

**HARMONIZATION OF SEISMIC HAZARD MAPS
FOR THE WESTERN BALKAN COUNTRIES
BSHAP**

(SfP Project Number 983054)

APRIL Progress Report - 2009

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1. LIST OF ABBREVIATIONS USED IN THE PROJECT PLAN

ARSO	Environmental Agency of The Republic of Slovenia
DTM	Digital Terrain Model
DEMA	Danish Emergency Management Association
EC	European Commission
GIS	Geographical Information System
GPS	Global Positioning System
IGEO	Institute of Geosciences, Tirana, Albania
IPR	Intellectual Property Right
IZIIS	Institute of Earthquake Engineering and Seismology at the University "Ss. Cyril and Methodius", Skopje, FYR Macedonia
METU	Middle East Technical University, Ankara, Turkey
MSO	Montenegro Seismological Observatory
MSK	Scale of Seismic Intensity (Medvedev-Sponhouer-Karnik)
PGA	Peak Ground Acceleration
GMP	Ground Motion Prediction
PSHA	Probabilistic Seismic Hazard Analysis

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3. BACKGROUND AND OBJECTIVES

During past centuries, the southern part of Europe has been devastated by a great number of large earthquakes, resulting in human victims and enormous material loss. Because of intensive building construction and increasing urban population density for the last two decades, the current consequential effects of such disastrous events would be even more drastic. It is therefore, of great importance to assess the seismic hazard properly, raise public awareness and improve disaster planning and management in the whole region.

Besides exceptional willingness and cooperation of the participating countries, in developing of this Project the most important role acted Disaster Preparedness and Prevention Initiative (DPPI) of the Stability Pact for South Eastern Europe. DPPI recognized possibility to, through launching of this Project, introduce necessary, basic steps towards the complex seismic risk management process in this region. DPPI organized four Project Working Group meetings (Macedonia, Albania, Montenegro and Serbia) for the purpose of elaboration, preparation of the Project Proposal Plan.

The main objective of the Project is the preparation of new seismic hazard maps of the region using modern scientific methodologies that will ensure harmonization within the region as well as with the European standards. The fact that current seismic provisions have been updated in early 1980-is (practically in all of participating countries) underlines an evident need to upgrade these technical norms. The foreseen logical step is harmonization with EU standards (EUROCODE 8), what impose the seismic hazard harmonization as the first step towards.

Another important objective of the Project is to improve scientific collaboration between the project partners. Enhancement of joint cooperation and coordination in the field of seismic hazard will provide an important step towards preparedness and prevention activities in disaster management. Through lecturing of invited experts in seismic hazard related topics introduction of the state of the art of methodology will be achieved as well as the training of young scientists. Also, the project deliverables will help achieving the deployment of new seismic instruments in the participating countries and foster real time data exchange between national seismic networks.

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 this Project results using it to estimate seismic risk at certain region/location. Consequently, civil protection agencies should risk prevention, preparedness and mitigation measures. Direct users of Project results should be structural engineers, earthquake engineers, and physical planers in the whole region.

