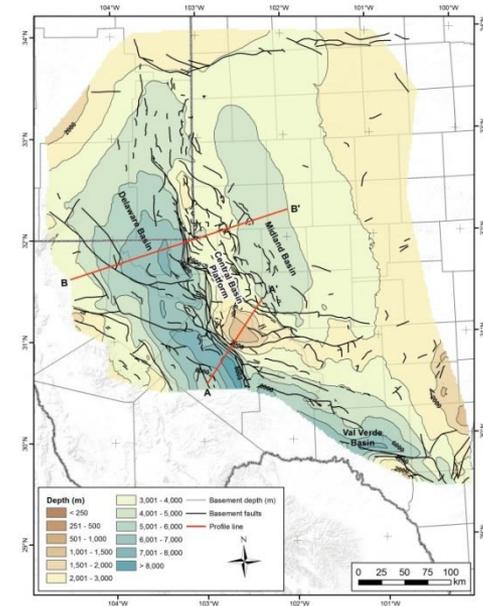
Depth to Basement Maps – State or Basin Scale



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

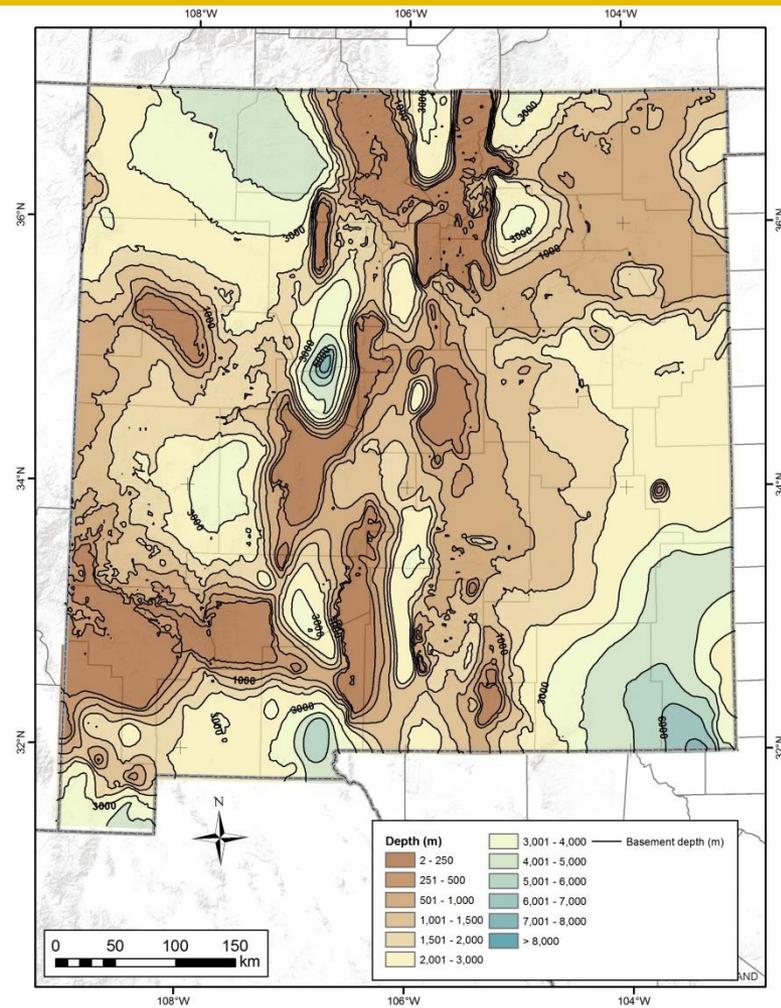
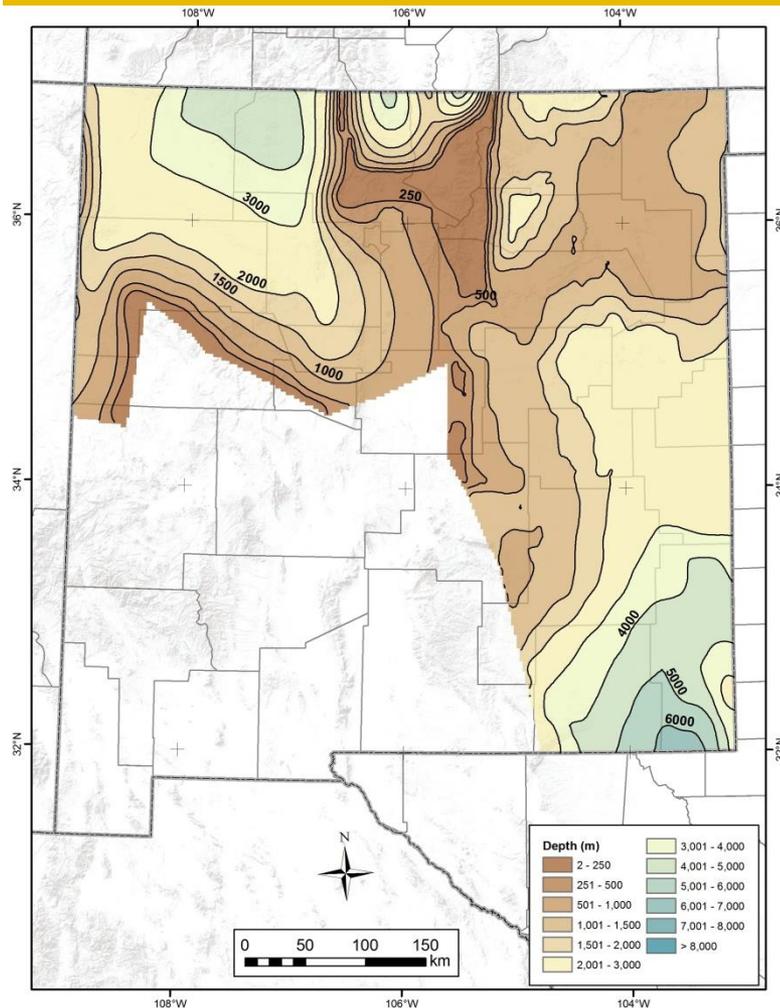


