New Directions in Seismic Hazard Assessment through Focused Earth Observation in the Marmara Supersite

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D1.2
Kick-off Meeting Report

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Dissemination Level		
PU	Public	
PP	Restricted to other programme participants (including the Commission)	
RE	Restricted to a group specified by the consortium (including the Commission)	
CO	Confidential, only for members of the consortium (including the Commission)	

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1.GENERAL INFORMATION

1.1 ABSTRACT

This document represents a summary of the MARSite Project kick-off meeting that took place in İstanbul, Turkey at KOERI on the 19th and 20th of December 2012.

The kick-off meeting report includes the meeting agenda, list of participants, the meeting's minutes, and the revisions of the work program.

72 participants from partners attended the meeting. Due to adverse weather conditions on the 20th of December the timing of the WP Parallel Sessions was adjusted. The parallel sessions and the closing plenary session lasted one hour each and the meeting was adjourned at 13:00. All presentations made at the MARSite kick - off meeting can be found in the secure area of the project web site: www.marsite.eu

Participants to MARSite Kick-off Meeting

2 KICK-OFF MEETING

2.1 OPENING

The Kick off meeting was opened by Professor Mustafa Erdik's, the Director of KOERI, welcome speech. Prof. Erdik emphasized the importance of the MARSite Project in terms of its contribution to enhancing the acquisition, use of data and improve the understanding of earthquakes. He proceeded to thank the EU for its support, Prof. Nurcan Meral Özel, Coordinator of the MARSite Project, and Öcal Necmioğlu, Project Coordinator Assistant, for their work in the negotiation period and all the partners for their support.

Prof. Erdik's speech was followed by the speech of Prof. Lale Akarun, Vice-Rector of Boğaziçi University.

The last talk of the opening session was given by Prof. Yucel Yılmaz from Kadir Has University in Istanbul Turkey. Prof. Yılmaz is one of the most prominent geologists of Turkey with a long and valuable academic history at the Istanbul Technical University. His talk focused on the active tectonics and morphotectonic development of the Marmara region, aiming to define the foundational elements of the Marmara Region in relation to the objectives of the MARSite Project.

2.2 INTRODUCTORY WP PRESENTATIONS WITH Q&A

2.2.1 Introducing MARSite - Nurcan Meral Özel, Project Coordinator

Professor Nurcan Meral Özel started her presentation by thanking partners for their support in the preparation of the grant proposal. After sharing information about the consortium members, she reminded partners of the importance of abiding by the financial rules.

Professor Özel shared information about the project and work packages and each task. The description included the objective of each task, the number of deliverables, the person-month per participant and the organization and individuals in charge. Furthermore she presented information on the outcomes of the MARsite project.

She stressed that collaboration with other ongoing European projects would be important.

2.2.2 Project Management – Part I: Overview of Project Guiding Documents - Ocal Necmioglu, Project Coordinator Assistant

Mr. Necmioğlu shared information on the status of signatures of the Form A (Annex IV), Consortium Agreement and Non-Disclosure Agreement by the partners. He reminded partners that had not yet sent the sign documents to do it as soon as possible.

Information on the recognition of ESA as an international organization was shared. A special clause 2 was added to the Grant Agreement per legitimate request of Partner 16. Despite this there was a request from Partner 16 to remove the following sentence from the CA/NDA:

Nothing in this Consortium Agreement shall limit the Parties' right to seek injunctive relief or to enforce an arbitration award in any applicable competent court of law.

An agreement based on the fact that in case the terms of the Consortium Agreement are in conflict with the terms of the GRANT AGREEMENT, the terms of the latter shall prevail was reached with ESA. ESA has joined the Agreement on one condition, which is the following:

i) this (agreement) does not create any precedent for future activities and

ii) the partners acknowledge the status of ESA as an International Organisation.

After the explanation the plenary acknowledged ESA as an International Organisation.

Mr. Necmioğlu went on to give information on :

- goals of the management structure,
- roles and responsibilities of WP Leaders ,
- 6-monthly reports which are not deliverables and will be produced internally to monitor the progress of the work foreseen by the Grant Agreement and to provide basis for the milestone meetings scheduled every 6 months,
- periodic reports ,
- annual public reports,
- project review ,
- final report ,
- non-deliverable products,
- meetings,
- milestones,
- deliverables,
- external expert advisory board,
- the project web site.

2.2.3 Project Management – Part II:Overview of EC Requirements during the Project Life-time - *Meral Marina Alguadiş, Project Manager*

Ms. Alguadiş shared information on the financial structure of project management. The issues were the financial reporting forms, procedure and timeline, most common mistakes made in financial reporting and usage of logos in all communication. She also explained that there would be an internal financial reporting period (12^{th} month) prior to the official

reporting period (18th month) in order to ensure a speedy and correct financial reporting system.

2.2.4 WP2-WP11 Presentations

A description of the Work Packages aims, objectives and tasks was presented on the first day. The presentations could be found on the MARSite website. www.marsite.eu

2.3 WORK PACKAGE PARALLEL SESSIONS

The WP2, WP3, WP4, WP5, WP6, WP7, WP8 parallel sessions were conducted in the morning on the second day of the Kick-off meeting. The purpose of the WP sessions was to bring each WP contributors together to discuss all possible details of the work foreseen within the WP. The outcomes of the parallel sessions were shared in the plenary session. No parallel session was planned for WP1 and WP11.

The WP9 meeting was held on the first day of the Kick-off Meeting. Due to adverse weather conditions WP7 and WP10 parallel session were not held, however; information of previous discussions on WP7 and WP10 was shared in the closing plenary.

