

# D8.4



## Minutes of the 1st Annual Meeting of the Beacon project

DELIVERABLE D8.4

Dissemination type: Other

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Start date of project: **01/06/2017**

Duration: 48 Months

|   |        |  |
|---|--------|--|
| This project receives funding from the Euratom research and training programme 2014-2018 under grant agreement No 745 942 |        |  |
| <b>Dissemination Level</b>  |        |  |
| <b>PU</b>   | Public |  |

### **REVIEW**

| <b>Name</b>         | <b>Internal/Project/<br/>External</b> | <b>Comments</b>   |
|---------------------|---------------------------------------|---|
| All Beacon Partners | Project internal                      | Distributed to the Parties according to the Beacon Quality Management Plan prior to submission to the Funding Authority in accordance with the Beacon Consortium Agreement, section 4.2<br>14/08/2018: Correction regarding BGRs presentation, point 11. Test case 1a01 instead of 1c |
| EARB                | Project internal                      |   |
|                     |                                       |   |

### **DISTRIBUTION LIST**

| <b>Name</b>   | <b>Number of copies</b> | <b>Comments</b> |
|---|-------------------------|-----------------|
| Athanasios Petridis (EC)<br>Christophe Davies (EC)<br><br>Beacon partners<br>EARB<br>Participants at the 1 <sup>st</sup><br>Beacon Annual Meeting | Digital distribution    |                 |

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Beacon

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Date of issue: **06/07/2018**

## Minutes of the 1<sup>st</sup> Annual Meeting of the Beacon project

**29-31 May 2018** at Milos Conference Centre in Adamas, Milos, Greece.

<http://www.miloscenter.gr/>

**Participants:** see separate list. Tuesday 14 people could not land on Milos due to wind conditions. They had to take the ferry and joined the group for dinner on Tuesday evening.

**All Presentations** are available on the Beacon Projectplace and on <http://www.beacon-h2020.eu/events/2018/05/beacon-1st-annual-meeting-milos/>

The Wednesday and Thursday sessions constitute the Beacon Milestone #6, Interaction seminar between experimentalists and modellers.

### Tuesday 29/5

1. *Registration coffee and gathering, 09.30-10.30*

2. *Welcome and intro, 10.30*

3. *European Commission*

Project Officer Christophe Davies gave an update on the Euratom programme and current EU issues. The presentation is available via above link in the “Tuesday” folder.

4. *Management, coordination and communication*

Primary Coordinator Contact at the Coordinator SKB, Mary Westermarck, gave a short update regarding organisational and administrative issues.

Suggested procedures for the economic reporting are a part of the document “Beacon Quality management plan and manual” and were distributed 23 May 2018, before the 1<sup>st</sup> Annual meeting and General Assembly, which facilitated the agreement of these procedures at the meeting. The presentation is available via above link in the “Tuesday” folder.

5. *Work package 1*

Olivier Leupin, Nagra, presented work done and planned work in WP1.

*D1.1 State of the Art report* was submitted in January based on a questionnaire filled out by Nagra, SKB, Posiva, Surao, Enresa, Andra, GRS, and MKG. The questions raised by the EARB are described under their point, section 7. The presentation is available via above link in the “Tuesday” folder.

6. *Work package 2*

Simon Norris, RWM, presented work done and planned work in WP2. This was planned to be a joint presentation with Kate Thatcher from Quintessa, but Kate was one of the participants that had to take the ferry. *D2.2 Report on identification of relevant data/models, improvement of understanding of main processes associated to bentonite component evolution taking into account possible heterogeneities* was submitted in November. It will be updated during the project, and reissued in an updated version at the end of the project. It will also be published as an RWM report.

It was suggested that “a real” database would be useful and that it would be good if it could have a life after the project. Can this be arranged? To begin with the excel-file will be made available for

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Beacon

D8.4 – Minutes of the 1st Annual Meeting of the Beacon project

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download on the Beacon webpage.

The presentation is available via above link in the “Tuesday” folder.

#### 7. *Expert Advisory and Review Board (EARB)*

Wilfried Pfingsten from the Beacon Expert Advisory and Review Board presented their review of the first years deliverables, as well as some input on the project and their role.

The EARB requests feedback on the input they presented in their first deliverable.

