

D8.5



Minutes from 2nd annual meeting

DELIVERABLE D8.5

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Author: Mary Westermarck, SKB

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PU	Public	

REVIEW

Name	Internal/Project/External	Comments

DISTRIBUTION LIST

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Athanasios Petridis (EC) Christophe Davies (EC) Beacon partners		

Minutes Beacon 2nd Annual meeting, General Assembly and Workshop

Date: 21 May 08.30 – 22 May 17.00, 2019
23 May Optional visit to URF Bukov in the morning
Place: Universita Karlova (CUNI), Faculty of Science, Albertov 6, Prague, Czech Republic
Participants: See attached list of participants
Agenda: See attached

All presentations are available at the Beacon Projectplace here
<https://service.projectplace.com/pp/pp.cgi/r1778090098> If trouble with access contact
mary.westermark@skb.se

The Beacon project and the participants of the meeting are really grateful to the hosting partner Univerzita Karlova, Faculty of Science, and to SÚRAO, that they could host this meeting. Thank you very much!

During an initial session Prof. RNDr. Jiří Zima, CSc., Dean of the Faculty of Science, welcomed us to the faculty and our Beacon colleague David Mašín gave us a nice presentation about Prague, the University and the Faculty of Science.

Beacon background/ objectives/overall status.

Scientific coordinator Patrik Sellin gave an introduction to the Beacon project.
Gaps, holes or inhomogeneous density distributions may prevail in the buffer or backfill material by several causes:

- Very heterogeneous initial conditions caused by installation technique
 - Blocks with gaps between them
 - Gaps filled with pellets
 - Mechanical interaction e.g. buffer/backfill, backfill/plug
- Bentonite in a deposition hole or a backfilled tunnel may be lost
 - by piping and erosion during the installation and saturation phases
 - by colloid erosion during glacial groundwater conditions

How well can the bentonite self-seal and homogenise these anomalies?

The purpose Beacon: Development, calibration and verification of material models and modelling techniques!

The project is on track and rolling according to plan.

WP1: Assessment cases (WP-leader Olivier Leupin).

The objectives of this WP are to:

- i. **Derive the degree of disorder** (homogeneity or heterogeneity) that results from specific bentonite applications such as the ANDRA tunnel plug, the Nagra disposal cell and the KBS-3 deposition tunnel backfill based on experimental evidence and numerical simulations
- ii. **Integrate a term of property variability in the safety assessment** of the nearfield and
- iii. **Formulate requirements** in respect to the emplacement density of bentonite **that includes property variability** and that allows to fulfil specific safety functions.

WP2: “What have we learnt since the project’s inception” (WP-leader Simon Norris)

The key objectives of BEACON WP2 are:

- to collect relevant information as produced from past and ongoing projects that provide knowledge relevant to understanding bentonite mechanical evolution in a repository context; and
- to process it to a level where it can be useful as input to the other BEACON work packages.
- Update as BEACON progresses to ensure currency.

The database and associated report (D2.2) are available on BEACON’s Projectplace and on the public BEACON website. The database is a useful resource and it would be good if it could eventually be used more widely than BEACON and WP2 will aim to release an updated version at the end of BEACON, including any experiments undertaken in BEACON itself.

The final report will be published by RWM

It was also suggested to connect the work done in Beacon with the work that is done in Decovalex and Task force EBS.

WP3/5 – Work done, planned work, input to other WPs, discussion, questions, part 1

WP3 overview

WP-leader Antonio Gens gave an introduction and summary of the current status of WP3. Objectives of WP3:

- The final goal is to develop enhanced, robust and practical numerical tools, firmly grounded on a good understanding of the phenomena involved.
- The numerical tools should have the required predictive capabilities concerning the behaviour of engineered barriers and seals especially in relation to their final state.
- A key component of the numerical tool that requires especial attention is the mechanical (stress-strain) constitutive model because the prediction of the final state of the barrier (including its heterogeneity) is directly dependent on its features and capabilities.

Last year's milestones:

- Deliverable 3.1 submitted. November 2018
- WP3-WP5 meeting in Paris (29-30 January 2019)
- Presentations and discussion in the 2nd Annual meeting in Prague

Ongoing:

- Deliverable 3.2
 - Description of improved constitutive models and their implementation and verification.
 - Month of delivery: 27 (August 2019)
 - Proposed deadline for individual reports: **June 15th**

Upcoming:

- Continue development of constitutive models and implementation in computer codes (Tasks 3.1 and 3.2)
- Task 3.3 Verification of the basic features of the models against simple benchmarks
 - c) Model a set of single-element laboratory results under well-controlled conditions for a well-known bentonite
- Laboratory tests performed at EPFL (Presented by Alessio Ferrari after lunch)
 - Oedometer tests on granular MX-80 bentonite
 - Information on microstructure!

