Project N. 037110

NEAREST

Integrated observations from NEAR shore sources of Tsunamis: Towards an early warning system

Instrument: STREP

Thematic priority: 1.1.6.3 GOCE (Global Change and Ecosystems)

D36_3 Minutes of meetings

Due date of deliverable: March 2010
Actual submission date: March 2010

Start date of the project: 01/10/2006 Duration: 36 + 6 months

Organisation name of the lead contractor for this deliverable: ISMAR

Project Co founded By the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	
PP	Restricted to other programme participants (Including Commission Services)	
RE	Restricted to a group specified by the Consortium (Including Commission Services)	**RE**
CO	Confidential, only for members of the Consortium (Including Commission Services)	

Minutes of the 2nd year NEAREST Meeting

Berlin, May 9-10 October 2008

Venue

Technische Fachhochschule Berlin
Luxemburger Strasse 10 - 13353 Berlin (Germany)
Haus Gauß: Room B501

List of Participants

Organisation	Participant name
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TFH	Hans Gerber
	Wilfried Langner
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IM	Fernando Carrilho
CNRST	El Mouraouah Azelarab
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	Abdelouahad Birouk
	Mohamed Benammi
	Aomar Ibenbrahim
ASTER	Maria Grazia Zucchini
	Alessandra Borgatti
Advisors	Vasily Titov
	Hitoshi Mikada
EC Observer	François Schindelé

Day 1 - Thursday 9 October 2008

Opening Session

After a welcome address by Klaus Kramer and Hans Gerber from the hosting organisation TFH, the project Coordinator Mr Zitellini presented the Agenda of the Meeting and illustrated the structure and the scope of each meeting session. Each sessions was aiming at achieving a complete state of the art of the project, sharing results and information among the different workpackages, discussing critical aspects and identifying corrective actions for a good prosecution of the project in the following months.

The Coordinator stressed the importance of the reporting aspects along with the scientific activities and provided an overview of the following steps connected with the end of the second year of activity.

Finally, the Coordinator introduced the EC observer François Schindelé to the audience.

WP3 Analysis and planning Seismological monitoring

Presentations made by Wolfram Geissler – AWI
Presentations available on the Nearest website: *Berlin_WP3_Geissler*

The speaker presented the results of the WP3 Meeting which was held the previous day in an ad hoc meeting among the partners involved. He reminded some details on the main goals and activities foreseen in WP3. In particular, the extension of the onshore seismic networks, a better knowledge about the seismically active geological structures, an evaluation of the hazard potential and the contribution to the development of a Tsunami Early Warning System. A map of the area provided by the Institute of Metrology in Lisbon for the period Sept. 2007 – July 2008 was described as well as the parameters of the Lobster (Longterm Ocean Bottom Seismometer for Tsunami and Earthquake Research) the instrument used in the field experiment.
Geissler reported about the Recovery Cruise with Urania (Palermo – Faro) in the period between 1st August 2008 and 13th August 2008: the recovery route and the work onboard. The main phases of the Recovery Cruise included the

- -ranging, release
- -recovery on sea surface & on deck
- -stop recording, clock synchronization by GPS
- -cleaning, disassembling, packing of OBS
- -data download and archiving

In parallel with the Recovery Cruise, the partner from FFCUL and ISMAR carried on the surveillance of Navigation, Chirp and Multibeam.
During the recovery of the OBS a stop in the recording occurred and 9 instruments had problems of battery capacities. This meant a good recording but the clock was not synchronised. The levelling of seismometer was successfully done.

To sum up the problems occurred were related to:

- 9 OBS didn't succeed in the clock synchronization due to battery low
- 12.5 OBS didn't have a correct levelling
- the OBS orientation which is still in evaluation
- the swings after strong impulses

The presentation continued with the description of FFCUL work onboard about the data surveillance and analysis. Some examples of OBS signals and behaviors during earthquake events were showed. Then the speaker focused on some strange signals on hydrophones

recorded and some details were provided about the data collected and the outcomes resulted.

The following steps to be done are about:

- the OBS orientation
- the evaluation of time corrections
- data quality protocol and meta data
- integration of Geostar and onshore data into a common database
- local seismicity studies
- structural studies by passive methods

The presentation continued with a description of some pictures by the Moroccan colleagues about their monitoring of their local coasts.
Finally the WP3 was described by a reporting point of view with regards to objectives and starting point, progress toward the objectives, deviations, personnel involved and deliverables produced. Some questions and clarifications were asked by some partners and the project coordinator gave some anticipations about the planning for the following six months.

WP2 Analysis and planning: Tsunami source characterization
Presentations made by WP 2 Leader: Juan Jose Dañobeitia – CSIC

Presentations available on the Nearest website: *Berlin_WP2_ Dañobeitia*

The activities of the WP2 were described with an overview of the objective and the starting point, the workplan and its goals. Before a detailed presentation of each tasks started, a list of the staff engaged, meetings, papers produced and research stays were presented.

As for the *Reprocessing and pre-stack depth migration of existing MCS data*, CSIC concentrated on SWIM-06 data acquired in June 2006 for a total of 10 MCS profiles.

As for the *Wide-angle reflection/refraction acquisition experiment*, the Cruise dates were already fixed. It will be held in 18 days, between the 27th October and the 13th November 2008. The starting point will be Cartagena (48 hours + transit) and during the 8th October Meeting a consensus had been reached on the first refraction line to be studied.

The task 2.3 *Processing, modelling and interpretation of wide-angle seismic data* keeps its schedule and the deliverable 24 *Depth-migrated MCS profiles* was almost completed and included 10 MCS lines. Luis Matias from FFCUL integrated the presentation with some pictures and suggestions. Some comments and recommendations were presented by some other partners (Marc Andree Gutscher, Eulalia Gracia, Nevio Zitellini) about the positioning of the lines.

WP4 Analysis and planning Tsunami signal detection

Presentations made by WP4 Leader Laura Beranzoli – INGV and Francesco Chierici- ISMAR
Presentations available on the Nearest website: *Berlin_WP4_Beranzoli*
Berlin_WP4_Chierici

The presentation focused on the activities carried out during the second year of the project and in particular on the last semester (goals achieved, deliverables produced and criticalities met) and the activity for the following 6 months
The main objectives of the WP were reminded as well as the partner involved with reference to their contribution and role. The experiment overview was provided. The description focused on the tasks for the 4th semester

- the preparation planning and implementation of a long-term (about 1 year) mission; cruises for deployment and recovery; mission follow-up.
- the data back-up, quality checks, preparation of the data base to be integrated with other data; pre-analysis of 'parent' tsunami signals.

The status of the deliverables was showed and the next ones were described: a draft circulated about D15a recovery cruise of the deep-sea platform and data quality checks and D15b about the cruise report was completed. An overview of all deliverables due for the WP4 and of the milestones was provided

Deviations from the project WorkProgramme

The main deviations were:

1. *Bouy Acoustic communications malfunctioning* which occurred immediately after the GEOSTAR deployment (on 25th August 2008)
   Remedial action: the acoustic modem and the electronics of the buoy were removed and shipped to laboratory in order to set up again the communication chain. The system was restored and re-configured. On 17th October a new cruise took place in order to rebuild the communication on the buoy. The acoustic link was newly established: the observatory was acoustically checked and some data and parameters were retrieved

   After the setup of the buoy electronics and the reconfiguration of GEOSTAR via acoustic communications (17 October 07), the acoustic system of the abyssal observatory hang up revealing a *problem of the seafloor acoustic modem*.
   Remedial action: contacts with the acoustic communication supplier (SERCEL) started soon in order to programme an upgrade of the modem communication system for a possible next deployment. None possibility to arrange a recovery of the observatory (needed ship, MODUS, cable + winch). GEOSTAR has continued to work as an autonomous observatory. All data were locally stored and would have been recovered after the recovery cruise.

2. *Buoy drift and ARGOS alarms emission to INGV* (19 October)
   Arrangement of an extraordinary cruise for the buoy recovery on 20th October 2007. Some pictures were showed about the buoy, the real time position tracking from GPS data via satellite link, the recovery in the warehouse.
   The deviation is related also to the mooring line at sea. During cruise of AWI in the deployment area the buoy acoustic release on the seafloor was monitored: it correctly answered the query from the pinger surface unit.

In August 2008, the Geostar was recovered by Urania, Some pictures and details were provided. As for the outcome of the mission:

- it lasted 325 days (25 Sept. 2007 - 17 Aug. 2008)
- observatory last operating day was 6 July '08 (central clock drift: 184 ms in 359 days ~ 0.51 ms/day)
- the acoustic status was of 256 working hours (also tested positively on deck immediately after the recovery)
- battery status was low for the observatory and for acoustics

Some first results were showed. As for the conclusion, the contemporary onset of malfunctioning over the 7 channels of digitiser suggested a damage about this latter which was probably occurred by the violent knock against the ship. The remedial actions were explained to the audience.