- All partners are asked to take part of EARBs first deliverable D8.13. All partners directly affected by that deliverable should give their feedback. Send it to Mary and she will assemble. There will be a reminder of this after the summer holidays.  
D2.2 will be continuously updated during the project and the feedback in D8.13 regarding D2.2 will be considered and responded to in this process  
The authors of D1.1 will send a written response to the EARB regarding the feedback concerning D1.1. It will also be considered and responded to in the final deliverable of WP1, the deliverable D1.3.

There is a need for an agreed procedure for the feedback to the deliverables from the EARB, including the response from the responsible for each deliverable and it should preferably take place before the submitting of the deliverable.

- A solution to this will be suggested to the Beacon Consortium and the EARB before the end of 2018.

The EARB expressed the view that there might be a need for a list of definitions where it is described how some of the words used in the project have different meanings for different partners.

- Mary will make such a list in the Beacon Quality Management plan and Manual, and ask for input to it from the partners.

The presentation is available via above link in the “Tuesday” folder.

#### 8. *Work package 6*

Presentations by Johan Swahn and Roland Pusch are available via above link in the “Tuesday” folder  
The version of D6.1 available at the meeting is to be considered a draft. It will be adjusted and completed and a new final version issued.

During the afternoon the group made a visit to Imerys Bentonite plant.

### Wednesday 30/5

The Wednesday and Thursday sessions constitute the Beacon Milestone #6, Interaction seminar between experimentalists and modellers.

**WP3 & WP5:** Status in the WPs, work done and planned work with focus on experienced difficulties, discussions. Presentations are available on Beacon Projectplace via the above link, in the Wednesday folder, and on the Beacon web.

#### 9. *Introduction/summary of the current status of WP3 (Antonio Gens)*

Summary of constitutive laws developed and used by different teams in single element cases.

Summary of performance table. Future proposal of a similar set of single element cases but now with

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Beacon

D8.4 – Minutes of the 1st Annual Meeting of the Beacon project

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fixed testing and initial conditions (water content, dry density, stress) and the same material for all teams. The presentation is available via above link in the “Wednesday” folder.

*10. Introduction, and summary of the current status of WP5 (Jean Talandier)*

The presentation is available via above link in the “Wednesday” folder.

The teams have been asked to focus on the difficulties encountered for the presentations made at this meeting. Three tests have been selected to work with. They were chosen from the cases assembled in WP2 based on the following. They were:

- rather simple
- both cases with pellets and blocks
- well known material, only MW80
- well instrumented
- and the groups that performed the experiments are participating in the project since close cooperation between experimentalists and modellers is a great advantage.

The second test performed with 32 mm pellets at CEA and the third test, 1c, was performed at Posiva. Both Fabien Bernachy Barbe who performed the test at CEA, and Lasse Lavikainen, Posiva, were at the meeting and were asked to tell us a bit more about these tests during the Thursday.

There was a discussion around which dismantled large-scale in situ tests will be chosen to model in the second part of the project. They should have been subjected to careful and well documented dismantling. Experiments EB, Febex and CRT are the highly likely candidates.

There will be a WP3&5 meeting in Paris in 29 and 30 January 2019.

There compilation of results for D5.1.2 will be in March 2019 and D5.1.2 is planned to be submitted according to plan in May.

*11. BGR, Vinay Kumar*

Current state of work WP5 model test case 1a01. A linear swelling model is implemented and used in the benchmark analyses. The volume change is simulated using a time-dependent deformation boundary. The presentation is available via above link in the “Wednesday” folder.

*12. Clay Technology, Daniel Malmberg.*

Test 1a. Hysteresis based material model framework. Although, in the report, the model is extended to unsaturated states, in the applications only saturated conditions have been considered so far. CT have had problems with glitches in the software but have been working with the company COMSOL to develop the software. Planning to introduce friction in the future. The presentation is available via above link in the “Wednesday” folder.

*13. CU/CTU, David Masin.*

THM hypoplastic constitutive model. Test 1a01 and 1a02 were simulated. Overprediction generally. Calibration procedures were discussed. Model calibration is ongoing using MX-80 element tests. For numerical analyses staggered vs. fully coupled approaches discussed. There was a discussion on how to make compatible different orders of integration of transport and mechanical problems. Numerical issues were experienced when running the fully coupled approach, they are being resolved. The presentation is available via above link in the “Wednesday” folder.

