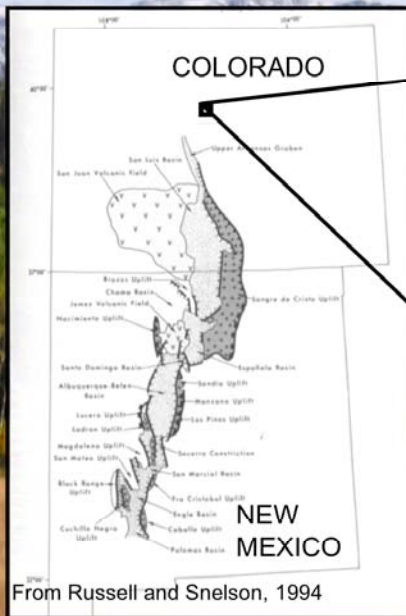


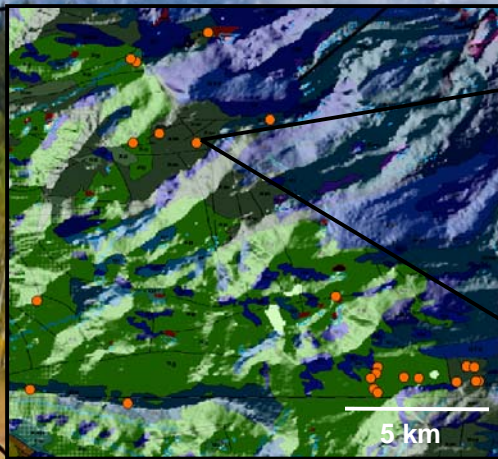
# Investigation of Pliocene cooling and exhumation in the Gore Range, Colorado by apatite (U-Th)/He thermochronometry

*Rebecca Flowers, Department of Geological Sciences, University of Colorado at Boulder*

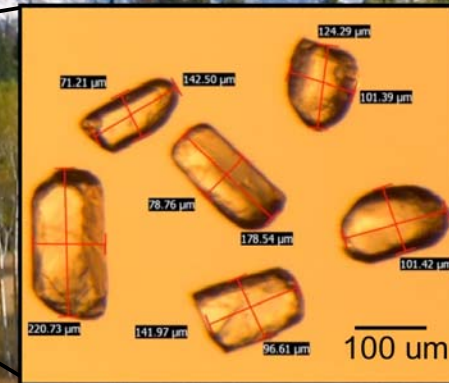
The Colorado Rockies are characterized by some of the highest elevations in the continental United States. There is no consensus on when these mountains attained their elevations or on the mechanisms responsible for uplift. Some studies suggest that the Rockies reached their current elevations during Early Tertiary contraction; others infer that the region experienced regional uplift as recently as the last few million years due to mantle upwelling associated with the Rio Grande Rift. One of the few locations in the Rockies with evidence of significant Late Tertiary faulting is the Gore Range and adjacent Blue River Valley in central Colorado, representing the northernmost significant manifestation of the Rio Grande Rift. The apatite (U-Th)/He and  $^4\text{He}/^3\text{He}$  thermochronometry methods are sensitive to temperatures as low as 30 °C. We are using these methods to resolve the detailed timing, rates, and magnitudes of cooling and unroofing in the Gore Range during Late Tertiary time. These results will also bear on the uplift history of the central Rockies, and the timing and nature of basin development during the propagation of the Rio Grande Rift. The PRF funding is supporting Rachel Landman's MSc thesis at the University of Colorado. Rachel has collected 48 samples in various stages of processing, and has sent the first apatite suite for both (U-Th)/He and  $^4\text{He}/^3\text{He}$  analysis with results expected by November.



Regional setting of Rio Grande Rift. The Gore Range and Blue River Valley represent the northernmost extent of the rift.



Simplified geological map of southern Gore Range with locations of samples collected during summer 2009 field season marked. The green and blue represents the distribution of Precambrian crystalline rocks and Quaternary sediments, respectively.



Reflected light images of apatite crystals extracted from a Gore Range sample. These apatites were hand-picked for their morphological and inclusion-free characteristics. They are currently undergoing (U-Th)/He analysis.