cords a change from estuarine swamp/marsh depositional environments to a more open-marine environment around the time of the Cenomanian-Turonian boundary.

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Low angle detachment along the Great Unconformity near the Colorado Plateau- Basin and Range breakaway: arguments against a tipped crustal section in the Gold Butte area, southern Nevada

Low angle extensional faults in the southern Virgin Mountains follow the Great Unconformity over lateral distances of >1000 km^2. Detachment took place along subhorizontal bedding horizons in Cambrian Tapeats, Bright Angel, and Muav formations such that thinned flat-lying para-autochthonous sections of these lower Paleozoic rocks remain in the footwall adjacent to Proterozoic basement over a wide region. Above the detachment, extensional allochthons containing upper Paleozoic through Tertiary (18 Ma) rocks exhibit 30-80° E-tilting due to westward translation. This implies that major breakaway faults in this region initiated and moved at low angle and had ramp-flat geometry analogous to thrusts. Thus, isostatic footwall uplift is not required to explain the presence of low angle faults. Instead, Paleozoic cover was translated westward in domino blocks sliding generally along the Great Unconformity for tens of km west of the Grand Wash fault. Similar relationships are observed in the North Virgin Mountains and other para-autochthonous Proterozoic culminations north of the Gold Butte block, suggesting that this low-angle fault system forms a regional ramp-flat detachment system west of the Colorado Plateau. Ar-Ar dating of K-feldspars across the Gold Butte block show Proterozoic cooling ages and a general younging to the west, consistent with deeper exposed levels. Thermal models suggest the west end of the block was at depths <10 km prior to Miocene extension rather than at 15-18 km deep as suggested by the tilted crustal section model.

KELLER, G. RANDY

Lithospheric Architecture of the Colorado Plateau and Its Margins

Because of its tectonic significance, the lithosphere of the Colorado Plateau and its margins has been the subject of much recent debate and interest. On the Plateau itself, recent seismic results present conflicting values for crustal thickness. Some of this variation probably reflects actual complexities in crustal structure. However, some of these results suggest the presence of a high-velocity (>7.0 km/s) layer at the base of the crust. A variety of technical and physical considerations make such a layer hard to detect unless it is ~10 km thick. Our group has used receiver function analysis to determine crustal thickness and Vp/Vs ratio estimates for the southern Colorado Plateau based on the analysis of teleseismic P-waves recorded at Canyon de Chelly National Monument, Arizona and at Chaco Culture National Historic Park, New Mexico. These new data were combined with seismic refraction and gravity data in an integrated analysis of lithospheric structure. The receiver functions were stacked together in clusters of similar back azimuths and epicentral distances. Using crustal velocity values from previous studies as constraints, the receiver functions from the two stations suggest an upper crustal layer approximately 24 km thick with a Vp/Vs ratio of 1.85 (which corresponds to a Poisson's ratio of 0.29). The lower crust is about 23 km thick with a Vp/Vs ratio of 1.88 (corresponding to a Poisson's ratio of 0.3). The thickness for the whole crust is approximately 47 km. Although errors in this number may be as large as +/- 5 km, this result supports arguments based on seismic reflection and refraction data for a thick crust (45-50 km) for the Colorado Plateau, and for a crust that is more mafic in composition than typical continental crust. Based on buoyancy arguments, gravity data in the region agree with seismic results and suggest that no major variations in crustal thickness occur across the southern plateau. This crustal structure is in fact very similar to that of the Great Plains in eastern New Mexico, which is an area that shares many of the geologic characteristics of the Plateau. The Basin and Range province has also been the target of several recent seismic experiments. The results from the SSCD, DELTA FORCE, and PACE experiments in the Basin and Range province of southern Nevada, California, and western Arizona show that while the crustal thickness is surprisingly uniform, there are some intriguing variations. The velocity models derived from these experiments coupled with analysis of gravity data reveal some intracrustal features that can be correlated with extensional regimes. In particular, the lower crust in the seismic models thickens in regions where extension is greater. The regions with thickened lower crust also correlate with long wavelength gravity highs. These results suggest that the mechanism for maintaining crustal thickness during extension can be either magmatic underplating or lower crustal flow or a combination of these processes. The margins of the plateau are associated with a variety of lithospheric structures. The Wasatch Front margin is particularly interesting and can be interpreted as a "rift within a rift" because of its velocity structure and the abrupt transition in crustal thickness into the Plateau. The southwestern and eastern margins are more gradual in terms of variations in crustal thickness but both have strong reflectors in the lithospheric mantle. These reflectors can be interpreted to lie at or near the lithosphere-asthenosphere boundary.

KENDELL, CARL F.

Structure and Stratigraphy of Late Tertiary Rocks in the Subsurface: Rush Lake Area, Iron County, Utah

In 1992-1993 a 2-D seismic grid was shot in the Rush Lake-Parowan Gap area of Iron County, Utah. The grid is comprised of 7 lines of high resolution 40 fold vibroseis data totaling about 36.5 line miles. The shoot was supplimented with about 12 miles of preexisting purchase data to fill in some gaps in the grid.

The resulting processed record sections from the shoot not only show the half-graben nature of the valley and it's bounding faults, but also clearly defines much detail in the faulting which occurs within the Late Tertiary sediments themselves. The thickest section of sediments, and apparent depocenter of the basin, is located beneath Rush Lake. Rising