



Erosion of the Colorado Plateau mantle lithosphere

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The Colorado Plateau is a stable Proterozoic province in the western US that has been relatively unaffected by compressional and extensional tectonic events during the Cenozoic. Since Late Neogene however, basaltic magmatism has been widespread on the Colorado Plateau edges, and the edges have been uplifted with respect to the interior of the Plateau. Tomographic images show that seismic wave velocities are slow below the Colorado Plateau edge, and receiver function results indicate that Moho and lithosphere-asthenosphere boundaries are discontinuous below the center of the Plateau.

These observations could be explained by the formation of edge-driven convection cells at the Colorado Plateau edge, and destabilization of the interior mantle lithosphere. The lithospheric edge formed during extension and thinning of the Basin and Range and Rio Grande Rift provinces. Results of numerical models show that the edge of the Proterozoic lithosphere is eroded, and a lithosphere instability might be forming below the Plateau. The lithosphere erosion results in decompression melting, magmatism and uplift of the Plateau edge. The instability disturbs the Moho and lithosphere-asthenosphere boundaries below the Plateau interior.