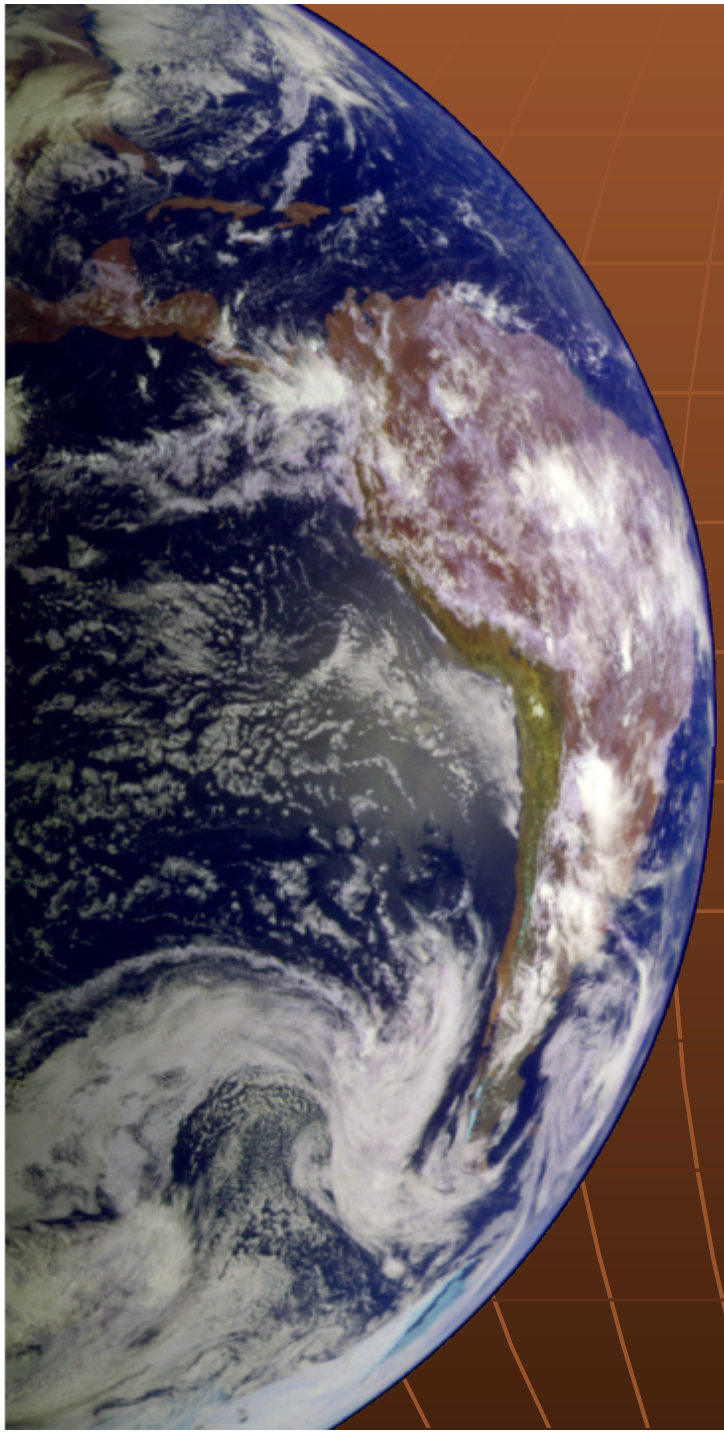

Corey A. Joy

- M.S. Aspirant (2011)
- Supervisor: Professor Mrinal Sen
- The University of Texas Institute of Geophysics

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My Education

- Bachelors of Science in Mechanical Engineering & a Minor in Physics
  - Graduated: May 2009
  - Research: Heat exchanger for a hybrid fission-fusion nuclear reactor
- Masters of Science in Geophysics
  - Expected Graduation date: May 2011
  - Research...

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2

My Research

- What?
  - The effects of carbon dioxide saturation on rock properties & application to exploration geophysics
- Why?
  - Study the effects of CO_2 sequestration on seismology
  - Monitor gas flow in CO_2 sequestration & enhanced oil recovery
  - Can be used for inversion

3

My Research

- How?
  - Learn the physics & chemistry of fluid substitution
  - Relate elastic properties of CO_2 saturated rock to amplitude vs. offset
  - Develop a model and compute synthetic seismograms
- Goals
  - Make a contribution to CO_2 sequestration
  - Learn how to apply my findings
  - Increase my capacity to interpret complex reservoirs

4

Son Phan

- M.S in Geological Sciences
- Supervisor: Dr. Mrinal K. Sen
- Thesis topic: ***Uncertainty in reservoir parameters estimation, case study on a reservoir in Gulf of Mexico***

  - features to look at: available well log data, extracted wavelet, reservoir starting model, and reservoir inverted result.