Davide Embriaco from INGV continued the presentation about the Pressure Gauge data and the damage occurred. The analysis led to an investigations about the cause of the jumps and large discrepancy in pressure data and the cause of corrosion.

Laura Beranzoli concluded that during the following 6 months the work would be devoted to the data analysis from other sensors that would give the possibility to make analysis on the water column, cross-checking analysis and that will constitute a precious data set calibrated on the site. The pressure data in selected time windows would be used to revise and eventually refine the parameter of the Tsunami Detection Algorithm. To fulfill the project objectives, the partner proposed to fix all the problems (also with the contribution of suppliers) and to find out a new opportunity for a further mission in order to achieve the real-time message transmission from the observatory to land within the project duration

The remedial action would be realised within the frame of the ESONET NoE program of Demonstration Missions, LIDO-DM (LIstening the Deep Ocean) that would operate a first nucleus of seafloor observatory network at Mediterranean scale in two ESONET sites by aligning to the same performances SN1 cabled Observatory (Eastern Sicily) and GEOSTAR observatory newly deployed in the Gulf of Cadiz. The network would perform an experiment of geo-hazard detection and mammals tracking. A new deployment of the whole system (GEOSTAR and the buoy) is scheduled in May 2009 with the support of the Spanish vessel "Sarmiento de Gamboa" (CSIC).

The presentation was concluded with the proposed adjustments to the bar chart showing the work plan of WP4 with reference to tasks 4.4 and 4.5.

Some comments arose from the audience and the project coordinator stressed the risk of the experiment, the fact that the instruments is a prototype and praised the work done within the work package. In particular it was stressed the short time of reaction and the prompt solution to apply to another project.

WP5 Analysis and planning – Data integration / Integrated Tsunami Detection Network

Presentations made by WP5 Leader: Josè Morales – UGR, Fernando Carrilho – IM, Abdelouahad Birouk – CNRST, Luis Matias - FFCUL
Presentations available on the Nearest website: *Berlin_WP5_Morales*
Berlin_WP5_Carrilho
Berlin_*WP5_Birouk*

The activities of the WP5 were described with an overview of the objectives and a precise description of each tasks.

As for task *5.1 Establishment of data collectors for real-time automatic processing of data*, some data were showed about the status and the improvements achieved in the data acquisition and processing of the seismic network related with the WP5 (task 5.1 and 5.2).
The seismic instrumentation pool managed by IAG-UGR was described and as well as some maps of the seismic stations location.
In particular, the speaker presented the choice of the Seismological Communicator Processor (SeisComP) 2.5 (SC2.5), developed by GEOFON data center at GFZ Postdam (Hanka, 2003) as the best solution because:

- it is a robust protocol (soft) for real time transmission of data for its use in Internet or any other circuit that supports the protocol TCP/IP
- it is robust because the clients can be disconnected and connected without lost of data
- the requested data can be limited to a single station, to a single channel, to a complete net or another type of device (tidal gauge, OBS, boys etc)
- the packages are sent in way of 512-bytes in mini-SEED format
- the most common implementation is to include the protocol Seedlink inside the SeiscomP package

The change in the land seismic component of the network meant to face some important challenges which were described. During 2008, since a new version of the the SeisComP 3.0 (SC3) was launched the group was involved in a training course. This new version has some more characteristics such as the possibility to receive in real time until more that one thousand of streams from different types of seismometers (strong ground motion, short periods, broad bands), belonging to different organisms and networks, by using TCP/IP protocol; the remote review, a status control network and the possibility to share waveforms with different nodes or server.
The speaker presented some pictures of the seismic stations installed underlying that several hundreds of seismograms from different networks around the world are under processing.

As for task *5.2 Development of automatic procedures for rapid determination of seismic parameters* its principal goal is to have a robust tool to determine a fast location and evaluation of the size of the seismic source in tsunamigenic region as SW Iberia. SC3 receives and manages waveforms in real time from different networks and devices and moreover it allows the following automatic processes. The presentation proceeded with the description of how the AUTOLOC soft estimates several magnitudes by using the seismograms that arrive in real time to the dataconcentrator. Several functions and tables were described.
To sum up, during the 2nd year of the project, the Autoloc, autopicker, and magnitude evaluations of the SC3 had been adopted at IAG-UGR seismic center and SC3 proved to be a good tool for fast location and size evaluation of the seismic activity and could be used as a module for future Early Warning System in the gulf of Cadiz.

As for the following year IAG-UGR is going to include more BB's seismic stations in the seismic networks and to continue with the testing of the system for local/regional earthquakes and also for global earthquakes.

Fernando Carrilho from IM continued the presentation regarding WP5 with a focus on the Data Concentrator, its requirement, its configuration and future development. In particular, the Cascais upgrade was expected very soon. Some pictures of the tide gauges were presented, as well as the seedlink data flow. The speaker presented some pictures about the quality control done on the received data. An overview of the future activities to be realised within the work package was explained.

Birouk gave an overview of the CNRST contribution to the WP5 activities as for the development of an effective tsunami detection methodology and the definition of thresholds for issuing different levels of alarm messages.

The coordinator praised the good collaboration and the integration among the Spanish, the Portuguese and the Moroccan teams.

Luis Matias from FFCUL concluded the presentations of WP5 with a focus on the activities dealing with observations of tide gauges and the problems arisen with the processing of online data (i.e. bad weather). The connection with the Italian colleagues' work was underlined.

WP6 Analysis and planning – Paleotsunami and Paleoseismic records
Presentations made by Eulalia Gracia - CSIC; Cesar Andrade – CSIC and Luigi Vigliotti – ISMAR
Presentations available on the Nearest website: *Berlin_WP6_Gracia*

The WP leader presented the objectives of the WP. They are in particular:
- to map low lying areas in Portugal, Spain and Morocco, and submarine channels and basins
- to characterise the tsunami and turbidite deposits related to 1755 and older events by completing several geological, geophysical and geochemical procedures
- to constrain the age of the tsunami and earthquake episodes preserved on sedimentary record using radiometric (14C, 137Cs, 210Pb), and luminescence (TL, OSL) dating methods
- to propose a model of recurrence interval for the earthquake and tsunami events occurred in Gulf of Cadiz during the Holocene

The meetings attended, the presentations done, the publications presented, the field works realised and the cruises participated in were listed with reference to the people involved.
The results for each tasks were presented.

As for *task 6.1. Onshore sedimentological evidence of tsunami records* each partner involved presented the work done. The FFCUL partner explained the field work, the lab work and the Moroccan meeting which took place in March 2008. Some pictures and data were showed to describe the progress toward the objectives. Luigi Vigliotti presented the Paleomagnetic, Rock-Magnetic and Sedimentological analysis of Sediments from Boca do Rio (Algarve).

As for *task 6.2. Offshore sedimentological evidence of earthquake events* Eulalia Gracia presented the team and the work done. From the period of the 18th February to 19th March 2008 the team involved opened, described and imaged (digital photo) five recently acquired

sediment cores from the SW Iberian Margin which will be added to the turbidite paleoseismology model of the Gulf of Cadiz. The presentation continued with the description of the new methodology applied to calibrate radiocarbon ages and of the calculation of the calendar ages of the turbidite events. Some data, information and images were presented about the RV James Cook 27 cruise (Atlantic Margin), occurred from the 3rd of August to the 3rd of September 2008, Santa Cruz de Tenerife to Portland (UK).

As for the deviations from the project Work Programme, the WP leader explained:

1. the need to postpone the completion of deliverable D21 to month 36 because, on one side, of the higher than expected amount of effort and time in surveying, coring, describing and interpreting the stratigraphy and sediments collected in Algarve and Morocco coastal lowlands; and on the other side because of the required preliminary processing of sediment in order to select the most promising three sites where tsunami deposits could be found.
2. the need to postpone the end of deliverables D22, 22b, 23 to month 36 because more time was necessary to work on the new JC-27 cores together with the previously obtained ones. The necessary steps to achieve this were already done (i.e. a collaboration agreement with Drs. R. Wynn & D. Masson from NOCS to work on the new cores acquired in the Gulf of Cadiz during the RV James Cook-2008 cruise) or are planned (i.e. a new request for shiptime in the RV Sarmiento de Gamboa to carry out the NEAREST-CORE cruise). And in particular, the NEAREST-CORE cruise is going to be devoted to complete high-resolution acoustics and seismics in the Gulf of Cadiz. Based on the preliminary ship time scheduled it is likely that the cruise may occur by Autumn 2008, just by the end of the project. As there won't be enough time to analyze the new data, only first results will be given as deliverable regarding this cruise by the end of the NEAREST project.

According to the deviations explained, the presentation ended with an overview of the barchart. The coordinator concluded with some comments on the planning of the refraction campaign leaving the decisions to the Steering Committee meeting of the following day.

