DIFFERENTIAL MOVEMENT OF DISCRETE CRUSTAL BLOCKS DURING NEOGENE UPLIFT OF THE SOUTHERN APPALACHIAN BLUE RIDGE PROVINCE

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Introduction Background Methods Results Discussion Cenozoic rejuvenation of topography

- Hack , 1982
 Rock control & differential uplift
- Nystrom , 1986
 Miocene sediments from Blue Ridge
- Dennison and Stewart, 2001, 2006 Lineaments and Miocene uplift
- Gallen et al., 2011, 2013 Miocene uplift and stream profiles









Topographic domains





Topographic domains









$k_{sn} = S * A^{\theta}$

*k*_{sn} = normalized steepness

S = slope

A = drainage area

 θ = concavity









































































Uplift of the Blue Ridge – Blocky

- Contrasting stream geometry and topographic style suggest differential uplift
- Discrete zones are bounded by topographic lineaments





36°N







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Uplift of the Blue Ridge – Broad and Blocky

Cracking and formation of blocks and lineaments





Uplift of the Blue Ridge – Broad and Blocky

Cracking and formation of blocks and lineaments

Discussion

Conclusions

- Smokies and Black Mountains
 - pre-Miocene uplift : high relief
 - more resistant lithology
 - no knickpoints
- High plateaus of the Cullasaja, Watauga, and New Rivers

Conclusions

- pre-Miocene uplift : low relief
- less resistant lithology
- many knickpoints

Conclusions

- Broad uplift of mountain range produced local separation of crustal blocks
- Lineaments bound zones of contrasting topography

Conclusions

- flat topography in upper reaches
- steep topography in upper reaches
- Varying degrees of stream equilibrium

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East-West Normal Faults

East-West Dextral Normal Faults

Paleostress inversion