4. PROJECT STRUCTURE AND ACTIVITIES

MILESTONES, DELIVERABLES AND SCHEDULE: SfP 983054

		1 st year				2 nd year				3 rd year			
Milestone:		1-3	4-6	7-9	10-12	1-3	4-6	7-9	10-12	1-3	4-6	7-9	10-12
Month no:		X-XII	I-III	IV-VI	VII-IX	X-XII	I-III	IV-VI	VII-IX	X-XII	I-III	IV-VI	VII-IX
Month:		X-XII	I-III	IV-VI	VII-IX	X-XII	I-III	IV-VI	VII-IX	X-XII	I-III	IV-VI	VII-IX
1.	Compilation of earthquake catalogue data												
	1.1. Earthquake catalogue completion												
	1.2. Unification of magnitude scale												
2.	Seismic source modeling												
	2.1. Seismotectonical elaboration												
	2.2. Recurrence of earthquakes inside the identified seismic sources												
	2.3. Modeling of seismic sources using smoothed seismicity approach												
3.	Determination of GMP models												
	3.1. Investigation of available GMP models												
	3.2. Comparison of results from different GMP models												
4.	Seismic hazard assessment												
	4.1. Preparation and testing of input database												
	4.2. Computation of hazard probabilities												
5.	GIS implementation												
	5.1. Preparation of GIS background and thematic maps												
	5.2. Elaboration of hazard GIS maps												
6.	Equipment purchase and deployment												
7.	Software purchase												
	7.1. Accelerogram analysis software												
	7.2. GIS software												
	7.3. Alternative hazard computation software with limited license												
8.	Project coordination activities, issuing information and results in the Project												
	8.1 Web site preparation												
	8.2 Web maintenance, Workshops, coord. and dissemination of the results												
	8.3. Presentation and dissemination of the final hazard results												
9.	Training of young scientists												
Deliverable		Web site of Project			Depl. instruments & Completed Earthq. catalogue	Determined GMP		Determined alternat. source models		GIS background maps		Seismic hazard maps in GIS form	
Reporting	as planned progress		1st Progress Report		2nd Progress Report		3rd Progress report		4th Progress Report		5th Progress Report		Final Report

5. TECHNICAL PROGRESS

A) MONTENEGRO

A.1 Major Accomplishments

On October 2nd 2007, for the purpose of bringing the Project objectives to the attention of public, Montenegro Seismological Observatory in coordination with NATO Sfp Office successfully organized the Project kick off Meeting in Podgorica, Montenegro. As the leading project partner, MSO, coordinates Project activities, prepares workshop agendas, Minutes of the meetings and finalizes the Six-month reports.

At the very beginning of the Project realization, MSO established a dedicated Web presentation (www.wbseismicmaps.org). The web is continually maintained and updated with all project-relevant information and documents.

Representatives and involved personnel of MSO actively participated to all project workshops: Ig, Skopje and Dubrovnik and Budva. The major activities realized through and besides these workshops have been as follows:

Compilation of national earthquake catalogue (earthquakes occurred on the territory of Montenegro and surroundings) with threshold magnitude 3.0. Later on the national catalogue has been reexamined and filled in with additional catalogue data got through collaboration with NEREIS project.

All relevant data on seismotectonics related to the Montenegro territory and surrounding area have been investigated and presented.

Preliminary results of seismic hazard using OHAZ software had been presented at Skopje workshop. As the input data MSO national catalogue, solely, has been used. Output results have been graphically presented and the influence of catalogue filtering and involvement of seismotectonic file in the hazard calculation was discussed.

The process of international bidding for the Project related purchase of equipment was successfully ended. The procurement of instruments for the MSO is late: the 50% of advance is already paid through NATO. The final postponed deadline for instrument delivery was stated as midst of April. The delivery term is still not definitely clear although the vendor provide information that the shipment will be sent in short time. In the mean time, the land property right for one seismic (and geodynamic) station on Dracevica, municipality of Bar, is resolved and site construction work is done. For the second purchased instrument - field observation of convenient site for one station as well as the negotiations on property issues are in progress. The third instrument will be placed into existing shelter of civil protection service.



Dracevica seismic and geodynamic station: construction work and GPS permanent antenna

As the donation of DEMA the purchase of one permanent GPS station was realized. Planned seismological station will be additionally supplied by permanent GPS antenna: earth crust deformations will be continuously measured for the purpose of better understanding of seismotectonical movements and development of regional geodynamical model. While expecting the delivery of seismological station, five months ago the GPS station was placed on alternative position, Martinicko Gostilje,

municipality of Danilovgrad, and became operable. Through national contribution the permanent GPS instrumentation for the seismic and geodynamical station Dracevica is already bought and installed.



