

St. Anthony Falls Laboratory

Mississippi River at 3rd Ave SE

Ph: 612-627-4010 and on the web at: www.umn.edu/safl/seminars

Seismic singularity extraction and its relation to sedimentary transitions

Felix Herrmann

Earth Resources Laboratory

Department of Earth, Atmospheric and Planetary Sciences,
Massachusetts Institute of Technology

Wednesday, February 20, 2002

3:30 PM

Refreshments will be served at 3:00 PM

Abstract: Relating sedimentary records to seismic data is a major challenge. By shifting focus to a scale-invariant sharpness characterization for the reflectors, we develop an attribute that can capture and categorize the main reflector features, without being sensitive to amplitudes. Sharpness is defined by a scale exponent, which expresses singularity order and determines the reflection signature/waveform. Local scale exponent estimates are obtained with a new monoscale method. Compared to multiscale wavelet analysis, our method has the advantage of measuring transition exponents at a single fixed scale using a simple on-off criterion. The exponents contain amplitude variation information and describe lithological onsets. We create an image of the earth's local singularity structure by applying our method to seismic traces and well-log data. The singularity map facilitates interpretation, facies characterization, and integration of well and seismic data on the level of local texture.