

Improvements in the Harmonized Seismic Hazard Maps for the Western Balkan Countries

(SfP Project Number 984374)

Six-Monthly Progress Report 10.07.2012 - 30.09.2012

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NATO

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October 2012

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OUTLINE OF THE SfP 984374 SUMMARY REPORT

SfP – Seismic Maps Harmonization II

SfP-984374 Improvements in the Harmonized Seismic Hazard Maps for the Western Balkan Countries

Project Co-Directors:

Asst. Prof. Dr. Zeynep Gulerce, METU, Ankara, Turkey (NPD)

Asst. Prof. Radmila Salic, IZIS, Skopje, Macedonia (PPD)

Prof. Dr. Neki Kuka, Institute of Geosciences, Energy, Water and Environment, Tirana, Albania

Prof. Dr. Hazim Hrvatovic, Geological Survey of Federation of Bosnia and Herzegovina, Sarajevo, Bosnia and Herzegovina

Asst. Prof. Dr. Snjezana Markusic, Department of Geophysics, University of Zagreb, Zagreb, Croatia

Civil. Eng. Jadranka Mihaljevic, Montenegro Seismological Observatory, Podgorica, Montenegro

Eng. Vladan Kovacevic, Seismological Survey of Serbia, Belgrade, Serbia

Approval Date: 10.07.2012 **Effective Date:** 04.10.2012

Duration: 2 years (October 2014)

NATO Budget: 239,000.00 EUR

Information about the SfP Project through Internet: N/A; will be established January 2013

Abstract of Research

The Western Balkans is a seismically active region and characterized by significantly higher earthquake hazard and risk when compared to the rest of Europe. Local seismic design code regulations, seismic risk estimation, risk management and seismic safety improvements should be based on reliable hazard maps. However, relatively sparse seismological networks and limited cross-border seismic data exchanges restricted the adequacy of seismic hazard assessment and disaster management in the region. Minimizing of the loss of human lives and property damage, social and economic disruption due to earthquakes, essentially depends on reliable estimates of seismic hazard. The foreseen logical step is harmonization with EU standards (EUROCODE 8), what impose the seismic hazard harmonization as the first step towards The main goals to achieve are improvement in the initial harmonized seismic hazard maps of the participating countries by implementing state-of-the-art probabilistic seismic hazard assessment techniques and the outputs of the BSHAP project, integration of improved seismic hazard maps with the ongoing seismic hazard studies in Europe and surrounding countries and collaboration and exchange of information between the participating country scientific communities and earthquake professionals around the world. To this end, the recently deployed seismic stations, seismic data exchange protocols, earthquake catalogue and hazard studies conducted by the BSHAP participants will be brought to a more enhanced level with the opportunities provided by the new project. The end users of the Project results will be governmental disaster management agencies, ministries of environment or agencies responsible for environmental protection and sustainable development in the Balkan region. The civil protection agencies as well as the insurance companies, in all of the participating countries, may benefit from these results by using it to estimate seismic risk at certain region/location. Consequently, they will introduce risk prevention, preparedness and mitigation measures. Direct users of Project results should be structural engineers, earthquake engineers, and physical planners in the whole region.

Major Objectives

- *Compiling and integrating the available strong ground motion data recorded by the improved seismic networks during BSHAP or previously occurred earthquakes using the outputs of earlier scientific projects.*
- *Improving the BSHAP earthquake catalogue by adding unified earthquake metadata such as magnitude, depth, and style-of-faulting information and site characterization of selected strong ground motion recording stations.*
- *Selecting and implementing proper ground motion prediction equations for the probabilistic seismic hazard assessment by comparing the compiled strong ground motion data with available global, European, Euro-Med, and regional ground motion prediction models.*

- Encouraging the use of collected strong ground motion database for the end users and international earthquake research communities by realizing improved multi-lateral data exchange protocols and publishing the major project findings in an open-to-public web portal.
- Collecting the available information on seismotectonical source characterization of faults and background zones in the Geological Information Systems (GIS) framework with the help of BHSAP and other scientific project outputs. Providing expertise to the participants for implementing the seismic source characterization as the input of probabilistic seismic hazard assessment framework.
- Improving the seismic hazard maps of the region using the project end products (seismotectonic and accelerometric database) and state-of-the art seismic hazard assessment methods.
- Establishing active scientific collaboration and exchange of information between the participating countries and scientific communities all around the world.
- Training of future-promising young scientists in earthquake-hazard related topics by conducting group meetings, workshops and training seminars.

Overview of Achievements since the Start of the Project until (30 September 2012)

The kick-off meeting and first project workshop was realized in Skopje in October 4-5, 2012. The overview of discussions and decisions made on this meeting is summarized on the meeting agenda attached.

Payments through NATO Funds: 0.00 EUR

Milestones for the Next Six Months

- Upgraded National Magnitude 3+ Catalogues (03 December 2012)
- Investigating the catalogue completeness and identifying the possible existing gaps in the catalogue (31 December 2012)
- Examining and filtering the BSHAP Earthquake Catalogue for missing or duplicate events and fulfillment of missing or new earthquake data (30 March 2013)
- Inventory of broad band and accelerograph stations (01 December 2012)
- Compilation of all available strong motion data (01 December 2012)
- Participation on "ORFEUS Observatory Coordination Workshop", 12-14.11.2012, Istanbul, Turkey (selected project representatives)
- Proposal for equipment purchase (30 November 2012)
- Second Project Workshop, Belgrade, Serbia (beginning of February 2013)
- Project Web Site (01 January 2013)