2.4 CLOSING

2.4.1 Work Package Parallel Sessions Outcome Presentations

A summary of discussions in the parallel sessions was presented in the plenary. All plenary session presentations can be found on the MARSite website (www.marsite.eu). WP leaders also provided a report on the discussions took place during the Parallel Sessions, which are summarized below:

2.4.1.1 WP2 INGV - Paolo Favali

The discussion was focused on the integration of the data. For seismological data, this is the current situation:

i) The seismological networks are made of broad-band (BB) and short-period stations

ii) The data from BB are in real time, 30 by KOERI and 20 by TUBITAK

iii) The 18 BB stations of KOU will be also integrated

iv) The sampling rate for all the BB stations is uniform (100 Hz per channel)

v) The sensors are Guralp, mostly 120 s

vi) The acquisition centre at KOERI

vii) The complete back-up centre at TUBITAK (Ankara)

KOU will contact AFAD (Disaster and Emergency Management Presidency in Turkey) in order to explore the possibility to include also their data. A directory with the information on all the stations (geographical distribution, coordinates, type of instruments, etc.) will be prepared.

As far as Geochemical & Hydrological data are concerned, this is the current situation:

There are two networks with automatic geochemical-hydrological stations currently working on the area: the ARNET is composed by 5 hydrothermal stations and data are collected by KOU; 11 springs and 20 Rn stations are monitored by TUBITAK. The monitored hydrological parameters are temperature and in some cases water level and conductivity. TUBITAK carries out a monthly check of the automatic stations and collects water samples for chemical (major components) and isotopic (18O, D) analyses. The data are collected in the acquisition centre of TUBITAK (Ankara).

Some specific WP activities have been defined, such as:

i) Task 3 - A directory with all the information on all the stations (geographical distribution, coordinates, type of instruments, etc.) will be prepared and shared with WP 1, 2, 4.

ii) Task 2, 4 - A directory with all the information regarding the hydrological and geochemical stations belonging to ARNET and TUBITAK networks (geographical distribution, coordinates, sampling rate, sensors, etc.) will be prepared by GFZ (KOU) and TUBITAK and shared with WP 1 and 3.

ii) Task 1, 2, 4 - A common field work involving WP 1, 2 and 4 responsibles (INGV-GFZ-TUBITAK) is planned for early April to visit the monitoring stations, collect water samples for dissolved gas analyses and select suitable working areas for soil degassing measurements to be carried out during the whole project duration. As TUBITAK has usually performed isotopic analyses on the water samples, an agreement for the future analytical activities in MARSITE will be discussed including the analytical procedures, methods and laboratories to be involved.

The field work is also aimed to 1) carry out a preliminary data analysis to decide the periodical data acquisition strategy, 2) schedule the soil degassing campaigns.

2.4.1.2 WP3 TUBITAK - Semih Ergintav

TUBITAK provided information on the available GPS data sets and introduced the processing steps and outputs. Briefly, TUBITAK is ready to share the velocity file and time series. All of these time series will be the reference data sets for SAR products. Also, following the discussions, TUBITAK will share the zenith delay and atmospheric corrections within WP3.

CNR-IREA and INGV have declared their readiness to process the available Cosmo-SkyMed SAR data sets. To this aim, SAR data have to be ordered to the data provider. The areas to be studied were selected during the meeting. First priority is to focus on the Eastern part of Marmara, including Izmit Bay and Istanbul; major landslides, which are in the Buyukcekmece and Kucukcekmece regions in Istanbul, will also be studied in detail. Second priority is the Ganos fault in the eastern part of the Marmara.

CNR-IREA and INGV declared their intention to prepare a proposal to ASI (Italian Space Agency) in order to request the COSMO-SkyMed data archive and to plan new acquisitions on the selected areas for which no COSMO-SkyMed data are already available.

BRGM will try to perform L-Band interferometry on the Ganos fault and will also prepare a CAT-1 proposal to obtain L-band data set.

Sarmap will share its software and updates within the WP3. They will write new codes to reduce the atmospheric artifacts, using new sensors/data.

INGV will open TERRAFIRMA PS-archive (for ERS and ENVISAT) and they will integrate the available PS-archive with other geophysical data sets. KOERI will be a part of this integration due to its familiarity with the database from previous projects.

The displacements maps, based on different SAR data, will be shared as "Shape" or “kml” file within WP3. TUBITAK, ITU and KOERI will validate different deformation maps and try to classify the common anomalies. ITU and TUBITAK, also have the results for ERS and ENVISAT and this data sets will serve as another control sets to all deformation maps.

TUBITAK will list a paper sets about the InSAR/PSInSAR/GPS related papers for Marmara Region.

All data will be shared within WP3, under the supervision of TUBITAK. TUBITAK, as a WP3-leader, will share the results with other WPs.

GFZ is ready to focus to models in order to separate the short and long term deformations in the deformation maps, under the control of GPS data sets. TUBITAK, KOERI and ITU will be a part of this study to define the real anomalies within the geological&tectonic frame.

If necessary, a short proposal will be prepared in order to use the Terrasar-X data. Accurate Digital Elevation Models for the selected areas should be made available for InSAR processing.

2.4.1.3 WP4 IU – Asım Oğuz Özel

The discussions for Task 1 "Deployment of surface microearthquake array and borehole seismometers and integrating of borehole and surface array data for better location of microearthquakes" took the most of the meeting time. Followings are the issues discussed;

Firstly the scientific purposes of the borehole system were discussed. Based on the discussions, it was concluded that the main objective of the task is to design and to build multiparameter borehole system consisting of:

Very wide frequency response (VBB) (0.0027Hz to 100 Hz) borehole broad band seismometer

Wide dynamic range and stable borehole (VBB) broad band seismic sensor,

The borehole sensor system will incorporate a ± 2g strong motion accelerometer to increase the amplitude dynamic range.

Incorporate a borehole locking mechanism that can be installed at different depths of the borehole. The type of borehole locking mechanism will be determined after selecting the size and depth of the borehole.

Suitable acquisition system will be delivered by Guralp Systems to control and acquire data from the borehole and surface sensors.

Incorporate 3-D strain meter, this will be initiated in the third year.

Two axis-tilt meter, This will be initiated in the third year.

Temperature.

Local hydrostatic pressure measuring device will be initiated in the third year.

Moreover, a surface array consisting of 8-10 broad-band seismometers will be deployed. Thus, the data from the surface array will be combined with borehole data to provide high Signal to noise ratio (SNR), lower magnitude detection threshold levels and improvement in earthquake location. The borehole and surface array data will be combined with the data from KOERI and TUBITAK earthquake recording stations and will be included in the monitoring and analysis of micro-earthquake activity in the Western part of the Marmara Sea. This is an additional and important goal of the Task 1.

