

## Understanding Seismic Anisotropy in Exploration and Exploitation

A one-day course, covering seismic Shear-wave and Converted-wave anisotropy

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### Course description

All rock masses are seismically anisotropic, but we have historically ignored this in our seismic acquisition, processing, and interpretation. The anisotropy nonetheless does affect our data, in ways that limit the value that we derive from it, if we ignore that anisotropy. Defined as a rock property, the anisotropy is usually small, but it can lead to effects in the data which are large.

In this short course, we will *understand* why ignoring anisotropy has been so successful in the past, and why it will be less successful in the future, as we acquire better seismic data, as we analyze it in expensive deepwater contexts, and as we realize the vast potential of shale as a reservoir rock. We will further understand how we can improve our practice, so as to more fully realize the potential inherent in our data, through algorithms and analysis which recognize the fact of seismic anisotropy. The course is accompanied by numerous class exercises, presented in .xls format.

1. Physical principles (morning)
  - a. Definition of anisotropy
  - b. Anisotropy vs.heterogeneity
  - c. Anisotropy as a function of scale
  - d. Elasticity and Symmetry
  - e. The Power of Notation
2. S-waves: (morning, afternoon)
  - a. Polar anisotropy
  - b. Azimuthal anisotropy: S-wave splitting
  - c. Crossed-dipole sonic data
3. C-waves: (afternoon)
  1. C-wave basics
  2. Polar anisotropy
  3. Azimuthal anisotropy: C-wave splitting
4. Epilogue: (afternoon)