WP5 overview

WP-leader Jean Talandier gave an introduction and summary of the current status of WP5. Objectives of WP5:

Contribution to verification and validation of hydromechanical models used to predict bentonite based components evolution taking account heterogeneities

- Initial distribution of properties (dry density, water content...)
 - Pellets mixtures
 - Joint between blocks
 - Technological voids...
- External solicitations
 - Local water flow during saturation
 - Organisation of the stress field around the bentonite based component
 - Thermal distribution and evolution

What is **needed**?

Beacon

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Dissemination level: PU

Date of issue: **26/06/2019**

- Prediction of the transient phase
 - At what time the saturation will be achieved?
 - What are the properties and the evolution of the material in some particular regions – gaps, interfaces...
- Prediction of the final state
 - Are the specifications fulfilled despite the presence of heterogeneities?
 - Water permeability
 - Gas entry pressure
 - Swelling pressure...

Definition of a set of **tests** based on experimental data to improve the numerical tools

- Test cases are taken from the WP2 inventory

Ongoing:

D5.1.2 - Synthesis of the results obtain of test cases from task 5.1 → May 2019

- ❖ Need to be completed
 - Some inputs from participants are missing
 - Analysis and discussions for each test
 - Global synthesis...

Jean Talandier sent out a draft of D5.1.2 just before the meeting. It will be updated after the meeting, distributed to all partners for check, and submitted thereafter.

Upcoming work:

D5.1.3 - Specifications of predictive test cases from task 5.3 → November 2019

Task 3 of WP5 is approaching, and the “task of this meeting” is to choose experiments for Task 5.3.

FEBEX, EB and CRT

Since projects FEBEX, EB and CRT have been chosen for task 5.2 they were briefly presented by Olivier Leupin, Antonio Gens and Patrik Sellin. See presentations at Beacon Project Place.

Modelling teams presentations (20 min inc questions)

Part 1

ULG (Liliana Gramegna)

Quintessa (Rebecca Newson)

LEI (Asta Narkuniene and Darius Justinavicius)

ICL (WP3 and WP5) (Lidija Zdravkovic)

Presentation on proposed laboratory tests for WP3 (Alessio Ferrari)

WP3/WP5 - part 2

Clay Technology (Mattias Åkesson)

VTT (Laura Asensio and Heidar Gharbieh)

CU/CTU (David Mašín)

Andra (Benjamin Darde)

BGR (Vinay Kumar)

EPFL (Jose A. BOSCH)

UPC (Antonio Gens)

WP4: Work done, planned work, input to other WPs, discussion, questions

WP4 Introduction (Klaus Wieczorek)

→ Task of WP4:

Complete respective data and provide support and parameters for advanced material models

Objectives WP4

- Provide input data and parameters for development and validation of models
- Reduce uncertainties about conditions and phenomena influencing bentonite homogenisation

Challenges WP4

- Demanding and inhomogeneous work programme – due to different requirements of modelling groups (“Service WP”)
- Maintain flexibility to react to the needs of model developers and validators (WP3/5)

Summary WP4

Data for modelling WP5 test cases: Reduction of uncertainties

- In material parameters (e.g., suction curve, mechanical parameters)
- Repeatability (several identical tests by one or several labs) → effort?

Data for model development:

- Characterisation of water movement (x-ray tomography)
- Dependence of material evolution on wetting characteristics (Hydration time, constant intake rate or constant injection pressure, resaturation by liquid water or vapour)
- Influence of the initial material structure on the mechanical behavior
→ All realized in the WP4 programme
- Microstructure and rH/suction evolution, not only post-mortem analysis

New experiment as WP5 Test Case?

- Concentrate on available WP4 tests

The **WP3/5 partners** were asked to **specify data needs** after the meeting in January.

Input from 3 teams (up to now)

- Data requirements / suggestions regarding certain WP4 experiments
 - o Material parameters
 - o Initial conditions
 - o Procedure
- Data requirements regarding WP5 Test Case 1c
 - o Granular MX-80 pellets with no interpellet filling: Elastic parameters, hydraulic data under free swelling, confinement, and limited axial load
 - o Same for MX-80 blocks/pellets?