The instrumentation of the borehole system was discussed. Principally, the instrument will have a wide dynamic range as specified above. The manufacturer (Guralp Systems) will try to increase the high frequency detection of the borehole seismometer above 100 Hz; to 200 Hz.

Also discussed was the comparison between the SNR of seismic signals and the operational depth of the borehole sensor. It is believed that comprehensive information (data) on the value of borehole sensor systems and its effectiveness in the analysis of seismic events does not exist. The design of the borehole system will provide a "sophisticated tool" to research and measure the potential detection improvements that can be realized with broad band borehole systems. The research will also include detailed study of seismic signals at different frequencies bands and depths in comparison to an identical surface sensor.

To record wide magnitude range of earthquakes, the instrument will be composed of both seismometer and accelerometer. Firstly, the VBB instrument will be installed, and in the third year, the instrument will be taken out to install the strain-meter and tilt-meter at the bottom of the borehole. These instruments will be cemented at the bottom of the borehole while the broad-band seismometer will be installed above the cemented instrumentation.

Also discussed are the diameter and the method used to drill the borehole. The casing that is likely to be used for the borehole was also discussed. The casing type depends on the drilling method that is likely to be used. Details of the borehole technology that is used will be documented. This will be done under the supervision of Guralp Systems.

During the meeting it was decided that Guralp Systems will be informed in details of the location, depth and geological formation of the borehole station. The final physical instrumentation specification will be decided after the location and the depth of the borehole is decided.

As well as the geology, the required infrastructure is an important factor in determining the location of the borehole station. The location of the borehole should be such that power and data transmission facilities will be available without incurring high level of cost.

Concerning Task 2, "Task 2: Analyzing response of near-surface geology to earthquake ground motion and its effects masking the source related information through borehole data", the details of the analysis and methods were not elaborated due to time limitation. However, it was generally agreed that the installed instrumentation would be providing perfect set up to study very many anomalies encountered in response of near surface geology to earthquake ground motion. It was also agreed that there will be many more research possibilities with available data set. Please refer to Task 1 in relation to the suggested data analysis on instrumentation and seismic detection problems. Besides, cooperation with the other projects/Wp is proposed in order to define an optimal data usage and techniques / applications.

2.4.1.4 WP5 KOERI - Nurcan Meral Özel

Task 1: There are currently 26 GPS sites around Marmara. 16 of these sites will be upgraded and strong motion stations will be installed. There is a need to determine the sites for the upgrade with the aim of optimizing the current configuration with respect to the current strong-motion station distribution, site quality and possible rupture scenarios. Existing strong-motion stations of the Istanbul EEW System will be integrated and a proposal was considered for the installation of fiber-optic and satellite communication systems.

Task 2: Rapid fault mechanism solutions and hypocenter determination is required for finite fault models. Several options have been considered to address this problem, such as:

i) making use of KOERI's National Earthquake Monitoring Center's (NEMC) current operational system

ii) development of an existing offline local MT Inversion programme for real-time automatic operations

iii) Integration ofSeisComp3

iv) Utilization of PRESTo from D9.3

Case scenarios will be created to be tested using linear and non-linear inversions to characterize the quality of models and station distribution and PhD Thesis will be supervised under this Task.

Task 3: PGV and ShakeMaps could be generated from finite fault models obtained in Task 2 using 1D Green Functions. Various EQ scenarios and corresponding PGV maps will be generated. After the occurrence of the earthquake, the semblance of the EQ data to the scenario database will be cross-checked and the best fit PGV will be determined for rapid assessment.

Task 4: There are 2 Deliverables at M24 (determination of characteristic source properties) and M36 (creating tsunami scenario database) which could benefit from the deliverables foreseen in WP3 and WP7, as following:

i) D3.7 Identification and localization of primary and secondary fault branches (M18)

ii) D7.2 GIS Database of the fault parameters (M36)

iii) D7.4 Revisited historical earthquake catalogue (M36)

It was decided to request the internal availability of D7.2 and D7.4 at M18. Sensitivity Analysis will be performed based on well-studied events. Inundation modeling could be performed at selected locations based on the available bathymetry and topography data including building inventory

Task 5: The aim is to improve model with recent data (faults, slip rates, historical earthquakes, association of the historical earthquakes with the fault segments). Outputs of Tasks 7.1 and 7.2 are needed at M12. Various Ground Motion Prediction Models will be tested to understand which model fits better using SM recordings from Eqs 4<M<7. Openquake software is being currently used but does not have time-dependent analysis capability. Hence, there is a need on the software. EZ-FRISK could be implemented.

Task 6: The aim is to provide daily/weekly/monthly/yearly forecasts of spatio-temporal seismicity using catalogs. More than 90 models are available and some will be tested (CCEP, STEP, ETAS, etc.) in order to determine their suitability for the region. Several existing catalogues (NEMC, ISC, etc.) will be utilized to identify the background seismicity and aftershock rates.

2.4.1.5 WP 6 INERIS – Pascal Bigarre

The WP6 session meeting started with a round table first and then was followed on the exchange of information between the present partners related to the objectives, available pre-existent data.

Task-1: Investigations of local instability areas - onshore and offshore – and developing of advanced susceptibility mapping (P. Bigarre - INERIS, CNR (ISMAR-IREA), ITU, U. Pavia, INGV, KOERI)

Task 1.a Off-shore landslide and Tsunami hazard:

i) Sanin Özeren (ITU) and Luca Gasperini (CNR-ISMAR) propose to pursue their collaboration collecting new marine data for off-shore landslides (6 submarine mass movements located from previous surveys) and focus also on a large slump in front of Istanbul (potentially tsunamigenic).

ii) Semih Ergintav (TUBITAK) showed an existent bathymetry map and the possibility to obtain detailed data from previous geological boreholes (more information and reports are available and will be asked to the service of the Istanbul Metropolitan Area in charge of geological and geotechnical investigations) used for the seismic microzonation and synthesized in a web site (Semih Ergintav will send the website link).

iii) Information has been given before the meeting by O. Ozel (IU) on further geophysical surveys to be conducted in the near future and extended up to the eastward zone of Büyükçekmece, much less urbanized but still at stake for the future.