Implementation of Results

The final outputs of the Project will be available for the practical implementation to end users in all participating countries including: i) Computer and other technical support used in the Project along with seismic hazard assessment software package will be installed in all participating institutions, ii) all seismic instrumentation purchased through the Project will be installed at the territories of the participating countries and will be used for the strong motion recording of earthquakes and the recorded data will be used for improvement of regional strong motion data base, iii) research capabilities in all participating institutions in the Project will be strengthen by establishing of working groups and cooperation within the region will be managed, iv) seismic hazard maps as a crucial output of the Project will be published locally, as well as in scientific publications and conferences, with included acknowledgement of NATO support. Results of the Project will be available to all foreseen end-users in all participating countries

NATO Consultant: N/A

Other Collaborating Institutions

- Center for Seismology, Federal Meteorological Institute, Sarajevo, Bosnia and Herzegovina
- Hydrometeorological Institute of Republic of Srpska, Sector for Seismology, Banja Luka, Bosnia and Herzegovina
- Seismological Observatory, Faculty of Natural Sciences and Mathematics, Skopje, Republic of Macedonia.

Intellectual Property (IP) Rights: N/A

Minutes	1st PROJECT WORKSHOP & KICK-OFF MEETING 4-5 October 2012 Skopje, Republic of Macedonia
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Chaired by: Minutes by:	Zoran Milutinovic, Prof. Dr. Radmila Salic, M.Sc.
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Present				
#	Name Surname E-mail	Project Role	Institution	Country
1	Neki Kuka, Prof. Dr. <i>nekikuka@live.com</i>	Co-Director	Institute of Geosciences, Energy, Water and Environment, Tirana	Albania
2	Llambro Duni, Prof. Dr. <i>llduni@hotmail.com</i>	Participant	Institute of Geosciences, Energy, Water and Environment, Tirana	Albania
3	Snjezana Markusic, Prof. Dr. <i>markusic@irb.hr</i>	Co-Director	Department of Geophysics, University of Zagreb, Zagreb	Croatia
4	Marjan Herak, Prof. Dr. <i>herak@irb.hr</i>	Participant	Department of Geophysics, University of Zagreb, Zagreb	Croatia
5	Davorka Herak, Prof. Dr. <i>herak@rudjer.irb.hr</i>	Participant	Department of Geophysics, University of Zagreb, Zagreb	Croatia
6	Radmila Salic, M.Sc. <i>r_salic@pluto.iziis.ukim.edu.mk</i>	PPD	Institute of Earthquake Engineering and Engineering Seismology, Skopje	Macedonia
7	Zoran Milutinovic, Prof. Dr. <i>zoran@pluto.iziis.ukim.edu.mk</i>	Participant	Institute of Earthquake Engineering and Engineering Seismology, Skopje	Macedonia
8	Dragi Dojcinovski, Prof. Dr <i>dragi@pluto.iziis.ukim.edu.mk</i>	Participant	Institute of Earthquake Engineering and Engineering Seismology, Skopje	Macedonia
9	Stevko Stefanoski <i>stevko.stefanoski@cuk.gov.mk</i>	Invited Guest Expert	Government of Republic of Macedonia Crisis Management Centre, Skopje	Macedonia
10	Trajko Todorcevski <i>trajko.todorcevski@dzs.gov.mk</i>	Invited Guest Expert	Government of Republic of Macedonia Protection and Rescue Directorate, Skopje	Macedonia
11	Zoran Rakicevic, Prof. Dr. <i>zoran_r@pluto.iziis.ukim.edu.mk</i>	Invited Guest Researcher	Institute of Earthquake Engineering and Engineering Seismology, Skopje	Macedonia

12	Aleksandra Bogdanovic, M.Sc. <i>saska@pluto.iziiis.ukim.edu.mk</i>	Invited Guest Research Ass.	Institute of Earthquake Engineering and Engineering Seismology, Skopje	Macedonia
13	Marta Stojmanovska, M.Sc. <i>marta@pluto.iziiis.ukim.edu.mk</i>	Invited Guest Research Ass.	Institute of Earthquake Engineering and Engineering Seismology, Skopje	Macedonia
14	Julijana Cvetanovska, M.Sc. <i>jule@pluto.iziiis.ukim.edu.mk</i>	Invited Guest Research Ass.	Institute of Earthquake Engineering and Engineering Seismology, Skopje	Macedonia
15	Goran Jekic, M.Sc. <i>jekic@pluto.iziiis.ukim.edu.mk</i>	Invited Guest Research Ass.	Institute of Earthquake Engineering and Engineering Seismology, Skopje	Macedonia
16	Irena Gjorgjeska, Eng. <i>gj_irena@pluto.iziiis.ukim.edu.mk</i>	Invited Guest Research Ass.	Institute of Earthquake Engineering and Engineering Seismology, Skopje	Macedonia
17	Igor Markovski, Eng. <i>igorm@pluto.iziiis.ukim.edu.mk</i>	Invited Guest Research Ass.	Institute of Earthquake Engineering and Engineering Seismology, Skopje	Macedonia
18	Dejan Filipovski, Eng. <i>dejan@pluto.iziiis.ukim.edu.mk</i>	Invited Guest Research Ass.	Institute of Earthquake Engineering and Engineering Seismology, Skopje	Macedonia
19	Aleksandar Zurovski	Invited Guest Student	Institute of Earthquake Engineering and Engineering Seismology, Skopje	Macedonia
20	Risto Anastasov	Invited Guest Student	Institute of Earthquake Engineering and Engineering Seismology, Skopje	Macedonia
21	Capragorski Goran	Invited Guest Student	Institute of Earthquake Engineering and Engineering Seismology, Skopje	Macedonia
22	Manojlovski Filip	Invited Guest Student	Institute of Earthquake Engineering and Engineering Seismology, Skopje	Macedonia
23	Jadranka Mihaljevic, Eng. <i>mihaljevic@seismo.co.me</i>	Co-Director	Montenegro Seismological Observatory, Podgorica	Montenegro
24	Vladan Kovacevic, Eng. <i>vladan.kovacevic@seismo.gov.rs</i>	Co-Director	Seismological Survey of Serbia, Belgrade	Serbia
25	Svetlana Kovacevic, Eng. <i>svetlana.kovacevic@seismo.gov.rs</i>	Participant	Seismological Survey of Serbia, Belgrade	Serbia
26	Zeynep Gulerce, Prof. Dr. <i>zyilmaz@metu.edu.tr</i>	NPD	Middle East Technical University, Ankara	Turkey
27	Sinan Akkar, Prof. Dr. <i>sakkar@metu.edu.tr</i>	Participant	Middle East Technical University, Ankara	Turkey

