This is my first column as the new Associate Editor for Geophysics Bright Spots. The current issue of Geophysics features many excellent articles. Due to space limitations, only a few are mentioned in the following paragraphs. I rely heavily on the authors' pictures to whet your appetite for their stories.

Reverse time migiration of mulitples for subsalt imaging by Yike Liu, Xu Chang, Degang Jin, Ruiqing He, Hongchuan Sun, and Yingcai Zheng. With deepwater drilling in the GOM costing greater than $100 million dollars a well, companies are investing in acquisition and processing of seismic data. New acquisitions with full azimuth and broad band allow sharper subsalt images and fewer illumination holes. However, we would be too hasty if we were to attribute subsalt shadow zones only to the narrowness of azimuth in acquisition. Figure 7 of Liu et al. shows a conventional RTM image for the Sigsbee2B model. Their Figure 8 shows their new RTM image using "multiples" has better illuminated subsalt reflectors. The authors' spectacular subsalt image is due not only to the use of multiples but also to the manner in which the multiples are used. Rather than back-propagating the recorded data on the receiver side of the RTM, the authors back-propagate the predicted multiples. On the source side of the RTM, the authors use the recorded data as source for forward modeling instead of using an impulsive source wavelet. To implement their ideas in RTM workflow, practically no extra coding would be required. You no longer need adaptive subtraction because the predicted multiples, not primaries, are the input to the RTM.

Rock physics analysis and time-lapse rock imaging of geochemical effects due to the injection of CO_2 into reservoir rocks by Tiziana Vanorio, Amos Nur, Yael Ebert. Fluid substitution using Gassmann's theory has been found inadequate for predicting time-lapse seismic effects of CO_2 injection into reservoirs. The authors study rock microstructures and rock-property responses to geochemical processes (e.g., precipitation and dissolution) induced by fluid injection. Their Figure 1 shows the modeled changes of the elastic moduli for five scenarios with differing degrees of chemo-mechanical alterations in the rock frame due to the injection of CO_2. Their Figure 8 shows the time-lapse SEM and/or CT-scan images monitoring the effects of salt precipitation (8a) and calcite dissolution (8b).

Approximation of pure acoustic seismic wave propagation in TTI media by Chunlei Chu, Brian K. Macy, and Phil D. Anno. TTI anisotropic RTM has become a routine imaging technique due to advances in both computing and imaging algorithms. One key ingredient in a practical RTM implementation is the algorithm for computing TTI anisotropic P-wave propagation. Feasibility of computation has necessitated approximations to the elastic wave equation. One earlier type is the "pseudo-acoustic" approximation which involves setting to zero the shear-wave velocity along the TTI symmetry axis. The pseudo-acoustic approximation suffers from residual shear waves that lead to image noise. More significantly, it suffers from instabilities for some anisotropic parameter combinations and for models with high complexities (see Figures 11a and 11b of Chu et al.). Another type of approximation, "pure-acoustic", approximates the P-wave dispersion relations by equating $-\omega^2$ to functions of the wave-number components. The pure-acoustic approximation, which no longer involves—ω^4, avoids shear-wave noise. The existing formulation of the pure-acoustic approximation employs a pseudodifferential operator which is not easy to implement. The authors present two new pure-acoustic formulations that can be implemented using either finite-difference or pseudo-spectral methods. The authors use several numerical examples, including their Figures 11c and 11d duplicated here, to show that the results are free from shear-wave artifacts and instabilities.

The following papers were also recommended by the Associate Editors (AE) for this issue of Geophysics:

1) *Porosity prediction using the group method of data handling* by Nasher M. AlBinHassan and Yanghua Wang. AE: Kurt Marfurt
2) *Scale properties of the seismic wavefield—perspectives for full waveform matching* by Margherita Maraschini, Daniele Boiero, Sebastiano Foti, and Laura Valentina Socco
3) *Integrated geological and geophysical studies for delineation of chromite deposits: A case study from Tangarparha, Orissa, India* by William K. Mohanty, Animesh Mandal, S. P. Sharma1, Saibal Gupta, and Surajit Misra. AE's remark: Mohanty et

