Figure 7. Relationship between topography and crustal thickness. A) shows the smoothed topography for the CREST array. CREST stations are shown by black dots, TA stations by red dots and US stations are shown by blue dots. Major cities are denoted by white dots. Thin dashed lines outline the Colorado Rockies. B) shows the smoothed crustal thickness map derived from the CCP stack. Thick dashed line denotes a possible proterozoic suture. C) is a scatter plot of Moho depth vs elevation for the data in A) and B). D) is a 2-D histogram of the scatter data in C).

- elevation and crustal thickness are anti-correlated
- correlation coefficient: -0.37
Sources of Buoyancy to support the Rockies
Crust thinnest (46-48 km) under the Colorado Dome. Topographic support by low velocity/density crust, isostatic mantle, and mantle flow pressures.

Receiver Function crustal thickness

AFT denudation rate
>150 m/Ma 5-10 ma

Degree 24-61 Geoid

Mean crustal shear wave velocity
TA-only versus TA+CREST $P_m$s moho depth comparison

TA data (Gilbert): 40-45 km thick at Colorado dome

CREST: 44-46 km thick beneath most of Colorado dome
Li et al. versus TA+CREST $P_{m\text{s}}$ moho depth comparison

CREST: 44-46 km thick beneath most of Colorado dome
Zurek and Dueker, CDROM volume
Zurek and Dueker, CDROM volume
Deep Probe:
Crosswhite and Humphreys
Average crustal thickness of 46.8 km in the Colorado Plateau, 45.2 km in the Great Plains, thinning to only 35 km thick in the Rio Grande rift (RGR).

Possible sub-crustal discontinuities

Crustal thickness in the Colorado Plateau is not significantly different than the Great Plains, so excess CP elevation is not from thick crust alone.
Great Basin

- House Range
- Cricket Mtns.
- Pahvant Range
- Sevier Plateau
- Awapa Plateau
- Boulder Mtn.
- Circle Cliffs uplift
- Lake Powell
- San Juan river
- Monument uplift
- Defiance uplift
- Zuni uplift
- Mt. Taylor
- Rio Grande rift

Moho

Colorado Plateau receiver function image
Figure 1. Topography, stations, and crustal shear zones. Geographic features denoted as: Sierra Madres, SM; Medicine Bow Mountains, MB; Laramie Mountains, LM. In the Laramie Mountains, the Palmer Canyon block (PCB) and Laramie Peak block (LPB) are labeled. The black dashed line denotes the CDROM refraction line and the nearby triangles are the broadband seismometers. The Cheyenne belt suture (CB) is the white line, dashed where inferred. Other major shear zones are denoted with gray lines: Laramie Peak shear zone, LPSZ; Farwell Mountain–Lester Mountain suture zone, FLSZ; Soda Creek–Fish Creek shear zone, SFSZ; Skin Gulch shear zone, SGSZ. The location of the Stateline Kimberlite District (SLKD) and Iron Mountain District (IMD) are shaded red.
Yuan and Dueker, CDROM volume
Schmandt and Humphrey
Body wave tomogram comparison

Figure 5.12: Comparison of regional P-wave tomograms along cross section C. (a) Burdick et al. (2010) (b) Schmandt et al. (2010).
CDROM 410-LVL
410 diapirs?
Ambient noise images: Stachnik
(left) Ambient noise x-sections

(right) vertical velocity gradient
(left) Ambient noise x-sections

(right) vertical velocity gradient
Yuan et al, in review: case for a 150 km thick lid beneath Colorado
Yuan et al, in review;
Mean SV, Xi, G parameters
Yuan et al, in review: Isotropic SV velocity
Yuan et al, in review: Isotropic SV velocity
Yuan et al, in review: Azimuthal anisotropy
Yuan et al, in review: SV/SH parameter
Yuan et al., in review; at Four Corners area the lithos seems about 150 km thick.
Yuan et al, in review: In NE Utah a changing set of anisotropic parameters