Agenda points:	<ol style="list-style-type: none"> 1. BSHAP 983054 – Summary <ol style="list-style-type: none"> 1.1. Earthquake Catalogue 1.2. Selection of GMPEs and Accelometric Data Bank 1.3. Seismic Source Characterization 1.4. Probabilistic Seismic Hazard Assessment 2. BSHAP 984374 – Improvements to Be Done <ol style="list-style-type: none"> 2.1. Earthquake Catalogue 2.2. Selection of GMPEs and Accelometric Data Bank 2.3. Use of fault plane solutions in PSHA: Croatian FPS database 2.4. Seismic Source Characterization & Probabilistic Seismic Hazard Assessment 3. Managing the Work Packages and Timetables 4. Budget and Purchases 5. Workshops, Director Meetings, Web Site, Data Management 6. Future Prospects, Collaboration, Visibility 7. Other
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MINUTES	
1. BSHAP 983054 – Summary	
Conclusions Decisions	<p>1.1 Earthquake Catalogue – Summary given by <i>Prof. Dr. Liambro Duni</i></p> <ul style="list-style-type: none"> ○ The Unified BSHAP 3.5 earthquake catalogue was compiled by merging together the national catalogues. ○ Since the moment magnitude characterizes more accurately the earthquake size, it was chosen as a uniform magnitude scale for seismic hazard investigations. ○ New equations relating the Mw with Ms and Mb have been derived for the BSHAP area. Also, an update of the already previously derived relations between Mw and ML has been done. ○ The catalogue is considered complete for the whole BSHAP region for magnitudes Mw larger than 4.0. However, the completeness is not homogenous everywhere. ○ This catalogue is a first attempt. It needs to be improved in the future. <p>1.2 Selection of GMPEs and Accelometric Data Bank – Summary given by <i>Prof. Dr. Zoran Milutinovic</i></p> <ul style="list-style-type: none"> ○ Information on records (157Nos) and related earthquakes comprised by European Strong Motion Data Base (August 31, 1998) will be provided. ○ Information and data on strong motion station sites available in IZIIS geotechnical data base will be provided. ○ Post 1998 update of SM data base is required. ○ IZIIS will check its geotechnical data for updating the strong motion station sites database.

- Integration of all (records/strong motion station sites) information is necessary; IZIS will provide a table to be filled by all participants; deadline – one week from the workshop termination.
- Training in strong motion data processing is necessary for development of Unified BSHAP Strong Motion Data Base. Format of the database shall be decided.
- It was requested report on the Bosnia instruments deployment purchased under previous project.

1.3 Seismic Source Characterization – Summary given by *Eng. Jadranka Mihaljevic*

- Single seismotectonic model comprised for the BSHAP project is compiled and harmonized research product of national experts. Seismotectonic model of broader influence area is full set of seismogenic zones.
- Geographical partition of seismogenic zones has been done on the basis of geological settings, seismicity features and fault data. Each zone is defined by present faults (attributed by its types, directivity angle and their relative weight,) and seismicity defined by b-value and expected Mmax.
- Unified regional fault GIS layer has been composed.

Proposed Improvements:

- To have better performance source zones should be generalized. A smaller magnitude catalogue threshold is favourable to have more earthquakes inside zones.
- Better characterisation of neighbouring countries (see catalogue issues, as well).
- Different assessment of Max.
- Additional modelling of linear source zones is still not feasible on the base of data available (Z. Gulerce)
- Use of multi-model approach. Create models based on expert opinion and perform sensitivity analysis or logic tree approach.
- Use experiences and expertise from SHARE to upgrade approach?

1.4 Probabilistic Seismic Hazard Assessment – Summary given by *Prof. Dr. Neki Kuka*

- The PSHA for the Western Balkan Countries builds upon extensive research and database compilation carried out over the last three years by the institutions participating in the BSHAP project. Hazard assessment is based on the smoothed-gridded seismicity approach.
- The seismic hazard maps derived in this project are a good basis to characterize the seismic hazard in our region. They will help the national authorities, public and private institutions, civil emergencies agencies, etc. for urban planning, disaster preparedness, etc.
- But they should not be considered as national documents for design building codes. Every country, based on the seismological database (BSHAP catalogue), and the present seismotectonic zones delineation and characterization, methodology and

	<p>experience from BSHAP project, as well as the present maps, have to improve the seismic hazard assessment for the relevant territories.</p> <p>Proposed Improvements:</p> <ul style="list-style-type: none"> ○ Completing the BSHAP catalogue with events $MW \geq 3.5$ (better for $MW \geq 3.0$); eliminating of possible inaccuracies; completing of the extended database in format we already have defined and agreed. ○ Improving of the BSHAP seismotectonic databases (some zones are too small and difficult to estimate reliably the seismicity parameters, especially for the low seismicity areas). ○ Identifying and characterization of the large faults in the BSHAP region, which have generated earthquakes with $MW \geq 6.5$; combining the smoothed gridded seismicity with the fault generated seismic hazard. ○ Creating of the strong motion database for the BSHAP area; deriving a GMP model – better describing our region.
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Actions	Responsible	Deadline
Report on the Bosnia instruments deployment purchased under previous project.	H. Hrvatovic	ASAP