Additional needs?

Decision – To propose to the Commission and Project Officer to merge deliverables D4.1 and D4.2 into one deliverable.

WP4 teams presentations (20 min inc questions)

CEA (Fabien Bernachy-Barbe)

CIEMAT (Maria Victoria Villar)

CU (Jan Najser)

CTU (Jiri Svoboda)

KIT/GRS (Franz Rinderknecht)

BGS (Katherine Daniels)

JYU (Joni Tantt)

EPFL (Patryja Baryła)

Synthesis of the results -and general matters, next meetings, deliverables.

Jean Talandier - General discussion: 50 min

A large variety of models have been used : ICFEP, OpenGeoSys 5, HBM, Lagamine/ACMEG, Comsol, Lagamine, Sifel, Comsol, Code_Bright, QPAC/ILM. Comsol teams work in different ways.

Test 1, main comments:

- “classical” swelling pressure tests at constant volume are well reproduced with the models. However, major differences have been observed for the time dependent behaviour but the trend
- Hydraulic part seems better capture model than “mechanical” part. This has been shown for test 1b and 1c with RH evolution or inflow estimations
- The most difficult situation for the models is certainly when a gap is introduced in the cell → test 1a01 (second part) and test 1a02
- Role of friction has been highlighted in test 1c. Should friction be introduced systematically in the model?
- Treatment of pellets mixture as an homogeneous media with mean properties seems to be a reasonable approach but certainly some characterizations should be done for low density mixture
- Large variety of models has been used and new approaches introduced such as : triple structure for pellets mixture, HBM or ILM models...
- Many improvements have been introduced in the models: Should we run again those tests to illustrate how the models have been improved along the project ? How to manage it in the report D5.1.2?
- Experimental results have been presented during those 2 days : is it what modellers expected?

Next WP3/5 meeting will be in the beginning of February, presumably in Paris.

Next steps WP3:

- Deliverable 3.2
 - Description of improved constitutive models and their implementation and verification.
 - Month of delivery: 27 (August 2019)
- Proposed deadline for individual reports: **June 15th**
- Deliverable 3.3
 - Description of the constitutive models developed in the project. Conceptual bases, mathematical description and model capabilities. Assessment of predictive power.
 - Month of delivery: 46.

WP3 Task organisation

Task 3.3 Verification of the basic features of the models against simple benchmarks

- Modelling the EPFL tests
- Task 3.3 Verification of the basic features of the models against simple benchmarks.

Modelling the EPFL tests

- Information on the tests as well as the data will be provided in about a month (2nd half of June)
- First modelling results to be submitted one month before the next WP3/WP5 meeting
- Modelling results to be discussed in the next WP3/WP5 meeting

Next steps WP5:

- D5.1.2 - Synthesis of the results obtain of test cases from task 5.1 → May 2019
 - o Need to be completed
 - Some inputs from participants
 - Analysis and discussions for each test
 - Global synthesis...
- D5.1.3 - Specifications of predictive test cases from task 5.3 → November 2019
 - o Choice of the test (s) is needed...
- Task 5.2 Large scale experiment
 - o Results for the intermediate meeting in January/February 2020
- Assessment cases can be discussed meeting in January/February 2020

WP6: Input from Civil Society (Nadja Železnik (NTW/EIMV))

Due to requirement from the Commission to clarify the description of work of WP6 and its deliverables an amendment of the GA is being made.

In the new GA the name of WP6 is “Civil Society Dissemination” and there is a new description of work and list of deliverables for the work package. Focus is on dissemination of the project and its results to the civil society. Also the WP6 group will focus more on WP5 results than on the other WPs, this to make effective use of the limited time and budget.

EARB (Jinsong Liu)

Input towards submitted deliverables, work done and advice towards future work within Beacon.