*Data:
McCormick et al. (2010)
U. Nebraska, School of Natural Resources
Broadhead et al. (2005)
Ruppel et al. (2009)*



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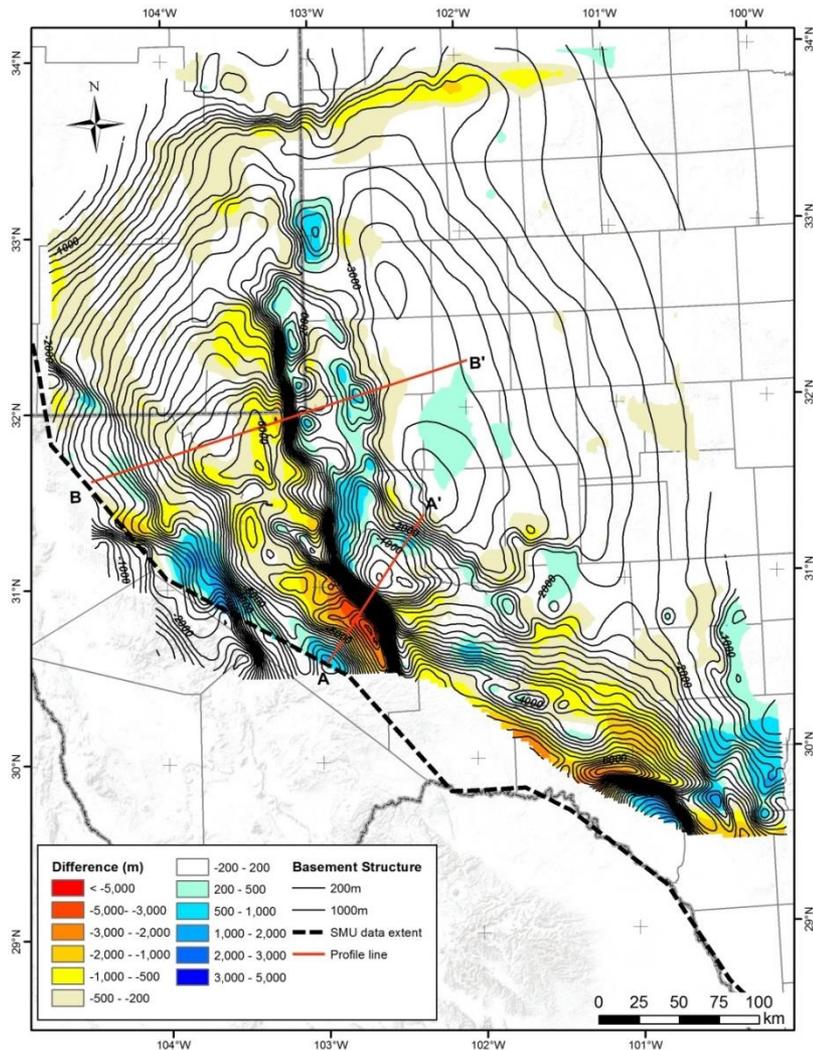
Depth Data at National and State Scales



