

1. Our Mala GPR unit uses GroundVision to process data. For each of the following GroundVision filters, explain what it does, why you use it, and the consequence of not using that filter.

a. DC Removal

b. Band Pass

c. Time Varying Gain

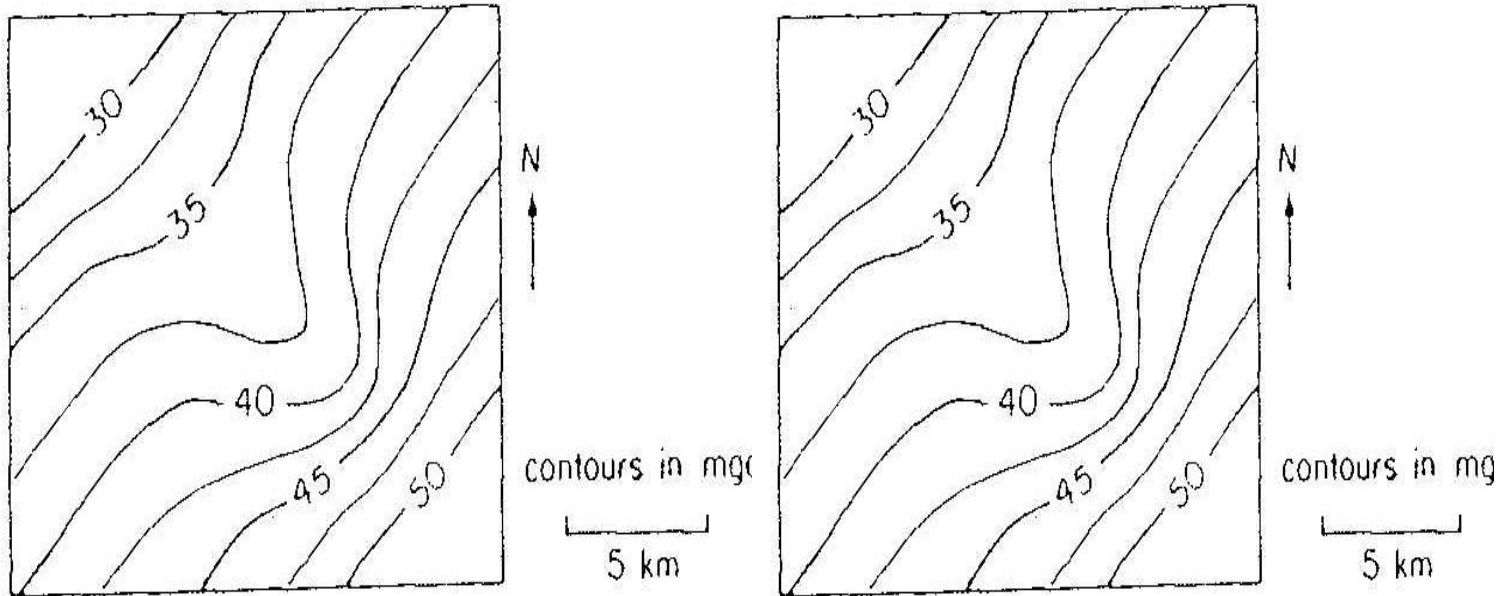
d. Subtract Mean Trace

2. Examine the complete Bouguer anomaly map shown below. Assume the regional gravity variation is caused by a lateral change in the thickness of the crust.

- a. Draw contours for the regional on the left map and the residual on the right hand map; use a 2.5 mgal contour interval. Indicate (hachure) lows or highs. **Neatness and accuracy count here.**

Contour the regional:

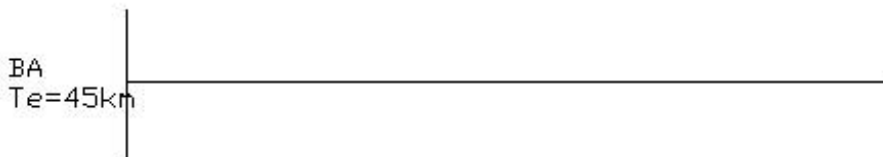
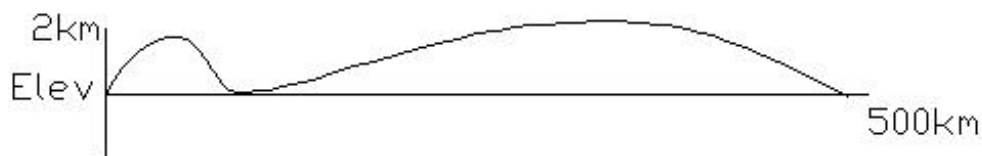
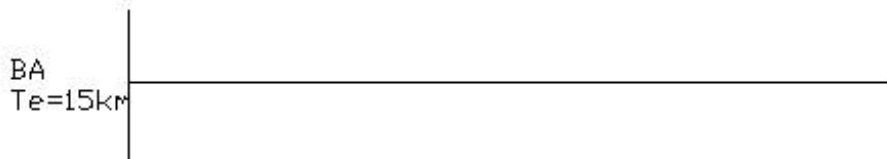
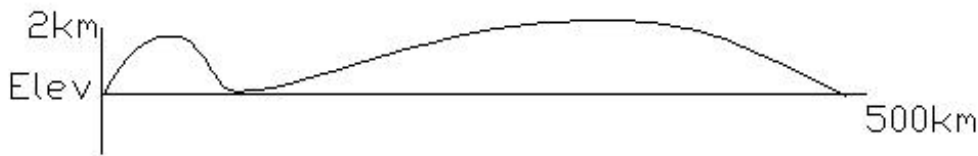
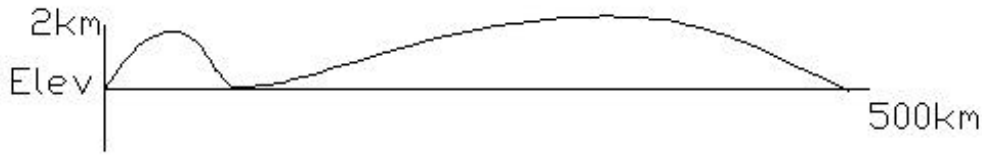
Contour the residual:



- b. Which explanation of the local Bouguer anomaly is most probable? Sedimentary rocks of density $2,500 \text{ kg/m}^3$ are intruded by (1) rock salt with density $2,200 \text{ kg/m}^3$ or (2) granite with a density of $2,750 \text{ kg/m}^3$. Explain and justify your thinking.

- c. In which direction is the crust thickening? Why?

3.) Each of the three sketches below has the same constant density topography. I want you to provide (on the provided graph) the expected Bouguer anomaly for each case. Each one has a different elastic thickness for the crust beneath the topographic load (as labeled; 4 km, 15 km, 45 km). Label your graphs as necessary and use the room to the side (below, on back, ...) to EXPLAIN YOUR REASONING.



4. I showed that the deflection of continental lithosphere due to the loading of periodic topography is:

$$w(x) = \frac{h_0}{\left[\frac{\rho_m}{\rho_c} - 1 + \frac{D}{\rho_c \cdot g} \cdot \left(\frac{2 \cdot \pi}{\lambda} \right)^4 \right]} \cdot \sin\left(\frac{2 \cdot \pi \cdot x}{\lambda}\right) \quad \text{where:} \quad D = \frac{E \cdot h^3}{12 \cdot (1 - \nu^2)}$$

Explain (define) the variables and constants: h_0 , ρ_m , ρ_c , D , g , E , h , ν , and λ - mention their geophysical context.