    * well log: matches between well logs and seismic data, how different well logs affect reservoir parameters

    *wavelet: variation in reservoir parameters by varying wavelet amplitude and phase values

    *starting model: effect of frequency content of starting model to final estimation results

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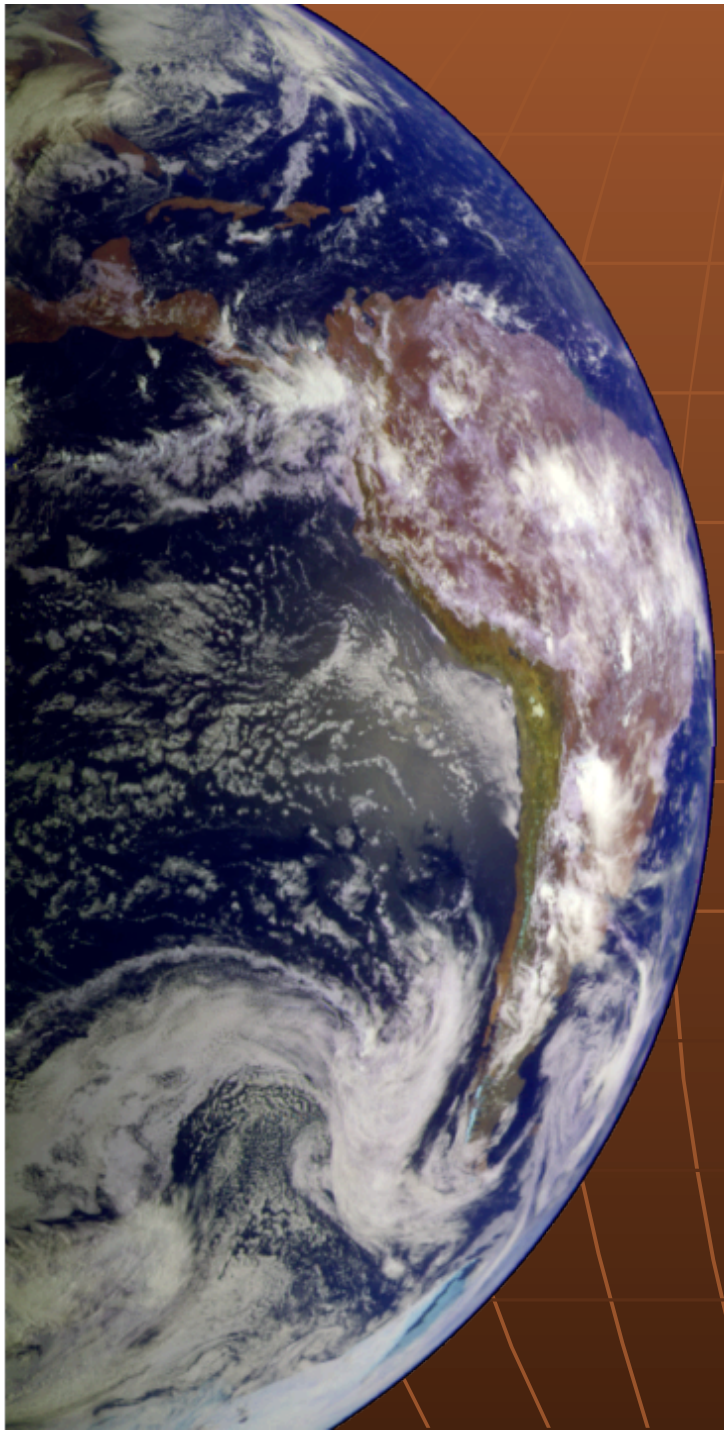