2. BSHAP 984374 – Improvements to Be Done

<p>Conclusions Decisions</p>	<p>2.1 Earthquake Catalogue – <i>Slavica Radovanovic, M.Sc., presented by Svetlana Kovacevic, M.Sc.</i></p> <p>Proposed Improvements:</p> <ul style="list-style-type: none"> ○ Examining and filtering the BSHAP Earthquake Catalogue for missing or duplicate events and fulfilment of missing or new earthquake data. ○ Investigating the catalogue completeness and identifying the possible existing gaps in the catalogue. ○ Unification of the magnitude scales and adding available earthquake metadata for the present earthquakes. ○ Providing a final earthquake catalogue compatible with international standards. <p>Basic postulates:</p> <ul style="list-style-type: none"> ○ All data should have root reference as agreed in Format of the catalogue. ○ Relations adopted or developed for magnitude conversion should be documented (for the partner countries at list). ○ Earthquakes in the border zones of the countries should be attached to the national catalogue of the country with maximum macroseismic intensities (not agreed by all participants, to be discussed). ○ The sovereignty of states, in a manner that are internationally recognized, refers to the contents of catalogues and cannot be subject to overruling <p>- All representatives agreed to submit the Magnitude 3+ Catalogues from 1970. All catalogues to be submitted to Mr. Vldan Kovacevic and</p>
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Snjezana Markusic.

-Respectively, all received catalogues will be forwarded to all parties that already sent their own catalogue.

-The coordinates and hypocentral time should be given with specified sufficient accuracy. To state specifics of the catalogue to provide earthquake format in advance. Optionally, to adopt the BSHAP catalogue format?

- After the catalogue is completed, the sensitivity analysis will be done by Prof. Gulerce and Prof. Kuka.

2.2 Selection of GMPEs and Accelometric Data Bank – Summary given by Ms. Radmila Salic

Proposed Improvements:

- Compiling the available strong ground motion data recorded by the improved seismic networks during BSHAP or previously occurred earthquakes using the outputs of earlier scientific projects
- Building a harmonized accelerometric databank by unifying the formats of the collected strong ground motion data
- Improving the databank by adding ground motion recording station information
- Investigation of available ground motion prediction models and their applicability to the region, comparison of results from different prediction models
- Final decision on the ground motion prediction models and their weights to be used in PSHA

- Prof. Akkar will provide the project team with the accelerometric data bank for Balkan Region currently available from other scientific projects.

- At first stage all partner countries should provide the list of their BB and SM stations along with the station coordinates. After the basic data will be collected, template for inventorisation will be prepared and send to all countries to be fullfield.

- Prof. Akkar invited the project representatives to participate at “ORFEUS Observatory Coordination Workshop: Seismic Networks and Acceleration Networks” which will be hosted by the Kandilli Observatory and Earthquake Research Institute of Bogazici University (KOERI-BU). The Workshop will be held in Istanbul between 12-14 November 2012. The workshop will focus on the interaction between broadband and accelerometric networks, and open data access and exchange. Project representatives to be nominated.

2.3 Use of fault plane solutions in PSHA: Croatian FPS database – Summary given by Prof. Dr. Marjan Herak

Croatian FAULT-plane solutions (fps) database

- The database is regularly updated at least twice a year.
- The database is now good enough to roughly define geometry of faulting in many (but not all!) Croatian and neighbouring regions.
- Rapid and easy access to data of neighbouring networks would greatly improve solutions (past and future!).
- An effort to adopt routine moment-tensor computation for local and regional earthquakes is needed!
- The software (written by Prof Herak and associates) is freely

available.

Re (Calibration) of magnitude scales for the Croatian seismographic network

- Regression of Mw vs. ML using both magnitudes determined independently on the same set of stations and earthquakes is far better than regressions of locally determined ML vs. Mw determined (mostly for large and distant earthquakes!) by other agencies.
- Proposed inversion of observed spectral shapes of local and regional earthquakes results in consistent Mw estimation using data collected by the Croatian Seismographic Network.
- New calibrating functions for local magnitudes (ML and MWA) yield distance-independent estimates.
- The correspondence between the three magnitudes is close to 1:1 relationship. This is encouraging, promising an easy conversion from ML to MW for older events.
- Results obtained in studies done so far using ML as proxy for MW will most probably not significantly change after proper conversion.

2.4 Seismic Source Characterization & Probabilistic Seismic Hazard Assessment – *Summary given by Prof. Dr. Zeynep Gulerce*

Proposed Improvements:

- Additional modelling of linear source zones requires the slip rates on the individual sources and seismic moment balancing methods. The required data is not available for the region therefore changing the seismic source models is not foreseen for this project.
- An improvement in the source characterization can be achieved by keeping the areal sources but updating the methodology by changing the way of smoothing the seismicity or by using simulated catalogue. Additional expertise and collaboration would be necessary for these changes.
- Within the first year of the project, inputs from the earthquake catalogue working group and ground motion characterization working group should be completed. This input will chance the PSHA results significantly. In the meantime, sensitivity analysis may be performed.