*14. EPFL (were unfortunately not represented at the meeting, the presentation was made by Antonio Gens)*

1a01 and 02 have been modelled. They have managed to find a very low density. The peak in the beginning was overpredicted. To add hysteresis would be interesting and desired. Friction will be discussed Thursday. The presentation is available via above link in the “Wednesday” folder.

*15. GRS/KIT, Klaus Wiezorek*

Code Viper. Description of the conceptual model addressing the hydraulic problem. The presentation is available via above link in the “Wednesday” folder.

*16. ICL, Lidija Zdravkovic*

Double-structure constative model (IC DSM). Tests 1a01 and 1a02 analysed using ICFEP. The presentation is available via above link in the “Wednesday” folder.

*17. LEI, Asta Narkuniene and Darius Justinavicius*

Analysis of Test 1a01 using COMSOL and CODE\_BRIGHT (learnt in the Training course), to compare. A single porosity model. Does not start from 0. Probably related to boundary conditions. The presentation is available via above link in the “Wednesday” folder.

*18. Quintessa, Rebecca Newson*

Internal Limit Model (ILM) used based on Modified Cam clay. Tests 1a01 and 1a02 analyzed. General behavior reproduced. The presentation is available via above link in the “Wednesday” folder.

*19. ULg, Liliana Gramegna.*

Tests 1a01 and 1a02 modelled. A double porosity model. Use of the BBM (single structure) as constitutive model. Interfaces modeled using a dedicated element. The presentation is available via above link in the “Wednesday” folder.

*20. UPC, Antonio Gens*

Use of BExM (double structure). Tests 1a01 and 1a02 analyzed. The presentation is available via above link in the “Wednesday” folder.

*21. VTT, Heidar Gharbieh*

THMc model framework for swelling clays (VTT-UCLM model). Implemented in COMSOL. Rest 1a02 analysis. The presentation is available via above link in the “Wednesday” folder.

*22. Andra, Benjamin Darde*

Powder and pellets. Analyzes a single pellet during swelling (suction decrease), experimentally and numerically using a hydromechanical analysis. The presentation is available via above link in the “Wednesday” folder.

*23. SKB, Shinya Tachibana.*

Cam-clay based model (including plastic swelling though). Test 1a02 analyzed under saturated conditions. Initial suction derived from swelling pressure. The presentation is available via above link in the “Wednesday” folder.

*24. Specific issues for WP3/WP5 (Antonio Gens, Jean Talandier and all)*

Suggestions for further work: relate the desired behaviour outcome to constitutive model features. At least two materials, MX80 and Febex. The presentation is available via above link in the “Wednesday” folder.

*25. Synthesis of the results (Jean Talandier)*

The most important question is why the results are so different, and very dispersive, also from the measured. A comment to this by Kate was: 9 modellers have reached different results. If 9 experimentalists did the same experiment, how different would the results be? Hysteresis should be taken into account. The role of friction in small tests can be an issue. Uncertainties on measurements are sometimes difficult to identify and should be considered, initial gaps and sensor surfaces. The velocity needs to be predicted. SKBs and Posivas results are quite similar.

Generally no more work should be done with this first round of test cases. Those that want to should move on, others may do some more work on this. Look at how much time you have spent and how much you have left in the project. The most difficult was the void.

Common initial conditions are requested for the next task.

#### TASK 5.2 Decision on selection of large scale experiments to model

It is decided that all three below experiments can be chosen, generally two of them should be chosen by each team.

- EB (problem that hydration is not even and complex)
- Febex
- CRT (seemed simpler, showed to be less simple. Ola K has modelled it. There was movement of the capsule. The final state was more or less saturated. Good example of mechanical evolution between heater and rock)

In Decovalex both EB and Febex are modelled

The presentation is available via above link in the “Wednesday” folder.

### Thursday 31/5

Interaction seminar between experimentalists and modellers, Milestone #6 (continuation).

WP4: Status in the WP, work done, planned work and discussions.

#### *26. Introduction and agenda - WP4 tasks, (Klaus Wieczorek)*

Overview. List of planned experiments. Deliverables in months 27, 45 and 47. The presentation is available via above link in the “Thursday” folder.

#### Task 4.1 - Homogenisation of an initially inhomogeneous bentonite system

##### *27. CEA, Fabien Bernachy Barbe*

About the testcase. The presentation is available via above link in the “Thursday” folder.