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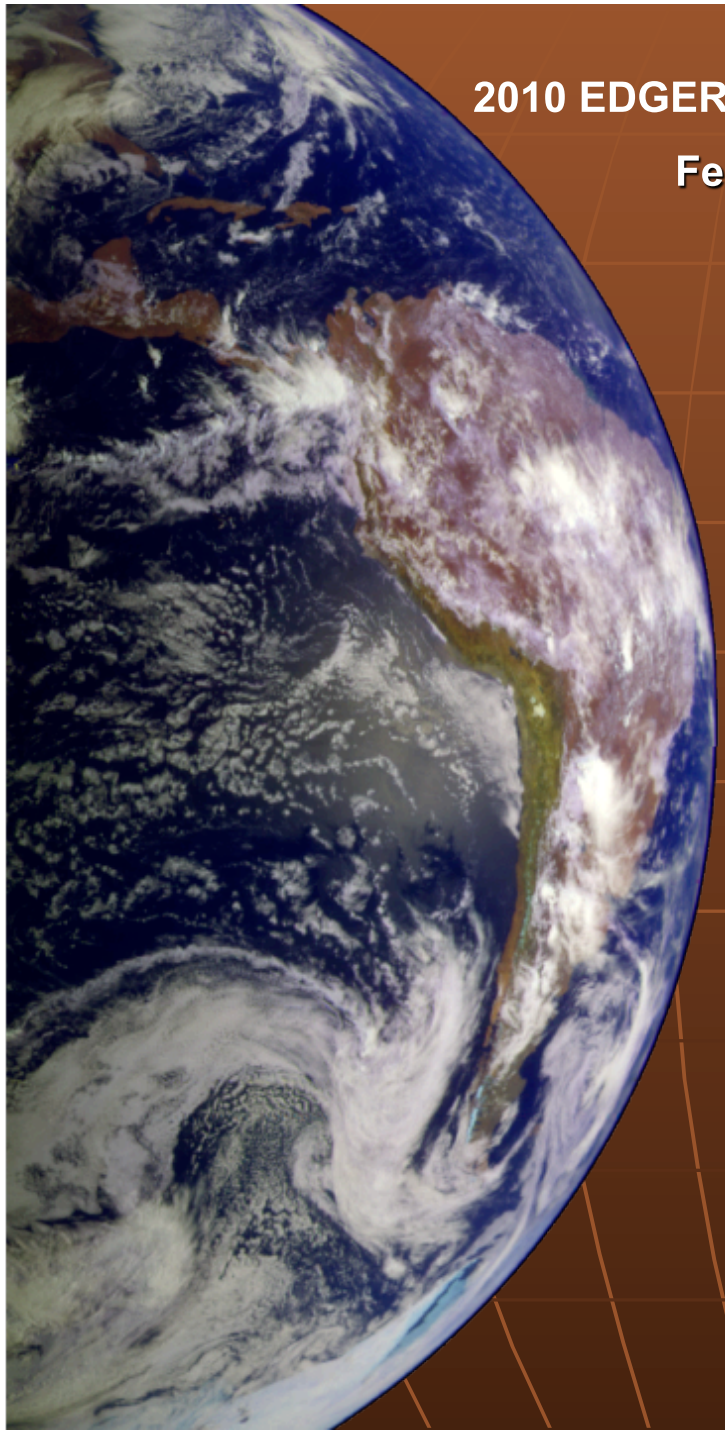

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UT-AUSTIN EDGER FORUM

Yang Xue

Ph.D. Aspirant, 2010

Supervisor: Dr. Mrinal Sen

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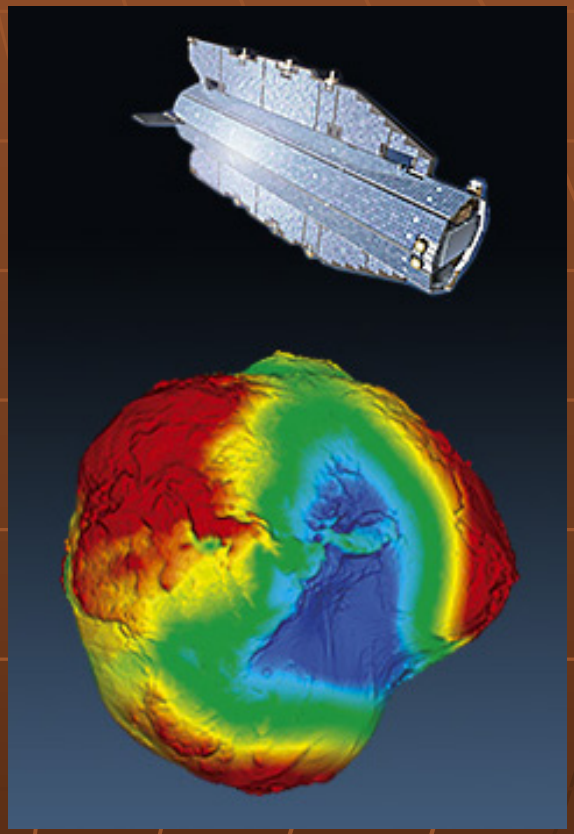
Previous Work

GOCE sensitivity studies in terms of cross-over analysis (Aerospace Engineering and Geodesy, University of Stuttgart, Germany)

- Location of cross overs (XOs)
- Simulation of gravity gradients (GGs) and invariants of all orbit points
- Closed loop test with noise-free data
- Closed loop test with noisy data
- Noise impact on GGs and invariants



http://www.esa.int

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Future work

Supervisor: Dr. Mrinal Sen

Using statistic (Monte Carlo method) in seismic inversion problem

Thank you for your attention!

