

# Department of Atmospheric Sciences Seminar Announcement

Department of Atmospheric Sciences, S.O.E.S.T., University of Hawai'i at Mānoa  
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## Orographically Induced Vertical Motion on Oahu

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**Date: Wednesday, November 12, 2014**

**Refreshments: 3:00pm – 3:30pm at MSB Lanai.**

**Free Cookies, Coffee, & Tea Provided**

**Seminar Time: 3:30pm**

**Location: Marine Sciences Building, MSB 100 Auditorium**

### **Abstract:**

The weather on Oahu is dictated in large part by the orographic forcing by the Ko'olau Mountain range. Using a high-resolution vertical motion diagnostic model with  $0.0005^\circ$  grid spacing, vertical wind speeds are calculated over the island. The model initialization is done with uniform  $10 \text{ m s}^{-1}$  winds, and the wind direction is gradually varied. For northeast trade winds, the Ko'oalu Range ridgeline produces a maximum vertical motion enhancement. As the winds become more northerly, easterly, or southerly, the geometry of the orography increases in importance and preferential locations of upward motion are observed. Comparing the winds from  $0^\circ$  and  $90^\circ$ , the concave headwall structures of the Ko'olau are shown to play a critical role in the vertical motion. The easterly wind causes enhanced vertical motion along the eastern facing arms of the headwalls, and the northerly winds have an identical effect on the northern facing arms. In addition, the location of the strongest vertical motion shifts. By forcing the computationally inexpensive model with downscaled operational WRF output winds, the high-resolution picture of vertical motion and precipitation generation can be observed operationally.