WP7 Analysis and planning: Modelling of tsunami impact in SW Portugal

Presentation made by the WP 7 Leader: Maria Ana Batipsta – FFCUL, Francesco Chierici – ISMAR.

Presentation available on the Nearest website: *Berlin_WP7_Batipsta*
Berlin_WP7_Chierici

The WP leader presented the activities foreseen for WP7 but most of the results were presented during Barcelona meeting. In particular, during the second year, the acquisition of bathymetric data at sea was completed and the numerical modelling for tsunami propagation was implemented. The final goal is the preparation of a set of inundation maps for the selected target areas. Maps and tables were shown regarding nested grid system, benchmark testing, the model earthquake (the Lisbon event) and the Casablanca test site.

As for the next steps, the team needs to tune the model for flow depth velocity, to produce the flow depth velocity maps and to wait the ouputs of TRANSFER project in order to produce the standards for inundation maps. The list of publications was provided and their status of the art was underlined.

The coordinator underlined the connections with the Transfer project and stressed the collaboration especially in the Gulf of Cadiz. The collaboration between the two teams takes advantages of the results avoiding any duplication of the work done within the two projects.

Francesco Chierici from ISMAR presented the 2-D model of tsunami generation in compressible water column overlying a porous sea bed and the results achiedeved in particular concerning the acoustic wave induced within the water column by the sea floor motion.
The solved model allowed the team to study, on one side, the pressure and velocity fields (in the water column and in the porous sediment) and, on the other, the free surface signal (from the velocity vertical component at the air-water interface) at different distances from the source. As for the conclusions, it was observed that the acoustic signal generated by the sea-floor motion travels from the source at sound speed, reaching the observation points much earlier than the possible tsunami wave. Moreover, the acoustic signal showed a low attenuation in amplitude also at a long distance from the source and it carried information on the source length, sea bottom rising velocity and water depth, also in the case of frequency interference. Finally, the main effect of the porosity is a low-pass filtering of the signals and a damping of the tsunami wave amplitude and the acoustic modulation.

WP8 Analysis and planning – Feasibility study and prototype for an EWS
Presentation made by Luis Matias - FFCUL
Presentation available on the Nearest website: *Berlin_WP8_Matias*

The speaker presented the main progresses made within the Work Package made up of two tasks and the presentation was focused mainly on task 8.1. “Simulation of tsunami generation scenarios” and on the feasibility study on prototype of an early warning system. While in WP 4 the data were collected by seismology and sea level, in WP 8 these information had to be analysed and used through the simulation. The speaker presented the TEWS architecture (published by NOA at the end of 2007 on behalf of the Indian Ocean Tsunami Warning System), a design of an end to end Tsunami Warning System with reference to the part where the decision has to be made on a Tsunami generation. Many pictures referred to the TAT Tsunami analysis developed by the JCR of Ispra were explained and detailed (see presentation). The speaker proposed to discuss among the partner and decide by the end of 2008 whether to use the model adopted by NOA along with the computation of scenario made available by the JRC facilities.

WP9 Analysis and Planning: Circulation of project information to end-users
Presentation made by WP9 Leader: Nevio Zitellini – ISMAR
Presentation available on the Nearest website: *Berlin_WP9_Zitellini*

The task 9.1 Project communication was completed in the previous period so as the task 9.2 Project web site which is updated periodically. In particular, a new section dedicated to the dissemination was created. This section will be developed and improved with the contributions of all partners.
As for task 9.3, all the partners were solicited to contribute to develop the contact database.
The diffusion plan (task 9.4) includes two different actions: the first one is the diffusion of the knowledge inside the scientific community and in the second one the knowledge dissemination is addressed to a non specialistic public. The contribution to the diffusion comes mainly from:

- the NEAREST partners participation to the national and international scientific congresses;
- the production of various scientific papers published on international journals and thematic volumes (i.e. Marine Geology , Journal of Marine and Petroleum Geology, Tectonophysics, etc) or on not SCI journals.

The dissemination toward a non specialistic public has been done, in each NEAREST partner country, by radio interviews and TV appearances, internet newsletters and newspaper articles.
The speaker presented a list of published scientific papers and the conference participations, the radio interviews and TV appearances and internet newsletters.
Another activity was addressed to very young people. For this purpose, ISMAR was participating in an educational local project "Il linguaggio della ricerca" promoted by CNR and addressed to the secondary and high schools of Bologna. This project includes the visit to the ISMAR Institute, brief lessons or talks on tsunami and the Nearest project, practical applications and distribution of dissemination materials tailored on the age of the audience. This materials can be easily translated in the languages of the partners involved in the project. In addition some Italian scientific museums have been contacted in order to perform meetings or "permanent" exhibitions about tsunamis issues and the contents of the NEAREST project.

Presentation made by Nevio Zitellini – ISMAR
Presentation available on the Nearest website: *Berlin_Multibeam_Zitellini*

Mr Zitellini took advantage of the audience to present some images on the work done during the recovery campaign about the multibeam survey on some interesting and critical areas.

Closing remarks (definition of the list of issues to be discussed by the Steering Committee on Friday 10th October)
(Nevio Zitellini -ISMAR)

Day 2 - Friday 10 October 2008

Financial and administrative issues

The first session of the morning was addressed to project PIs, and their principal collaborators in the management of the project.

The Friday session started with an intervention of Ms. Zucchini (Aster) who summarized the reporting activity to be carried out at the end of the second year of the project implementation. The contributions expected by each partner were reminded, defining deadlines for the provision of files and signed documents. Template of reports to be produced were presented and specific procedure for financial reporting was illustrated in details, including recommendations recently received from the Nearest financial officer. The related file will be uploaded in the Nearest website to allow easy access and consultation from each partner. The financial level of expenses at the end of year 2 was then analysed, pointing out that:

- the minimum level of expenditure to assure the third advance payment from The Commission will be certainly reached. The payment is expected in spring 2009.
- some partners (CNRST, CSIC) have already sustained costs exceeding initial forecasting; nevertheless, considering their high level of interest in the project they decided to support with own funds the extra-costs to complete the project activities.

Steering Committee Meeting

The second session of the morning was addressed to the NEAREST Steering Committee meeting, involving only the responsible members for each project partner, plus some observer assistants. During the SC meeting the main critical issues of the forthcoming period were tackled.
The detailed report on the Steering Committee meeting is available in a separate specific file.

Advisor Report @ Berlin (2008)

Presentation made by Hitoshi Mikada – Kyoto University
Presentation available on the Nearest website: *Berlin_Mikada*

The speaker expressed his pleasure to be at the meeting and started by summarizing the comments presented during the Marrakech meeting. In particular, during that meeting his major comments had been addressed to survey/observation plans that should be based on scientific hypotheses, the inter-package activity and international collaboration that needed to be encouraged and technical developments that had to be considered as a top priority issue. Already during the Marrakech meeting he had noticed that a lot of work had been done especially in the international collaboration with Morocco. In Berlin he recommended to keep going on and to continue to develop the technical part of the project.
He continued by describing his work and the Japanese experience. Figures and photos were showed to present instruments, analysis, field work and data (see presentation)
As for his conclusions, professor Mikada advised to continue the work done till that moment and suggested to take into consideration also the post-NEAREST activities maybe into another funded project.

Tsunami Mitigation Strategy

Presentation made by François Schindele – European Commission Observer
Presentation available on the Nearest website: *Berlin_Schindele*

The speaker introduced himself, his role and experience as national contact for Tsunami Warning System in the Pacific especially in Tahiti. His participation during the Meeting was foreseen to share some recommendations about the strategy for Tsunami mitigation.
The Tsunami warning system was described as made up of three phases: assessment, warning guidance and preparedness.
As for the assessment phase, the speaker stressed the importance of historical studies, field surveys, numerical simulation, Tsunami data base, inundation maps and evacuation maps. In particular, he underlined how sometimes a local event could prove experience and important information for the scientific studies.
As for the warning guidance, its main aspects were described as measurement, telecommunication (especially real time), numerical simulation, early detection, real-time data, wave forecast and warning dissemination "to the last km".
The speaker praised the good cooperation among the Spanish, Portuguese, Moroccan teams and hoped a continuous work in this direction.
As for the preparedness phase, the speaker described the pacific experience about education, dissemination and communication through brochures, books, community meetings, TV, radio and web information. He underlined that each country had to be responsible for this phase especially because it has to fit the characteristics of each organisation. He was happy to see that the Nearest project covered this aspect and suggest to take advantage of the publications already available.
The presentation ended with some recommendations about the components rotation and suggestion about the worst scenario (see presentation).
Some partners added comments about the peculiarity of the Nearest project especially about the near source situation and that the tide gauge had to be installed close to costal area with the maximum probability to have a Tsunami event.
Schindele gave also another suggestion about the importance to anticipate some deliverables presentation to have the time to share and discuss the information. The Coordinator thanked for the suggestion and assured that the issue was discussed and would be one of the main decision to be taken in the next meeting in Brest.

