

# AGENDA – ROSE meeting 27<sup>th</sup>-30<sup>th</sup> April 2015

*Location:* P1 in PTS1, S.P. Andersens veg 15, Trondheim.

## Monday 27<sup>th</sup> April

09:30 Coffee and registration

09:50 Welcome

### Session 1: Rock physics

10:00 Rock Physics Template for Source Rocks, *Jose Carcione, OGS and Per Avseth, NTNU/Tullow Oil Norge*

10:40 AVO Sensitivity to Shale Reservoirs, *Hamad Alghenaim, NTNU*

10:50 Static vs. Dynamic Moduli – Another piece in the puzzle; *Erling Fjær, SINTEF / NTNU*

11:10 Ultrasonic Studies of Stressed Sand and Clay; *Mohammad Hossain Bhuiyan, NTNU (now SINTEF)*

11:30 Seismic Dispersion of Mancos Shale; *Dawid Szewczyk, NTNU*

11:50 Bounds on anisotropic moduli; *Rune M Holt, NTNU/ SINTEF*

12:10 **LUNCH**

13:00 Laboratory Simulation of stress effects on 4D at Seismic and Ultrasonic frequencies; *Andreas Bauer, SINTEF/NTNU*

13:20 Aspect ratio histograms of 3D Ellipsoids and 2D Ellipses; *Martin Landrø, NTNU*

### Session 2: Modeling, Processing and Anisotropy

13:40 Diffractions: Do we exploit the imaging potential?, *Dirk Gajewski, University of Hamburg, Germany.*

14:10 Recursive stack to zero offset along local slope, *Bjørn Ursin, NTNU*

14:30 Integrated basin scale thermal modelling, *Ketil Hokstad, NTNU/Statoil*

14:50 Estimation of anisotropy parameters from CRS approximation, *Shibo Xu, NTNU*

15:10 **Coffee break**

15:30 Upscaling in orthorhombic media, *Yuriy Ivanov, NTNU*

15:50 Wavefield modeling in shadow zones. Tip wave superposition versus finite difference method, *Alena Ayzenberg, NTNU*

16:10 Anelliptic approximation for P-wave phase and group velocity in orthorhombic media, *Qi Hao, NTNU*

16:30 Low-frequency dispersion. Layering versus fracturing, *Alexey Stovas, NTNU*

**19:00 Dinner, Palmehaven, hotel Britannia, Dronningens gt. 5**

## Tuesday 28<sup>th</sup> April

### Session 3: Seismic acquisition and broadband seismic

- 09:00 Spatial gradient acquisition *Johan Robertsson, ETH Zurich*  
09:30 Modeling and migration of marine seismic with general source configurations, *Kjetil Eik Haavik, NTNU*

### Session 4 Time lapse and reservoir characterization

- 09:50 Overburden 4D time shifts induced by reservoir compaction at the Snorre Field, *Thomas Røste, Statoil*
- 10:10 **Coffee break**
- 10:40 Combining time lapse seismic and gravity to estimate CO<sub>2</sub> saturation changes at Sleipner, *Martin Landrø, NTNU and Mark Zumberge, Scripps*
- 11:00 Spatial reservoir characterization using the dilation factor, *Kenneth Duffaut, NTNU*  
11:20 Topography and column thickness inversion from 4D amplitudes, *Anders Kjør, NTNU*  
11:40 Shot generated noise and towing depth – implications for 4D seismic, *Toan Dao, NTNU*

### 12:00 LUNCH

### Session 5: Imaging and inversion

- 13:00 Parametrisation and resolution of Elastic Full Waveform Inversion, *Børge Arntsen, NTNU*.  
13:20 3D Wave Equation Migration Velocity Analysis of seismic data from Sleipner, *Wiktor Waldemar Weibull, NTNU*.  
13:40 Imaging and Full Waveform Inversion of seismic data from the CO<sub>2</sub> gas cloud at Sleipner, *Espen B. Raknes, NTNU*.  
14:00 Elastic wave mode decoupling for anisotropic reverse time migration, *Chenlong Wang, NTNU*.  
14:20 The Snorre PRM study, *Mark Thompson, Statoil*
- 14:50 **Coffee break**
- 15:20 Creating Virtual Receivers from Drill-bit Noise Using Seismic Interferometry, *Yi Liu, NTNU*.  
15:40 The Influence of Anisotropy on Elastic Full Waveform Inversion, *Tore Bergslid, NTNU*.  
16:00 Industry scale elastic modeling on a single GPU, *Jon M. Venstad, NTNU*.  
16:20 Discussion and adjourn

**29<sup>th</sup> -30<sup>th</sup> April: Course on CSEM (Controlled Source ElectroMagnetics, P1, 8:30**  
**Rune Mittet and Ståle Johansen. (course description on next page). Course ends at 16:00**  
**30<sup>th</sup> April**

## **CSEM (Controlled Source ElectroMagnetics) COURSE - ROSE consortium meeting**

*Lectures: Rune Mittet and Ståle Johansen; 2 lecture days: 29<sup>th</sup>-30<sup>th</sup> April 2015, aud. P1, S.P. Andersens veg 15A*

**Wednesday 29<sup>th</sup> May: Lecturer: Rune Mittet:**

### **Introduction**

Application areas for marine CSEM and marine MT.  
Survey layout.  
Transmitter and receiver equipment.

### **Theory**

Skindepth and dispersion effects  
Radiation pattern from a horizontal electric dipole transmitter.  
Transmitter waveform design.  
Propagation modes in marine CSEM – reflections versus refractions.

### **Data visualization**

Amplitude and phase as a function of transmitter-receiver offset.  
The effects of high/low resistivity on amplitude (and phase) versus offset.  
Normalized plots.

### **Data uncertainty**

Data weights for inversion.  
Maximum depth of imaging.

### **Marine CSEM in shallow water.**

### **Decomposition in upgoing and downgoing fields.**

Effect on data.  
Inversion of upgoing electric fields.

### **Anisotropy**

### **Environmental effects of marine CSEM**

**Thursday 30<sup>th</sup> April: Lecturer: Ståle Johansen:**

### **Interpretation of CSEM data**

- Introduction to interpretation of CSEM data
- Basic interpretation concepts
- CSEM work flow
- Sensitivity study and survey design
- Inversion
- Practical interpretation and integration of CSEM data
- Anisotropy in interpretation
- Troll case study
- Gulf of Mexico case study
- Barents Sea case study
- West of Shetland case study
- Implications for HC play- and prospect evaluation

### **Learning outcome**

The participants will get a basic understanding of the CSEM experiment and the underlying physics. They will understand the fundamental processing sequence from raw data to inverted resistivity cubes. They will get an introduction to interpretation of CSEM data and to integration of the results with seismic data, and also how to use the data in the exploration process.

### **Daily time plan:**

<b>08:30</b>	<b>Lecture</b>	<b>13:15</b>	<b>Lecture</b>
<b>10:15</b>	<b>Coffee</b>	<b>15:00</b>	<b>Coffee</b>
<b>10:30</b>	<b>Lecture</b>	<b>15:15</b>	<b>Lecture</b>
<b>12:15</b>	<b>Lunch</b>	<b>16:30</b>	<b>End</b>