Martinicko Gostilje geodynamic station

In the frame NATO SfP Project No. 983054 all involved institutions, wishing to establish cooperative mutual relations, especially to interchange seismic data, signed *The Protocol on Multilateral cooperation in seismic Data Exchange*. According to suggestions and agreements made on Dubrovnik WS, The Protocol document was prepared by MSO. The capacities of the MSO have been broadened so to make possible real-time seismic data exchange.

In December 2008, MSO organized Workshop in Budva, Montenegro. The main topics discussed were the problems of late delivery of purchased instrument and coordination of project future activities. In the previously arranged frame of references, the *Protocol on multilateral cooperation in further developing the OHAZ software* was signed among MSO (on behalf of the BSHAP Project) and Institute of Geosciences of Polytechnic University of

Tirana, Albania and Environmental Agency of Republic of Slovenia, Ministry for Environment and Spatial Planning, Slovenia (as the owners of source code of OHAZ software). Later on, MSO undertook further activities on improvement of the OHAZ in respect of implementing new PGM formulas and extending software dynamic memory. Further Help development should be implemented. The cooperation in implementation of new PGM formula between ARSO, IGEO and MSO is intensive.

According to gained experience and agreement with other partner institutions the GIS software MapInfo Professional 9.5 has just been purchased.

A.2 Actions to insure the implementation of results

For the purpose of future implementation of results of the project Co-Director Prof Glavatovic took part in the Meeting related to the putting EUROCODES into practice. Meeting was organized by University of Montenegro, Civil Engineering Faculty in Podgorica. Prof Glavatovic informed the engineering community about the major objectives of The NATO SfP 983054 and its importance for the tailoring of EUROCODE 8. Also, the similar information was issued on the Annual Assembly of Montenegrin Association for Earthquake Engineering held in Podgorica on May 9th, 2008. The draft of *Strategy of civil Construction in Montenegro till 2020* put the *Euro codes* introduction as one of the primarily goals. The necessity of preparation of National Annexes is underlined, especially regarding the implementation of *Euro code 8*, what is in direct relation to goals of BSHAP Project.

MSO is regularly cooperates activities with the Emergency Management Sector of Ministry of Interior related to issues of seismic risk management. In February 2009, for the needs of this Sector Ms Jadranka Mihaljevic, civil eng., prepared *Seismic Risk Study for Montenegro*.

A.3 Milestones for the next six months

Within the next months the deployment of purchased instruments should be realized. Three broad band and accelerometric seismic stations should be tested, calibrated and integrated in existing seismic network. The first results of analysis of Earth crust kinematic monitoring data obtained by permanent GPS station Martinicko Gostilje will be presented.

Finalization of regional unique, compiled earthquake catalogue should be over. The contributing part of Montenegro catalogue has be already prepared. Comparison of different GMP formula for the Western Balkan region should be investigated.

By the end of April, according to gained experience and agreement with other partner institutions the common GIS "Map Info Professional 9.5" training will be finished. GIS will be implemented in creation of Project related thematic maps, starting with earthquake catalogue data and maps of seismotectonics.

The EZ FRISK program for seismic hazard computation will be purchased so to familiarize with the main features of software and format input data accordingly.

A.4 Involvement of young scientists

In the time period from the beginning of the project three young scientists were involved in the realization of the project activities.

Ms. Ljiljana Vucic, Mathematician assistant researcher, has prepared the Web presentation for the Project, and maintains it as the permanent task. With respect to *the Protocol on Multilateral cooperation in seismic Data Exchange* Ms Vucic is the nominated liaison officers in charge of coordinating the activities listed in the areas of cooperation. Nowadays, new connections and collaboration in this field has been established with: MEDNET, Italy, Slovenia, Croatia, Macedonia, Bosnia and Herzegovina, Bulgaria and Greece.

