**The Santa Ana Mountains: Indenter Tectonics and the Earthquake Hazards of “The OC”**

**The convergence of the 5-6 mm/yr northwest-vergent Peninsular Ranges (Santa Ana Mountains - SAM) and the ~1 mm/yr south-vergent Transverse Ranges (Puente Hills) lies within the Santa Ana River canyon in the southeastern LA Basin.**

**The collision of these two terranes has had a profound effect on the local geology and geomorphology, and is serving as the driving mechanism for most of the seismic hazard for Orange County.**

**The complexity of this convergence is clearly expressed by E-W trending folds and thrusts on the northern nose of the SAM and the southernmost Puente Hills in the Santa Ana River canyon, and by the dispersed microseismicity within the collisional zone.**

**The model temporally and kinematically explains**

1. **the right-lateral slip on the Whittier fault as the southern LA Basin escapes westerly,**
2. **the accelerated uplift and folding within the Eastern Puente and Chino Hills due to the convergence, the oblique, right-lateral, reverse slip on the Chino fault by folding and uplift of the Chino Hills,**
3. **the uplift and segmentation of Loma Ridge by oblique convergence of the SAM and the southern LA Basin sedimentary fill,**
4. **the repeated northward offset of Santiago Creek by left-lateral shearing,**
5. **the uplift of the Coyote Hills by oblique convergence,**
6. **the folding and uplift of the Anaheim and Peralta Hills by shortening due to compressional over-thrusting,**

**7) a left-lateral solution for the M5.4 July 29, 2008 Chino Hills earthquake by easterly escape tectonics, and**

1. **a potential but previously unrecognized left-lateral shear zone along the western side of the Santa Ana Mountains. The concept is essentially an Indian subcontinent indenter model but at a much smaller scale.**

**The significance of this model is that while many of the faults and folds created by the collision are small seismic sources, they also pose a myriad of potential surface rupture hazards within this densely urbanized region.**