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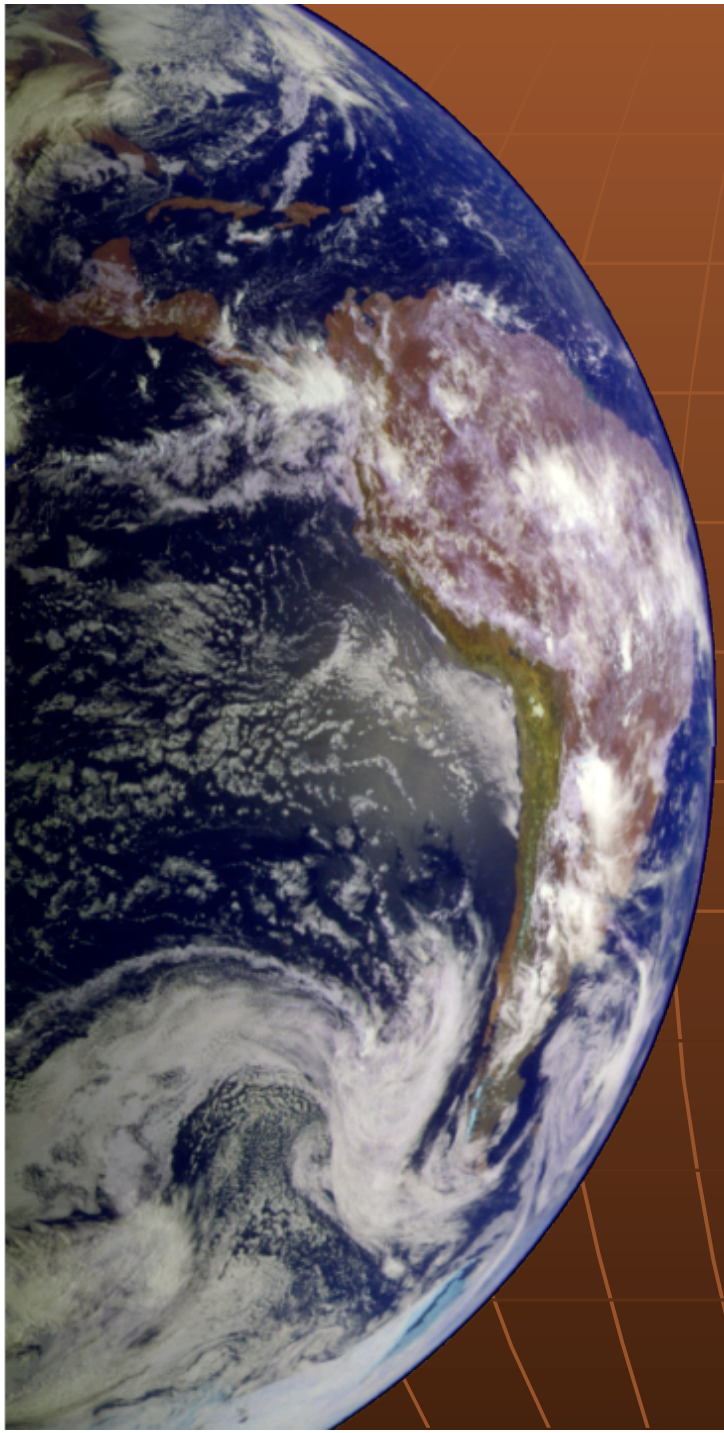

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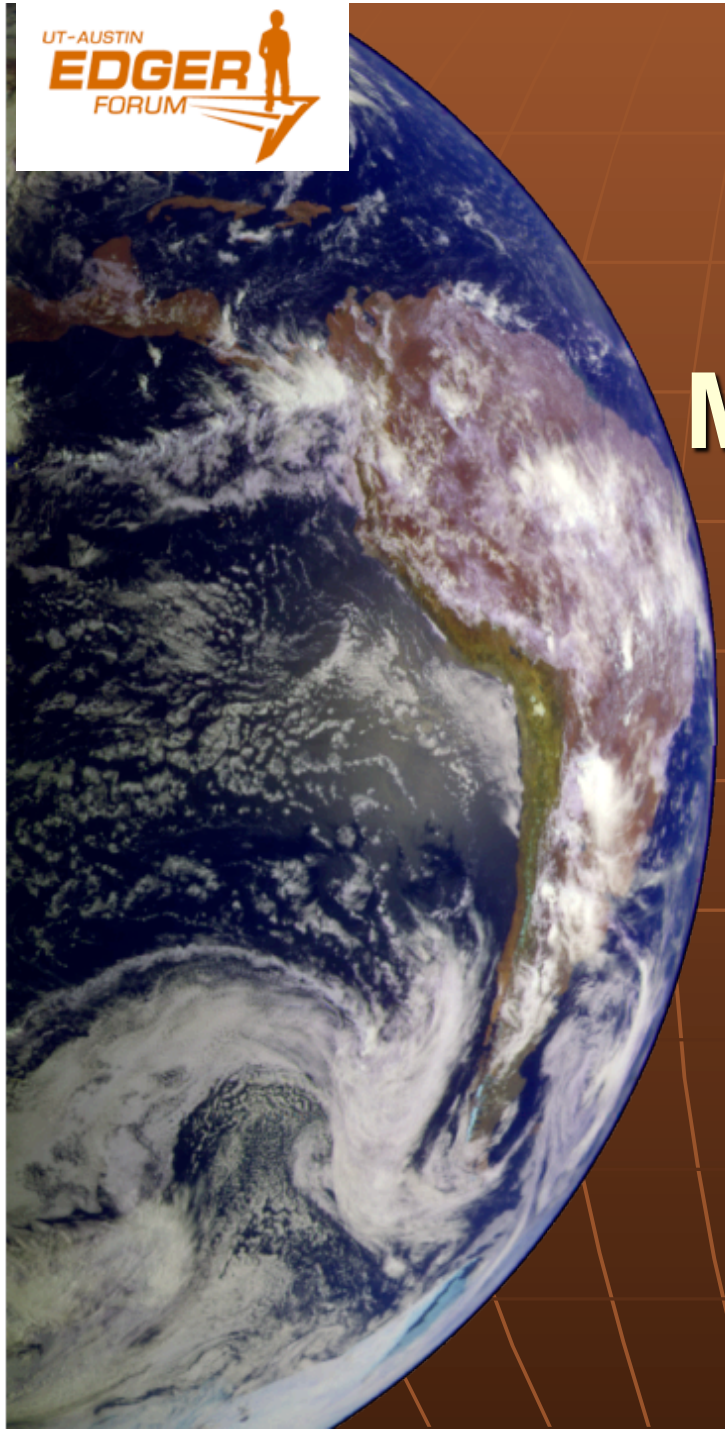

