

# Bay Area Geophysical Society Seminar Series



**BAGS**  
BAY AREA GEOPHYSICAL SOCIETY

## Shallow-Depth Earthquake Fault Exploration and Lateral Evaluation Using Seismic Methods

Dr. Rufus Catchings

Research Geophysicist

Earthquake Science Center

United States Geological Survey

**February 24<sup>th</sup>, 2022 5 PM PST -- Zoom Talk**

### **Abstract:**

Locating and evaluating earthquake faults at shallow depths can be challenging, particularly for blind faults, faults in areas with high erosional/sedimentation rates, and in highly urbanized settings, where urbanization often obscures geomorphic evidence of the faults. However, near-surface active faults can represent major hazards to large populations and/or critical infrastructure worldwide. Invasive techniques, such as paleoseismic trenching, offer the clearest evidence of faulting, but long trenches cannot be economically excavated, particularly in highly urbanized areas or in areas where faulting is

distributed across kilometer-wide zones, such as at fault step overs. Even for known or previously identified faults, it is important to determine the fault lengths and connectivity to other faults, not only for the shaking and rupture hazards, but also because the maximum-magnitude earthquake that can occur on a given fault is directly related to the fault length. Although there are multiple seismological methods that can be used to identify, explore, and laterally trace near-surface faults in ideal geologic settings, I find that two methods, tomographic Vp/Vs ratio mapping and PGV of guided-waves evaluation, are highly robust and reliable. I present examples of these fault-zone exploration and evaluation methods in northern California, southern California, and in Beijing, China. Combinations of these and other techniques can be applied in nearly any terrestrial fault zone worldwide to help mitigate earthquake hazards.

### **Presenter's Bio:**



Rufus Catchings is a research geophysicist (seismology) at the U.S. Geological Survey's Earthquake Science Center at Moffett Field (Menlo Park), California. Catchings conducts seismic studies related to (i) earthquakes and other hazards, (ii) ground water and other resources, and (iii) tectonics. Catchings has served as advisor for more than 60 local, State, Federal, International, and private organizations. He has served as research advisor for MS and Ph.D. students from multiple universities and has more than 400 published works, including journal articles, reports, book chapters, and abstracts.

### **Zoom meeting information:**

Zoom ID: 984 3219 1171

Password: BAGS4ever