Suggestions:

- A young researcher should focus on the sensitivity analysis. He/she may be trained for two weeks in Tirana to learn the basics of the PSHA code.
- Sensitivity analysis should be performed by changing the Mmax value in each cell (in other words by adding the uncertainty in Mmax), using a constant b-value in the region (by adding the uncertainty in b), and varying the b-value with and without the elliptical smoothing.
- Different GMPEs should be added to the PSHA code.
- Sensitivity analysis should be performed for the number of GMPEs selected, weight of GMPEs, etc.
- PSHA results may be compared to the other available open

	source PSHA cods. HAZ39 would be an option.	
Actions	Responsible	Deadline
Upgraded National Magnitude 3+ Catalogues (from 1970) to be submit to Mr. Vladan Kovacevic (Serbia) and Prof. Snjezana Markusic (Croatia), as well as to all parties respectively	All Partner Countries Directors	03.12.2012
Catalogue Sensitivity Analysis	Z. Gulerce / N. Kuka	To Be Defined
Balkan SM Data Bank	S. Akkar	ASAP
List of broad band and accelerograph stations with WGS84 coordinates to be send to Ms. Radmila Salic (Macedonia)	All Partner Countries Directors	22.10.2012
Internal assessment of the ground motion data. Providing a list of available ground motions to Ms. Radmila Salic (Macedonia)	All Partner Countries Directors	01.12.2012
Project Representatives to be nominated for "ORFEUS Observatory Coordination Workshop", 12-14.11.2012, Istanbul, Turkey	R. Salic / Z. Gulerce	ASAP
3. Managing the Work Packages and Timetables		
Conclusions Decisions	3. 1 Managing the Working Packages - It was agreed that time table of WP1 and WP2 must be revised and limited to 9-12 months in order to assure enough time for the WP3 and WP4. - WP1 and WP2 teams have to work in parallel. - It was agreed that leader Country for WP3 to be Montenegro (if Bosnia participation in the project will be terminated).	
Actions	Responsible	Deadline
N/A		
4. Budget and Purchases		
Conclusions Decisions	4. 1 Purchases - Every partner Country to request a proposal from their selected vendor and to submit the proposals to Prof. Gulerce. Further Prof. Gulerce will officially request for quotations. - To be sent official e-mail to Guralp support centre to fix the problem with previous purchased instruments (problems reported by Macedonia).	
Actions	Responsible	Deadline
Proposal for equipment purchase	All Partner Countries Directors	30.11.2012
Guralp Support Request	R. Salic / D. Dojcinovski	ASAP
5. Workshops, Director Meetings, Web Site, Data Management		
Conclusions Decisions	5.1 Workshops and Trainings - Next Project Workshop to be organized in Belgrade, Serbia, beginning of February. To be discussed: earthquake catalogue and accelerometric data base. For the efficiency, the work to be split in two days in two working groups. - Training on analysis and processing of strong ground motion records to be scheduled during the summer 2013. Training will be given by Prof. Sinan Akkar. Possible venues Turkey or Croatia, to be agreed. 5.2 Meetings - Apart from regular meetings and workshops was agreed that it will be necessary frequent working meetings among the working groups and	

	<p>participants. It was proposed and decided “GoToMeeting” software licence to be purchased. (www.gotomeeting.com).</p> <p>5.3 Web Site</p> <ul style="list-style-type: none"> - Project web site to be put in operation in max one month. Information’s related to the previous BSHAP project to be added on the project web page as well. - Ms. Jadranka Mihaljevic has delivered to Ms. Radmila Salic all available previous BSHAP project data on (3) CD roms. <p>5.4 Data Management</p> <ul style="list-style-type: none"> - It was proposed by Prof. Akkar two servers for the Balkan BB and SM Data Base to be to be purchased (main and back-up server). (BB Data-to be discussed) - Exchanging the working files was agreed to be done through Drop Box and if necessary the upgrade version to be purchased. 	
Actions	Responsible	Deadline
Second Project Workshop, Belgrade, Serbia	V. Kovacevic	Beginning of Feb. 2013
Training on analysing and processing of strong ground motion records (Turkey or Croatia).	Z. Gulerce / S. Akkar	Summer 2013
Project Web Site (operation mode)	Z. Gulerce	01.01.2013
“GoToMeeting” software licence to be purchased	Z. Gulerce	01.11.2013
Servers for Balkan (BB) and SM Data Base to be purchased	To Be Agreed	To Be Agreed
6. Future Prospects, Collaboration, Visibility		
Conclusions Decisions	<p>6.1 Final Project Results and Findings</p> <ul style="list-style-type: none"> - Project final results to be present at 15ECEE in Istanbul, Turkey. - Final Project Findings to be published in Springer Book Series. It was agreed every leading to be responsible for writing a chapter for her own leading task. 	
Actions	Responsible	Deadline
15ECEE Conference Paper	Z. Gulerce / R. Salic	April 2014
Springer Book Series Chapter <i>Harmonization of the BSHAP Earthquake Catalogue</i>	Serbia Croatia	Nov. 2014
Springer Book Series Chapter <i>Strong Ground Motion Database and Ground Motion Prediction Models</i>	Macedonia Montenegro Turkey	Nov. 2014
Springer Book Series Chapter <i>Seismic Source Characterization</i>	Montenegro BIH Macedonia Albania	Nov. 2014
Springer Book Series Chapter <i>Probabilistic Seismic Hazard Assessment</i>	Albania	Nov. 2014
7. Other		
Conclusions Decisions	<p>7.1 Bosnia participation in the project.</p> <ul style="list-style-type: none"> - It was agreed that, if the Agreement with BIH Partner Country will not be signed in a several days, BIH participation in the project will be terminated. - Prof. Dr. Zoran Milutinovic overtook a responsibility to contact personally Mr. Samir Agic and try to find solution for BIH participation. - If the Agreement will not be signed, all participants agreed on expert engagement of Prof. Hrvatovic as independent Consultant to the Project. - Project/Project Participants will not interfere further in the internal BIH issues. 	