Closing remarks by Nevio Zitellini - ISMAR

The coordinator underlined how many suggestions made by the advisors and the EC observer had already been included in the project development. In particular, the collaboration among the work packages, the international cooperation with Morocco, the technical collaboration (for example, problems within Geostar found a prompt reaction within Esonet Network). The consortium showed the capability to have positive reaction. As for the suggestions of the EC observer, the coordinator underlined how Nearest project was already on the track to realize them even with the required variations. The coordinator stressed the point that with the beginning of the 3rd year of the project a new critical phase was going to start: the processing of the data acquired is a key moment.
He thanked the partner participating in the meeting and a brief reminder on the next steps scheduled was made (i.e. reporting to the Commission and Brest meeting in April).

NEAREST **Berlin (D), 10 October 2008**

Steering Committee Meeting Minutes

List of participants:

Partner n.	Acronym	Representative
1	ISMAR	Nevio Zitellini
2	FFCUL	Maria Ana Baptista Luis Matias (observer)
3	CSIC	Juan José Danobeitia
4	AWI	Wolfram Geissler (observer)
5	UBO	Marc André Gutscher
6	INGV	Paolo Favali Laura Beranzoli (observer)
7	TFH	Hans Gerber
8	UGR	José Morales
9	IM	Fernando Carrilho
10	CNRST	Azelarab El Mouraouah
11	XISTOS	/

Assistants: Maria Grazia Zucchini and Alessandra Borgatti (ASTER)

Decision on possible postponement of the end of the project

The Coordinator reported to the PIs that some partners have asked to postpone the end of the project in order to be able to present the results of their workpackages within its duration. The assumed postponement could last for no more than 2 or 3 months. The procedures of the hypothetical amendment (according to the Grant Agreement and to the Consortium Agreement) are presented and the Coordinator focused the attention on the consequences of this decision. The PIs and the Coordinator decided that the final decision will be taken during the spring meeting.

Strategy for publication - dissemination of major nearest outcomes and EGU spring2009 meeting participation

The Coordinator called attention to the plan for the dissemination of the project results for the year 2009. First of all, he suggested that the first results of the refraction campaign could be presented during *EGU (European Geosciences Union) meeting* (the most important geophysics meeting in Europe) whose General Assembly 2009 will take place in Vienna Austria, 19 – 24 April 2009. The Coordinator asked the PIs to share their ideas about the presentations to be scheduled for that meeting. Via e-mail he will collect the suggestions for the topics to be presented and he will define a common strategy avoiding overlapping.
As for the *strategy for the publications*, the Coordinator stressed the importance to have a shared management especially in relation to the refraction experiment's results.
He communicated to the PIs about a contact with an editor for a *volume dedicated on the Gulf of Cadiz* from a geophysical and marine geological point of view. The publication will involve other scientists working on the topic. The PIs agreed on the importance of the publication and to present it during an important meeting. Two options are considered:

- to present it during a special session in the Fall AGU Congress taking place in San Francisco (US)
- to foresee a workshop within ESF (European Science Foundation)

Relations with Topo community

As mentioned during the working session of the previous afternoon, the Nearest partners have relevant contacts with the Topo community. Topo Iberia, Topo Europe and Topo Med are initiatives that connect the researchers dealing with multidisciplinary geoscientific studies.
The Coordinator stressed the importance to inform the Topo Community about the Nearest results and suggested to invite some representatives to participate to the next Nearest meeting. The Iberian partners and Josè Morales in particular are asked to collect the contact reference of the main representatives of the Topo communuity.

Logistics organization of a field trip in Morocco to study the neotectonics of the area

During the Marrakech Meeting in October 2007 the partners shared the proposal to organize a field trip in Morocco to study the nature of the activity of the fault and map it. The field trip is planned for the end of January/ beginning of February 2009. The Coordinator suggested to start collecting proposals and arranging logistics. The field trip will be open to every interested partners and their students. The Moroccan partner, Azelarab El Mouraouah, proposed to organise alongside this field trip a meeting open to Moroccan scientists with the presentation of the state of the art in the area and the presentation of Nearest activities. The Coordinator approved the idea. The details will be defined via e-mail among the interested partners.

Organization of next Nearest mid-year meeting

The Nearest Meetings foreseen for year 2009 will be slightly anticipated in order to schedule the final one within the project period. The Coordinator proposed to program the mid-year meeting at the beginning of April. The dates for the next meeting were eventually scheduled for the 2nd and 3rd April. The meeting will take place in Brest and it will be arranged in collaboration with UBO. Some preliminary details are discussed among the partners.
From a reporting point of view, the anticipation of the mid-year meeting implies that the six-monthly reports will therefore cover only 5 months (the period between October 2008 and February 2009). The arrangement could be done because these reports are working documents not to be delivered to the European Commission but useful to the correct management and monitoring of project activities.

The Steering Committee meeting was closed with the reminder that all useful documents are available in the restricted area of Nearest website.

Minutes of the 2nd year NEAREST Meeting

Brest, 2-3 April 2009

Venue

IUEM-Institut Universitaire Europeen de la Mer

Place Nicolas Copernic, Plouzane (France)

Auditorium hall

List of Participants

Organisation	Participant name
ISMAR	Nevio Zitellini
	Francesco Chierici
FFCUL	Maria Ana Baptista
	Luis Matias
	Cesar Andrade
	Conceiçao Freitas
	Rachid Omira
	Sonic Silva
CSIC	Valenti Sallares
	Rafael Bartolome
AWI	Wolfram Geissler
UBO	Marc-André Gutscher
	Audrey Gailler
	David Graindorge
	Pascal Le Roy
	Nissrine Maad
	Brigitte van Vliet-Lanoe
	Flora Gallais
INGV	Paolo Favali
	Laura Beranzoli
	Davide Embriaco
	Stephen Monna
UGR	Daniel Stich
	Flor de Lis Mancilla
CNRST	El Mouraouah Azelarab
	Toto El Arbi
	Aomar Ibenbrahim
	Mohamed Kasmi
ASTER	Maria Grazia Zucchini
	Alessandra Borgatti

Day 1 - Thursday 2 April 2009

Opening Session

After a welcome address by Marc André Gutscher from the hosting organisation UBO, the project Coordinator Mr Zitellini presented the Agenda of the meeting and illustrated the structure and the scope of each meeting session. Each sessions was aiming at achieving a complete state of the art of the project, sharing results and information among the different work packages, discussing critical aspects and identifying corrective actions for a good prosecution of the project in the following months.

The Coordinator underlined that the project was at a key moment: in few months the results will be ready and if some critical points are envisaged the partners still have time for reaction.

WP2 Analysis and planning: processing and interpretation of wide angle seismic data – preliminary results

Presentations made by WP 2 Leader: Valenti Sallares – CSIC and Audrey Gailler - UBO

Presentations available on the Nearest website: *WP2_CSIC_Sallares.ppt*
WP2_UBO_Gailler.ppt

The activities of the WP2 were described with an overview of the objective and the starting point, the work plan and its goals. Before a detailed presentation of each tasks started, a list of the staff engaged, meetings, publications produced and instrumentation used were presented.

As for the *Wide-angle reflection/refraction acquisition experiment*, the Cruise took place between Oct 27th (Cartagena) and Nov 11th (Cadiz) on board BIO Hespérides. The speaker gave some details on the ship, the scientific team involved, the instruments used and the gun array. A TV team of three journalists of German ZDF Station participated in the Nearest-Seis cruise in the framework of a docu-drama jointly produced by ZDF and Discovery Channel on the Lisbon 1755 earthquake and tsunami (produced by A. Solomon, H. Stein, script by H. Nelsen-Minkenberg). They filmed all the operations made on board (specially those related to OBS deploying and recovering), as well as a number of interviews with members of the scientific team.

Regardless of the cruise's time reduction, its objectives were satisfactorily fulfilled and a lot of information were recorded. The speaker presented some figures about the WAS profiles.

As for the task 2.3 *Processing, modelling and interpretation of wide-angle seismic data*, all data had been pre-processed. In particular, Audrey Gailler, postdoc hired at UBO for 18 months, from UBO had started modelling the wide-angle data along Profile P2, including data from both OBS and landstations. Audrey Gailler presented her preliminary work.
Some comments and interventions were presented by some other partners (Marc Andree Gutscher, Luis Matias, Nevio Zitellini, Wolfram Geissler) about the modeling and the method chosen.

WP3 Analysis and planning Seismological monitoring

Presentations made by Wolfram Geissler – AWI
Presentations available on the Nearest website: *WP3_AWI_Geissler.ppt*

The speaker reminded the meetings held for WP3, including the one held the previous day.

He reminded some details on the main goals and activities foreseen in WP3 and gave a detailed presentation of the data acquired by the OBS. Some critical points were explained along side with possible solutions:

- OBS timing
- Lack of some synchronization and correct levelling
- OBS orientation
- Transient signals after strong impulses

The presentation then focused on the signals recorded and the first results gained from the seismicity analysis. Detailed maps and graphics were presented.