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

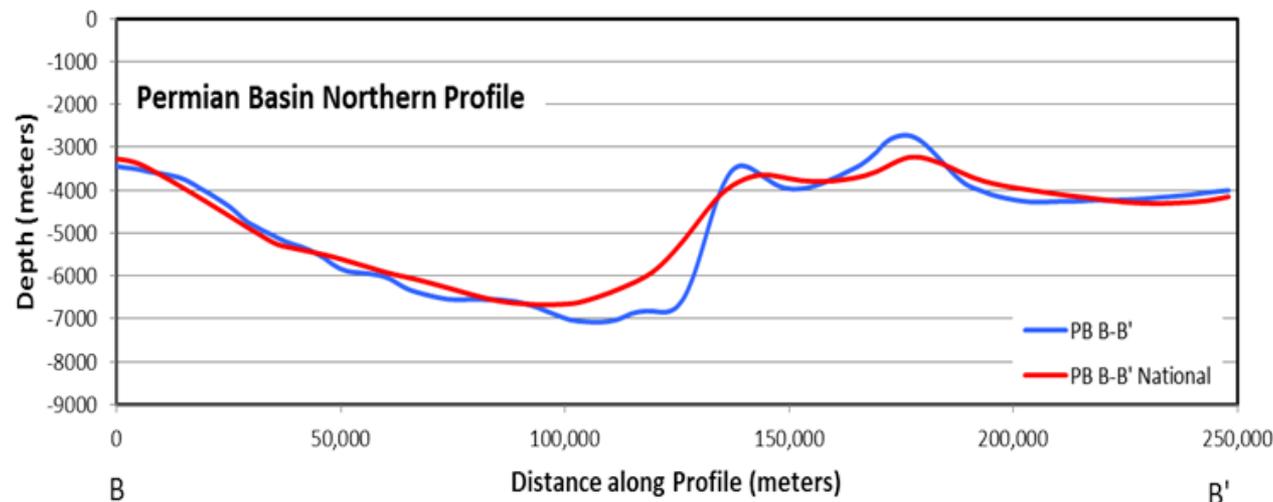
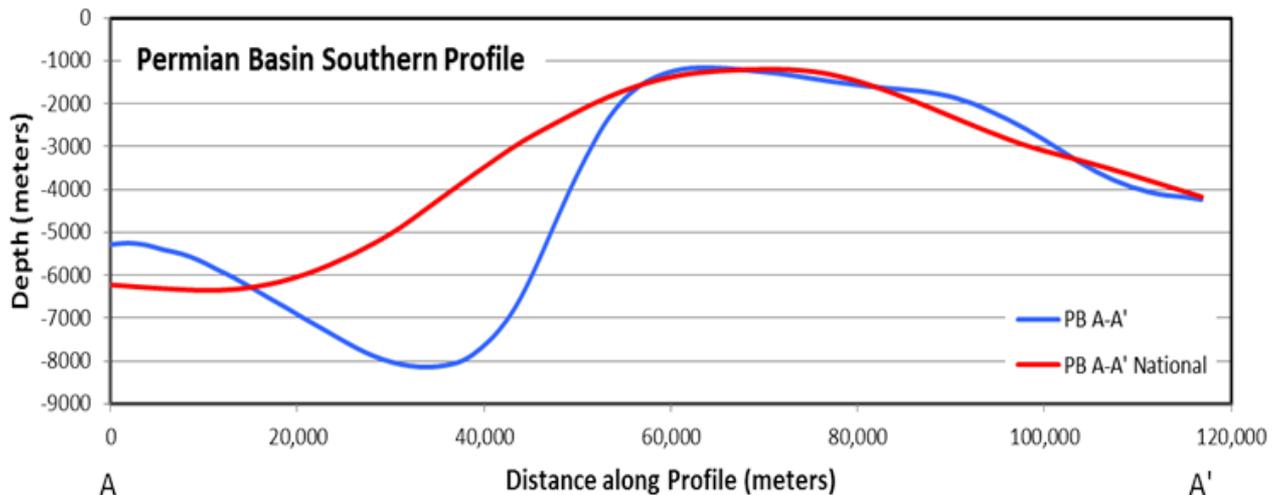
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Permian Basin Difference Map



