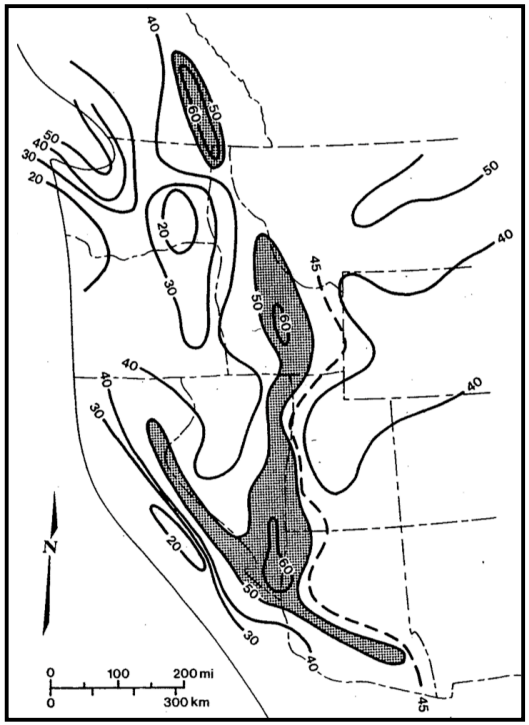
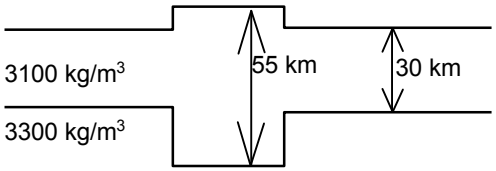
The northern Basin & Range averages about 1.5 km in elevation, in spite of a thin crust of ~30 km thickness. All of western U.S. has been elevated by about 2 km in the Cenozoic, so the northern B&R would be about 0.5 km below sea level under normal conditions (much like the Aegean Sea, on back of this page).

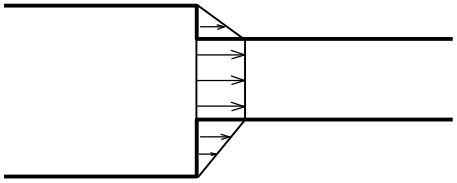
After the Sevier orogeny, the crustal thickness in eastern Nevada averaged about 55 km thick.

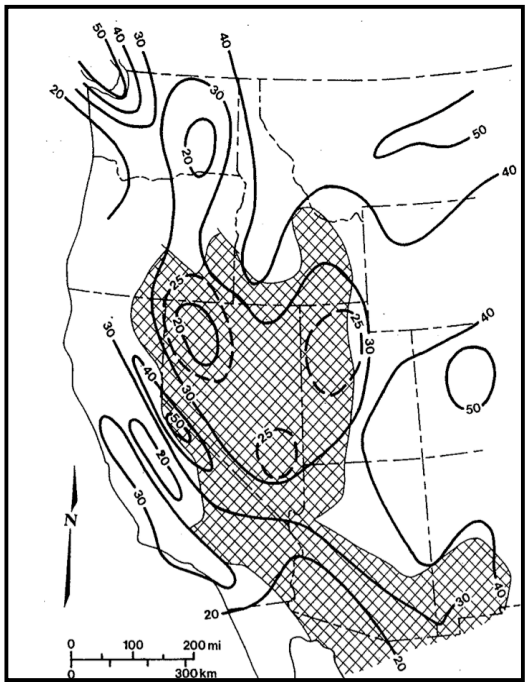



**1)** Estimate how high the Sevier Mountains were.
Assume average crustal and mantle densities as shown to the right.




**3)** *For geology majors only*:
The weight of the mountains pushing down creates a high pressure that pushes on the adjoining crust. The figure to the right shows the pressure excess created by the mountain (compared to the adjoining crust). Calculate the force that this mountain range applies on the adjoining crust (per unit distance in and out of the page). At any depth, assume the pressure is $\rho g z$ for density $\rho$, gravity g = 10 m/s$^2$, and depth z in meters. Or easier, use $\Delta\rho g z$ for $\Delta\rho$ being the density difference at depth z.



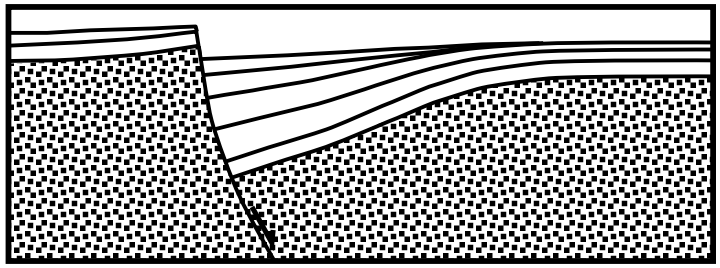



**2)** The core complex extension and intense volcanic activity accompanied each other as they propagated north to south across the northern B&R. A question has been:

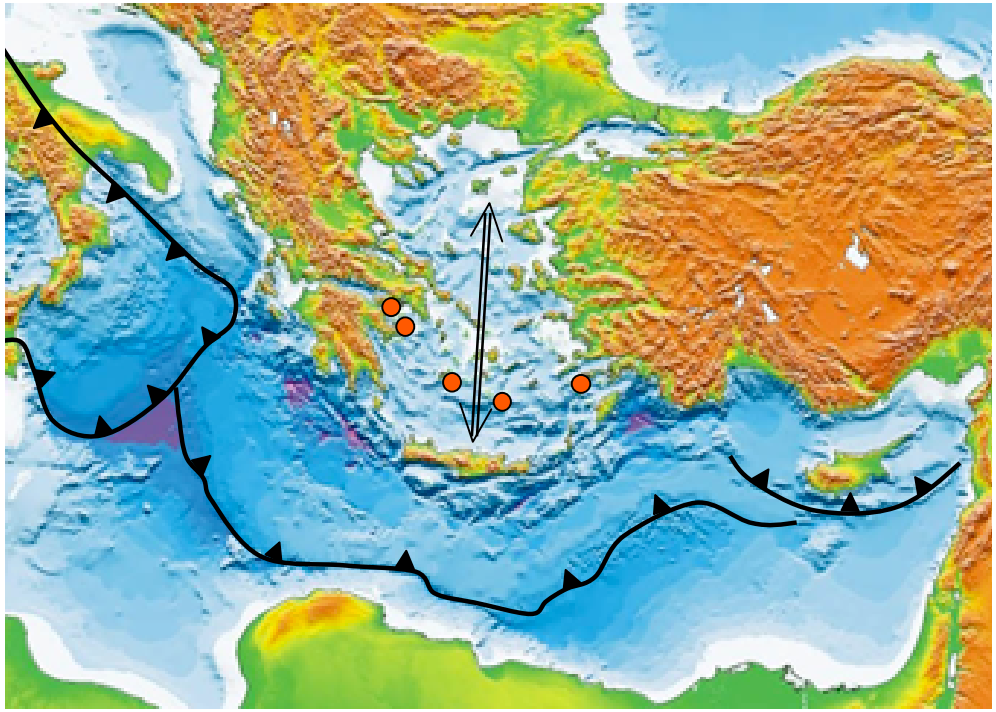
- did gravitational collapse of the Sevier mountain mountain range cause lithospheric thinning that drove the volcanism, or
- did the volcanism weaken the lithosphere and allow the gravitational collapse to occur?

Below is shown a valley created by a normal fault created during extension, and filled with volcanic sediment on top of basement rock. This represents the relations found in central NV.

Which of the above options do you favor, and why?



**Eastern Mediterranean Sea, with Aegean Sea between Turkey and Greece.**

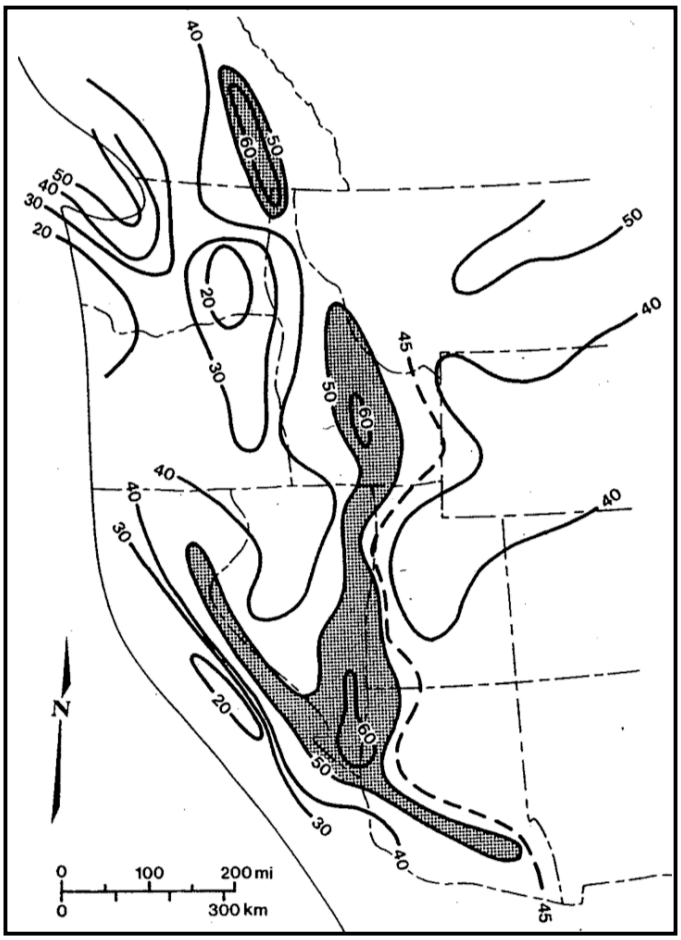


The Aegean is highly extended continental crust pulled apart as the Hellenic subduction retreats to the south.

Volcanic arc (red-filled circles) lie within the extended Aegean Sea.

Crete is part of the topographic divide between thrust belt to the south and the Aegean to the north.

**Evidence for major east-west crustal shortening during the Sevier orogeny**




Estimated crustal thickness after Sevier orogeny. This would have created a north-trending topographic high running through Nevada.