##### *28. CIEMAT, Maria Victoria Villar*

The tests corresponds well with two natural environment cases. The presentation is available via above link in the “Thursday” folder.

##### *29. CTU, Jiri Svoboda*

Option 2 corresponds quite well to natural environments, last option doesn't correspond very much. The presentation is available via above link in the “Thursday” folder.

##### *30. CU, David Masin*

Will do the modelling for the CTU experiments as planned. The presentation is available via above link in the “Thursday” folder.

##### *31. KIT, Franz*

The cell is sealed up to 2MPa but changes will be made to make it tighter. KIT are also planning to switch to other pellets. The presentation and the films shown are available via above link in the “Thursday” folder.



## Task 4.2 - Persistence or development of inhomogeneities

### 32. *BGS, presented by Patrik Sellin*

The presentation is available via above link in the “Thursday” folder.

### 33. *JYU, presented by Lasse Lavikainen*

All experiments are reproduced 3 times to get some kind of statistics. The material used is similar to the MX80 used originally. Constant temperature and room temperature. The presentation is available via above link in the “Thursday” folder.

*EPFL no presentation*

### 34. *Task 4.3 Natural analogues – SKB, Patrik Sellin*

The main objective is to investigate creep. It has not been possible to get hold of any cores for the purpose yet. Cores available at CIEMAT (drilled 11 meters) could be very interesting. The presentation is available via above link in the “Thursday” folder.

### 35. *Specific issues and general discussion WP4*

#### a) *Friction issue – Posiva pellet/block test (Lasse Lavikainen)*

Tests are more like pilot tests but could be used in the safety case. The exact and final reproducibility is unknown. Friction angle is not taken into account. Presumably most of the friction is coming from the blocks. Special method to measure dry density. Discussion: EPFL had some plans for friction tests but we have no news. ULg has an idea of measuring friction. Tests have been done at Clay. Minor differences with lubrication. Friction tests done should be collected.

#### b) *Experiment list*

Will be sent out next week.

#### c) *Next meetings, input from / interaction with WP3/5 and deliverables*

It is more important to have WP4 representation at WP3 and 5 meeting than to have WP4-meetings so the WP4-group will assemble in conjunction with WP3/5 meeting in January.

### 36. *General summary and conclusions*

The project progresses well and as planned. Modelling groups have done more work and progress than expected. Almost all partners were able to attend this annual meeting, only last minute cancellations. The training course in January was almost too successful. An example is LEI and Darius that just by attending the course could start modelling.

### 37. *Nextcoming annual meetings*

Annual meetings no 2 in Prague (21-22 May 2019) and no 3 in Liege (13-14 May 2020) will be open for external participation but it will not be extensively advertised. And of course all Beacon partners are expected to participate, to share their experiences and results, and to take part of the other partners ditto.

The 4<sup>th</sup> Annual meeting and final workshop/conference will be in London in 14-15 April 2021 with a preparatory WP6 meeting 13<sup>th</sup> April.

Participants are urged to take as “homework” to think about who could and should be interested in attending at the final workshop in London. It will be preceded by a call for abstracts. There will be a poster session, and a session for short oral poster introductions.

Hereby the Beacon first annual meeting is closed, approximately 13.00. The meeting ended with lunch.

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Beacon

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### Action list















| No | Action point  | Responsible  | Deadline          |
|----|---|--|-------------------|
| 1  | Excel “database” from WP2 to Projectplace end Beacon Web  | Mary   | 31 August 2018    |
| 2  | Take part of EARBs first deliverable D8.13. All partners directly affected by that deliverable (in particular responsible for D2.2 and D1.1) should give their feedback. Send it to Mary/coordinator and she will assemble. | All partners<br>Simon, Kate,<br>Olivier respectively | 30 September 2018 |
| 3  | Coordinator will respond to EARB Deliverable D8.13 during the autumn.   | Mary   | 31 October 2018   |
| 4  | Decision list at Projectplace   | Mary   | Done              |
| 5  | Procedure for feedback and handling of EARB reviews of the deliverables   | Coordinator  | October 2018      |
| 6  | Distribute list of experiments  | Klaus W  | Done              |