Mohammed Alhussain

(PhD Aspirant)

Supervisor: Prof. Mrinal Sen

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Background

- Bachelor degree in Geophysics from The University of Tulsa (1997-2001)
- Master degree in Geophysics from Curtin University of Technology, Australia (2005-2007)
- Saudi Aramco (2001-Present) :
  - Seismic data processor (Exploration Dep.)
  - Wellsite Geologist (Exploration Dep.)
  - Researcher (Advanced Research Center, EXPEC ARC)

MSc research

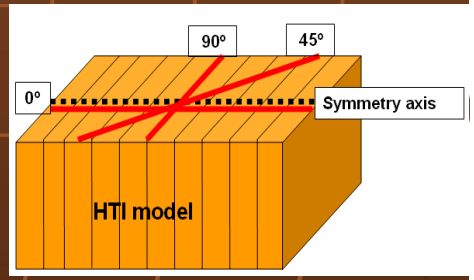
Spherical Wave AVO Response of Isotropic and Anisotropic Media: Laboratory Experiment Versus Numerical Simulations

Supervisors:

Boris Gurevich
Milovan Urosovich

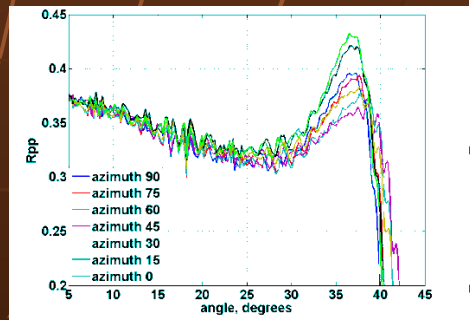
MSc research

- Physical modeling



- Experimental verification of spherical wave effect on the AVO response and implications for three-term inversion

- AVOaz response of a vertically fractured reservoir



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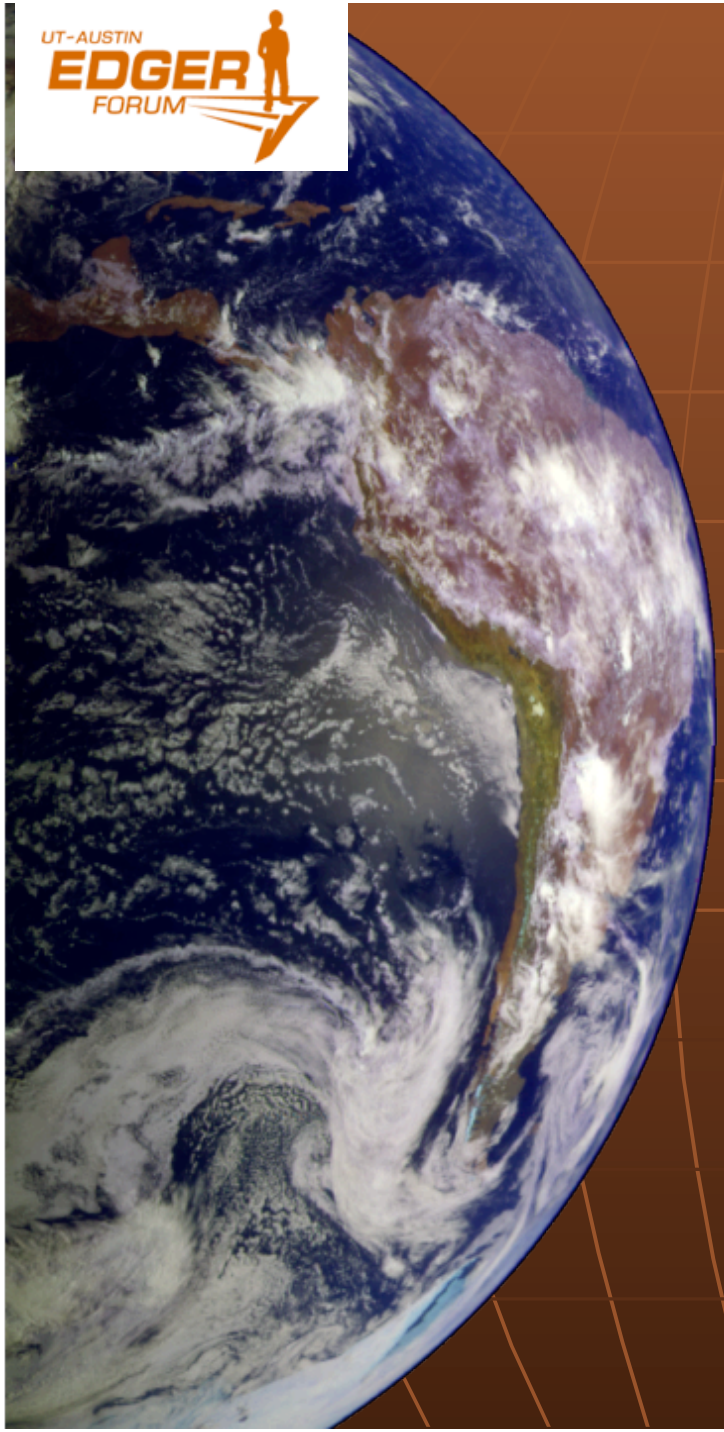
PhD research