Task 1.b On-shore landslides:

i) Semih Ergintav (TUBITAK) confirms the presence and availability of a pre-existing GIS database for onshore landslides and it could be exploitable for an advanced dynamic GIS to obtain susceptibility maps (INERIS task).

ii) Paolo Gamba gives more details about the hyperspectral methodology, where satellite data will be used to map surface information such as vegetation and other soil parameters to define hazard maps. Detail survey of the preselected zone is necessary to confirm the adequacy between the high-tech technique and the overall pilot zone configuration. The Avcilar peninsula is already strongly urbanized, hilly with homogenous vegetation, for this reason Semih Ergintav proposes to study the area between Buyukcekmece-Kucukcekmece.

iii) Salvatore Martino suggests to the WP team to create an inventory of earthquake induced effects (including landslides), to use the GPS data (from TUBITAK) and DInsar data (collaboration with Marco Moro, INGV) to check the possibility to map slope displacements before and after recent strong earthquakes. He proposes to talk about it with Stefano Salvi (INGV expert in post-seismic displacement). Semih Ergintav proposes also to find a helpful link with WP3 (and Stefano Salvi) to study the major landslides, which are in the Buyukcekmece and Kucukcekmece.

iv) Two invited representatives of IMA evoke a new seismic microzonation of a new area near to the Marmara cost, including the Buyukcekmece and western part of Haramidere.

v) The portuary zone is characterized by very large suspected slope instability, due to the presence of soft saturated deposits. Here, risk may be rated as very significant. This zone may be examined as a candidate for remote sensing calibration task, and/or for ground instrumentation (> WP9)

Task 2: Ground motion data, local seismic site effects and dynamic numerical modelling (O. Ozel - IU, IFSTTAR, INERIS)

Task 2.a Off-shore landslide and Tsunami hazard

i) Sanin Özeren (ITU) confirms the existence of the numerical modelling of landslide generated Tsunami scenario.

Task 2.b On-shore landslides

ii) Pascal Bigarré reminds that most of the data to be handled in the on-shore aspect are potentially of interest for integration in an advanced version of the pre existent GIS: amplification maps, geotechnical engineering dynamic response of landslide from numerical models, supplementary hydrological data related to soils and to be related to liquefaction phenomena, and of course shaking maps from scenarios.

ii) Luca Lenti (IFSTTAR) and Salvatore Martino (La Sapienza) introduce the dynamic numerical modelling task, a new deterministic approach to calculate displacement different from Newmark method. This modelling needs: a) selection of representative slope typologies (i.e. distinguished in terms of topographic features and geological setting); b) selection of seismic inputs (i.e. earthquakes time histories recorded by the local seismic arrays); c) validation criteria (e.g. consisting on a comparison with really measured/observed earthquakes-induced slope displacements). It is proposed also take into account the directional slope response since near field conditions might be assumed in case of several local strong motions. Collaboration with Oguz Ozel and an interaction with the WP5 (dealing with expected shaking scenarios) are encouraged.

iii) Pascal Bigarré (INERIS) proposes local investigation of some possible landslides, and proposes an interaction between WP6 and WP9 tasks.

iv) This microtremor campaign will be carried out in collaboration with the IU and Oguz Ozel will be the supervisor.

As a first meeting gathering all partners, numerous aspects have been discussed enabling all partners to get into details and take some first decisions to go ahead, as listed in the following:

i) Both on-shore and off-shore sides of WP6 will focus especially on pilot zones considered at risk and already of the Marmara Sea: the Avcilar peninsula as on-shore, the gulf of Avcilar as off-shore.

ii) A short-list of expected data (publications, technical reports and documents, etc.) Versus what is needed / for the different partners is to be established.

iii) Transfer of the pre-existing GIS related to landsliding hazard mapping can be organized by the outset of 2013 from TUBITAK towards INERIS and others partners if needed.

iv) A project including an important subsurface geological and geotechnical characterization survey, including geotechnical boreholes, of a specific zone in the south part of the peninsula is to be undertaken in the next few months. How to get full advantage of this must be decided in relation with soil and rock characterization, pre-selection of a pilot landslide to be instrumented in the future (-> WP9), or deeper surveyed in more details for extra input towards dynamic numerical modeling.

v) The connection with WP9 that includes the experiment of an early warning system applied to landslide risk is needed (WP9 task leader : Prof. Ansal).

vi) As regards on-shore investigations and R&D, a detailed field visit of the on-shore pilot zone, possibly organized locally by Sanin Özeren (ITU) and conducted by a geologist is to be organized in the period of April 2013, along with a technical meeting between partners.

2.4.1.6 WP7 ITU – Naci Gorur

Due to the severe weather circumstances on the second day, WP7 had not had the chance to have an actual meeting in the absence of the WP Leader, but a detailed report has been provided after the meeting as following:

Task 1: Re-evaluation of the seismo-tectonics and geohazards (P. Henry- ITU, CEREGE, CNR-ISMAR)

i) Geological synthesis of the Marmara Region from Eocene to present (ITU) (Contact Person/s): N. Gorur, A.M.C. Şengör

This work will be performed mainly by ITU group with the contribution of CEREGE, IFREMER, CNR-ISMAR and INGV. ITU scientists have already published a number of papers on the Eocene Thrace Basin, a large part of the Marmara Region. This study should be completed in large part by the M9

ii) Nature and distribution of activity along the North Anatolian Shear Zone in the Marmara Region (ITU) (Contact Person /s): N. Görür, A.M.C. Şengör

The Sea of Marmara forms the westernmost part of the North Anatolian Shear Zone. Şengör et al. published a paper in 2005 on this topic entitled “The North Anatolian Fault: A New Look”. In this paper, they discussed various aspects of the shear zone. As they stated, the North Anatolian Fault is only an element of the shear zone. The Eocene fore-arc Thrace Basin constituted the stratigraphic basement of the shear zone. There is no doubt that fore-arc tectonic structures controlled to different extents its structural geology and geomorphology. Therefore, without detailed knowledge of these structures, it would not be possible to understand fully the dynamic regimes responsible for the formation and shaping of the Sea of Marmara and the North Anatolian Fault in this marine realm. ITU group will be working on the North Anatolian Shear Zone in the Marmara Region and the surrounding areas to study the age, shear evolution and kind of structures generated in this zone. This study is thought to be completed by the M17.