General remarks:

- The EARB appreciates the responses from the project to our comments. This helps to understand how our advice will be considered for the next steps of the project.
- The EARB has the opinion that, compared to other similar projects, the degree of integration between work packages is well-visible, but there is still room for improvement (e.g. feedback on feedback).
- The poster distribution in advance of the annual meeting was a good idea. It allows to earlier look at results and allows preparing questions, comments, remarks on specific topics

Comments to the 2nd Annual meeting:

- The EARB thinks that expectations of “WP1 – assessment cases” need to be clearly defined, especially the difference with the expectations from the “WP5 large scale test”.
- The main added value of WP1-Assessment cases could be predictions at long term and more specifically the long term hydration process. This is important to catch if long term hydration will lead or not to homogenisation. How far chemical processes are important need to be taken into account? Sensitivity assessments on some parameters could also be helpful for a better understanding of the concepts.
- It seems that simplest experiments and their modelling still do not show full agreement. The EARB would like to recall a presentation from WP2.
 - Experimental repeatability/data reproducibility
 - Model and data uncertainties/their propagation
 - What a good and acceptable model for our purpose? (Many or few parameters?)
- The EARB considers it impressive that many new characterisation techniques are used:
 - Pore size distribution,
 - Video scripts showing the homogenisation process,
 - Environmental SEM showing the microscopic structures during homogenisation,
 - etc.
- The EARB was impressed by the BGS presentation. The tests seem to been done very carefully and the obtained results very relevant for the project.

In relation with the presented open questions, the EARB considers it profitable to better understand the complexity of the swelling behaviour and to do long term tests

Beacon II (Patrik Sellin)

Scientific Coordinator Patrik Sellin brought up the question whether there was an interest for a Beacon II. There was a large interest and it will be argued for during the next couple of years to have a Beacon II in the second wave of EURAD WP's.

Organisational and administrative issues (Mary Westermark)

Coordinator contact Mary Westermark summarized from the last year, the year to come, and meeting practicalities. The main points were:

- The reporting of the first period went rather smoothly and the beneficiaries did a good job. All costs have been accepted as eligible and the Commission has made the payment to the Coordinator. The contributions will be distributed as soon as possible. 5 partners have already reached 85% of distributed granted contribution. MKG, UPC, CIEMAT, KIT and BGR. The remaining 15% will be distributed after the final reporting of the project, in the case of enough eligible costs reported.
- Adjustment of D6.1 and an amendment of the Beacon Grant Agreement to clarify the DoW of WP6 were required from the Commission in July 2018 and the process of finding suitable solutions to their concerns has been going on since. Suitable solutions have now been found, that have been accepted both by the Commission, the Consortium and the WP6 group. The amendment will be submitted shortly.
- The 3rd Annual meeting of Beacon will be at the Université de Liege, the 13-14 May, 2020, and
- The 4th and final Annual meeting of Beacon will be at Imperial College London, 13 or 14-15 April 2021. It is yet undecided if there will be a preparatory session about Beacon, bentonite and nuclear waste management aimed at civil society and general public the 13th.

Executive Board

During the meeting the Executive Board had two short gatherings to check status and have a possibility to tend to remaining questions. All members of the Executive Board are pleased with the way the project is going and no remaining questions, issues or problems were identified.

Dinner

On Tuesday evening the meeting participants had dinner together, hosted by the project on a boat that took us on a short ride on the river.

Mineralogical museum

During the lunches the faculty's mineralogical museum, normally closed to public, was open for all the participants. Delegates, after eating, can proceed with informal discussions within the museum rooms by looking at exhibitions.

Between the meeting and the dinner on Tuesday evening a possibility was given to the participants of the meeting to visit the faculty's laboratory

Visit to URF Bukov

On Thursday the 23 May parts of the group of approximately 26 of the participants to the meeting visited URF Bukov, a visit and journey arranged by SURAO.

Next Annual Meeting will be in Liege 13-14 May 2010

for signature.

BEACON

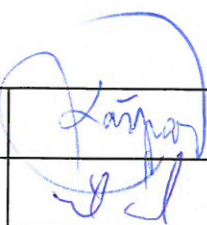

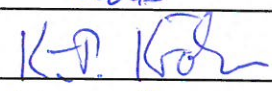
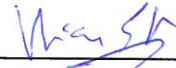
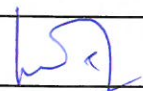
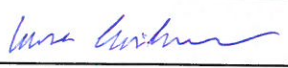
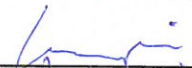



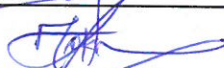

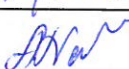
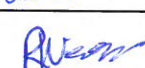
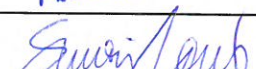
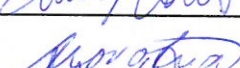
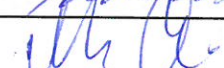
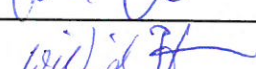
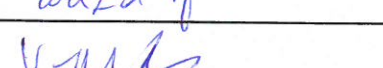
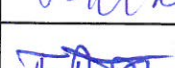




