

Earthscope Seminar

DISCUSSION SUMMARY

APRIL 2, 2007

PRESENTER: **Angela Magee**

NOTE-TAKER: **Chunpeng Zhao**

PAPER TITLE: Upper mantle structure beneath the eastern Colorado Plateau and Rio Grande rift revealed by Bouguer gravity, seismic velocities, and xenolith data

AUTHORS: Roy, MacCarthy, and Selverstone

This paper uses Bouguer gravity data along five parallel profiles across the Colorado Plateau to model uppermost mantle density contrasts. Then they converted modeled density contrasts to seismic velocity variations for comparison with regional seismic data. Also they compared modeled densities to calculated densities from xenoliths. They find a large wide region of low uppermost mantle density beneath the eastern Colorado Plateau margin, Jemez Lineament, Rio Grande rift and parts of westernmost Great Plains.

The discussion of this paper focused primarily on the proper interpretation of the 6 figures. On figure 1, there are three similar ways to change density: material, pressure and temperature. John drew a gravity anomaly picture to help us understand the meaning of anomaly (color) showed on Fig2. We can see from Fig2 that the most negative anomaly is beneath the Colorado Plateau which stands for the lowest density region. But Figure 2 is kind of not very clear to help people understand it. The color scale is strange and it will be helpful to make some other filtered pictures.

Figure 5 is a little confusing for us. But at the end we all agree that the purpose of this figure (model) is to let you get an abstract about what is going on here and help you to understand their modeling process. Another problem about this figure is why they ignore the most western anomaly of the data? It seems like

they just want to fit their model to the Colorado Plateau and Rio Grande Rift region so they did not care about that anomaly. This could be a weakness of this paper.

A large problem about Figure 6 is Vp velocity anomaly does not match with the gravity profile very well. And there are two blue regions on each side of the red regions of gravity model in Fig 6. Matt explained that this accounts for the two pulse aside the model signal in Fig 5 which stand for the density increase.

Finally, there are three implications proposed by this paper: Basalt extraction, Partial melt and high heat flow. Question is whether these implications are consistent with their modeling area.