- 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

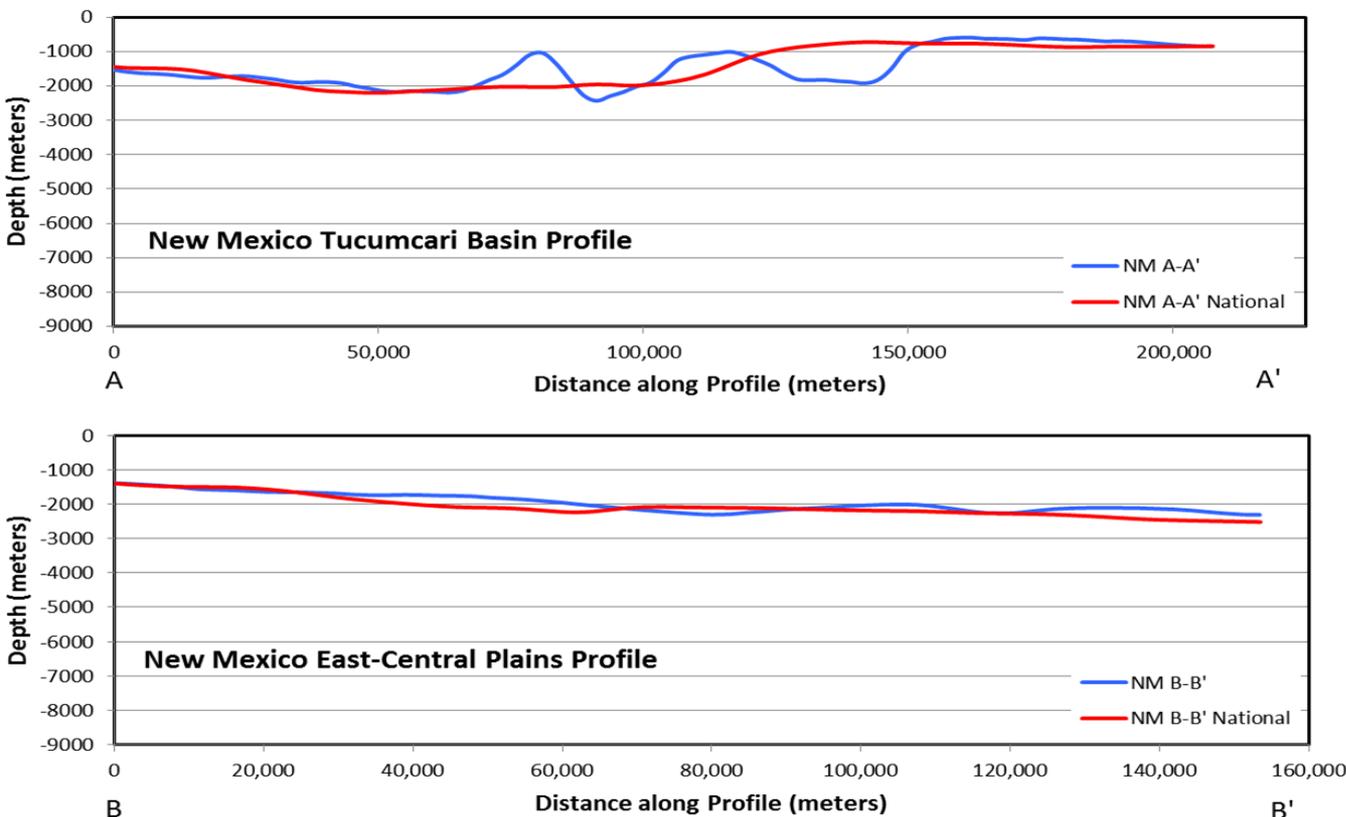
Permian Basin Depth Profiles



- 