- Reservoir geophysics
  - Seismic fracture characterization
  - Real data will be provided by Saudi Aramco
  - Candidacy Exam (Fall 2010)
  - Graduation date !! Spring 2013



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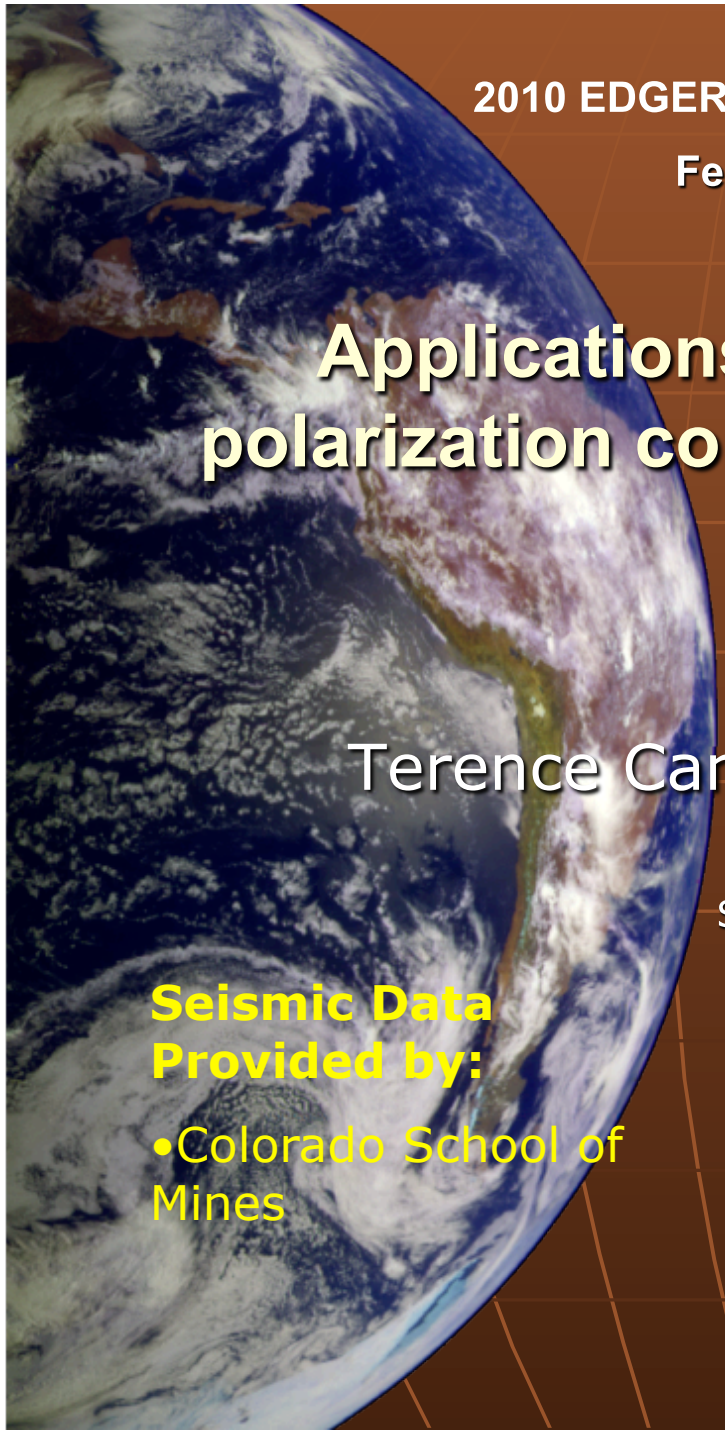

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Applications of reflected shear wave polarization correction for varying levels of anisotropy

Terence Campbell (Ph.D. Aspirant, 2010)

Supervisor: Dr. Robert Tatham

Seismic Data Provided by:

