

# **CREWES NEWS**

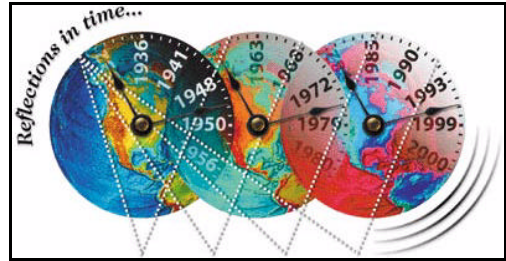
The Consortium for Research in Elastic Wave Exploration Seismology

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## CREWES at the CSEG

We invite you to visit our booth at the Canadian Society for Exploration Geophysicists (CSEG) meeting, May 4-6. Our booth, #909 in Exhibit Area A in the MacLeod Room, will be located alongside other booths from The University of Calgary Department of Geology and Geophysics. We look forward to seeing those of you who are in, or can make it to Calgary.

CREWES staff and students will be presenting a number of papers during the Convention:



- The Blackfoot III buried geophone experiment. *Dan Cieslewicz and Don C. Lawton*
- An evaluation of prestack migration on foothills data using various migration techniques: A case study involving equivalent offset migration (EOM). *John C. Bancroft, and M. Graziella Kirtland Grech*
- Equivalent offset migration for VSP's and data acquired with vertical receiver arrays. *John C. Bancroft and Yong Xu*
- Description of Glauconitic channel by AVO analysis. *Yong Xu and John C. Bancroft*
- Offset inversion of the Blackfoot P-wave data and discrimination of sands and shale. *John V. Pendrel, Robert R. Stewart, Jocelyn Dufour, Bill Goodway, and Paul van Riel*
- Simultaneous P-P and P-S inversion by weighted stacking applied to 3C-3D seismic data. *Jeffrey A. Larsen, Gary F. Margrave and Han-Xing Lu*
- Anisotropic depth migration using the equivalent offset method (EOM). *John C. Bancroft and Robert Vestrum*
- Migration of seismic source-gathers in TI media by nonstationary phase shift. *Robert J. Ferguson and Gary F. Margrave*
- Residual statics analysis by equivalent offset mappings. *Xinxiang Li and John C. Bancroft*
- Spectral analysis of a ghost. *Nasser S. Hamarbatan and Gary F. Margrave*
- Depth imaging of elastic wavefields – where P meets S. *Brian H. Hoffe and Laurence R. Lines*
- Analysis of Array simulation using the Blackfoot high resolution 3-C data. *Brian H. Hoffe, Henry C. Bland, Gary F. Margrave and Peter M. Manning*
- Finite difference modelling as a practical exploration tool. *Peter M. Manning and Gary F. Margrave*
- New developments in Fourier imaging methods. *Gary F. Margrave*
- Prestack V(z) f-k migration for P-P and P-S data. *Xinxiang Li and Gary F. Margrave*

Abstracts are available on the CREWES website: click on the Sneak Preview link to access the listing.

## CREWES Around the World

As well as being at the CSEG, this summer will see CREWES staff and students presenting papers at the following professional meetings:

### **1999 Canadian Geophysical Union Meeting (CGU) May 9-13, 1999, Banff, Alberta, Canada**

- Interpreting the Hotchkiss structure: A possible meteorite impact feature in northwestern Alberta .  
*Michael J. Mazur and Robert R. Stewart*
- Depth imaging of complex foothills geology. *Larry R. Lines*

### **European Association of Geoscientists and Engineers 61st Annual Conference and Technical Exhibition (EAGE) June 7-11, 1999, Helsinki, Finland**

- Survey design for vertical cable seismic acquisition. *Carlos Rodriquez-Suarez and Robert R. Stewart*
- Migration of source gathers by nonstationary phase shift - TI examples. *Robert J. Ferguson and Gary F. Margrave*
- Prestack migration of vertical array data using EOM. *John C. Bancroft*

### **Sixth International Congress of the Brazilian Geophysical Society (SGBf - Rio 99) August 15 - 19, 1999, Rio de Janeiro, Brazil**

- Prestack equivalent offset migration: the basics. *John C. Bancroft*
- Equivalent offset migration: additional applications. *John C. Bancroft*
- Survey design for vertical cable seismic acquisition. *Carlos Rodriquez-Suarez and Robert R. Stewart*

The abstracts for these papers are together with the CSEG abstracts on the CREWES website, under the Sneak Previews Link. As always, presenters will welcome any Sponsor Representatives who wish to discuss their work.

