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The Tectonic Evolution of the Central Andean Plateau and Geodynamic Implications for the Growth of Plateaus

ABSTRACT: Current end-member models for the geodynamic evolution of orogenic plateaus predict (1) slow-and-steady rise during crustal shortening and ablative subduction (i.e., continuous removal) of the lower lithosphere, or (2) rapid surface uplift following shortening, associated with punctuated removal of dense lower lithosphere and/or lower crustal flow. We will review results from a recent multidisciplinary study of the modern lithospheric structure, geologic evolution, and surface uplift history of the Central Andean Plateau to evaluate the geodynamic processes that have formed the Plateau. Comparison of the timing, magnitude, and distribution of shortening and surface uplift, in combination with other geologic evidence, highlights the pulsed nature of plateau growth. We will discuss specific regions and time periods that show evidence for end-member geodynamic processes, including middle-late Miocene surface uplift of the southern Eastern Cordillera and Altiplano associated with shortening and ablative subduction, latest Oligocene-early Miocene and late Miocene-Pliocene punctuated removal of dense lower lithosphere in the Eastern Cordillera and Altiplano, and late Miocene-Pliocene crustal flow in the central and northern Altiplano.