Special issue on E&P and seismology planned for Geophysical Prospecting *December, 2006*

Guest editors Kees Wapenaar, Delft University of Technology, and Jean Virieux, Université de Nice-Sophia Antipolis, write about a special issue planned for Geophysical Prospecting.

What can Exploration and Production (E&P) learn from seismology and vice-versa? That's the intriguing question which will be addressed in a special issue of Geophysical Prospecting as a follow-up to the successful workshop with the same title, held during the EAGE meeting in Vienna on 11 June, 2006. Contributions are welcome from participants at the workshop as well as from other researchers in E&P and seismology.

Traditionally seismic exploration and (earthquake) seismology have been two branches of science that evolved quite independently from each other. Apart from the different scales and the different applications, the main reason for the low level of communication probably lies in the different ways of data acquisition and, consequently, the different ways of retrieving information from the data. In seismic exploration the data are acquired on a relatively dense and regular grid, the sources are reasonably well known, the responses mainly contain reflection information, and the main processing consists of full waveform reflection imaging and angle-dependent reflection analysis. In seismology, on the other hand, the data are gathered by sparse and irregularly positioned multi-component stations, the sources are natural and generally not well known, the responses mainly contain transmission information (surface waves and P- and S-body waves) and the main processing consists of tomographic inversion of the interpreted arrival times of the different phases.

Currently there are several developments that stimulate the communication between the two communities. The improvements in dense sampling of earthquake data open up the road for applying reflection imaging techniques to these data. Multi-component geophones (at the surface or on the ocean bottom) enable explorationists to exploit P- and S-wave information in imaging and inversion. Global offset acquisition incorporates transmission waves inside seismic traces, raising recent interest in refraction information. Reservoir monitoring leads to continuous recording, increasing even more convergence between the two communities.

We envision different aspects for this interaction related to the exploitation of different parts of the traces or seismograms. Data management with dense survey, continuous recording, requires technological aspects in order to improve the quality control of the collected data (automatic orientation of sensors, coupling with the ground). Let us mention the example of automatic or semi-automatic time picking while dealing with P and S waves on multi-component recordings.

Deterministic reconstruction of the velocity structure using (first-arrival) travel-time tomography, Fresnel, or finite-frequency tomography for active sources or earthquakes may be considered. Waveform inversion for the interpretation of both reflected and transmitted
waves using both acoustic and elastic approaches, 2D and 3D geometries, are challenging problems for both active and passive seismology.

Quite exciting developments are evolving in both fields in retrieving additional information by cross-correlating responses of different receivers ('seismic interferometry'). Explorationists use this for retrieving and/or improving reflection information (either from passive or active data) whereas seismologists have shown that they can reconstruct surface waves between stations by correlating ambient noise observations. Seismic interferometry has great promise for retrieving more information from the seismic coda.

All these developments justify an intensive dialogue between explorationists and seismologists. For this special issue, we invite researchers from both fields and challenge them to use their imagination to stimulate the cross-fertilization between these fields. We think the dialogue between researchers from E&P and seismology is very timely and therefore we would like to expedite the review process as effectively as possible: we aim for publication of this special issue around the end of 2007/beginning of

2008. Of course this is only feasible when all authors commit themselves to submit their papers before the submission deadline, which is 31 January, 2007. Also we ask authors to take part in the review process of other papers for this issue.

Note that all submitted manuscripts will go through the same peer review process and that a submission is not a guarantee for publication. Authors who are planning to submit a paper should inform us about their plans as soon as possible and send us a provisional title and list of authors (in case there are co-authors). Papers should be submitted before January 31, 2007. Soon after January 31, 2007, authors will be asked to act as a reviewer for one or two papers for this issue. Please note that Geophysical Prospecting does not charge any publication costs to authors (no page charges, no colour charges).

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