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**Management Committee (MC)  
and Working Group (WG) Meeting  
Limassol (Cyprus), 20<sup>th</sup> - 22<sup>nd</sup> April 2015**

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**Minutes**

**19<sup>th</sup> April 2015**

Arrival

Informal meeting, field trip preparation

**20<sup>th</sup> April 2015**

**8:30-17:30 Field trip**

The field trip through the rocks of Cyprus is lead by Christopher MacLeod.

**18:00 – 19:00 MC meeting**

1. Important changes in the COST regulations: no action rapporteur is necessary anymore
2. Information about the topics of the workshop
  - Common project proposal
  - STSM projects in 2015
  - Dissemination – Wikipedia
  - Planned training schools: Devon, spring 2016

**21<sup>st</sup> April 2015**

**9:00 – 10:30 Plenum meeting**

The next phase of FLOWS will be to explore options for a proposal of a MARIE SKLODOWSKA-CURIE INNOVATIVE TRAINING NETWORK (ITN) by FLOWS partners.

Carlos Garrido presents the Marie Skolodowska Curie Action in Horizon 2020 and what an ITN is and why it is useful for FLOWS partners.

It has a budget of € 6.2 billion and funds all actions. It is divided into two sectors, the academic and the non-academic sector.

An ITN is an innovative training network and its main goal is the training for entrepreneurs and for innovative researchers, for ESRS (early-stage researchers), less than four years of research before under-graduate.

A typical ITN consists of

1. beneficiaries: recruit researchers
2. a partner organization: host secondments providing training
  - propose a joint research programme
  - recruit researchers across the consortium
  - advanced research skills and transferable skills training
  - networking events
  - secondments for each researcher

It has a maximum duration of 48 months: EID/EJD/ETN.

Its minimum number of beneficiaries/countries is three and its maximum is 15.

ETNs are different:

- they must be member states/associated countries (e. g. not China)
- maximum number of beneficiaries: ten (mostly between six to ten)
- beneficiaries come from any sector
- there is no min/max for partner organizations
- ESRS are funded for three to 36 months
- it usually leads to an academic degree award
- max 540 researcher months

The Consortium tips and pitfalls 1:

- no max. consortium size, but six to ten beneficiaries are considered to be manageable
- must have non-academic sector participating (beneficiaries)
- same partner from same country is accepted but not more than 40 % of the budget can be forwarded to that country

The Consortium tips and pitfalls 2:

include non-EU countries as beneficiaries or partner organizations but “high income” countries (e. g. USA) are doing better in applying as partner organizations.

Essential training elements 1:

- individual research project
- dedicated training events
- complementary (e. g. final conference)

Essential training elements 2:

- training in advanced research skills and transferable skills (e. g. project management)
- secondments for all ESRS to another sector for a meaningful duration (> three months)
- training for each ESR in PhD

#### Quality of research programme

- educate the evaluator
- research objectives
- provide a clear description of research methodology
- originality and innovative aspects

#### Quality of supervision

- quality of research
- each researcher has a non-academic co-supervisor

#### Communication and dissemination – impact of this activities?

- Dissemination and exploitation
- Public engagement (what – who – when)

#### Work plan

#### Infrastructure, competences and complementary

#### Gender

- mainstreamed throughout Horizon 2020
- gender experts on every evaluation panel
- detailed description

Excellence: 50 %  
Impact: 30 %  
Implementation 20 %

Carlos Garrido points out the importance of the Marie-Curie Initial Training Network ABYSS Training network on reactive geological systems from the mantle to the abyssal sub-seafloor.

Christian Hensen wants to know if there has already been made experience regarding the evaluation. Carlos Garrido answers that the topic absolutely needs to be interesting, e. g. earthquakes so that industry would be integrated. Christian Hensen asks whether general highlights are needed. Carlos Garrido replies that they need to see the whole structure in order to check whether it might be a good scientific project (earthquakes, fluids, raw material risks); the background should be solid.

Christopher MacLeod would like to know how the procedure works. Carlos Garrido explains that the proposal needs to be sent to the members. Everybody meets in Brussels and they receive a multiple choice questionnaire. Every proposal will be reviewed by three panels.

Carlos Garrido also points out that the social aspect as well as the training and the state-of-the-art knowledge are important for ITN.

Marianne Nuzzo asks whether the FLOWS aspects would be good for an ITN. Carlos Garrido replies that credibility is important and that consistency should be fulfilled. First there should be discussed the framework and then industry should be contacted as well.

Mark Lever adds that it would be the best to use a buzz word like “earthquake” in order to gain the interest of industry.

Christopher MacLeod thinks that earthquake prediction should be pointed out.

Christian Hensen explains that this is already the case in FLOWS.