- Colorado School of Mines

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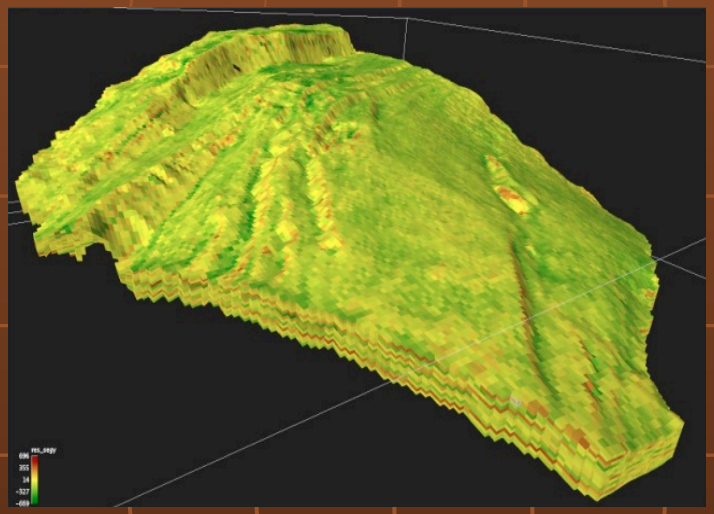
Reservoir Characterization

(Terence Campbell, Ph.D. Aspirant)

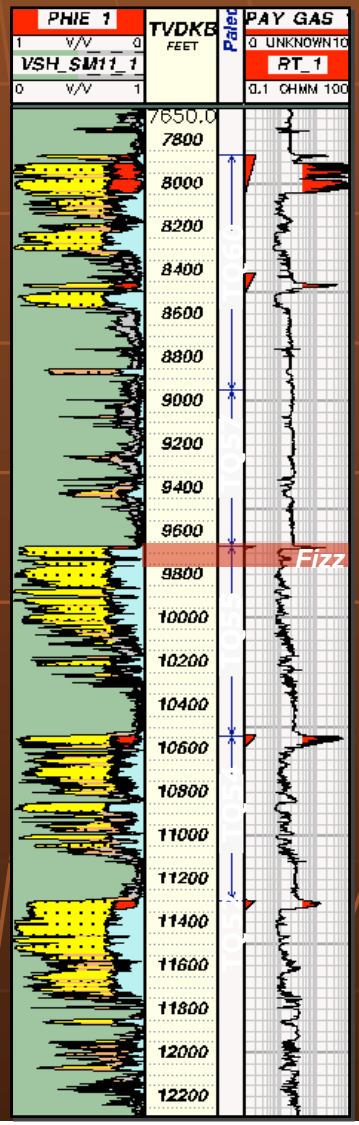
3-D Seismic data volume along with substantial well logs, production information and petrophysical information are provided to re-visit the nature of the field.

Bin Size 12.5m x 25m
Sampling rate 4ms
Frequency and depth calculated
velocity model.



- **Developed a process for incorporating the seismic geomorphologic information for the intervals into the reservoir modeling mission.**
- **Quantified the morphology of the elements within the study area to improve rock volume estimates for future resource assessments.**

Lantana-1



Gross = 469'
Net Res = 459'
ϕ = 21%,
Sw=25%
Net Pay = 154'

Gross = 149'
Net Res = 138'
ϕ = 23%,
Sw=27%
Tot Col = 146'

Gross = 550'
Net Res = 461'
ϕ = 24%,
Sw=36%
Net Pay = 11'

Gross = 270'
Net Res = 242'
ϕ = 22%,
Sw=28%
Net Pay = 49'

Gross = 325'
Net Res = 312'
ϕ = 24%, Sw=34%
Net Pay = 39%

10.1.18

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Corrections for distortion in polarization of reflected shear-wave in isotropic and anisotropic media

- Exploring issues of varying distorted polarization of shear wave reflection in both isotropic and anisotropic media
- Fully defining the problem, develop corrections and demonstrate their efficacy on both model and field data.
- Investigation expands on that work exploring issues with polarization analysis, and amplitude variation with offset and azimuth (AVOA) on prestack data.

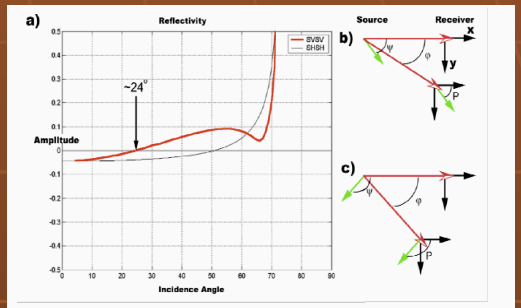
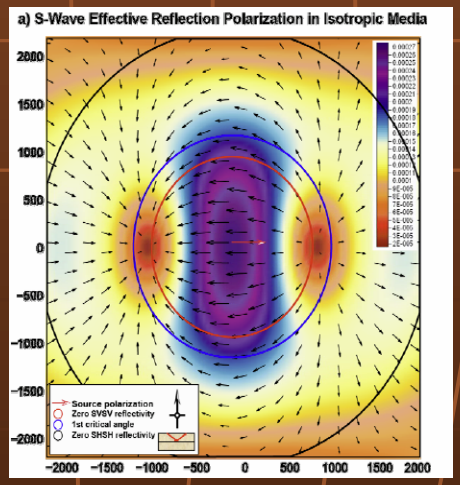
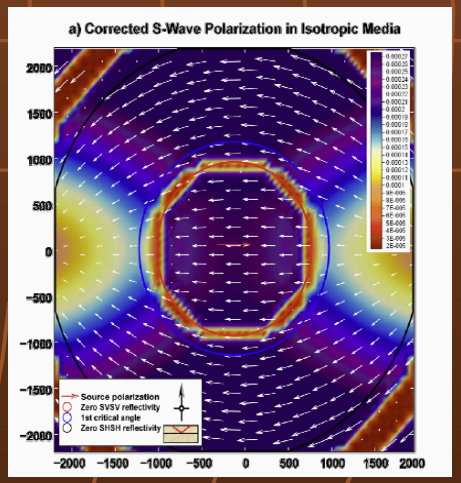