	7.2Country Borders - The maps to be presented in all project documents will contain only UN recognized state borders.	
Actions	Responsible	Deadline
Direct contact with Mr. Samir Agic, BIH (Assistant Minister)	Z. Milutinovic	20.10.2012
Independent Consultancy Contract with Prof. Dr. Hrvatovic (if the BIH participation will be terminated) <i>(5 out of 6 participating country Directors agreed on this action item)</i>	Z. Gulerce	01.11.2012

SfP NATO BUDGET TABLE

Please provide one sheet per Project Co-Director

ATTENTION: Project Co-Directors from NATO countries (except Bulgaria and Romania) are only eligible for NATO funding for items f-g-h !

Project number: SfP -	984374	Project short title: SfP -	Seismic Maps Harmonization II
Report date: 20 October 2012		Duration of the Project ¹ :	04.10.2012 - 04.10.2014
Project Co-Director:	Prof. Dr. Neki Kuka, Tirana, Albania		

Detailed Budget Breakdown <i>(to be completed in EUR³)</i>	ACTUAL EXPENDITURES	FORECAST EXPENDITURES		Comments on changes, if any, in the financial planning compared to the approved Project Plan
	from start until 30.09. 2012	(2) for the following six months	(3) for the following period until project's end	
(a) Equipment	0	4,000	4,000	
Subtotal "Equipment"	0	4,000	4,000	
(b) Computers - Software	0	2,000	0	
Subtotal "Computers - Software"	0	2,000	0	
(c) Training	0	0	2,500	
Subtotal "Training "	0	0	2,500	
(d1) Books and Journals <i>(global figure)</i>	0	0	0	
(d2) Publications <i>(global figure)</i>	0	0	0	
Subtotal "Books - Publications"	0	0	0	
(e) Experts - Advisors	0	0	0	
Subtotal "Experts - Advisors "	0	0	0	
(f) Travel	0	4,000	4,000	
Subtotal "Travel"	0	4,000	4,000	
(g) Consumables - Spare parts:	0	500	1,000	
Subtotal "Consumables - Spare parts"	0	500	1,000	
(h) Other costs and (i) stipends <i>(specify)</i> <i>Stipends</i>	0	0	0	
Subtotal "Other costs"	0	0	0	
TOTAL (1), (2), (3) :	0	10,500	11,500	
CURRENT COST OUTLOOK $= (1)+(2)+(3)$	22,000			

¹ Give month/year when the Project started and expected ending date. ² Choose the appropriate date and complete the year.

³ As of January 2002, grants are made in Euro (EUR) and all figures should be given in EUR.

SfP NATO BUDGET TABLE

Please provide one sheet per Project Co-Director

ATTENTION: Project Co-Directors from NATO countries (except Bulgaria and Romania) are only eligible for NATO funding for items f-g-h!

Project number: SfP -	984374	Project short title: SfP -	Seismic Maps Harmonization II
Report date: 20 October 2012		Duration of the Project ¹ :	04.10.2012 - 04.10.2014
Project Co-Director:	Prof.Dr. Hazim Hrvatovic, Sarajevo, BiH		

Detailed Budget Breakdown <i>(to be completed in EUR³)</i>	ACTUAL EXPENDITURES	FORECAST EXPENDITURES		Comments on changes, if any, in the financial planning compared to the approved Project Plan
	from start until 30.09. 2012	(2) for the following six months	(3) for the following period until project's end	
(a) Equipment	0	8,000	8,000	
Subtotal "Equipment"	0	8,000	8,000	
(b) Computers - Software	0	2,000	2,000	
Subtotal "Computers - Software"	0	2,000	2,000	
(c) Training	0	0	8,000	
Subtotal "Training "	0	0	8,000	
(d1) Books and Journals <i>(global figure)</i>	0	0	0	
(d2) Publications <i>(global figure)</i>	0	0	0	
Subtotal "Books - Publications"	0	0	0	
(e) Experts - Advisors	0	0	0	
Subtotal "Experts - Advisors "	0	0	0	
(f) Travel	0	1,000	9,000	
Subtotal "Travel"	0	1,000	9,000	
(g) Consumables - Spare parts:	0	500	1,000	
Subtotal "Consumables - Spare parts"	0	500	1,000	
(h) Other costs and (i) stipends <i>(specify)</i>	0	500	2,000	
Stipends				
Subtotal "Other costs"	0	500	2,000	
TOTAL (1), (2), (3) :	0	12,000	30,000	
CURRENT COST OUTLOOK $= (1)+(2)+(3)$	42,000			

¹ Give month/year when the Project started and expected ending date. ² Choose the appropriate date and complete the year.³ As of January 2002, grants are made in Euro (EUR) and all figures should be given in EUR.

SfP NATO BUDGET TABLE

Please provide one sheet per Project Co-Director

ATTENTION: Project Co-Directors from NATO countries (except Bulgaria and Romania) are only eligible for NATO funding for items f-g-h!

Project number: SfP -	984374	Project short title: SfP -	Seismic Maps Harmonization II
Report date: 20 October 2012		Duration of the Project ¹ :	04.10.2012 - 04.10.2014
Project Co-Director:	Assoc. Prof. Dr. Snjezana Markusic, Zagreb, Croatia		

Detailed Budget Breakdown (to be completed in EUR ³)	ACTUAL EXPENDITURES	FORECAST EXPENDITURES		Comments on changes, if any, in the financial planning compared to the approved Project Plan
	from start until 30.09. 2012	(2) for the following six months	(3) for the following period until project's end	
(a) Equipment	0	6,000	3,000	
Subtotal "Equipment"	0	6,000	3,000	
(b) Computers - Software	0	2,000	0	
Subtotal "Computers - Software"	0	2,000	0	
(c) Training	0	0	2,000	
Subtotal "Training "	0	0	2,000	
(d1) Books and Journals (global figure)	0	0	0	
(d2) Publications (global figure)	0	0	0	
Subtotal "Books - Publications"	0	0	0	
(e) Experts - Advisors	0	0	0	
Subtotal "Experts - Advisors "	0	0	0	
(f) Travel	0	4,000	4,000	
Subtotal "Travel"	0	4,000	4,000	
(g) Consumables - Spare parts:	0	500	500	
Subtotal "Consumables - Spare parts"	0	500	500	
(h) Other costs and (i) stipends (specify) Stipends	0	0	0	
Subtotal "Other costs"	0	0	0	
TOTAL (1), (2), (3) :	0	12,500	9,500	
CURRENT COST OUTLOOK = (1)+(2)+(3)	22,000			

¹ Give month/year when the Project started and expected ending date. ² Choose the appropriate date and complete the year.³ As of January 2002, grants are made in Euro (EUR) and all figures should be given in EUR.