## Beacon 1st Annual Meeting, 29-31 May 2018, Milos

| Kolu | First name     | Last name    | Org                          | Signature |
|------|----------------|--------------|------------------------------|-----------|
| 1    | Mary           | Westermarck  | SKB                          |           |
| 2    | Irena          | Hanusová     | SÚRAO                        |           |
| 3    | Lucie          | Hausmannová  | SÚRAO                        |           |
| 4    | Franz          | Rinderknecht | KIT-INE                      |           |
| 5    | Jean           | Talandier    | andra                        |           |
| 6    | Simon          | Norris       | Radioactive Waste Management |           |
| 7    | Rebecca        | Newson       | Quintessa Ltd                |           |
| 8    | Vinay          | Kumar        | BGR                          |           |
| 9    | Maria Victoria | Villar       | CIEMAT                       |           |
| 10   | patrik         | Sellin       | SKB                          |           |

|             |               |  |                    |
|-------------|---------------|--|--------------------|
| 25 Tomáš    | Koudelka      | Faculty of Civil Engineering, Czech Tech | Koum               |
| 26 Timo     | Riikilä       | University of Jyväskylä                  | (personal reasons) |
| 27 Robert   | Charlier      | University of Liege                      |                    |
| 28 Darius   | Justinavicius | Lithuanian Energy Institute              |                    |
| 29 Asta     | Narkuniene    | Lithuanian Energy Institute              |                    |
| 30 Wilfried | Pfingsten     | Paul Scherrer Institut                   |                    |
| 31 Kate     | Thatcher      | Quintessa Ltd                            | KThatcher          |
| 32 Lidija   | Zdravkovic    | Imperial College London                  | Zdravkovic         |
| 33 David    | Potts         | Imperial College London                  | Dr Potts           |
| 34 Roland   | Pusch         | WP6                                      |                    |
| 35 Antonio  | Gens          | UNIVERSITAT POLITACNICA DE CAT           |                    |
| 36 Iiliana  | gramegna      | université di Liege                      |                    |
| 37 Yves     | MARIGNAC      | WP6/MISE-Paris                           |                    |
| 38 Jiri     | Svoboda       | CTU                                      |                    |

|    |             |             |   |  |
|----|-------------|-------------|---|--|
| 11 | nadia       | Mokni       | IRSN                                      |     |
| 12 | Ville       | Koskinen    | STUK                                      |    |
| 13 | Johan       | Swahn       | MKG                                       |    |
| 14 | Christine   | Anvegård    | MKG                                       |    |
| 15 | Nadia       | Zeleznik    | WP6                                       |   |
| 16 | Kóbor dr.   | József      | Green Circle of Pécs -University of Pécs. |    |
| 17 | Wieczorek   | Klaus       | GRS                                       |    |
| 18 | Klaus-Peter | Kröhn       | GRS gGmbH                                 |    |
| 19 | Benjamin    | Darde       | Andra                                     |    |
| 20 | Heidar      | Gharbieh    | VTT Technical Research Centre of Finland  |    |
| 21 | JUAN CARLOS | MAYOR       | ENRESA                                    |   |
| 22 | Mattias     | Åkesson     | Clay Technology AB                        |  |
| 23 | Daniel      | Malmberg    | Clay Technology AB                        |  |
| 24 | Ola         | Kristensson | Clay Technology AB                        |  |



|                 |                 |                    |  |
|-----------------|-----------------|--------------------|--|
| 39 Frédéric     | Bernier         | FANC               |    |
| 40 Klaus-Jürgen | Röhlig          | TU Clausthal       |   |
| 41 Jacques      | WENDLING        | Andra              |   |
| 42 Shinya       | Tachibana       | Kobe University    |   |
| 43 Lasse        | Lavikainen      | Posiva Oy          |   |
| 44 Christophe   | Davies          | EC                 |   |
| 45 Olivier      | Leupin          | Nagra              |   |
| 46 David        | Masin           | Charles University |   |
| 47 Rémi         | DE LA VAISSIERE | ANDRA              |   |
| 48 Fabien       | Bernachy        | CEA                |   |
| 49 JINSAO       | Liu             | SSM                |  |
|                 |                 |                    |  |
|                 |                 |                    |  |
|                 |                 |                    |  |



## 1<sup>st</sup> Annual Meeting of the Beacon project

29-31 May 2018 at Milos Conference Centre in Adamas, Milos, Greece. <http://www.miloscenter.gr/>