Finally the WP3 was described by a reporting point of view with regards to progress toward the objectives, deviations and deliverables produced. Four tasks were already completed. Task 3.5 was almost already done and task 3.6 was started. As for the last deliverable to be produced, the forecast delivery date had a controlled two-months shift.
The conclusion was focused on waveform data and local seismicity.

WP4 Analysis and planning Tsunami signal detection

Presentations made by WP4 Leader Laura Beranzoli and Paolo Favali – INGV
Presentations available on the Nearest website: *WP4_INGV_Beranzoli*

The presentation started with a snapshot of the main objectives of the WP, the partners involved with reference to their contribution and role. The focus then shifted to a detailed description of the sensors with regards to rate, model and efficiency of data produced and of the Tsunameter prototype. Some data were showed on the event detection performance and quality check. The speaker explained in details the disturbances detected and the remedial actions put in place. Graphs and figures were provided to itemize the description.
In particular, the complete data back up, quality check and analysis showed that the oceanographic sensors, the gravimeter, the seismological sensor equipment and the pressure gauge were able to provide most of the expected data without gaps while the hydrophone stopped working in the first hours of the experiment.
The remedial actions planned was presented. In respect to the additional activities considered very relevant for the impact of the project, a prolongation of Task 4.4 and Task 4.5 was proposed in order to perform a new deep seafloor experiment.

WP6 Analysis and planning – Paleotsunami and Paleoseismic records
Presentations made by Rafael Bartolomé - CSIC; Cesar Andrade – FFCUL and El Arbi Toto – CNRST
Presentations available on the Nearest website: *WP6_CSIC_Gracia*

The speaker presented the objectives of the WP, the meetings attended, the presentations done, the publications and the field works realised. The results for each tasks were presented.

As for *task 6.1. Onshore sedimentological evidence of tsunami records*, Cesar Andreade from FFCUL presented the work done. Some pictures and data were showed to describe the progress toward the objectives and the study conducted during the field work.

As for *task 6.2. Offshore sedimentological evidence of earthquake events* the speaker presented the team and the work done especially thanks to the RV James Cook cruise.

The *task 6.3. Onshore-Offshore Correlation: Paleoseismicity and recurrence rate* started with a compilation of the large magnitude instrumental earthquakes, historical seismic record, historical tsunamis and tsunami deposits (tsunamites) in the SW Iberian Margin (from Lisbon to Cadiz area). The work focused on the correlation of the turbidite events with the instrumental and historical seismic records. Some figures were showed.

The presentation of the work packages continued with an intervention of the Moroccan partner who showed some pictures on the study conducted at the Dhar Doum-Lalla Zahra fault, NW Coastal Morocco.

The presentation ended with a focus on the deviations from the work programme. In particular, CSIC asked for an "Accion Complementaria (AC)" to request for shiptime in the RV Sarmiento de Gamboa to carry out NEAREST-CORE cruise. As piston core sampling has already been collected after the research collaboration with the NOCS Team (JC27 cruise, August 2008), the NEAREST-CORE cruise would be manly devoted to complete high-resolution acoustics and seismics in the seismogenic zones of the Gulf of Cadiz. The AC has been successful and the shiptime was allocated for the NEAREST-CORE cruise during 2010 onboard the RV Sarmiento de Gamboa. The schedule of the vessel for 2010 had not been approved at that time, but very preliminary dates of the NEAREST-CORE cruise (15 days max.) would be around May-June 2010. Since the NEAREST-CORE cruise is supposed to take place when the NEAREST project will be already finished, the Deliverable D22b will be completed with the data already collected. The coordinator concluded with some comments on the possible project postponement and its consequences on this task.

WP7 Analysis and planning: Modelling of tsunami impact in SW Portugal
Presentation made by the WP 7 partner: Rachid Omira – FFCUL
Presentation available on the Nearest website: *WP7_FFCUL_Baptista*

The speaker focused especially on task 7.4 Production of Inundation Maps for Lagos-Sagres and presented, with the help of some pictures, different scenarios. Then the contribution to IOC-NEAMTWS was explained with regards to the design of a tsunami detection network in the Gulf of Cadiz. In particular, the study has adopted a specific strategy for tsunameter installation based upon three main criteria:

1. maximization of warning time,
2. coverage of all the area where tsunami can be detected and
3. the conditions of installation: flat bottom topography and a "safe" distance from the seismic source for station location

A list of the publications realized was provided.

WP8 Analysis and planning – Feasibility study and prototype for an EWS
Presentation made by Luis Matias - FFCUL and Iben Brahim - CNRST
Presentation available on the Nearest website: *WP8_FFCUL_Matias*
WP8_CNRST_Ibenbrahim

Luis Matias opened the presentation reporting about the status of the simulator and about his recent meeting with Herculano Caetano from XISTOS in Lisbon. The work about the simulator was almost finished.

As for the Early Warning System, the speaker reminded that a prototype for the Tsunami Early Warning System that covers Portugal was working at IM facilities and it collected and analysed real-time data from seismic and tide-gauge sensors.

The presentation focused on the ongoing coordination with the Tsunami group at JRC and the Portuguese Civil Protection authority. A top-down system was created and by 2011 there will be 4 regional tsunami warning centres
The speaker reported, with the help of some pictures, about definition of coastal tsunami forecast points and DART locations.

The presentation of WP 8 continued with the Moroccan partner intervention about the Moroccan Seismic Network Upgrade. The two phases of the work and some pictures were described. In particular, in November 2008 CNRST started the installation of new VSAT Seismic Network. CNRST has bought a real time digital tide gauge and an agreement with Harbours management department was signed. This agreement regarded the installation and operating of the tide gauge acquired by the CNRST and the upgrade of tide gauges owned by HMD for real time data communication. Casablanca Harbour was chosen to host the new tide gauge and the installation was scheduled within about a month.

WP9 Analysis and Planning: Circulation of project information to end-users
Presentation made by WP9 Leader: Nevio Zitellini – ISMAR
Presentation available on the Nearest website: *WP9_ISMAR_Zitellini*

The coordinator announced that the project website will be revised especially concerning the news section and more emphasis would be devoted to meeting agendas, deliverables, presentation at international meetings and conferences and papers from other communities. The website would continue after the official end of the project, because the collaboration among the partners would as well continue. A document was showed about the EGU participation. The meeting would take place from 20th to 26th of April and 14 among posters and presentations would be done by Nearest partners. The coordinator underlined that this presence demonstrated the important scientific activity of the partnership.

Closing remarks by Nevio Zitellini - ISMAR

The coordinator briefly presented the issue about the project eventual postponement which would be discussed during the Steering Committee Meeting of the following day.

Referring to the presentation of Luis Matias, the coordinator underlined the importance to focus on the output of the Tsunami Early Warning System and especially on the strategy to be followed. He proposed a meeting to be held in mid-June among WP2 and WP3 partners in order to discuss on the conceptual model on crustal/mantle velocity. He anticipated that the next project Meeting could be scheduled before the 30th of September. The discussion then continued on the future scenarios and the ideal system for the area involved by the project.

He thanked the partner participating in the meeting and presented the agenda of the following day.

Day 2 - Friday 3 April 2009

Management and administrative issues in view of the end of the project

The Friday meeting was opened by a session devoted to the analysis of the state of the art of the project form the financial point of view.

Ms Zucchini presented in particular some tables summarizing the actual level of expenditure claimed by the partners in the first two years of the project, showing a comparison with what initially foreseen at budget level. Although a number of noticeable deviations interested

most of the partners when considering what claimed per single year, the situation at the end of the second year of the project was eventually absolutely aligned with the budget expectations, having reached the 98%.

Actually there are two partners (CNRST and XISTOS) having already exhausted their budget, nevertheless they confirmed their relevant interest in the project and declared that they will cover with internal funds the costs associated to the remaining activities to be carried out to the end of the project. On the contrary the 30% level of underspending of TFH was not allowed to be justified, as no TFH representatives attended the Brest meeting. The coordinator will take care to ask TFH to give assurance they will recover such underspending in the third project year.

Then the situation about the payments received up to now from the Commission was analysed, including the third payment received at the end of March 2009. Taking into consideration that most of the partners had already reached the maximum amount to be transferred by the Commission before the end of the project (which corresponds to the 80% of the total contribution expected) with the previous payment, the third payment has been limited to the following partners: FFCUL , AWI , INGV, UGR.

No further payment is expected before the termination of the project activities and the approval of the final report.