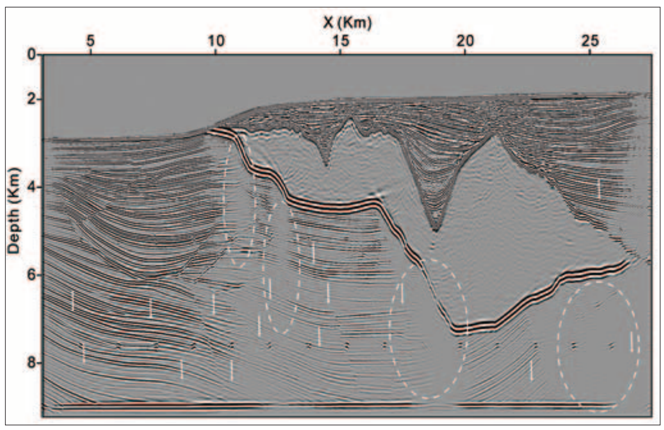

Figure 1. *(Figure 7 of Liu et al.) Conventional reverse time migration image of Sigsbee2B after removal of free-surface multiples.*

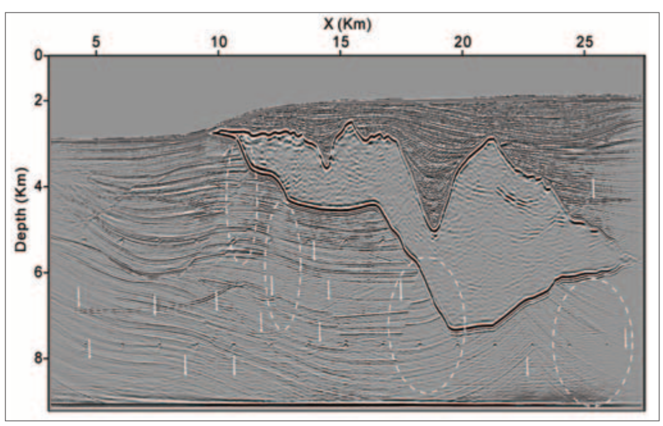

Figure 2. *(Figure 8 of Liu et al.) Reverse time migration image of Sigsbee2B using recorded data for the source side and predicted free-surface multiples on the receiver side.*