SfP NATO BUDGET TABLE

Please provide one sheet per Project Co-Director

ATTENTION: Project Co-Directors from NATO countries (except Bulgaria and Romania) are only eligible for NATO funding for items f-g-h!

Project number: SfP -	984374	Project short title: SfP -	Seismic Maps Harmonization II
Report date: 20 October 2012		Duration of the Project ¹ :	04.10.2012 - 04.10.2014
Project Co-Director:	Asst. Prof. Radmila Salic, Skopje, Macedonia		

Detailed Budget Breakdown (to be completed in EUR ³)	ACTUAL EXPENDITURES	FORECAST EXPENDITURES		Comments on changes, if any, in the financial planning compared to the approved Project Plan
	from start until 30.09. 2012	(2) for the following six months	(3) for the following period until project's end	
(a) Equipment	0	9,500	9,500	
Subtotal "Equipment"	0	9,500	9,500	
(b) Computers - Software	0	2,000	500	
Subtotal "Computers - Software"	0	2,000	500	
(c) Training	0	0	6,000	
Subtotal "Training "	0	0	6,000	
(d1) Books and Journals (global figure)	0	0	0	
(d2) Publications (global figure)	0	0	0	
Subtotal "Books - Publications"	0	0	0	
(e) Experts - Advisors	0	0	0	
Subtotal "Experts - Advisors "	0	0	0	
(f) Travel	0	7,000	3,000	
Subtotal "Travel"	0	7,000	3,000	
(g) Consumables - Spare parts:	0	500	1,500	
Subtotal "Consumables - Spare parts"	0	500	1,500	
(h) Other costs and (i) stipends (specify)	0	500	2,000	
Stipends	0	0	0	
Subtotal "Other costs"	0	500	2,000	
TOTAL (1), (2), (3) :	0	19,500	22,500	
CURRENT COST OUTLOOK = (1)+(2)+(3)	42,000			

¹ Give month/year when the Project started and expected ending date. ² Choose the appropriate date and complete the year.³ As of January 2002, grants are made in Euro (EUR) and all figures should be given in EUR.

SfP NATO BUDGET TABLE

Please provide one sheet per Project Co-Director

ATTENTION: Project Co-Directors from NATO countries (except Bulgaria and Romania) are only eligible for NATO funding for items f-g-h!

Project number: SfP -	984374	Project short title: SfP -	Seismic Maps Harmonization II
Report date: 20 October 2012		Duration of the Project ¹ :	04.10.2012 - 04.10.2014
Project Co-Director:	Ms. Jadranka Mihaljevic, Podgorica, Montenegro		

Detailed Budget Breakdown (to be completed in EUR ³)	ACTUAL EXPENDITURES	FORECAST EXPENDITURES		Comments on changes, if any, in the financial planning compared to the approved Project Plan
	from start until 30.09. 2012	(2) for the following six months	(3) for the following period until project's end	
(a) Equipment	0	18,000	0	
Subtotal "Equipment"	0	18,000	0	
(b) Computers - Software	0	1,000	1,500	
Subtotal "Computers - Software"	0	1,000	1,500	
(c) Training	0	0	10,000	
Subtotal "Training "	0	0	10,000	
(d1) Books and Journals (global figure)	0	0	0	
(d2) Publications (global figure)	0	0	0	
Subtotal "Books - Publications"	0	0	0	
(e) Experts - Advisors	0	0	0	
Subtotal "Experts - Advisors "	0	0	0	
(f) Travel	0	3,000	5,000	
Subtotal "Travel"	0	3,000	5,000	
(g) Consumables - Spare parts:	0	500	1,000	
Subtotal "Consumables - Spare parts"	0	500	1,000	
(h) Other costs and (i) stipends (specify) Stipends	0	500	1,500	
Subtotal "Other costs"	0	500	1,500	
TOTAL (1), (2), (3) :	0	23,000	19,000	
CURRENT COST OUTLOOK = (1)+(2)+(3)	42,000			

¹ Give month/year when the Project started and expected ending date. ² Choose the appropriate date and complete the year.³ As of January 2002, grants are made in Euro (EUR) and all figures should be given in EUR.

SfP NATO BUDGET TABLE

Please provide one sheet per Project Co-Director

ATTENTION: Project Co-Directors from NATO countries (except Bulgaria and Romania) are only eligible for NATO funding for items f-g-h!