From the reporting point of view a calendar of deadlines for the provision of WP activity reports and Management reports referred to the fifth semester was agreed:

- WP activity reports to be prepared by WP leaders:
    - they have been drafted out in March 2009 to be presented at the mid-year plenary meeting to be held in Brest (2-3 April 2009)
    - deadline for the report provision 10 April 2009
- Management reports to be prepared by each partner according to the template provided by Aster at the end of March 2009
    - deadline for the report provision 4 May 2009

Finally the meeting management session was closed with a presentation made by Ms. Zucchini introducing the audit certification procedures to be adopted by each partner at the end of the project. General concepts and contract requirements on audit certificates were illustrated, providing also reference documents and guidelines. Such documents will be provided to the administrative referent of each partner by the coordinator via e-mail. They will be also available on the Nearest website from May 2009.

The recommendation received from the EC financial officer were mentioned, inviting the partner to start the audit certificate procedure with sufficient advance, to guarantee the respect of deadline for audit certificate provision (45 day after the end of the project , together with the final cost statement).

Steering Committee Meeting

The second session of the morning was addressed to the NEAREST Steering Committee meeting, involving only the responsible members for each project partner, their delegates, plus some observer assistants. During the SC meeting the main critical issues of the forthcoming period were tackled.
The detailed report on the Steering Committee meeting is available in a separate specific file.

NEAREST **Brest (F), 3 April 2009**

Steering Committee Meeting Minutes

List of participants:

Partner n.	Acronym	Representative
1	ISMAR	Nevio Zitellini
2	FFCUL	Maria Ana Baptista Luis Matias (observer)
3	CSIC	Valenti Sallares (delegated by Juanjo Danobetia)
4	AWI	Wolfram Geissler (delegated by Wilfried Jokat)
5	UBO	Marc André Gutscher Nathalie Queffélec (observer)
6	INGV	Paolo Favali Laura Beranzoli (observer)
7	TFH	/
8	UGR	Daniel Stich (delegated by Jose' Morales)
9	IM	/
10	CNRST	Azelarab El Mouraouah
11	XISTOS	/

Assistants: Maria Grazia Zucchini and Alessandra Borgatti (ASTER)

Project actual level of expenditure

The Coordinator proposed that each partner would provide a final updated forecast of expenses for the whole project by the end of June 2009. In so doing we will have a more reliable idea about the final level of expenditure of the project and we will be able to decide if some budget transfer among partners will be needed. The SC approved this proposal.

WP2 and WP3: proposal for a joint meeting to be held on June 2009 on the conceptual model of the crustal/mantle velocities

The Coordinator proposed to organize a joint meeting among the partners involved in WP2 and WP3 on the conceptual model of the crustal/mantle velocities. After a brief discussion among the partner involved in the meeting, the proposed period was 18-19 June and the proposed location was Barcelona. The final arrangements would be defined by e-mail.

Organization of a field trip in Morocco to detect the continuation on land of the strike-slip faults identified offshore Morocco

The Coordinator suggested to arrange a field trip in Morocco at the beginning of June. The field trip would last 3 or 4 days and would be opened to every partner interested in it.

WP8: evaluation for the implementation of a TEWS based on the experience gained by NEAREST within the IOC initiatives

As came out during the plenary meeting, the Coordinator asked Luis Matias from FFCUL to evaluate the implementation of a TEWS based on the experience gained by Nearest within the IOC initiatives. Luis Matias agreed on the issue.

Discussion on project postponement

As anticipated during the previous meeting, the Coordinator presented the issue on the project postponement.
The Coordinator reported that he had sent to Mr Denis Peter (the project officer) an e-mail regarding the possible request of extension of the project for few months and that he had received an answer on the 4th March 2009 by Stijn Vermoote (who will take over the role of project officer for the NEAREST project). The email text was showed to the partners.

> *"I understand your question related to a potential request for extension of the project and I'm happy you raise it at this stage. The fact is that early this year our hierarchy has communicated to all project officers that the number of projects that get an extension should be limited to a strict minimum. Where in the previous years, an extension was approved as long as it could be scientifically justified, we now have to limit this practice in order to limit the administrative burden linked to this. This means that in principle an extension of a project duration is not possible unless you can clearly specify that the extension is crucial to finalise your project, e.g. due to external factors."*

The Coordinator stressed the fact that a postponement would be justified to allow the realization of activities considered as crucial to finalize the project. He presented some examples so as to clarify to the partners which kind of activities could prevent the success of the project and which ones would not.
Moreover, the Coordinator and Mrs. Zucchini brought to the attention of the PIs all the issues about an eventual project postponement:

- the decision would be taken very soon (in June) because of the 45 days foreseen to receive a formal answer
- the decision would not be taken during this Steering Committee because of the absence of 3 PIs and because 3 PIs were substituted by their delegates
- the postponement should be of at least 6 months
- the final payment would be delayed
- additional reports would be presented according to the Consortium Agreement

Paolo Favali from INGV presented some issues that could be crucial for the success of the Geostar experiment. In particular, INGV was managing to test the acoustic with a product different from the previous one. This new product needed some checks to overcome the problems occurred and to be ready for the new deployment foreseen in May 2009.
The Coordinator stressed that each prototype could have problems, but Nearest project already showed the capability to react and that the problems within Geostar had found a prompt reaction. He summarized the different steps of the experiment and the reaction activities realized.

Three cases were assumed:

1. after the deployment the new instrument will work and 3 or 4 months are needed to test the data;
2. after the deployment the new instrument won't be working and no more reactions can be performed within Nearest project (but eventually within Lido or Esonet projects);
3. the new instrument cannot be deployed because the equipment won't be ready.

The partners agreed that the latter case could imply a postponement in the deployment campaign and it could represent a strong motivation for asking a project extension.

Some partners (Valenti Sallares from CSIC, Wolfram Geissler from AWI and Azelarab El Mouraouah from CNRST) underlined that an eventual postponement would allow a more in-depth analysis of data and could be welcommed from a scientific point of view.
The Coordinator reminded that the results gained within Nearest would produce new collaborations among the partners, in particular, to continue the processing of data. In some cases (i.e. for AWI)

the idea to create new networks or to apply for fellowships (Marie Curie or other opportunities) was already foreseen. Anyway, the eventual postponement would be a chance to have extra time for the data analysis.

Maria Ana Baptista from FFCUL underlined the importance to be successful in the Geostar experiment so as to show the effectiveness of this part of the project.

Taking into considerations all the before-mentioned aspects, the partners unanimously agreed (by show of hands) that the consortium would wait the beginning of May (11 of May at the latest) to evaluate if the equipment of the Geostar experiment is ready to be deployed. If not, the Coordinator will start the project's postponement procedure with the agreement of the partners.
The Coordinator assured anyway that the project officer would be informed about this possible occurrence.

Decision about the final plenary meeting (proposal: Rome)

If a postponement would not be needed, the final meeting would take place within the 30th September 2009. Such meeting was agreed to take place in Rome. The dates for the final meeting were eventually scheduled for the 16th and 17th September.

Minutes of the final NEAREST Meeting

Roma, 24-25 February 2010

Venue

Excel Resort Montemario
Anfiteatro meeting room

List of Participants

Organisation	Participant
ISMAR	Nevio Zitellini
	Francesco Chierici
	Luigi Vigliotti
	Luca Pignanoli
	Rita Maria Riccioni
FFCUL	Maria Ana Baptista
	Luis Matias
	Cesar Andrade
	Pedro Terrinha
	Gabriela Carrara
	Conceiçao Freitas
CSIC	Valenti Sallares
	Javier Lario
AWI	Wilfried Jokat
	Wolfram Geissler
UBO	Marc-André Gutscher
INGV	Paolo Favali
	Laura Beranzoli
	Stephen Monna
	Giuditta Marinaro
	Davide Embriaco
TFH	Hans Gerber
UGR	José Morales Soto
	Daniel Stich
	Flor de Lis Mancilla
IM	Fernando Carrilho
CNRST	El Mouraouah Azelarab
	Iben Brahim Aomar
	Kasmi Mohamed
XISTOS	Herculano Caetano
ASTER	Maria Grazia Zucchini
EC	François Schindelé

Day 1 – Wednesday 24 February 2010

Opening Session

The meeting started as scheduled with the warm welcome address of the hosting organisation, INGV, represented by Paolo Favali, who had the pleasure to introduce the final Nearest meeting having got the participation of all the partners and main scientist involved in the project, including an expert observer from the Commission, Mr Schindelé.

The project Coordinator Mr Zitellini, then took care of presenting the Agenda of the meeting and illustrated the structure and the scope of each meeting session. Each session has been opened by a brief report (10-15 minutes) by the WP leader, outlining activities carried out during the last part of the project (April 2009-March 2010), main goals achieved, deliverables produced and criticalities met, including deviations to original time schedule. In most cases the WP leader has been supported by further speakers, having coordinated specific project tasks, to illustrate all those aspects deserving detailed in-sights.

In the second part of each session a brief summary (5-10 minutes) from the WP leader of the main results achieved during the whole WP duration has been presented, illustrating future perspectives and potential impact for the European scientific society.

At the end of each WP session a plenary open discussion took place, allowing final assessment of WP results with contribution of all participants.