iii) Distribution of Neogene sediments within the Sea of Marmara (ITU, CNR-ISMAR) (Contact Person/s): N. Gorur, M.N. Cağatay

A serious problem is the distribution of the Neogene sediments within the Sea of Marmara. Previous estimates were based on assuming a basin-wide Neogene depocentre. More recent seismic profiling and studies of sedimentation rates on cores obtained during the numerous sea-borne missions showed that none of the Marmara basins can

have any sediment older than top Pliocene at best. Almost all probably formed in the Pleistocene. This necessitates re-evaluation of the on-land sedimentary and geomorphological record and defines Neogene depocentres and areas of denudation in and around the Sea of Marmara. We believe that only after such a work one can make a true geological synthesis of the entire area from the late Cretaceous to the present. ITU scientists will work on this problem and try to correlate available marine and land seismic and bore-hole data in order to find out the age and nature of the infill of the depressions in the Sea of Marmara. This study is planned to be finished by the end of M9.

iv) Holocene fault scarps based on marine THR and HR data: preparation of an atlas of submarine active faults (ITU, IFREMER, CNR-ISMAR, CEREGE) (Contact Person/s): A.M.C. Şengör, P. Henry

The publication of an atlas of active faults in the Sea of Marmara together with critical data selected is very helpful as a way to stimulate collaboration and will enhance the MARSITE outreach. The base map for such an atlas is being prepared by C. İmren, A. M. C. Şengör, X. Le Pichon and his co-workers. It will be finalized and presented to the group after the project month 9. The fault atlas will also include all known submarine and, if possible, subaerial landslides with an appendage including historical earthquake map, inclusion of Nautile and AUV data. The database of the fault atlas should be isoseismic, because they are the only things that can be checked and rechecked by data in archives, trenches and by archaeologists. Apparently, Ifremer is interested in the fault atlas and will provide data, material, as well as some manpower. Production of the atlas may be co-funded by MARSITE partners M24.

v) Slip rate estimation on active faults (CNR-ISMAR, ITU, CEREGE) (Contact Person/s): P. Henry

While vertical fault motion can be derived from subsidence analysis, the strike-slip component of slip may be obtained from horizontal offset of dated sedimentary or morphological features (piercing points). At present very few offshore locations displaying offsets have been dated accurately. Steps will be to evaluate the reliability of existing rate estimates, screen high-resolution data sets for datable offset morphologies and propose actions to date them. This should be done by M15.

vi) Fault kinematic and mechanical modeling (CEREGE, ITU) (Contact Person/s): P. Henry

Various fault kinematic models constrained by geodesy that have been published in the recent years differ in the fraction of plate motion assigned to the Main Marmara Fault vs. secondary faults and distributed deformation. Constraints on recent fault slip velocities (vertical and horizontal component) obtained during MARSITE will be compared with model predictions. This synthesis work should be done in the second half of MARSITE

vii) The relation between the fault system in the Sea of Marmara and the Thrace Basin (ITU) (Contact Person/s): Naci Görür

Along with the development of the North Anatolian Shear Zone in the Marmara Region, numerous faults of various kinds and ages formed. These faults represent different structural stages of the shear evolution in a dextral shear zone. Their differentiation and correlation on land and in the Sea of Marmara are important in understanding of the evolution of the submarine portion of the North Anatolian Fault. ITU group will make such an attempt ant try to finish it by the end of project month 12.

viii) Modeling of basin subsidence, sediment compaction and heat flow (CEREGE, ITU) (Contact Person/s): P. Henry

On-going studies constrain the recent subsidence of the Sea of Marmara basins with stratigraphic models correlated to the glacial-interglacial cycles. Variations of subsidence in time are recorded in the sedimentary structure of the basins and can be deciphered with a modeling approach, taking into account compaction and using measured heat flow as an additional constrain.

The subsidence history of the Central Basin could be reconstructed with this approach and imply a progressive change of active fault kinematics over the last 2 Ma to 300.000 years (Grall et al., 2012). The same approach is being applied to Tekirdag and Cinarcik Basins. Consistent subsidence models for the three deep basins should be produced by M12.

TASK 2: Integration of faulting parameters from paleoseismic and historical data for hazard assessment (L. Gasperini, S. Akyüz- ITU, CNR-ISMAR, KOERI, INGV, IFREMER)

i) Isoseismic maps based on historical data (ITU, KOERI, INGV) (Contact Person/s): S. Akyüz

A map of historical earthquakes would be useful. The database should be the isoseismic, because they are the only things that can be checked and rechecked by data in archives, trenches and by archaeologists. The isoseismic maps should be prepared by historians. Tentative epicentral locations may easily be entered into this map (M30)

ii) Preparation of an historical earthquake catalogue (ITU, KOERI, INGV) (Contact Person/s): S. Akyüz

Many historical earthquakes are revealed in the Marmara Region as a result of extensive research on both historical documents and paleoseismology. Despite all these efforts, there are still lots of uncertainties for the past earthquakes. A homogenized earthquake catalogue for the Marmara Region would give strong background for seismic risk assessment and be very useful in providing important data for predicting future events.

At least 2000-years earthquake history of the western NAF is aimed to be included within this catalogue (M30).

iii) Paleoseismological studies:

Onshore paleoseismological studies (ITU, INGV) (Contact Person (s): S. Akyüz, D. Pantosti

Compilation of the results of previous paleosesimological studies in the Marmara region (ITU-INGV); new paleosesimological studies on some selected critical branches and segments of the NAF (ITU, INGV) will give important data for earthquake catalogue and strong background for seismic risk assessment of Marmara Region. First target is a poorly known branch between Geyve and Erdek, which is planned for first year of the project. Other target is to concentrate to complete the lack of historical earthquake data from other critical segments that are defined according to on-going catalogue studies for the second year. To complete the lack of data, compilation of all data, and their preparation in GIS will be considered for mainly last year of project (three reports at the end of first, second and last year of the project and two paper by the end of the project are planned).