### Preliminary agenda

#### Tuesday 29/5

|                 |  |
|-----------------|--|
| 10.00-10.30     | Registration coffee and gathering  |
| 10.30-10.35     | Welcome and intro  |
| 10.35-11.05     | EU issues and the Euratom programme (Christophe Davies)  |
| 11.05-11.25     | WP7 and WP8: Organisational and administrative issues  |
| 11.25-11.45     | WP1: work done, planned work. Discussion.  |
| 11.45-12.00     | <b>Coffee break</b>  |
| 12.00-12.30     | WP2: work done, planned work. Discussion.  |
| 12.30-13.10     | Beacon Expert Advisory and Review Board: presentation of review of the first years deliverables, and discussion. |
| 13.10-13.30     | WP6: work done, planned work. Discussions.   |
| 13.30-13.55     | <b>Lunch</b> (planned to be at least partly take away)   |
| <b>13.55-18</b> | Visit Imerys Bentonite plant (inc transport)   |

#### Tuesday Evening – Dinner hosted by the project, at Restaurant Navagio

#### Wednesday 30/5 All day

##### *Interaction seminar between experimentalists and modellers*

##### **WP3 & WP5: Status in the WPs, work done, planned work. Discussions**

|             |   |
|-------------|---|
| 9.00-9.30   | Introduction/summary of the current status of WP3 and WP5 (Antonio Gens/Jean Talandier) |
| 9.30-9.50   | BGR   |
| 9.50-10.10  | Clay Technology   |
| 10.10-10.30 | CU/CTU  |
| 10.30-10.50 | EPFL (presented by Gens/Talandier)  |
| 10.50-11.15 | <b>Coffee break</b>   |
| 11.15-11.35 | GRS/KIT   |
| 11.35-11.55 | ICL   |
| 11.55-12.15 | LEI   |
| 12.15-12.35 | Quintessa   |
| 12.35-12.55 | General discussion  |
| 12.55-13.50 | <b>Lunch</b>  |
| 13.50-14.10 | ULg   |



|             |  |
|-------------|--|
| 14.10-14.30 | UPC  |
| 14.30-14.50 | VTT  |
| 14.50-15.10 | Andra  |
| 15.10-15.30 | SKB /Tachibana   |
| 15.30-15.55 | <b>Coffee break</b>  |
| 15.55-17.00 | Synthesis of the results (Jean Talandier)<br>General discussion/Specific issues for WP3/WP5 (Antonio Gens, Jean Talandier and all) |
| 17.00-17.30 | General matters, next meeting and deliverables   |
|             | Executive board meeting  |

## Thursday 31/5

### *Interaction seminar between experimentalists and modellers*

#### **WP4: Status in the WP, work done, planned work. Discussions**

|                |  |
|----------------|--|
| 8.30-8.40      | Introduction - WP4 tasks, agenda (Klaus Wieczorek)   |
| 08.40-10.00    | <b>Task 4.1 - Homogenisation of an initially inhomogeneous bentonite system</b><br>15 min/pres   |
| 08.40-08.55    | CEA  |
| 08.55-09.10    | CIEMAT   |
| 09.10-09.25    | CTU  |
| 09.25-09.40    | CU   |
| 09.40-09.55    | KIT  |
| 09.55-10.15    | <b>Break</b>   |
| 10.15-11.00    | <b>Task 4.2 - Persistence or development of inhomogeneities</b> 15 min/pres  |
| 10.15-10.30    | BGS  |
| 10.30-10.45    | JYU  |
| 10.45-11.00    | EPFL   |
| 11.00-11.05    | Presentation of Task 4.3 (Natural analogues) – SKB   |
| 11.05-11.30    | <b>Coffee Break</b>  |
| 11.30-12.15    | Specific issues and general discussion WP4<br>- Friction issue – short presentation of Posiva pellet/block test (Lasse Lavikainen)<br>- Experiment list and input from / interaction with WP3/5<br>- Next meetings and deliverables<br>- Conclusions |
| <b>General</b> |  |
| 12.15-13.15    | Summary and conclusions<br>Potentially following decisions in General Assembly   |
| <b>13.15</b>   | <b>Closing of first annual meeting</b>   |
| <b>13.15-</b>  | <b>Meeting ends with Lunch</b>   |