Christian Hensen summarizes that it is very important to work with “earthquakes” as a title in order to draw interest on the work of FLOWS. He also points out that there are also other important things: two common sides: field work and ship time. An ITN offers money but for the seafloor FLOWS needs more money. Maybe FLOWS should find other sources as well or should let an ITN work in order to have a basis for research proposals. This is what FLOWS should focus on now.

Christopher MacLeod argues that it would be hard to set an ITN if you don’t have a programme or field trip. A cruise couldn’t be paid from an ITN.

Pierre Henry wants to know whether a list of plans will be needed for an ITN. Carlos affirms that and explains that work packages titles are needed.

Mark Lever says that the 1<sup>st</sup> part would be to do research on the ground not on the cruise and the 2<sup>nd</sup> part of the project would come through.

Carlos Garrido proposes to present data or samples of previous cruises.

Pedro Terrinha explains that seismic data and ground data are available now (Golf of Cádiz).

Christian Hensen adds that there was the “FLOWS workshop on drilling from the Sea of Marmara seafloor” in Bremen in March 2015. Up to now there doesn’t exist any result to write a proposal but it could be combined to have an outlook.

Pierre Henry explains that there exists a data flow like Gibraltar to work on.

Christian Hensen points out that FLOWS doesn’t have to talk about an early warning system but about fluids in a certain area. He asks what timescale there is and if they are able to realize it.

Sebastiano D’Amico supposes that they would need about 6 months. It depends on the earthquake activity that is chosen. It would be good to know which section of the fault system is activated now.

Christian Hensen wants to know whether they would like to do it on shore.

Mark Lever bespeaks that they should present something which is interesting. Therefore it could be a goal to do it in the ocean (submarines). This is also more interesting for the students.

Marianne Nuzzo prefers to focus on the drill home.

Christian Hensen replies that they don’t have any.

Pierre Henry suggests combining freed monitoring and seismicity data.

Rolf Kipfer adds to combine these mentioned aspects with environmental research and land technology.

Christian Hensen explains that training network can be used for hiring researchers, but there are no means for technical development.

Pierre Henry thinks that a monitoring project is difficult to realize with cruises. It would be better to test an existing technical test.

Christopher MacLeod explains that it will be difficult to have a new project with an ITN without having the means to pay it. Therefore he wants to know if it has to be related to the existing projects.

Carlos Garrido answers that you can develop samples and do something else in another work package. He also points out that a consultant would be helpful to write a proposal.

Christian Hensen regrets that all employees at GEOMAR who are working on that have already enough work to do.

Carlos Garrido explains that all have to decide for an ITN and then there have to be found other ways for funding.

Christian Hensen wants to know how much money would be needed for fluid flow observations.

Mark Schmidt answers that there is no money needed for designing as small tests could be done, but for Mediterranean tests money will be needed.

Marc-André Gutscher points out that Louis Geli and Mr. Buffine of Ifremer could be involved to help.

Pierre Henry adds that free monitoring must be strengthened. He proposes a cruise with a Turkish vessel. Moreover on shore Oman would be interesting.

Adriano Mazzini says that there are already existing samples for monitoring in Italy.

Christian Hensen thinks this might be a possibility.

Christopher MacLeod proposes Israel, but Adriano Mazzini fears that instruments might be stolen there.

Carlos Garrido adds that Israel is a member in ITN.

Rolf Kipfer explains that the technology is available for fluids in seas but FLOWS needs deep fluids.

Adriano Mazzini suggests defining fluid locally or e.g. in front of Japan, where there are completely different conditions. He explains that there are existing shallow fluids on deep fluids.

Matteo Lupi means that FLOWS needs to find a place of large earthquakes (6.0 or +).

Marc-André Gutscher thinks that an interaction of rocks and industry would be a theme. In his opinion earthquakes on the Marmara seafloor are of no interest for industries.

Christian Hensen points out that seismicity and fluid combination are important. If transform faults were skipped, it could be discussed in a brainstorm.

Carlos proposes a focus site for everybody. As there are too many members in FLOWS, not all FLOWS institutions can be beneficiaries.

Christopher MacLeod suggests writing a unique proposal in which everybody is put under an umbrella.

Carlos Garrido adds that all should prepare the proposal directly, because it would be too late at the next meeting as the deadline is January 2016.

Pedro thinks to start the proposal including all the subjects that everybody wishes.

Christian Hensen adds to develop a concept.

Carlos Garrido proposes to make a list of who is interested in what and the absentee members can make their cross.

Christopher MacLeod points out that a PhD has to be given a theme to work on.

**Common project proposal:**

Main theme for discussion: "Fluid Flow related to seismic activity"

Other themes: "transform faults and earthquakes"

Christian Hensen suggests sitting in small groups in order to find projects.

Before that Paola Vanucchi and Pierre Henry are giving their lectures.

