

## Minutes

### **COST MIGRATE - Working Group 2**

#### **Kick-off meeting**

Date: October 05<sup>th</sup>-06<sup>th</sup>, 2015  
Time: Monday 05<sup>th</sup> 10:30 until Tuesday 06<sup>th</sup> 13:00  
Location: Centro Cívico y Térmica, C/Avenida de los Guindos no. 48, Málaga, Spain  
Chair: Dr. Makovsky (University of Haifa, Israel) and Prof. Deerberg (Fraunhofer UMSICHT, Germany)

#### Participants:

##### 1<sup>st</sup> day:

Prof. Deerberg, Fraunhofer UMSICHT, DE  
Dr. Makovsky, University of Haifa, IL  
Mr. Janicki, Fraunhofer UMSICHT, DE  
Mr. Collett, USGS, US  
Dr. English, University College Dublin, IE  
Dr. Yamamoto, JOGMEC, JP  
Dr. Yang, Heriot-Watt University, UK  
Mr. Sahoo, University of Southampton, UK  
Dr. Schicks, GFZ Potsdam, DE  
Dr. Chand, NGU, NO  
Prof. Cifci, Dokuz Eylul University, TR  
Dr. Sainz-Diaz, Univeristy of Granada, ES  
Mr. Mosch, Kongsberg, DE

##### 2<sup>nd</sup> day:

Prof. Deerberg, Fraunhofer UMSICHT, DE  
Dr. Makovsky, University of Haifa, IL  
Mr. Janicki, Fraunhofer UMSICHT, DE  
Mr. Collett, USGS, US  
Dr. English, University College Dublin, IE  
Dr. Yamamoto, JOGMEC, JP  
Dr. Yang, Heriot-Watt University, UK  
Mr. Sahoo, University of Southampton, UK  
Dr. Schicks, GFZ Potsdam, DE  
Dr. Chand, NGU, NO  
Prof. Cifci, Dokuz Eylul University, TR  
Dr. Sainz-Diaz, Univeristy of Granada, ES  
Mr. Mosch, Kongsberg, DE  
Mrs. Sismani, Aristotle University of Thessaloniki, GR

Mailing list: Participants of MIGRATE kick-off meeting  
Author: Georg Janicki - Fraunhofer UMSICHT  
Date of minutes: Oberhausen, October 07<sup>th</sup>, 2015

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**Agenda:**

Monday, Oct. 5th

- 10:30 Welcome, Finalizing Agenda, Introduction
- 10:45 Short Introduction of Participants
- 11:30 Coffee break
- 12:00 **Judith Schicks**, Helmholtz-Zentrum Potsdam: Development and test of exploration and exploitation techniques for hydrate reservoirs at GFZ
- 12:30 **Yizhaq Makovsky**, Haifa University: The Mediterranean sea research center of Israel - a new research facility for the eastern Mediterranean
- 13:00 Lunch
- 14:00 **Koji Yamamoto**, JOGMEC: Geotechnical studies and sand production problems
- 14:30 **Sourav Sahoo**, University of Southampton: Effect of Hydrate Saturation and Morphology on Acoustic and Electrical Properties of Sediments
- 15:00 **Thomas Mosch**, Kongsberg Maritime Embient GmbH: Monitoring Technologies and Strategies for Gas Hydrate Exploration
- 15:30 **Jinhai Yang**, Heriot-Watt University: Methane recovery from gas hydrate reservoirs by flue gas injection (*postponed*)
- 16:00 Coffee break

Tuesday, Oct. 6th

- 9:00 **Thomas Mosch**, Kongsberg Maritime Embient GmbH: Monitoring Technologies and Strategies for Gas Hydrate Exploration (*continuation*)
- 9:10 **Jinhai Yang**, Heriot-Watt University: Methane recovery from gas hydrate reservoirs by flue gas injection
- 9:30 **Nail English**, University College Dublin: MD simulation of clathrate-hydrate kinetics
- 9:50 **Görge Deerberg**, Fraunhofer UMSICHT: Submarine Gashydrate Reservoirs: Production of Methane and Storage of Carbon Dioxide
- 10:10 **Timothy Collett**, State-of-the-art in Exploration Drilling for Hydrates
- 10:30 Final Discussion
- 11:30 Coffee break

## 1 First day

- | Agenda - The final agenda has been discussed (see above).
- | Participants - Each of the attending participants introduced himself/herself.
- | Introduction  
MIGRATE WG 2 - Afterwards Prof. Deerberg briefly introduced the objectives of MIGRATE and the working plan of working group 2 (WG 2) (see attached slides).

