



2012 SEG Distinguished Instructor Short Course (DISC)

May 21st 2012, 9.00 a.m.

eni Barbara Conference room, via Emilia, 1- S.Donato M.se, Italy

Elements of Seismic Dispersion: a Somewhat Practical Guide to Frequency-Dependent Phenomena

Chris Liner

(University of Houston)



➤ ABSTRACT

The classical meaning of the word dispersion is frequency-dependent velocity. Here we take a more general definition that includes not just wave speed but also interference, attenuation, anisotropy, reflection characteristics, and other aspects of seismic waves that show frequency dependence. At first impression, the topic seems self-evident: Of course everything is frequency dependent. Much of classical seismology and wave theory is nondispersive: the theory of P- and S-waves, Rayleigh waves in a half-space, geometric spreading, reflection and transmission coefficients, head waves, and so forth. Yet when we look at real data, strong dispersion abounds. This course is a survey of selected frequency-dependent phenomena that routinely are encountered in reflection-seismic data. The Learning goals are:

- ✓ gain a broad understanding of dispersive phenomena and related investigation tools
- ✓ understand the fundamental difference between intrinsic and apparent dispersion phenomena
- ✓ improve knowledge of the reflection process beyond the classic model
- ✓ provide an appreciation of historical development and a deep guide to the literature for self-study.

The main items of the lecture are Time and frequency, Vibroseis Harmonics, Near Surface, Anisotropy, Attenuation, Interference, Biot Reflection.

➤ WHO SHOULD ATTEND

The course is framed along the lines of acquisition, processing, and interpretation to contain material of interest to the entire spectrum of seismic geophysicists. The mathematical level of the course is generally on the advanced undergraduate level, but deeper aspects often are included for advanced readers. Familiarity with the Fourier transform and related topics will be beneficial. In all cases, theoretical developments are illustrated by examples or case histories.

➤ BIOGRAPHY

Christopher L. Liner joined the faculty of the University of Houston Department of Earth and Atmospheric Sciences in January 2008 and is now professor and associate director of the Allied Geophysical Laboratories industrial consortium. He earned a B.S. in geology from the University of Arkansas in 1978, a M.S. in geophysics from the University of Tulsa in 1980, and a Ph.D. in geophysics from the Center for Wave Phenomena at Colorado School of Mines in 1989. He began his career with Western Geophysical in London as a research geophysicist, followed by six years with Conoco. After a year with Golden Geophysical, he served as a faculty member of the University of Tulsa Department of Geosciences from 1990 to 2004. From 2005 through 2007, Liner worked as research geophysicist with Saudi EXPEC Advanced Research Center, Dhahran, Saudi Arabia. Liner's research interests include petroleum reservoir characterization and monitoring, CO₂-sequestration geophysics, advanced seismic-interpretation methods, seismic data analysis and processing, near surface, anisotropy, and seismic wave propagation. He served as editor of Geophysics in 1999–2001 and contributing editor to World Oil in 2010 and is an editorial board member for the Journal of Seismic Exploration. Liner has written many technical papers, abstracts for scientific meetings and the textbook Elements of 3D Seismology.

Online registration at <http://www.eageseg.org>. Deadline: May 16, 2012

The registration fee is 80€ for SEG members, 160€ for non-members.