**11:00 – 12:30 Work Group meetings**

Development of ideas for ITN project proposal (topics, working areas, collaboration partners)

### **13:30 Lectures of Pierre Henry & Paola Vanucchi**

#### **Paola Vanucchi: “Control of fracture zones – Tectonics of the Brazilian Equatorial margin, T-BEM: ANIODP Proposed to drill active fracture zones”**

In the north east corner of Brazil (Clará Basin and Potiguar Basin) there is seismic and volcanic activity. The fracture zones are active. The problem is the sediment and not the depth of water.

Paola Vanucchi proposes a site survey.

IODP (International Ocean Discovery Program) – Exploring the Earth under the Sea – is a program everybody can take part in. It is lead by two universities in Brazil (one is Largo) and is funded by Brazil.

#### **Pierre Henry: “Bremen Workshop report, March 19 – 20”, BATHTAB**

The Sea of Marmara is situated along the Northern Anatolian Area and it is 100.000 years old. In a depth of minus 3 km there are hydrocarbon reservoirs where earthquakes happened.

Pierre Henry explains the two MARUM MeBo (Meeresboden-Bohrgerät) 70 and 200 which can both be used in a depth of minus 2000 m.

Pierre Henry points out that Louis Géli of Ifremer has done researches on “Western high fluid migration system”.

In the north Anatolian faults there are found mud volcanos.

Seismicity is mostly in a depth of minus 10 – minus 18 km.

### **14:00 – 15:30 Plenum meeting**

#### **Report of WGS to Plenum**

#### **WG 1 Seismicity and fluid flow at TTPBs: field data and modeling (Pierre Henry)**

1. natural seismicity and induced seismicity: how do they compare?
1. a) external forcing of fluid flow by rupture and/or seismic waves (km scale network) at induced seismicity site
- b) external forcing of fluid flow by rupture processes and/or seismic waves (km scale network at natural fluid related seismicity site)
2. Earthquake ground motion scenarios in induced seismicity areas
3. Relationship between fault stability fluid compressibility
4. Sensitivity of micro-seismic activity to water table fluctuations
5. Response of fault zone to fluid injection: in situ experiments (in peridotite/serpentite?)

#### **Records WG 1 (Pierre Henry)**

- Sedimentary records
  - interpretation of sedimentary record of earthquakes (scaling of seismotubidites with tsunami and earthquakes)
  - records of fluid emission (biomarker – authigenic carbonates)?
- Monitoring (instrumental developments)
  - very long-term autonomous OBS
  - seafloor geodes – acoustic ranging

#### Fluids as indicators

- creeping vs sleeping. How do fluid composition, depth of provenance, fluxes display correlate with fault behavior?

### **WG 2: Deep lithospheric structure and mechanical behavior of TTPBs (Carlos Garrido)**

WP1: high resolution imaging of transform faults: integration from field, monitoring, imaging and modeling

WP2: interaction of TF and fluid and magmatic processes

#### Individual projects:

WP1: - microstructural record of paleo-seismicity in TF

- seismic imaging of fluid over pressures in faults (Active Seismology and Numerical Modelling)

WP2: spatial-temporal relationship between seismicity and volcanism in South Algerian TTFs

WP3: - reactive fluid flow in serpentine and its impact on the reology of TFs

- modeling of stress distribution, topography in transform fault (numeric modeling)
- sedimentary record of TF activity (sedimentology and fluids geochemistry)
- interaction between continents – ocean transform faults
- unveiling the ductile record of the deep levels of TTF: linking geology and geophysics

WP4: Cooper (BMS) hydrothermal deposits in TF-constrains from ophiolites

#### Eight beneficiaries:

Cardiff (UK), RHUL (UK), CNR (I), OGS (I), HCMR (GR), Geomar (D), CSIC (ES), BMG Ltd.

- 1. ECORD-ETN-Identifying the Rock Types – summer school ODP – Core repository
- 2. Field Based school – Troodos Ophiolite
- 3. Geophysical Imaging and Seismic refraction – reflection, tomography, earthquake location etc.
- 4. Constraining the Reology of TFs: theoretical, experimental and natural constrains
- 5. Numerical modeling of TFs
- 6. Methods in the petrological and geochemical study

### **WG 3: Fluids, minerals, and microbial processes at TTPBs (Mark Lever)**

#### ETN Network Strategy

- Develop individual projects
- Collaborations between groups doing related projects
- Not necessary that all members work on the same sites and samples
- Common umbrella for projects (e.g. role of seismicity in controlling fluid flow and fluid chemistry in fluid-emitting structures)

#### Technology aspects

- New seismically active zones
- Approach: start with terrestrial systems, e.g. mud volcanos by Mount Etna, and then study shallow seeps, e.g. Corinth Strait, and later the deep sea
- Monitor local water chemistry, gas chemistry (incl. isotopic compositions), and seismicity and compare the three

#### General Strategies

- Training schools at terrestrial sites or marine sites
- Training school cover all ETN aspects
- PhD projects could range from field-based studies
- Link up with other institutes, e.g. GFZ

#### **Discussion/Decisions/Tasks to WGs**

Rolf Kipfer suggests a combination of the following: seismicity, geology and microbiology.

