THE PRE-BASALT BASEMENT GEOMETRY DELINEATED BY GRAVITY MEASUREMENTS NEAR KAMIAK BUTTE, EASTERN WASHINGTON

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Scientific Motivation

• To what extent does the Kamiak Gap provide a subsurface link between Palouse and Moscow/Pullman basins?

• Is there a hydraulic connection in the Grande Ronde basalt between the Palouse and Moscow/Pullman basins?

Research Objectives

- Use potential-field geophysics (gravity & magnetics) to define depth to basement within the Kamiak Gap.
- Constrain the subsurface geology of the Kamiak Gap using geologic and geophysical data.



Gravity

 $F = -G \frac{mM}{r^2}$



Measured in units of milliGals (mGals)

 $1 \text{ Gal} = 1 \text{ cm/s}^2$ $1 \text{ mGal} = 0.001 \text{ cm/s}^2$

Gravity Surveys









Gravity Reduction

- Tidal Effects
- Instrument Drift
- Latitudinal Variation
- Terrain Effects
- Atmospheric Correction
- Height Correction
- Theoretical Ellipsoid
- Bouguer Spherical Cap Correction
- Removal of regional trend

Bouguer Anomalies



Gravity Models



Bouguer Anomalies













Conclusions

Predicted maximum depth to basement is about 300 meters Average thickness of loess is about 40 meters Wanapum thickness ranges from 30 to 50 meters Latah sediments have an average thickness of 60 meters and a maximum thickness of approximately 100 meters The Grande Ronde is not continuous through gap, based on

the best fit model predictions