WP1 results and future perspective: Tsunami source identification

Presentation made by WP 1 Leader: Pedro Terrinha – FFCUL

Presentation available on the Nearest website: *RomeWP1_FFCUL_Terrinha.ppt*

Mr Terrinha made an overview of what have been done on Tsunami source identification that went well beyond the end to formal project activities.
He made a final explanation of maps of activities faults and gave interpretation of seismic lines. Modelling to give interpretation of these data set have been obtained as well.
After analogue modelling they carried out numerical modelling using the same seismic lines.
Many publications stemmed from this work.
In the future the main goals will be:

- improving the quality of maps (4D) and correlate with seismicity and tectonics of the surrounding areas;
- exploring connection between SWIM faults.

A justification of GPS observations was described by Luis Matias.

WP2 results and future perspective: Tsunami source characterization

Presentation made by WP 2 Leader: Valenti Sallares – CSIC

Presentation available on the Nearest website: Rome*WP2_CSIC_Sallares.ppt*

The activities of the WP2 were described focusing in particular on those tasks carried out in the last year of the project that represented the most important part of the work undertaken under WP2.
Mr Sallares provided presentations of Seis Wide-Angle Seismic (WAS) data quality along two different profiles P1 and P2. Data collected refers to the Nearest-Seis wide-angle seismic cruise carried out in October 2008. He illustrated also the progresses made with of wide-

angle seismic data modelling and interpretation. Main conclusions can be summarised as follows:

- P2 shows clear evidences for the presence of oceanic 6-7 km thick oceanic crust in the Gulf of Cadiz
- The continent-ocean transition is sharp
- Both crust and upper mantle of OC show anomalously low Vp > alteration /serpentinization
- P1 is more complex, showing four different domains:Tagus AP, Gorringe B, Horseshoe AP, Seine AP
    - Tagus show 3-5 km of sediments on top of mantle. No evidences of crust.
    - Vp on southern flank of Gorringe seem to be too low for mantle. Could be crust.
    - Horseshoe show 5 km of sediments on top of mantle.No evidences of crust
    - Seine shows thinner sedimentary layer (Mesozoic) on top of a 5-6 km oceanic crust
- Additional modelling is needed however in P1 before any tectonic/seismogenic interpretation is done.

WP3 results and future perspective: Seismological monitoring

Presentation made by Wolfram Geissler – AWI and Aomar Iben Brahim - CNRST

Presentations available on the Nearest website: *RomeWP3_AWI_Geissler.ppt*
RomeWP3_CNRST_Brahim.ppt

Illustration of activities carried out on seismological monitoring was made, outlining problems with OBS and suggestions for the future. In particular it was pointed out that:

Problems met	*Suggestions for future experiments*
9 OBS without clock synchronization due to battery low	Use of flash cards instead of hard disk, more batteries
12.5 OBS without correct levelling	More space for seismometer masses (fixed by GURALP)
OBS orientation Compass presently not useful,	tests with non-magnetic anchors? Use of Gyroscopes?

First results about seismicity analysis was performed, too, resulting in the following main conclusions:

- More than 700 local events to locate
- More precise location with OBS
- Focal depths up to 40..60 km (within oceanic lithospheric mantle)
- Good first-motion focal mechanism

Mr Aomar Iben Brahim in particular made a comparison of results obtained with different velocity models in OBS data processing
Estimation of time drift was given on request by Luis Matias.

About the future perspectives some specific activities have been proposed:

- More long-term observations to better constrain the status of major oceanic fault systems

- Integration of all existing geophysical data
- Extension of measurements along all the plate boundary and also along the "passive" margins of Iberia and Northern Africa

WP4 results and future perspective: Tsunami signal detection
Presentations made by WP4 Leader Laura Beranzoli - INGV and Francesco Chierici – ISMAR

Presentations available on the Nearest website: *RomeWP4_INGV_Beranzoli.ppt*
RomeWP4_ISMAR_Chierici.ppt

Ms. Beranzoli provided a complete overview of results of the two sea cruises made during the project, describing the main problems met, solutions adopted and final achievements obtained.
Mr. Chierici provided details about the modeling of the hydro acoustic signal, model for tsunami generator, model of sea floor permanent displacements, and interfering cases that were analyzed in –depth.
The model developed in the Nearest project in particular allowed to study:

- the pressure and velocity fields (in the water column and in the porous sediment)
- the free surface signal (from the velocity vertical component at the air-water interface)

at different distances from the source.
In this model, the sea floor motion causes a modulated hydro acoustic wave that, travelling much faster than tsunami wave, can propagate far outside the source area and carries information about source main parameters as velocity, amplitude and extension of the source area. In other word, this modulated acoustic signal can be regarded as tsunami precursor and it could be used in new tsunami early warning systems.
Non seismic tsunamigenic submarine landslide could also produce hydro acoustic waves.

As a general result of activities carried out during the project it was remarked that parts of new and innovative tsunameter was developed by few people, in a very limited time, and with a very small budget in comparison to other world-wide experiments. Moreover the detection part of the tsunameter has performed more than satisfactorily. Finally the communications link from seafloor and shore has been established more stably during the second mission.
As for what can be done in terms of future perspectives, it was suggested that special attention should be focused on:

- Implementation of 3d model with bathymetry.
- Implementation of 2.5d model for submarine landslide and comparison with 3d numerical model.
- transmission of the hydro-acoustic signal generated by the bottom motion to the atmosphere.
- OvDE and SMO hydro-acoustic antennas equipped with suitable low frequency hydrophones might be a good candidate for the detector and for the basic element of a possible hydro-acoustic tsunami early warning system.
- Laboratory measurement of the hydro-acoustic signal induced by landslides.

WP5 results and future perspective: Data integration/ Integrated tsunami detection network
Presentations made by WP5 leader Josè Morales - UGR, Fernando Carrilho - IM and Kasmi Mohamed – CNRST.

Presentations available on the Nearest website: *RomeWP5_UGR_Morales.ppt*
RomeWP5_IM_Carrilho.ppt
RomeWP5_CNRST_Mohamed.ppt

Mr. Morales provided a demo of on-line connection to the system established in Granada, registering earthquakes in real time monitoring.
Mr. Carrilho provided a comparison between new real time monitoring systems.
Mr. Mohamend gave a presentation on activity made in Morocco which produced a relevant upgrade of the Morocco seismic Network.
Finally Mr. Matias made a presentation on Noise analysis from OBS data recorded in the Gulf of Cadiz.

As for the final main results achieved within WP5 they were summarised as follows:

- The three nodes (IM, IGN-CNRST and IAG-UGR), after deep modifications in their seismic networks infrastructure, have adopted data-concentrators based on the SeiscomP/SeedLink protocol to receive data (mainly seismic from differents devices) in Real Time.
- Seismic data sharing between the partners involved in the WP5 and other agencies lead to the definition of a Virtual Seismic Network dedicated to the Surveillance of the SW Iberian margin (or to support another region) as a strategic tool of a future TEWS.
- The Seiscomp3.0 revealed to be a good tool for fast location and size evaluation of the seismic activity and can be used as a module for future Early Warning System in the SW Iberia margin.

Future perspectives:

- The seismicity in the region is very complex with seismic activity at upper mantle region and with different rupture mechanisms. A deep effort also have to be directed to characterize the role and define of the seismotectonics framework.
- A great effort must be made to involve other networks, especially from North of Africa, to intensify the Virtual Seismic Network that will be managed by the focal points dedicated to the Surveillance like at IM.
- SC3 is a very useful tool for fast location and magnitude evaluation. Effort to obtain a quick focal mechanism also would be interesting.

Finally an important recommendation to make efficient the TEWS is to have a dense network of seismic stations in the source region. That means installing buoys and OBSs with real time communication systems in order to cover the information gap in the source region.

Day 2 – Thursday 25 February 2010

WP6 results and future perspective – Paleotsunami and Paleoseismic records
Presentations made by Cesar Andrade – FFCUL and Luigi Vigliotti – ISMAR

Presentations available on the Nearest website: *RomeWP6_FFCUL_Andrade.ppt*
RomeWP6_ISMAR_Vigliotti.ppt

Mr. Andrade presented the objectives of the WP, the meetings attended, the presentations done, the publications and the field works realised. The results for each tasks were illustrated in details.
Main conclusions *on Onshore sedimentological evidence of tsunami records*:
Documentary and geological data for the Algarve coast compiled, reviewed, compared with Spanish data.

- Not all the events cited as of tsunami origin have had regional impact at the scale of the Gulf of Cadiz;
- Comparison between Portuguese and Spanish geological data on on-shore evidences more complex than antecipated;
- Correlation with off-shore data may provide clues to separate regional/local events and validate recurrence intervals.