## CREWES Welcomes New Sponsor

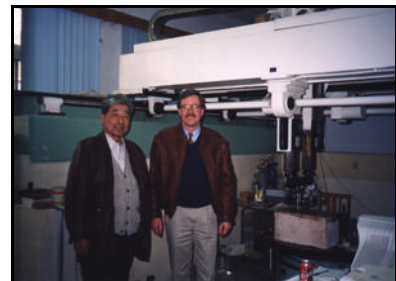
CREWES is delighted to welcome the Oil and Natural Gas Corporation Ltd. of India as our newest Sponsor. We look forward to collaborating with sponsor representative, Mr P. K. Painuly, and other personnel from the Geodata Processing and Interpretation Centre in Dehra Dun.



## CREWES Associate Director Visits China

CREWES Associate Director, Don Lawton, spent the last week of March in China, as a guest of the University of Petroleum (Beijing, Campus), and hosted by Dr. Guo Tao of the Department of Geophysics. Don delivered four lectures during the visit, including the Blackfoot 3C-3D survey and interpretation, physical seismic modelling experiments at the University of Calgary, and anisotropic depth migration. During the visit, he was shown some results from a 3C-3D seismic survey that has been conducted recently in China, and had a tour of the physical seismic modelling laboratory at UP.

Needless to say, Don also found time to visit to the Great Wall, Ming Tombs and the Forbidden City, ably guided by graduate students from UP. Don's Chinese experience was very successful and he greatly appreciated his hosts' hospitality.



*Don Lawton and Dr. Mu, Director of the University of Petroleum modelling laboratory.*

## Near-Surface Seismic Characterization Using Three-Component Buried Geophones

*This is the abstract from Dan Cieslewicz's thesis which was published in January. Copies have been made available to all Sponsors.*

Two seismic field experiments were performed to determine whether shear wave attenuation in the the near surface is responsible for the significant converted-wave bandwidth reduction observed in most multi-component land surveys. The experiments consisted of three-component geophones buried to depths of about 6, 12, and 18m that recorded data during the shooting of a 2-D seismic line. A control geophone was also placed on the surface. The geophones did not detect any systematic difference in the bandwidth of converted-wave reflections between the different geophone depths and the surface. It is concluded that the majority of attenuation in the converted wave occurs below a depth of 18 metres. The buried geophone data were also used to determine the depth of the water table using interval  $V_p/V_s$  ratios to demonstrate that the near-surface impedance gradient amplifies ascending reflections, and to indirectly infer the occurrence of receiver ghost. A basic interpretation is also presented.

## Improving Seismic Resolution with Nonstationary Deconvolution

*This is the abstract from Alana Schoepp's thesis which was published in November 1998. Copies have been made available to all Sponsors.*

Nonstationary deconvolution operators can be designed directly from the seismic data and applied to the data using nonstationary filtering techniques. Such operators can be continuously time-variant and have any desired amplitude or phase spectra. The operator design uses time-variant Fourier spectra measured directly from the seismic data, which are smoothed, inverted, and combined with a minimum-phase spectrum, if desired. This method of nonstationary deconvolution (NSD) approximately corrects the seismic data for the effects of anelastic attenuations, frequency dispersion, and source signature. The result is a one-dimensional nonstationary operation that extends the range of stationary deconvolution to a type of data-driven inverse-Q filter.

NSD has been applied to real seismic data and the results have been compared to results from the Wiener deconvolution and inverse-Q filtering. The datasets deconvolved with NSD show improved vertical resolution and improved reflection character as compared to results from the other methods.

### Making Contact...

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