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

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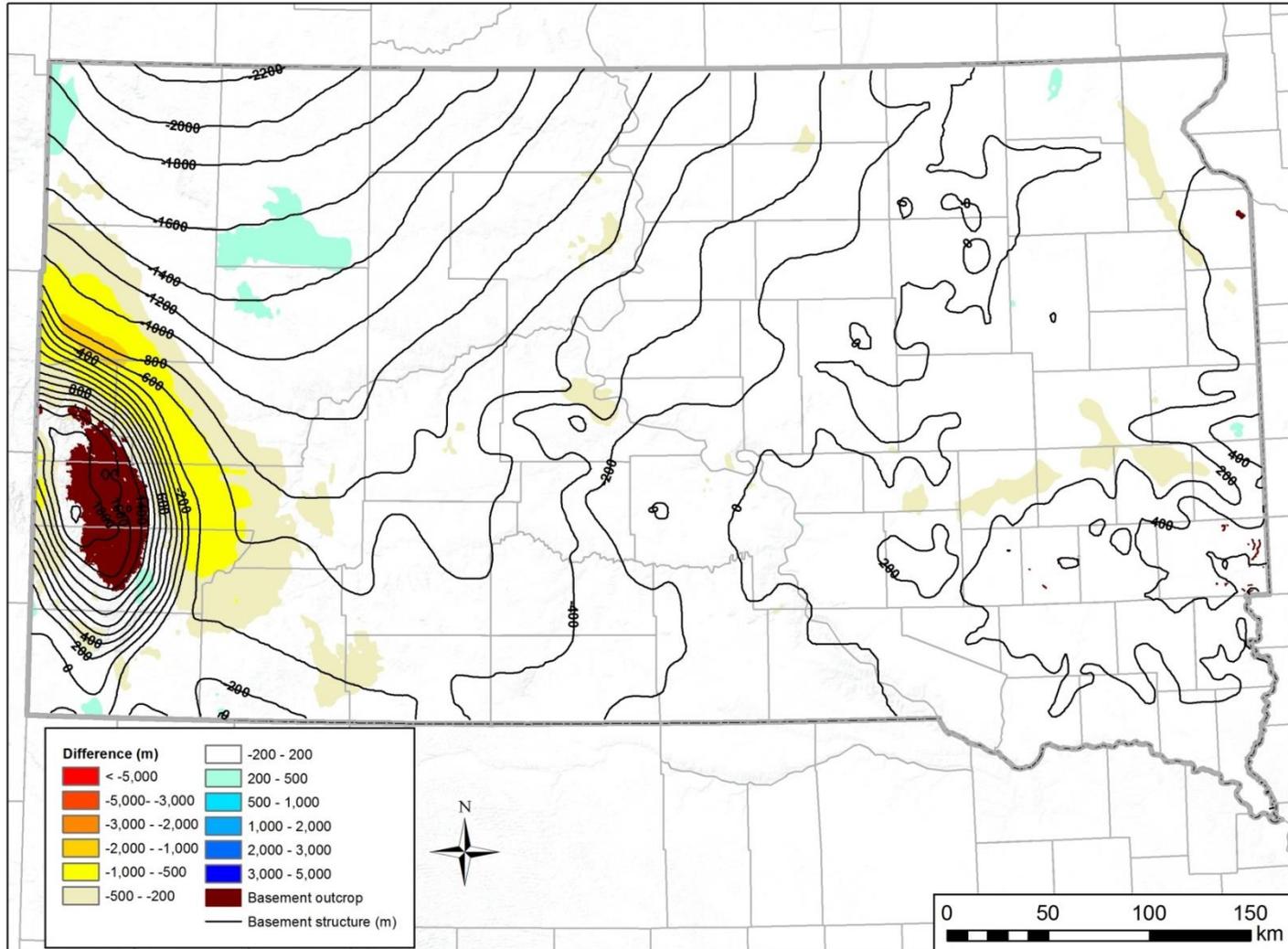
New Mexico Depth Profiles