Offshore paleoseismological studies (ITU, CEREGE, CNR-ISMAR, IFREMER) (Contact Person/s): L. Gasperini, M.N. Çağatay

During recent years the new method of marine paleoseismology has been developed and tested in different geodynamic settings. Its goals are application of scales (time and spatial) of the earthquake geology to the marine environment. The Sea of Marmara appears particularly interesting for this new method due to different reasons: 1) the relatively high deformation rates characterizing the NAF; 2) the rich and extended earthquake catalogues for the region; 3) the peculiar paleo-oceanographic history. For this reasons, the marine geological team that will include scientists from ITU, CNR-ISMAR and CEREGE will work on the study of the geological record of past earthquake through the analysis of already collected sediment cores from different parts of the basin. This will include the deepest depressions of Marmara, such as the Cinarcik, Central and Tekirdag basins, as well as cores collected in the shallow embayments, such as the Gulf of Izmit and the Gulf of Gemlik. We will first focus our attention on the events present in the historical catalogue, to understand whether a clear signature (physical, sedimentological or geochemical) characterize the earthquake induced mass movements at the seafloor from other natural phenomena.

ISMAR-CNR will study the earthquake sedimentary record in 2 key points of the Sea of Marmara (the gulfs of Izmit and Gemlik) by using the archive of gravity cores collected during several oceanographic expeditions. This will lead to the compilation of a geological record of the effects of a single earthquake in the sedimentary sequence, initially encompassing the last 2 ka, and subsequently extending back to the base of the Holocene. The first step of this operation will be the section of already collected cores

appropriate for this study. A report and scientific publication will be delivered at the end of the first year of activity.

GIS database of fault parameters based on historical onshore and offshore paleoseismological records (ITU, CNR-ISMAR, KOERI, INGV, IFREMER) (Contact Person/s): S. Akyüz

GIS database (attribute tables) for paleoseismological studies and fault parameters will be designed by ITU (Project month 6). ISMAR-CNR, INGV and KOERI will contribute to the population of the project database. Metadata of available marine geological data-sets will be delivered by CNR- ISMAR. The data will be entered into the system by ITU, but their compilation will be performed by all partners (M30).

iv) Fault Parameters (CNR-ISMAR, ITU, IFREMER, CEREGE) (Contact Persons): L. Gasperini

Due to its peculiar paleoceanographic history, the Sea of Marmara is characterized by Holocene distinctive sedimentary records that enable a quick and relatively safe determination of the shallow stratigraphy. In fact, the Sea of Marmara was a lake during the LGM, and was inundated by the Mediterranean water after the reaching of the -85 m sill of the Dardanelles. This event constitutes an important time-marker almost ubiquitous in the Sea of Marmara. Several studies carried out starting from the 1999 Izmit earthquake indicate that displaced geomorphic features are present in different basin domains, particularly dating back to the last 14-10 ka. For this reason, marine geological studies will focus on kinematic studies of fault strands active during the last 10 ka. This will be carried out analysing morphobathymetric maps and chirp sonar seismic reflection profiles collected during several oceanographic expeditions by several institutions, including SHOD, ITU, CNR, CNRS and IFREMER.

ISMAR-CNR, in cooperation with ITU, CNRS and IFREMER will analyse available high-resolution morphobathymetric and seismic reflection high-resolution data for the entire Marmara Basin in search for fault strands that have been active during the Holocene (i.e., during several earthquake cycles, considering an average returning period of 200-250 years for each event). During the first year, an inventory and a reprocessing/harmonization of the data available from different sources will be carried out, as a preliminary step towards geological interpretation and mapping. This set of data should also include data collected from Turkish Navy (SHOD) that will be made available through a scientific agreement. Deliverables from the first year will include a technical report and metadata of all available sources.

2.4.1.7 WP8 IFREMER - Louis Geli

Marsite represents an unique opportunity for coordinating efforts between towards an improved, integrated monitoring of the submarine section of the NAF. Within Task 1, agenda will be structured around planned marine operations:

i) Urania Cruise, in September 2013 (to be confirmed)

ii) Pourquoi-pas? Cruise, in 2014

iii) Recovery operations with R/V Yunus

Additional, non-contractual achievements and partners will work on the project:

i) CNRS/IUEM (Brest) will collect geodetic data

ii) GEOMAR will participate at its own expenses with OBS data

Within Task-2 and Task-3, however, work can start now with existing data, hence deliverables will be delivered in time:

KOERI is presently working of the integration of land and marine seismological data

i) integration of OBSs and land stations is actually achieved.

ii) on-going work to improve earthquake localization within the Sea of Marmara by improving the velocity model

IFREMER is presently working on existing OBS data for the high-resolution characterization of the near-fault seismicity

INGV is presently working on the integration of 1-year time series from the Gulf of Izmir

Within Tasks 2 and 3, KOERI will perform special effort for the real-time retrieval of non-seismological data (environmental parameters : T, p, current velocity). Request has been done to KOERI to make the real-time submarine datasets available to the Partner members.

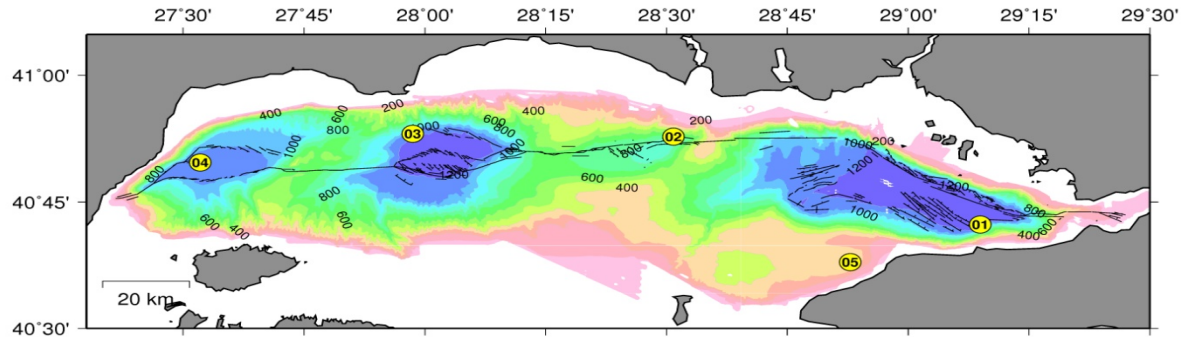
Within Task 3, INGV and Ifremer will share a common PhD to analyze time series of fluid parameters (fluid pressure in the sediment and at the seafloor, bubble flux, fluid velocity, fluid chemical composition).

