Science Forum Lecture Series

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William L. Ellsworth, Ph.D.

US Geological Survey

Wednesday
February 15, 2011
Argyros Forum 209C
1:00-2:00 p.m.

Light refreshments will be served

Earthquakes from the Top to the Bottom of the Magnitude Scale: Insights into Earthquake Physics from EarthScope

Earthquakes are among the most terrifying and deadly of all natural phenomena that we face on a recurring basis. In this century alone, earthquakes have been responsible for over 700,000 deaths worldwide. They strike without warning and occur throughout the world as a primary agent of tectonic activity and occasionally as unintended consequences of human activity. Why are earthquakes so difficult to predict and how well do our current models characterize the hazard they pose? One of many challenges faced by earthquake researchers is the enormous range of scales spanned by the phenomenon, from grain boundary fractures to 1,000 km-long ruptures of plate boundaries. Another challenge is the remoteness of the nucleation process, with rupture invariably beginning kilometers deep in the Earth. This talk presents an overview of the underpinnings of earthquake science and discusses important results being obtained from a new generation of scientific tools for studying earthquakes. These tools include: the first scientific drill hole into the earthquake nucleation zone of a major fault at EarthScope's San Andreas Fault Observatory at Depth (SAFOD); other EarthScope observatories, namely the Plate Boundary Observatory (PBO) network of geodetic instruments and the USArray of seismometers; similar geodetic and seismic networks around the world; and advanced computational approaches to the modeling and interpretation of earthquake processes.

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