Project number: SfP -	984374	Project short title: SfP -	Seismic Maps Harmonization II
Report date: 20 October 2012		Duration of the Project ¹ :	04.10.2012 - 04.10.2014
Project Co-Director:	Mr. Vladan Kovacevic, Belgrade, Serbia		

Detailed Budget Breakdown (to be completed in EUR ³)	ACTUAL EXPENDITURES	FORECAST EXPENDITURES		Comments on changes, if any, in the financial planning compared to the approved Project Plan
	from start until 30.09. 2012	(2) for the following six months	(3) for the following period until project's end	
(a) Equipment	0	11,000	11,000	
Subtotal "Equipment"	0	11,000	11,000	
(b) Computers - Software	0	2,000	500	
Subtotal "Computers - Software"	0	2,000	500	
(c) Training	0	1,000	4,000	
Subtotal "Training "	0	1,000	4,000	
(d1) Books and Journals (global figure)	0	0	0	
(d2) Publications (global figure)	0	0	0	
Subtotal "Books - Publications"	0	0	0	
(e) Experts - Advisors	0	0	0	
Subtotal "Experts - Advisors "	0	0	0	
(f) Travel	0	4,000	3,000	
Subtotal "Travel"	0	4,000	3,000	
(g) Consumables - Spare parts:	0	500	1,000	
Subtotal "Consumables - Spare parts"	0	500	1,000	
(h) Other costs and (i) stipends (specify)	0	500	500	
Stipends	0	750	2,250	
Subtotal "Other costs"	0	1,250	2,750	
TOTAL (1), (2), (3) :	0	19,750	22,250	
CURRENT COST OUTLOOK = (1)+(2)+(3)	42,000			

¹ Give month/year when the Project started and expected ending date. ² Choose the appropriate date and complete the year.³ As of January 2002, grants are made in Euro (EUR) and all figures should be given in EUR.

SfP NATO BUDGET TABLE

Please provide one sheet per Project Co-Director

ATTENTION: Project Co-Directors from NATO countries (except Bulgaria and Romania) are only eligible for NATO funding for items f-g-h!

Project number: SfP -	984374	Project short title: SfP -	Seismic Maps Harmonization II
Report date: 20 October 2012		Duration of the Project ¹ :	04.10.2012 - 04.10.2014
Project Co-Director:	Asst. Prof. Dr. Zeynep Gulerce, Ankara, Turkey		

Detailed Budget Breakdown (to be completed in EUR ³)	ACTUAL EXPENDITURES	FORECAST EXPENDITURES		Comments on changes, if any, in the financial planning compared to the approved Project Plan
	from start until 30.09.2012	(2) for the following six months	(3) for the following period until project's end	
(a) Equipment	0	0	0	
Subtotal "Equipment"	0	0	0	
(b) Computers - Software	0	4,000	2,000	
Subtotal "Computers - Software"	0	4,000	2,000	
(c) Training	0	0	0	
Subtotal "Training"	0	0	0	
(d1) Books and Journals (global figure)	0	500	500	
(d2) Publications (global figure)	0	0	1,000	
Subtotal "Books - Publications"	0	500	1,500	
(e) Experts - Advisors	0	0	0	
Subtotal "Experts - Advisors"	0	0	0	
(f) Travel	0	3,000	9,000	
Subtotal "Travel"	0	3,000	9,000	
(g) Consumables - Spare parts:	0	0	1,000	
Subtotal "Consumables - Spare parts"	0	0	1,000	
(h) Other costs and (i) stipends (specify) Stipends	0	500	500	
Subtotal "Other costs"	0	500	500	
TOTAL (1), (2), (3) :	0	8,000	14,000	
CURRENT COST OUTLOOK = (1)+(2)+(3)	22,000			

¹ Give month/year when the Project started and expected ending date. ² Choose the appropriate date and complete the year.³ As of January 2002, grants are made in Euro (EUR) and all figures should be given in EUR.

SFP NATO BUDGET SUMMARY TABLE

Project number: SFP -	984374	Project short title: Sfp -	Seismic Maps Harmonization II			
Report date:	20.10.2012	Duration of the Project ¹ :	04.10.2012 - 04.10.2014			
The Project is in the year (please indicate): 1						
Breakdown per Project Co-Director (to be completed in EUR³)						
Project Co-Director's name, city, country	APPROVED BUDGET: Total year 1-5	CURRENT COST OUTLOOK: Total year 1 - 5	ACTUAL EXPENDITURES since start until 31.03. / 30.09. of current year ²	FORECAST EXPENDITURES for the following 6 months	for the following period until project's end	Comments on changes, if any, in financial planning compared to the approved Project Plan
Zeynep Gülerce	22,000	22,000	0	8,000	14,000	
Radmilla Salic	42,000	42,000	0	19,500	22,500	
Neki Kuka	22,000	22,000	0	10,500	11,500	
Hazim Hrvatović	42,000	42,000	0	12,000	30,000	
Snjezana Markusic	22,000	22,000	0	12,500	9,500	
Jadranka Mihaljevic	42,000	42,000	0	23,000	19,000	
Vladan Kovacevic	42,000	42,000	0	19,750	22,250	
TOTAL (must be identical with TOTALs given in 'Breakdown per item'):	234,000	234,000	0	105,250	128,750	

Breakdown per item (to be completed in EUR³)						
Project Co-Director's name, city, country	APPROVED BUDGET: Total year 1-5	CURRENT COST OUTLOOK: Total year 1 - 5	ACTUAL EXPENDITURES since start until 30.04. / 31.10. of current year ²	FORECAST EXPENDITURES for the following 6 months	for the following period until project's end	Comments on changes, if any, in financial planning compared to the approved Project Plan
(a) Equipment	92,000	92,000	0	56,500	35,500	
(b) Computers - Software	21,500	21,500	0	15,000	6,500	
(c) Training	34,000	34,000	0	1,000	33,000	
(d) Books - Publications	2,000	2,000	0	500	1,500	
(e) Experts - Advisors	0	0	0	0	0	
(f) Travel	63,000	63,000	0	26,000	37,000	
(g) Consumables - Spare parts:	9,500	9,500	0	3,000	6,500	
(h) Other costs and (i) stipends	12,000	12,000	0	3,250	8,750	
TOTAL:	234,000	234,000	0	105,250	128,750	

¹ Give month/year when the Project started and expected ending date. ² Choose the appropriate date and complete the year. ³ As of January 2002, grants will be made in Euro (EUR) and all figures should be given in EUR.