Bentonite Mechanical Evolution

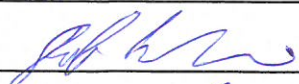
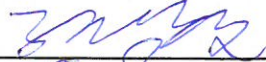

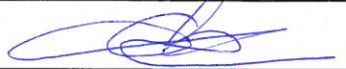
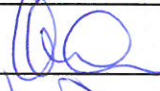

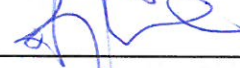
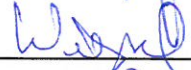


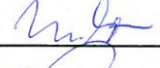

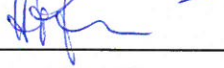


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Participant list Beacon 2nd Annual Meeting, Prague, 21-22 May 2019

First name	Last name	Organisation	Cou	Signature
Laura	Asensio	UCLM	ES	
Patrycja	Baryla	EPFL	CH	
Steven	Benbow	Quintessa Ltd	GB	
Fabien	Bernachy-Barbe	CEA	FR	
Frédéric	Bernier	FANC	BE	
Jose	Bosch	EPFL	CH	
Robert	Charlier	ULiege	BE	
Katherine	Daniels	BGS	GB	
Benjamin	Darde	Andra	FR	
Marketa	Dohnalkova	SURAO	CZ	
Peter	Eriksson	SKB	SE	
Alessio	Ferrari	EPFL	CH	
Antonio	Gens	UPC	ES	
Heidar	Gharbieh	VTT	FI	
Giulia Marianna	Ghiadistri	ICL	GB	
Liliana	Gramegna	ULiege	BE	
Bastian	Graupner	ENSI	CH	
Irena	Hanusová	SÚRAO	CZ	
Tero	Harjupatana	JYU	FI	
Jon	Harrington	BGS	GB	
Lucie	Hausmannová	SÚRAO	CZ	
Darius	Justinavicius	LEI	LT	

Vlastislav	Kašpar	ÚJV Řež a. s.	CZ	
Dr Jozsef	Kobor	WP6- Munic. Pécs	HU	
Tomáš	Koudelka	CTU	CZ	
Jaroslav	Kruis	CTU	CZ	
Klaus-Peter	Kröhn	GRS gGmbH	DE	
Vinay	Kumar	BGR	DE	
Lyesse	Laloui	EPFL	CH	
Lasse	Lavikainen	Posiva Oy	FI	
Olivier	Leupin	Nagra	CH	
Jinsong	Liu	SSM	SE	
Daniel	Malmberg	Clay Tech	SE	
Juan Carlos	Mayor	Enresa	ES	
Nadia	Mokni	IRSN	FR	
Jan	Najser	CU	CZ	
Asta	Narkuniene	LEI	LT	
Rebecca	Newson	Quintessa Ltd	GB	
Simon	Norris	RWM	GB	
Nikol	Novotna	SURAO	CZ	
Markus	Olin	VTT	FI	
Wilfried	Pfingsten	PSI	CH	
Veli-Matti	Pulkkanen	VTT	FI	
Franz	Rinderknecht	KIT	DE	
Klaus-Jürgen	Röhlig	TU Clausthal	DE	
Gianvito	Scaringi	CU	CZ	
Lisa	Schulze	TU Clausthal	DE	
Thorsten	Schäfer	KIT-INE	DE	

Patrik	Sellin	SKB	SE	
Haiquan	Sun	CU	CZ	
Jiri	Svoboda	CTU	CZ	
Jean	Talandier	Andra	FR	
Joni	Tanttu	JYU	FI	Joni Tanttu
Radek	Vasicek	CTU	CZ	
Jacques	Wending	Andra	FR	
Mary	Westermarck	SKB	SE	
Klaus	Wieczorek	GRS	DE	
María Victoria	Villar	CIEMAT	ES	
Lidija	Zdravkovic	ICL	GB	Lidija Zdravkovic
Nadja	Zelevnik	NTW	SI	
Mattias	Åkesson	Clay Tech	SE	Mattias Åkesson
ONDŘEJ	MIKLAŠ	SURAD	CZ	
DAVID	MARIN	UK	CZ	
EVA	HOŠMANOVÁ	ÚJV	CZ	
Dmitry	Lukin	SURAD	CZ	
TOMAŠ	KREJČÍ	CTU	CZ	



