

COLLABORATIVE RESEARCH (UNIVERSITY OF SOUTHERN  
CALIFORNIA, HARVARD UNIVERSITY AND THE  
U. S. GEOLOGICAL SURVEY): A NEW METHODOLOGY FOR  
DEFINING CONCEALED EARTHQUAKE SOURCES -  
APPLICATION TO THE PUENTE HILLS BLIND-THRUST  
SYSTEM, LOS ANGELES, CALIFORNIA - 01HQGRO101

Final Project Report

February 15,2001- February 14,2002

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Program Element II

Key Words: Quaternary Fault Behavior, Paleoseismology, Fault Segmentation

**Summary**

As part of our ongoing development and testing of a multidisciplinary methodology for studying the paleoseismology, earthquake potential, and kinematics of recent deformation of blind thrust faults, we completed borehole transects at two sites across the tip of the forelimb growth triangle above the Puente Hills blind thrust fault (PHT). The location of the active PHT beneath the heart of the Los Angeles metropolitan region makes it one of the most potentially hazardous faults in the United States. Our borehole results reveal discrete periods of uplift along the central, Santa Fe Springs segment of the PHT. We attribute these uplift events to four large (Mw0) earthquakes that have occurred along the PHT since ~ 12 ka. To the best of our knowledge, this is the first time that individual paleo-earthquakes have been identified directly from an active blind thrust fault. We have also generated Holocene slip rates at the two sites that are similar to the 1-1.5 mm/yr long-term rates for the PHT identified during our 2000 work on the PHT (Shaw et al., in press).