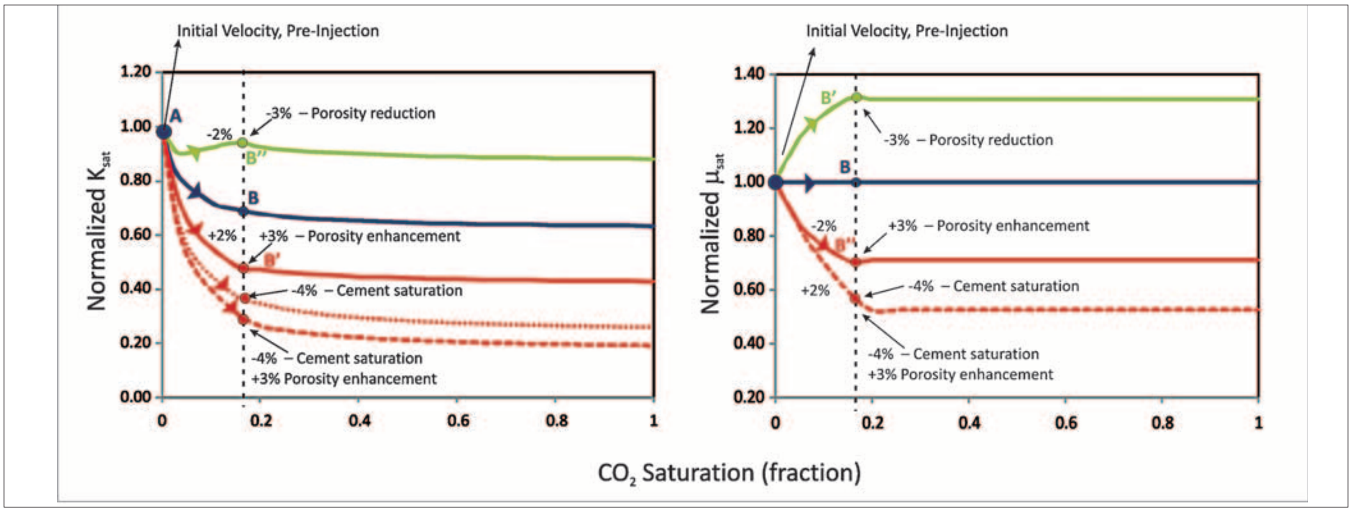

Figure 3. *(Figure 1 of Vanorio et al.) Forward modeling of changes in bulk and shear moduli of rocks upon CO_2 injection. Moduli are normalized with the respect to their pre-injection values. Five scenarios are shown: chemically inert uniform saturation (blue lines = Gassmann model), porosity enhancement due to dissolution processes (solid red lines), cement removal due to dissolution (dotted red lines), porosity enhancement and cement dissolution (dashed red lines), and porosity destruction due to precipitation processes (green lines). The change in bulk modulus is larger if both porosity enhancement and cement dissolution are taken into account (red dashed line). The shear modulus seems not to be much affected as the two lines overlap.*

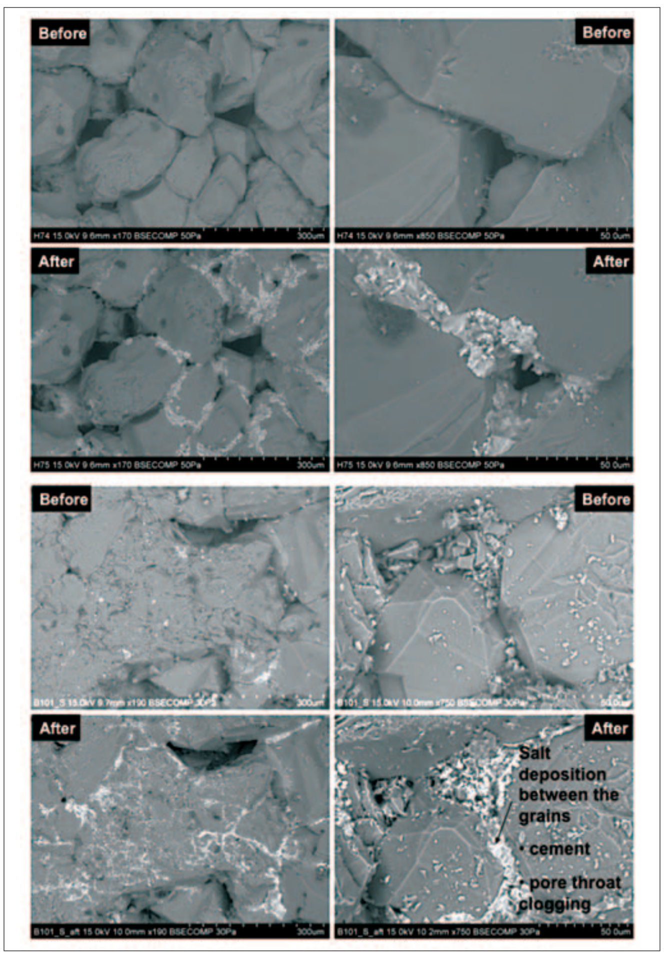

Figure 4. *(Figure 8a of Vanorio et al.) Time-lapse SEM images monitoring the effects of salt precipitation within the pore microstructure of two Fontainebleau sandstones characterized by high (upper panel) and low (lower panel) porosity and permeability values.*