Within Task 4, the following actions are to be taken

i) Ifremer and INGV will meet in Feb-March 2013 to specify the design of a new generation of multi-parameter stations and test existing sensors, particularly methane sensors

ii) DAIMAR will develop electronic card to log low- and –high sampling rate data, based on the above specifications

iii) discussion will start with KOERI, GURALP and other partners to use existing cable to connect a multi-parameter station (site of common interest could be station 2 within Kumburgaz Basin



2.4.1.8 WP9 KOERI – Mustafa Erdik

Task-1 and Task-4 will work interactively: Task-4 will provide input to Task-1. Prof. Dell'acqua provided information on the extent of contribution of EUCENTRE to WP9. It has been discussed that GEM (Global Earthquake Model, http://www.globalquakemodel.org) and GEO (Group On Earth Observations, http://www.earthobservations.org) tools can be used in the content of WP9 in Task 1, 2 and 4. Prof. Dell'acqua mentioned that some sample image of a sample region in Istanbul can be used to implement the tools developed in GEM and GEO for verification purposes. A pilot region can be selected where both high resolution photo image and structural typology and characteristics are available in Istanbul. It has also been discussed that some data have already been provided to GEM global component on vulnerability which is lead by Helen Crowley. Collaboration with Helen Crowley will be useful to determine the pilot location in Istanbul.

The main aim selection of a sample region is to verify and determine the limitations of the tools developed in GEM. As such Prof. Dell'acqua will provide information on the properties of the image to be used for pilot application and KOERI will respond to this request. It has been agreed that researchers from KOERI and EUCENTRE could visit each other for collaborative study on vulnerability methodology developed.

In Task 2, Prof. Ansal mentioned about a similar pilot region for landslide monitoring. Additionally Prof. Ansal emphasized that some criteria should be defined for selection of the pilot region. Dr. Bigarre reported that their group has already have some sites for landslide monitoring. Dr. Bigarre has also provided brief information on the properties of the monitoring system in term of instrumentation, data compilation and transfer. Prof. Ansal

has informed that TUBITAK has some number of landslide monitoring locations and some of these locations can be an option for WP9. But it has been emphasized that these locations should be evaluated especially in terms of location, instrumentation. Prof. Ansal will provide a document that involves the selection criteria of the pilot location for landslide monitoring. Dr. Parolai has provided information on the extent of contribution of GFZ to WP9. Dr. Parolai has informed that GFZ has some experience on landslide monitoring in Central Asia and could provide information about the systems that GFZ runs. The content of contribution to landslide monitoring can be in the form of instrumentation and software.

In Task 3, KOERI and AMRA will work together. KOERI and AMRA will work on the possible improvements on the existing Istanbul Earthquake Rapid response System. Dr. Parolai indicated that GFZ can contribute to this Task with the extension of existing SOSEWIN networks in Istanbul, and integrating Early-Warning Algorithms to these networks.

2.4.1.9 WP 10 BRGM - John Douglas

Due to the severe weather circumstances and early departures of some of the WP members, the WP leader shared information based on the discussions took place on the first day of the Kick-Off Meeting.

Task 1: Discussions are ongoing at INGV between coordinators of EMSO and EPOS (two key initiatives for MARsite). An e-mail will be circulated by INGV in January to all partners of MARsite requesting names (and contact details) of projects and initiatives that MARsite should be liaising with. Once list of projects is available, a study of the approaches for data integration in these projects will be made by all partners of WP10 led by INGV in early 2013. Potential similarities to the philosophy of MARsite will be identified and possible collaborations will be investigated by all partners of WP10 led by INGV in late 2013.

Tasks 2 and 3: The meaning of the phrase ‘data integration’ in the DoW is not clear. Philosophy of WP10 is interoperability and distributed systems (see, e.g., concepts of the Open Geospatial Consortium, the ORCHESTRA FP6 project and the INSPIRE directive). Aim of WP10 is not to produce a centralized server containing all the data collected during the project but to showcase what could be achievable in the future. The dissemination of real-time data is currently not a priority. Some brief documents and example websites (e.g. OneGeology Europe) showing the benefit of the philosophy of interoperability and distributed systems will be circulated – BRGM and ESA will do this in January. A teleconference between BRGM, ESA and KOERI (and others if required) will be held to plan next steps – BRGM will organize this at the end of January.

Potential data providers to the distributed system developed in Tasks 2 and 3 will be identified in early 2013 and their interest/capability to install web services will be ascertained by BRGM in early 2013.

2.4.2 Closing Remarks - Nurcan Meral Özel, Coordinator

In her closing remarks Professor Özel stated that in the Kick-off meeting all partners were able to better understand the project road-map, tasks and homework. She pointed out the importance of sharing information in the beginning of the project and that due to the weather conditions the time dedicated to WP Parallel Sessions had been less than originally planned. She therefore urged the WP leaders to continue meetings and discussions within their task groups in order to facilitate the collaboration of partners.

Furthermore she thanked all the partners for their participation and the KOERI staff for their support in the organization of the kick -off meeting.