Carlos Garrido explains that the origine of FLOWS were the transform faults.

Paola Vanucchi and Marianne Nuzzo agree that everybody should express his ideas and all WGs can work out on the similarities.

Sebastiano D'Amico thinks that PhD projects should be one topic.

Gert de Lange means that three different proposals exist and that they have to discuss on the matter how to unite all three.

Christian Hensen prefers to focus on one project for ITN.

#### **16:00 – 18:00 Work group meetings**

#### **FLOWs website and dissemination issues (Status of the website and suggestions for improvements/Status of the Wikipedia “project”)**

#### **WG 4: Integration and dissemination**

Dimitris Sakellariou explains that Wikipedia should be kept up-to-date and that entries should be made.

Christian Hensen explains that only few e-mails had reached the GEOMAR and that everybody knows to address e-mails to Dirk Fleischer.

#### **Status of STSM applications for 2015**

was not discussed.

Christian Hensen concludes for this day that all should still proceed on discussing about the structure. A project submission should be done, it would be better to have two projects than just to have an ITN. All had already discussed on a structure of potential projects.

## **22<sup>nd</sup> April 2015**

Before the work group meeting starts Christian Hensen has to announce that the next meeting will take place on 30<sup>th</sup> September – 2<sup>nd</sup> October 2015 (respectively 28<sup>th</sup> September – 2<sup>nd</sup> October 2015), but not as planned in Barcelona. Eulàlia Gràcia has just informed Christian Hensen that this is not possible anymore because there is no convenient meeting venue.

Christian Hensen asks for a feedback about a new hosting place.

### **8:30 – 10:00 Work group meetings**

#### **Digest input from plenum discussions/Refine suggestions for projects/Define tasks for the upcoming months**

Christian Hensen thinks that it needs to be discussed how many proposals are needed for ITN, one or two. Moreover it should be decided who is going to coordinate this project.

### **10:15 – 12:00 Plenum meeting**

#### **Report of WGs to Plenum/Decisions/Define tasks for the upcoming months**

Pedro Terrinha explains that after having collected all themes, more collaboration would be a good idea. He finds that he better belongs to another WG now; thus collaboration would be better than working separately in each group.

Pedro Terrinha suggests holding the next FLOWS meeting in Portugal. He receives credit for this.

Chris MacLeod says that they also should properly discuss everything regarding those not attending the actual meeting.

Christian Hensen explains that the financial aspect should not be left out.

Pierre Henry explains that there are sites in Sicily, Anatolia, Cádiz, Marmara and Spitzbergen.

Gert de Lange would like to include the transform system.

Christian Hensen thinks it could be used but where it causes an obstacle.

Chris MacLeod says that they don't have a focus.

Carlos Garrido underlines that all should work out common ideas to make it feasible to combine all interests.

Gert de Lange thinks that the sites in Cyprus are good to work at for the students.

Mark Lever wants to present projects that are publishable for the students.

Carlos Garrido suggests using project sites individually. The main need is to have PhDs and data.

Christian Hensen explains that it would be necessary to have a title and to have sites where to find several WGs in one place. Transform faults should be kept but specific reasons are necessary to find a place to get samples.

According to Chris MacLeod, the projects don't have to be in the same place. There will be links within each of the active processes.

Mark Lever explains that the proposed PhD projects are:

- 1) Activity of fault and sea-page sites
- 2) Track origin of fluids
- 3) Dissolved organic carbon substrates
- 4) Microbial habit, energy source
- 5) Track fluid inclusion
- 6) Microbe-mineral interactions

Alina Polonia explains that nobody has yet examined the area below Mount Etna. Thus she spontaneously presents this area.

Pierre Henry explains WG1's processes:

- On-shore external forcing of fluid flow
- Sedimentary records: quantitative interpretation of sedimentary record of earthquakes and tsunamis; records of fluid emissions
- Monitoring: very long-term autonomous OBS; seafloor geodesy – acoustic ranging (GEOMAR/CNRS, Brest); application of acoustic methods for monitoring of gas emission (Ifremer); development of chemical sensor
- Fluid as indicators: creeping vs sleeping  
How do fluid composition/depth of provenance/fluxes display correlate with fault behavior?  
(Azores-Gibraltar fault system: University of Lisboa and University of Hamburg)
- Identification of fluid flow transients from pore fluid composition (Ifremer/ITU)

**12:00 – 12:30 Wrap-up by Core Group (CG) members**