- 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 ($\sim \pm 200$ m), comparable to majority of areas in states such as Nebraska and South Dakota

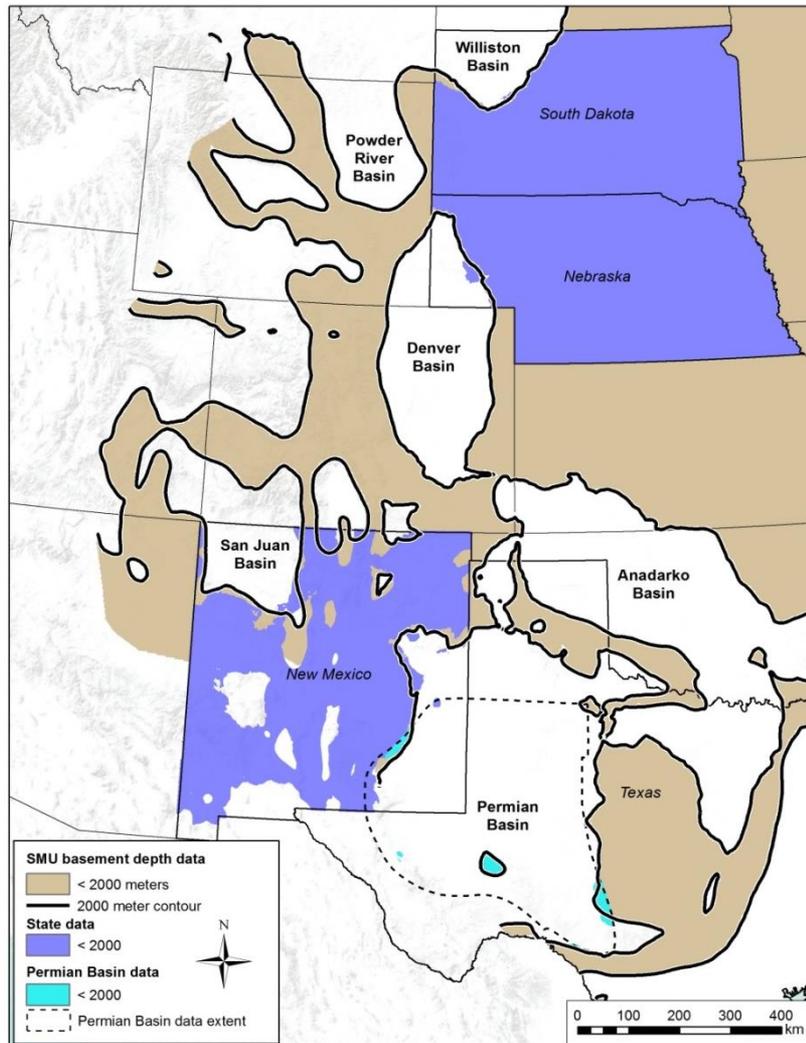
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South Dakota Difference Map



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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