Presentations

- According to the agenda the participants have given their presentations followed by short discussion.
- The presented slides are available from the internal MIGRATE homepage. Access is enabled to MIGRATE members only.
- In addition to the presentations Prof. Deerberg has shown a short clip from the project ISUP ([www.isup-go-subsea.com](http://www.isup-go-subsea.com)). The developed technology might be interesting for the exploitation of marine gas hydrate deposits because of:
  - Modularity
  - Autonomous/remote-controlled
  - cheaper than conventional measures

## 2 Second day

Presentations

- Due to a short delay in the schedule on the first day some presentations had to be shifted to the second day.
- Beside the ones of Timothy Collett all slide are available from the MIGRATE homepage as well. The slides shown by Timothy Collett contain data from India on scientific drilling operations and cannot be shared at this time. Instead his presentation from the first day afternoon is available.

Discussion

- After the presentations a discussion related to the production of natural gas from hydrate deposits started.
- What is missing/unknown so far?
  - Merging of different data sets
  - Understanding of the behavior of hydrates in porous media (pore scale to macro scale) → »pore scale model«
  - Transfer of theoretical/laboratory results to natural systems and determination of differences of formation processes (varying properties)
  - »Mechanical model«, especially determination of mechanical properties during the hydrate dissociation
  - Investigations of multiphase fluid flow within the sediment and completion as well
  - Heterogeneity of properties has to be considered
  - Coring capability and handling of pressured cores
- What is needed for production?
  - The requirement is site dependent
  - Model site has to be defined

- Industry has to be included → Technology and know-how of system providers is needed (attention should be paid to rules and processes of industry)
- Conventional drilling and production technology is crucial (prior to application of new technologies their reliability and function has to be proven).
- Chances for newly developed drilling/production devices?
  - The risk should be minimized → use of market available devices (reliability)
  - While using new technology for hydrate exploitation two unknowns exist
    - 1) is the device working
    - 2) nature (not all reservoir properties are well known)
  - Different interests exist: science vs. industry

WG 2 meeting in Haifa

- Afterwards the upcoming WG 2 meeting in Haifa, Israel was discussed. Dr. Makovsky proposed to combine the WG 2 meeting with another meeting taking place in Haifa on the same time. Therefore, a parallel meeting of AUV experts will be joined on the first day. On the second day geomechanical topics are to be discussed among MIGRATE participants. In addition, a preliminary agenda was prepared (see slides)

WG 2 tasks

- For the WG 2 meeting (and the report as well) several tasks have to be managed by WG 2 participants:
- Regarding existing technologies and key areas (see slides also)
  - a) the state of the art has to be summarized,
  - b) the controlling factors has to be shown and
  - c) the gaps are to be pointed out.
- The key areas and the persons in charge are as follows:
  - 1) **Process understanding Laboratory/Analytics:** (Dr. Schicks)  
Morphology of GH, characterization (depending on SH), kinetics
  - 2) **Resource Assessment:**  
Seismic, CSM, ESM, logging ...
  - 3) **Site Characterization, Monitoring:** (Dr. Makovsky)  
Sonar, CSM, ESM, coring, logging, CH<sub>4</sub>-detection ...
  - 4) **Reservoir and Basin Modeling:**  
Characterization of reservoirs, production, geomechanics
  - 5) **Drilling Technology:** (Prof. Deerberg)  
MeBo

6) **Production** and Monitoring **Technology**: (Prof. Deerberg)  
 MeBo, sand/gravel pack; downhole ESP with separator  
 (Pump)

7) **System Technology**: (Prof. Deerberg)  
 Ship/vessel, remote technologies on seafloor

- Here, the blue highlighted aspects are covered by specified participants of WG 2. Resource assessment, Reservoir and Basin Modeling and monitoring technology need to be reviewed.

### 3 Dates

| Event   | Participants                       | Date   |
|---|------------------------------------|--|
| 2. Working group 2 meeting in Haifa, Israel   | WG 2 / MIGRATE                     | November 10 <sup>th</sup> -11 <sup>th</sup> , 2015 |
| Submission of report to commission            | MIGRATE                            | February 2016                                      |
| 2. Working group 1 meeting in Southampton, UK | WG 1 / MIGRATE                     | November 25 <sup>th</sup> -26 <sup>th</sup> , 2015 |
| 2. Working group 3 meeting in Rome, Italy     | WG 3 / MIGRATE                     | November 17 <sup>th</sup> -18 <sup>th</sup> , 2015 |
| Working group 4 meeting in Kiel, Germany      | WG 4 / MIGRATE                     | November 4 <sup>th</sup> -5 <sup>th</sup> , 2015   |
| Industry workshop in Oberhausen, Germany      | MIGRATE / Industry representatives | April 29 <sup>th</sup> , 2016                      |
| Policy maker workshop in Brussels, Belgium    | MIGRATE / Policy maker             | May 26 <sup>th</sup> , 2016                        |