Figure 23. (a) SVSV reflectivity is shown in red and SHSH reflectivity is shown in black. At approximately 24° incidence angle the SVSV reflectivity is null. (b) Black arrows show receiver orientation as noted. The green arrows indicate the source polarization. Description of source to receiver geometry in plan view, φ is the source receiver azimuth, ψ is the source polarization angle measured from x, and P is the polarization of the reflected wave at the receiver position. This demonstrates how the contribution of SVSV and SHSH energy to either receiver component will vary with azimuth. (c) The length of the red arrows represents the offset at which SVSV reflectivity is null (here approximately 24° incidence angle). The contribution of SVSV energy to either receiver component will be zero. At this point, the reflected shear wave is polarized transverse to the source-receiver azimuth (adapted from Lyons, 2006).





(pictures taken from Gumble, 2006)

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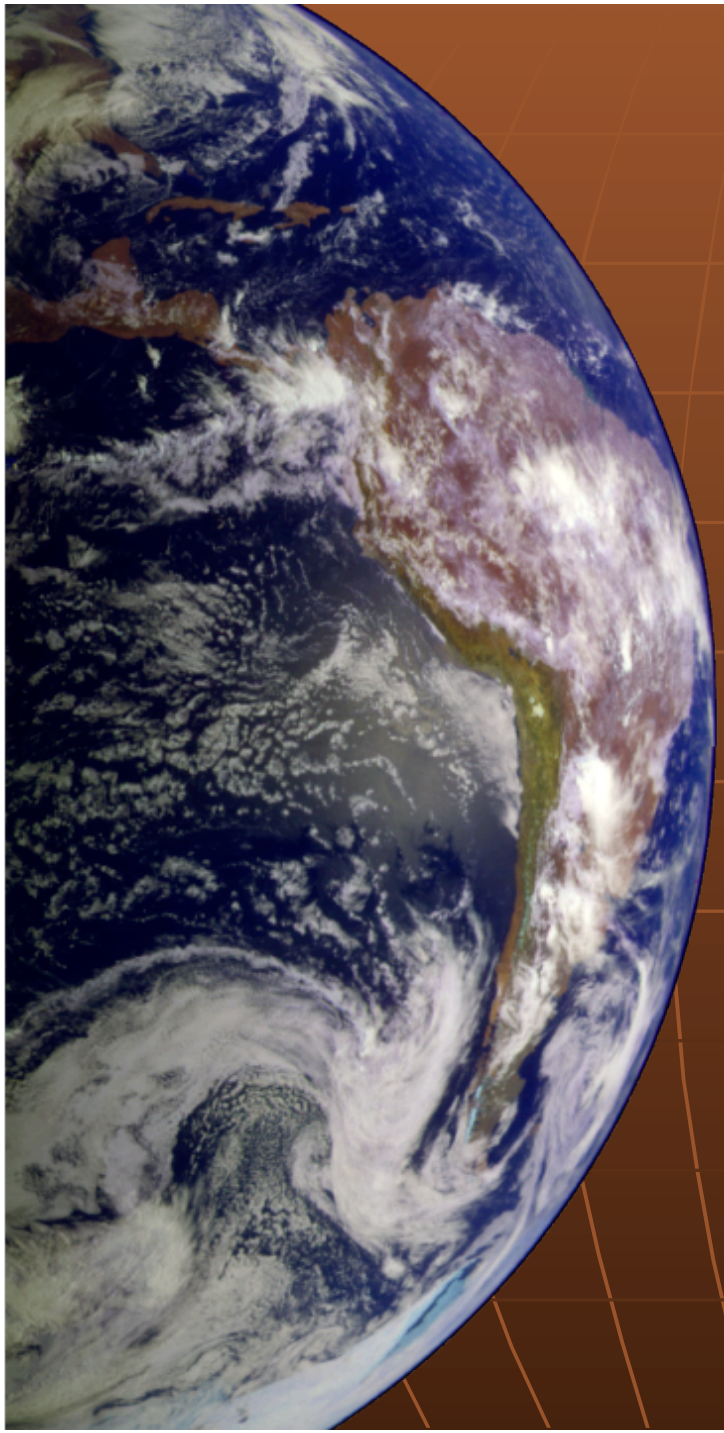

Thank you

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