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TOPOGRAPHIC SIGNAL OF FAULT DISPLACEMENT, FAULT PROPAGATION, AND ROCK UPLIFT IN THE COYOTE HILLS ON THE NORTHEASTERN MARGIN OF THE LOS ANGELES (LA) BASIN

Topographic signal of fault displacement, fault propagation, and rock uplift in the Coyote Hills on the northeastern margin of the Los Angeles (LA) basinTopography above blind thrust faults is an integrated signal of fault-related rock uplift, erosional modification of the emergent anticlinal crest, and base level fall rates of adjacent basins. The relative contribution of these variables is explored via analysis of topography and bedrock structure of the Coyote Hills, which have formed due to shortening across the Coyote Hills blind thrust fault (CHBT). Bedrock structure beneath the hills consists of a west-trending, south-vergent asymmetric anticline that is continuous with the La Habra syncline to the north. Rock uplift rate, based on base San Pedro Formation (~1.2 Ma) structural relief relative to the LA basin (LAb) on the south, varies from ~0.6 to 0.8 mm/yr from west to east for the anticlinal crest, whereas the La Habra syncline is characterized by a ~0.5 mm/yr rate. Transverse antecedent streams display an apparent right lateral separation, which reflects a combination of progressive along-strike crestal emergence and minor westward lateral translation of the Coyote Hills relative to the Puente Hills on the north. Channel elevation, gradient, and basin dissection and relief of consequent streams increase systematically from the west to east. Northward advection of south-flowing consequent channels and location of the drainage divide north of the structural crest result from southward and upward translation of rock on the CHBT relative to the LAb and the concomitant along-strike variations in base level lowering rates for both south- and north-flowing channels. Fault segmentation and geomorphic variables each lead to along-strike topographic variation and are not easily decoupled.