Ms. Jadranka Mihaljevic, civil engineer, has participated on all Workshops dedicated to the Project. In the second workshop in Skopje she presented the first results of OHAZ software implementation to the seismic hazard assessment for the territory of Montenegro. The resulting differences of output hazard, depending on earthquake catalogue filtering, have been emphasized. The appropriate format of seismotectonic model for Montenegro was also presented. The model itself was developed using neighboring Albanian seismotectonic model (presented in Ig Workshop) as well as already known geological, seismic and seismotectonics data gathered through basic study of Survey of Seismicity of the Balkan region (1974), as well as newly gathered in the COST Action 625 Project "3-D monitoring of active tectonic structures in the Peri-Adriatic Region". Croatia (Sept. 2007). On behalf of the Montenegro as the Project leading country, Ms. Mihaljevic presented the current state of the Project realization on XV DPPI SEE Regional Meeting held in October 2008, Zagreb. Also, in the role of the invited key-speaker she participated on "*Seminar for Experts and Senior Managers on NATO Standards and Project Evaluation Procedures, focusing on Hydro-Meteorological aspects*" that was organized by DPPI. Ms. Mihaljevic is the person in charged for the coordination and preparation of Six month reports.

In coordination with local UNDP office, the training of involved MSO personnel and young scientists (Mr. Gavranovic, Ms. Kaludjerovic, Ms. Mihaljevic, Ms. Vucic) for the GIS has been conducted in November 2008, what fits to Project plan of GIS implementation.

Six day training of young scientists Ljiljana Vucic and Natasa Kaludjerovic of the introductory course into Bernese GPS Software, including lectures on Global Navigation Satellite Systems, was realized in Bern, Switzerland in January 2009. The training was realized for the purpose of putting into practice permanent GPS data observations, analysis of obtained kinematical parameters and consequently, determination of geodynamic model of the region.

A.5 Major travel

Major travels were related to participation to Project related workshops: Ig, Slovenia (7-9 November 2007) and Skopje, Macedonia (17-18 December 2007) and Dubrovnik (26-27 March 2008) Also, in the role of project leading country, MSO representatives traveled to Zagreb, Croatia (20-22 February) ("Seminar for Experts and Senior Managers on NATO Standards and Project Evaluation Procedures, focusing on Hydro- Meteorological aspects") as well as to Brussels to NATO Forum on Environmental Security. Few domestic travels were realized for the purpose of site investigation for the placement of new seismic stations, as well as the workshop organized in Budva.

A.6 Visit by experts/advisors and NATO consultant

As the guest expert from Slovenia, Agency for Environment, Mr. Mladen Zivcic has been invited to Podgorica for the occasion of Official Launching of the Project.

A.7 Visibility of SfP project

For the purpose of visibility of the Project, the Web site: www.wbseismicmaps.org was dedicated to the Project following the NATO SfP existing recommendations. Besides ongoing and planned activities related to the Project, important document on outcomes, all necessary links to participating institutions, as well as to NATO SfP Programme are available. Web presentation is developed and hosted by Montenegro Seismological Observatory.

For the purpose of focusing the national and international attraction the event of Official Launching of The Project was held in Podgorica on October 2nd 2007, (<http://www.wbseismicmaps.org/Events.htm>) with the participation of distinguished guests from NATO SfP Programme, DPPI, diplomatic chore, as well as Montenegro Government representatives and ministries. The event itself was preceded by reports of all major national media: newspapers and TV.

A special March addition Security of daily news *Vijesti*, which is financed by the British Council, was dedicated to the objectives and significance of the Project.

The importance of collaboration within the NATO SfP Project No 983054 is emphasized on several occasions as the good example of streaming of Montenegro towards Euro-Atlantic integrations.

A.8 Technical and administrative difficulties

All technical and administrative difficulties related to establishing of dedicated banking account and tax-free exoneration were successfully resolved. The lack of information and prolongation of delivery of purchased instruments is blocking the planned installation of seismic stations.

A.9 Changes in personnel

Ms Natasa Kaludjerovic, BS of Physics, employee of MSO, has been involved as the Project participant.