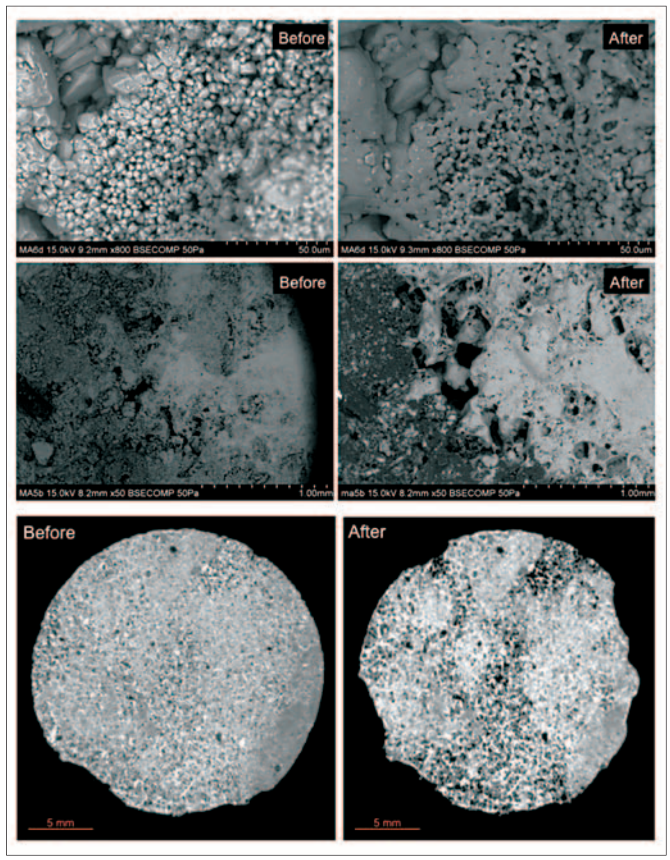

Figure 5. *(Figure 8b of Vanorio et al.) Time-lapse SEM and CT-scan (lower panel) images monitoring the permanent changes induced in the rock microstructure by calcite dissolution upon injection of CO_2-rich water. Two main changes are involved: porosity enhancement due to dissolution and loss of granular microstructure due to welding, probably due to pressure effects.*