Annex I: Agenda

Day 1 – 19 December 2012		
09:00 – 09:30	Arrival and Registration	
09:30	Session 1: Opening Session	
09:30	Official Opening	Mustafa Erdik Director, KOERI
09:45	Welcome Speech	Lale Akarun Vice - Rector, Boğaziçi University
10:00	Invited Talk: Active tectonics and Morphotectonic development of the Marmara region	Yucel Yilmaz Kadir Has University
10:45	Introducing MARSite	Nurcan Meral Ozel Coordinator
11:15	Coffee Break	
11:30	Project Management – Part I: Overview of Method of Work	Ocal Necmioglu Coordinator Assistant
12:00	Project Management – Part II: Overview of EC Requirements during the Project	Meral Marina Alguadis Project Manager
12:30	Lunch	
13:30	Session 2: Introductory WP Presentations with Q&A	
13:30	WP2: Land-based long-term multi-disciplinary monitoring	Paolo Favali INGV – WP2 Leader
13:50	WP3: Long-term Continuous Geodetic Monitoring of Crustal Deformation	Semih Ergintav TUBITAK - WP3 Leader
14:10	WP4: Establishment of Borehole Observation System and High Resolution Seismic Studies in the Marmara Sea	Asım Oguz Ozel IU - WP4 Leader
14:30	WP5: Real- and quasi-real-time Earthquake &Tsunami Hazard Monitoring	Nurcan M. Ozel KOERI - WP5 Leader
14:50	WP6: Earthquake-Induced Landslide Hazard in Marmara	Pascal Bigarre INERIS – WP6 Leader
15:10	Coffee Break	
15:30	WP7: Re-evaluation of the seismo-tectonics of the Marmara Region	Naci Gorur ITU – WP7 Leader
15:50	WP8: Monitoring seismicity and fluid activity near the fault using existing cabled and autonomous multiparameter seafloor instrumentation	Louis Geli IFREMER - WP8 Leader
16:10	WP9: Early Warning and Development of the Real-time shake and loss information	Mustafa Erdik KOERI – WP9 Leader
16:30	WP10: Integration of data management practices and coordination with ongoing research infrastructures	John Douglas BRGM – WP10 Leader
16:50	WP11: Dissemination	Santhi Veloupoulé

		EMSC - WP11 Leader
17:10	Coffee Break	
17:30	Session 3: WP Sessions*	
17:30	WP9 Session	
18:30	EOB	
18:45	Transport to the Restaurant	
19:30 – 22:00	Dinner organized by KOERI	

Day 2 – 20 December 2012		
09:30	Session 3 cont'd: WP Sessions	
09:30	WP2/WP3/WP4/WP5 Parallel Sessions	
11:00	Coffee Break	
11:30	WP6/WP7/WP8/WP10 Parallel Sessions	
13:00	Lunch	

14:00	Session 4: Closing Session	
14:00	Summary of Parallel Sessions and Discussions	Consortium
16:00	End of Kick-off Meeting	

** The purpose of the WP Sessions is to bring each WP contributors together to discuss all possible details of the work foreseen within the WP. There is no parallel session foreseen for WP11 (Dissemination). WP9 (Data Integration) Session will be held on the first day. On the second day, there will be 4 seminar rooms allocated for each 90 min session, thus each researcher will be able to participate at least 2 WP session*

Annex II: List of Participants

Name / Surname	Partner No	Partner Name
Nurcan Meral Ozel	1	KOERI
Mustafa Erdik	1	KOERI
Meral Marina Alguadis	1	KOERI
Ocal Necmioglu	1	KOERI
Atilla Ansal	1	KOERI
Cemil Gurbuz	1	KOERI
Ali Pınar	1	KOERI
Hayrullah Karabulut	1	KOERI
Mustafa Aktar	1	KOERI
Haluk Ozener	1	KOERI
Dogan Kalafat	1	KOERI
Ali Ozgun Konca	1	KOERI
Can Zulfikar	1	KOERI
Gulum Tanircan	1	KOERI
Karin Sesetyan	1	KOERI
Mine Demircioglu	1	KOERI
Cuneyt Tuzun	1	KOERI
Mehmet Yilmazer	1	KOERI
Ceren Ozer	1	KOERI
Mustafa Comoglu	1	KOERI
Heiko Woith	2	GFZ
Marco Bohnhoff	2	GFZ
Stefano Parolai	2	GFZ
Fatih Bulut	2	GFZ
Semih Ergintav	3	TUBITAK
Rahsan Cakma Kosma	3	TUBITAK
Onur Tan	3	TUBITAK
Cemil Seyis	3	TUBITAK
Vedat Ediger	3	TUBITAK
Zümer Pabuçcu	3	TUBITAK
Ali Özkan	3	TUBITAK
Luis Geli	4	IFREMER
Jean François Rolin	4	IFREMER
Paolo Favali	5	INGV
Franco Italiano	5	INGV
Stefano Salvi	5	INGV

Asım Oguz Ozel	6	IU
Esref Yalcinkaya	6	IU
Ethem Gorgun	6	IU
Savas Karabulut	6	IU
Serif Baris	7	KU
Berna Tunc	7	KU
Naci Gorur	8	ITU
Namık Çağatay	8	ITU
Sinan Özeren	8	ITU
Ziyadin Cakir	8	ITU
Remzi Akkok	8	ITU
Mariarosaria Manzo	9	CNR-IREA
Antonio Pepe	9	CNR-IREA
Luca Gasperini	9	CNR-ISMAR
John Douglas	10	BRGM
Hideo Aochi	10	BRGM
Marcello de Michele	10	BRGM
Fabio Dell'Acqua	11	EUCENTRE
Pierre Henry	12	CNRS
Jean Schmittbuhl	12	CNRS
Anne Deschamps	12	CNRS
Pascal Bigarre	13	INERIS
Stella Coccia	13	INERIS
Rémy Bossu	15	EMSC
Santhi Veloupoulé	15	EMSC
Pierre Philippe Mathieu	16	ESA
Paolo Gamba	17	UNIPV
Luca Lenti	18	IFSTTAR
Salvatore Martino	18*	La Sapienza
Cansun Guralp	19	GURALP
Marcomaria Zora	20	DAIMAR
Francesca Vaccaro	20	DAIMAR
Alessandra Lopez	20	DAIMAR
Paolo Pasquali	21	Sarmap
Alessio Cantone	21	Sarmap
Ahmet Emre Basmacı	N/A	End-User