Agenda Beacon 2nd Annual meeting, General Assembly and Workshop

Date and time: 21 May 09.00 – 22 May 17.00, 2019, 23 May Optional visit to URF Bukov in the morning

Place: Universita Karlova (CUNI), Faculty of Science, Albertov 6, Prague, Czech Republic

Tuesday 21/5	
08.30-09.00	Coffee and gathering
09.00-09.10	Welcome (prof. RNDr. Jiří Zima, CSc., Dean of the Faculty of Science)
09.10-09.20	About the University and the Faculty of Science (David Mašín)
09.20-09.35	Organisational and administrative issues, and meeting practicalities (Mary Westermark)
09.35-09.45	Introduction: Beacon background/ objectives/overall status (Patrik Sellin)
09.45-10.00	WP1: Assessment cases (Olivier Leupin)
10.00-10.15	WP2: “What have we learnt since the project’s inception” (Simon Norris)
10.45-11.15	Coffee Break
11.15-14.40	WP3/5 – <i>Work done, planned work, input to other WPs, discussion, questions part 1</i>
11.15-11.45	WP3/5 Introduction/summary of the current status (Antonio Gens/Jean Talandier) 30 min
11.45-12.00	FEBEX (Olivier Leupin)
12.00-12.15	EB (Antonio Gens)
12.15-12.30	CRT (Patrik Sellin)
12.30-13.20	Lunch – and the mineralogical museum will be open during the lunch break for all the participants. The museum is just next door where the lunch will be served and is normally closed to public. Delegates, after eating, can proceed with informal discussions within the museum rooms by looking at exhibitions.
	(20 min per team/presentation, including questions and change of speaker)
13.20-13.40	ULG (Liliana Gramegna)
13.40-14.00	Quintessa (Rebecca Newson)
14.00-14.20	LEI (Asta Narkuniene and Darius Justinavicius)
14.20-14.40	ICL (Lidija Zdravkovic)
14.40-15.00	Presentation by A Ferrari on proposed laboratory tests for WP3
15.00-17.10	WP4: <i>Work done, planned work, input to other WPs, discussion, questions- part 1</i>
15.00-15.20	WP4 Introduction Klaus Wieczorek, 20 min
15.20-15.50	Coffee break 30 min
15.50-16.10	CEA (Fabien Bernachy-Barbe)
16.10-16.30	CIEMAT (Maria Victoria Villar)
16.30-16.50	CTU (Jiri Svoboda)
16.50-17.10	CU (Jan Najser)
17.10-17.30	KIT/GRS (Franz Rinderknecht)
	Possibility to visit the Lab
Late afternoon	(Optional short gathering of the Executive Board)
18.50-	Dinner and discussions, hosted by the project



Wednesday 22/5

08.30-09.30	WP4 – part 2
08.30-08.50	BGS (Katherine Daniels)
08.50-09.10	JYU (Joni Tantt)
09.10-09.30	EPFL (Patryja Baryła)
09.30-12.30	WP3/WP5 - part 2
09.30-09.50	Clay Technology (Mattias Åkesson)
09.50-10.10	VTT/UCLM (Heidar Gharbieh and Laura Asensio)
10.10-10.40	Coffee break
10.40-11.00	CU/CTU (David Mašin)
11.00-11.20	Andra (Benjamin Darde)
11.20-11.40	BGR (Vinay Kumar)
11.40-12.00	EPFL (Jose A. BOSCH)
12.00-12.20	UPC (Antonio Gens)
12.20-13.20	Lunch - The mineralogical museum will be open
13.20-14.10	Synthesis of the results WP3/5 (Jean Talandier) General discussion: 50 min
14.10-14.30	General matters, next meeting and deliverables for WP3/5: 20 min
14.30-14.50	WP6: Input from Civil Society
14.50-15.20	Coffee break: 30 min
15.20-15.50	EARB: Input towards submitted deliverables, work done and advice towards future work within Beacon. 30 min
15.50-16.10	Beacon II?
16.10-16.30	Summary, conclusions. Possible remaining decisions in General Assembly
16.30	Closing of the second annual meeting
After 16.30	Short gathering of the Executive Board

Thursday 23/5

06.30 -17.00	Visit to URF Bukov, OPTIONAL
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