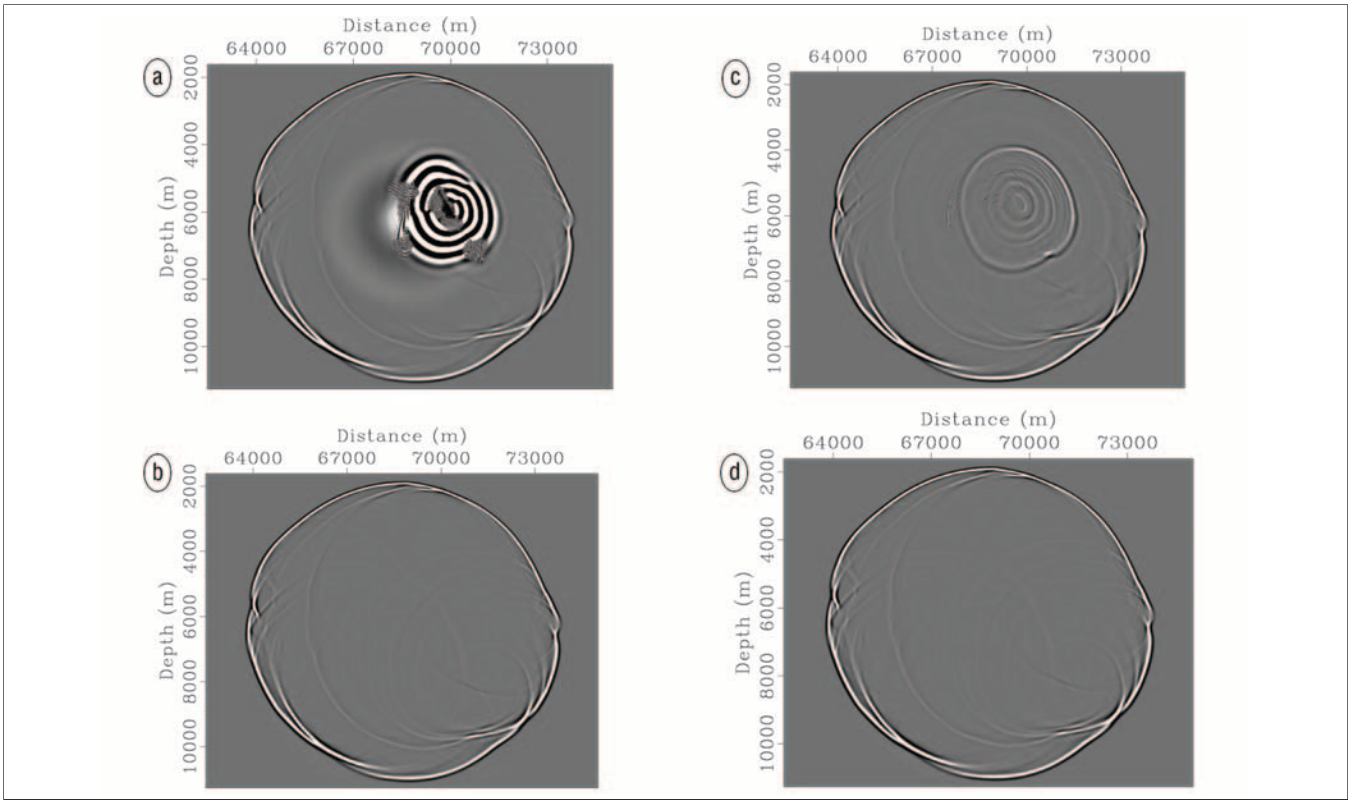

Figure 6. (Figure 11 of Chu et al.) Snapshots of wavefields for the BP TTI model using various acoustic approximations: (a) pseudo-acoustic; (b) pseudo-acoustic, an improved version of (a); (c) pure acoustic; and (d) pure acoustic, an alternative to (c). The algorithm for (c) is more accurate than that for (d) upon a detailed inspection of waveforms (not shown).

al. describe the exploration for chromite deposits in northeastern India using gravity, magnetic, VLF, and resistivity measurements. While gravity measurements do give strong indications of possible chromite deposits, an integrated approach gives more precise information about the potential location and dimensions of anomalous bodies. The combination of gravity and resistivity measurements seems the most diagnostic. The integrated approach allows interpretation of a potential chromite deposit and estimation of its size.

4) *Quest for consistency, symmetry and simplicity—The legacy of Albert Tarantola* by Klaus Mosegaard. AE Sven Treitel's remark: This article is both an obituary as well as a detailed summary of the late Albert Tarantola's contributions to geophysical inverse theory. It is bound to become a widely cited reference in this rapidly evolving field.
5) *Imaging permafrost velocity structure using high resolution 3D seismic tomography* by Kumar Ramachandran, Gilles Bellefleur, Tom Brent, Michael Riedel, and Scott Dallimore. AE's remark: Permafrost areas represent one difficult area for near-surface velocity construction. Ramachandran et al. use a tomographic inversion of the first-arrival traveltimes to construct a velocity model for the top 200 m of the Mallik 3D survey, Mackenzie Delta area, Canada. Resolution tests using a checkerboard pattern confirm the robustness of the velocity model in detailing small-scale velocity variations.
6) *Fast 3D migration-velocity analysis by wavefield extrapolation using the prestack exploding-reflector model* by Claudio Guerra and Biondo Biondi. AE Bin Wang's remark: The paper presents many useful new ideas for speeding up the wave-equation-based migration velocity analysis (WEMVA), currently a hot topic. The proposed prestack exploding-reflector modeling method enables wavefield continuation to be target-oriented; therefore it gains efficiency and flexibility. It is also an excellent idea to combine different SODCIGs in a single modeling experiment to gain efficiency.
7) *Influence of oil wettability upon spectral induced polarization of oil-bearing sands* by André Revil, Myriam Schmutz, and Mike L. Batzle. AE's remark: The results challenge the standard use of Archie's law for wetting oils.
8) *Airborne geophysical mapping of the Australian continent* by Brian R. S. Minty
9) *Approximation of pure acoustic seismic wave propagation in TTI media* by Chunlei Chu, Brian K. Macy, and Phil D. Anno. AE: Tamas Nemeth TLE