As for *Offshore sedimentological evidence of earthquake events* Mr Andrade illustrated in particular the results of the activities performed on:

- Lithology, sedimentary structure, imaging and physical properties of cores acquired in the SW Iberian Margin during the RV James Cook cruise.
- Grain-size analyses
- Radiocarbon dating
- Re-calibration of all 14C ages

As for *Onshore-Offshore Correlation:* they provided detailed description of achievements made focusing in particular on

- Compilation of large magnitude (Mw >6) instrumental earthquakes, historical seismic record, historical tsunamis and tsunami deposits in the SW Iberian Margin
- Chronostratigraphic event correlation from TAP to HAP
- Triggering mechanisms of turbidite events in SW Iberia
- Linking turbidite events with historical earthquakes, tsunamis and tsunami deposits
- Linking Offshore Turbidites & Onland Tsunami deposits

WP7 results and future perspective: Modelling of tsunami impact in SW Portugal
Presentation made by WP7 Leader Maria Ana Baptista – FFCUL

Presentation available on the Nearest website: *RomeWP7_FFCUL_Baptista.ppt*

The speaker focused especially on task 7.4 Production of Inundation Maps for Lagos-Sagres, illustrating in particular the influence of bottom friction. The work carried out induced important revision of Portuguese and Moroccan catalogues.

Main conclusions

Both scenarios analysed steer tsunami energy toward the coastal areas of the Algarve region. The Marques de Pombal scenario generates waves 2-7 m along the south of Portuguese coast whereas the Horsehoe scenario generates maximum wave heights of 4 m;

The variation of the bottom condition (Manning coefficient), strongly affects inundation parameters: maximum flow depth, maximum run up and maximum inundation distance.

Takahashi (2005), at locations where the flow depth exceeds 0.5m, generally, people cannot remain standing if the current velocity exceeds 1.5m/s. Current velocity computation results obtained for different bottom friction show values much larger than 1.5 m/s at the most locations of the studied area.

The case with no bottom friction (n=0.000) represents the worst case scenario of flooding and current velocity and should be used for warning purposes.

WP8 results and future perspective – Feasibility study and prototype for an EWS
Presentation made by WP8 Luis Matias - FFCUL and Herculano Caetano – Xistos

Presentation available on the Nearest website: *RomeWP8_FFCUL_Matias.ppt*

Luis Matias introduced the Early Warning System (EWS) prototype produced within the Nearest project.
Herculano Caetano presented a final demo of the simulator produced by Xistos in the framework of the Nearest project, which is an open system, able to be used everywhere:

- before accidents for training purposes
- during accidents to evaluate consequences
- after the event to facilitate communication with Civil Protection and Emergency Services.

Simulation have been performed in Lagos, Cadiz, Rabat from XISTOS in Lisbon. The work about the simulator was almost finished.

After the scientific sessions of the meeting were concluded, a presentation was made by the Commission Observer François Schindelé, giving his positive evaluation of the work made under the Nearest project and providing an overview on **The new challenge of the tsunami warning in the Mediterranean region.**
Presentation available on the Nearest website: *Rome NEAMTWS_*Schindele*.ppt*

Mr Schindele informed that in the next years 4 tsunami early warning systems will be available at world level. He stressed the importance in the next future of the following issues:

- data exchange / data sharing between systems
- use of high speed and safe connections (VSAT to be used for connections between end station and national warning centres, GTS recommended for tide gauge communications)
- enlarge the network of tide gauges and tsunamometres to increase efficiency and reliability of real time sea level monitoring in tsunamigenic zones.

In general the best results in areas like the Mediterranean will not be possible outside global projects with all Mediterranean countries involved.
Moreover for a better definition of tsunami scenarios, special attention should be focused on the main critical points that are harbours and beaches.

Moreover, it was outlined the relevance of education on these topics, distinguishing the potential of local, regional, and wide-area events: actually it is necessary to adopt different tools and databases to different scenarios in order to properly define if warning or watch is needed and to activate adequate actions.
Eventually, the wish of every body is to have very soon not only successful pilot experiments, but also standard reliable systems, assuring continuous functioning at operational level.

The meeting than was addressed to the analysis of the activities undertaken under
WP9 Circulation of project information to end-users
Presentation made by Rita Maria Riccioni – ISMAR

Presentation available on the Nearest website: *RomeWP9_ISMAR_Riccioni.ppt*

A comprehensive list of dissemination actions was presented and analysed in details, finalising the last activities to be performed by all partners in the final part of the project and beyond, for a wide diffusion of the project results.
The presentation was completed by a video produced to illustrate the last Nearest cruise carried out in November 2009 for the recovery of Modus and deployment of Geostar platform. A 3D version of the video will be available in the future. The video and many other materials will be uploaded on the Nearest website. The same will be done with the EWS prototype.

The final session of the meeting was focused on:
WP10 Management and reporting issues in view of the end of the project
Presentation made by Maria Grazia Zucchini – ASTER

Presentation available on the Nearest website: *RomeReporting_Aster.ppt*

The final list of documents to be produced by the end of the project was presented and delivery dates agreed for: last set of deliverables, periodic activity reports, periodic management reports and final project reports, specifying the contributions expected by each partner. Templates and procedures for the provision of each specific report where shown an commented. Recommendations for the correct provision of financial data and signed documents were provided too.

Closing remarks by Nevio Zitellini - ISMAR

The coordinator briefly summarized the main results and achievement of the project.
Each workpackage fulfilled the planned work, most of then going far beyond what initially planned. WP1 produced a completely new tectonic map of the Gulf of Cadiz with the possible, recognized for the first time, location of the Europe/Africa plate boundary. This map will be soon adopted by the EU project SHARE (http://www.share-eu.org/).
WP2 constrained the velocity distribution of seismic waves across the margins and within the oceanic crust allowing the for the first time to locate the Ocean-continent boundary. In addition the velocity distribution of the seismic waves determined in WP2 were used as input to WP3. These data were in fact needed for the ipo-central location of the local earthquake. WP3 measured for the first time the local seismicity of the area with the needed resolution to relate earthquake and tectonic structures. In WP4, it was initially planned "the improvement of near real-time detection of signals by a multiparameter seafloor observatory for the characterisation of potential tsunamigenic sources to be used in the development of an Early Warning System (EWS) Prototype". Instead of an improvement, NEAREST fully

realized and tested the first TEWS prototype ever installed in Europe. Not only, within WP4 it was developed an improved version of the Tsunami Detection Algorithm installed onboard of the abyssal station, in order to take into account also the basin effects. This modification allowed also the application of this algorithm also to the data acquired by tide gauges (see WP5 and WP7). In addition, in WP4 it was developed a new conceptual model for tsunami generation and the numerical code for its simulation, in order to look for a potential hydro-acoustic precursor. In WP5 it was created an infrastructure between Portugal-Spain and Morocco based on three nodes, IM, IGN-CNRST and IAG-UGR, acting as data-concentrators able to receive and exchange seismic data in Real Time. This infrastructure is ready to be used for future Early Warning System in the SW Iberia margin. It is worth to note that the Moroccan partner, CNRST, on the way and taking vantage of NEAREST, completely re-organized its national seismic network.
In WP6 was compiled, for the first time in a unique document, all the geological evidence so far known of the tsunami records on the Algarve coast land. These data were also compared with Spanish data. In WP6 were also linked the offshore turbidite events with historical earthquakes and on land-Tsunami deposits.
In WP7 inundation maps for Lagos-Sagres were produced, illustrating in particular the influence of bottom friction. The work carried out induced important revision of Portuguese and Moroccan catalogues.
In WP8 the feasibility study for a working Early Tsunami Warning System was successfully performed by creating two simulators. One to create synthetic data flows representing seismic waveforms and water level data computed from realistic scenarios to be fed into the monitoring system and test its outcomes. The second to provide the Civil Protection authorities with a simulator that will act as the real one under a simulated crisis. Simulations have been performed in Lagos, Cadiz, Rabat. It is worth to note that, thanks to NEAREST, the fact that Spain-Portugal and Morocco already were the most advanced country for Tsunami Early Warning studies favoured the choice of Lisbon and the Central Atlantic Node for the future Tsunami Early Warning System (EWS) sponsored and promoted by IOC-UNESCO.
Concerning WP9, the coordinator underlined that it was extremely successful in promoting the transmission of project information to the general public.
Concerning WP10, the coordinator stressed the very satisfying level of cooperation showed by the partners and the extremely professional work done by Aster in supporting the project management.
The Coordinator concluded expressing his full satisfaction for the project results and informed the partners that ISMAR will try to keep alive the NEAREST web site for the near future. In fact, NEAREST approached only at the end of the project live the "publishing season" of the scientific results. Thus, there is the need to keep the collaboration living at least for the next two years and a common NEAREST- web site will be one important tool for this goal. The coordinator concluded thanking the members of the Advisory Board for participating to the annual meeting and for their very useful comments, the Commission Observer Dr. François Schindelé for his participation, presentation and very useful comments, the organizer of NEAREST Final Meeting, Drs. P.Favali and L.Beranzoli.