A.10 Changes in project plan

A special attention was paid to procurement and selection of necessary seismic equipment. Having in mind the significant improvements of acquisition system that MSO undertook during the summer of 2007 and at the beginning of the current year, specific needs to improve capacity and performance of MSO seismic network were

more precisely defined. In that sense, the final decision regarding the purchase of seismic instruments was, as it has been stated in the justification of procurement.

B) ALBANIA

In the period October 2008-March 2009, the Institute of Geosciences (IGEO) of the Polytechnic University of Tirana, was focused on the following issues:

1. Compilation of the Albanian earthquake catalogue for the period 2000-2008 with $M_L \geq 3.0$.
2. Preparation of two presentations for the Budva workshop, regarding the probabilistic seismic hazard methodology and the related software, as well as their application in Albania in the last years.
3. Purchase of the seismological equipments.
4. Compilation of other relevant data and preparatory work for installation of the seismological equipments.

B.1 Major Accomplishments

Two catalogues of Albanian earthquakes have been previously prepared by the Albanian working team:

1. Catalogue of Albanian earthquakes with $M_s \geq 4.5$, for the time period 58BC-2006, sent on November 28, 2007. This catalogue includes earthquakes occurred within the area with geographical coordinates 39.00-43.00N and 18.50-21.50E. Part of this catalogue, covering the period 58BC-1964, includes earthquakes occurred within the area with coordinates 38.50-43.00N; 18.50-22.50E.

The catalogue includes in total 667 earthquakes, from which 450 are main shocks assigned the code 1, and 117 earthquakes are for/aftershocks assigned the code 0. The catalogue sources, reported magnitudes and its completeness are given too.

2. Catalogue of the Albanian earthquakes with $M_L \geq 3.0$, for the time period 1964-2000, sent on December 10, 2007. The catalogue contains 19453 events; from which 14818 events has computed magnitudes based on Albanian Seismological Network (ASN) data. Events occurred within the area with geographical coordinates [38.028-43.854N; 18.024-22.00E]. Reported magnitudes and references are given for this earthquake catalogue.

A new catalogue of the Albanian earthquakes for the period January 2000–December 2008 was prepared also in terms of $M_L \geq 3.0$. This catalogue comprises events occurred within the area with geographic coordinates 38.50-43.00N; 18.50-22.50E.

The Albanian specialists participated actively in the Budva workshop, dedicated to the coordination of project future activities. They presented their experience regarding to probabilistic seismic hazard methodology and the related software, and the results of several years dealing with the seismic hazard assessment of Albania. Compilation of a homogeneous earthquake catalog, by expressing the size of the earthquakes in a unified magnitude scale is the first step in the PSHA. Because most of PGM models proposed recently (Akkar & Bommer 2007, NGA models 2008, etc.) use the moment magnitude, M_W , it is indispensable to have a unified catalogue in terms of M_W .

For this reason, regression analysis is carried out to estimate the correlation between M_W , and M_L magnitudes reported by Podgorica, Tirana, Skopje and Thessaloniki. M_W

corresponding to the events used in the relevant datasets are taken from Harvard CMT catalog and RCMT catalogs from INGV and ETHZ. We think, similar relations for other countries involved in the BSHAP project can be derived and used for the compilation of a homogenous earthquake catalogue in terms of M_w , for Western Balkan region.

Because, some new updated PGM models proposed the last years for the European region (Berge-Thierry et al, 2003: Journal of Earthquake Engineering, Vol. 7, No. 2 (2003), pp. 193-222; Bindi et al., 2009: Bull. Earthquake Eng, Towards a new reference ground motion prediction equation for Italy - update of the Sabetta-Pugliese (1996), published online 10 March 2009) use M_S magnitude scale, it would be very useful that the homogenous catalogue compiled for Western Balkan to be also in terms of M_S , apart M_L and M_W .

The IGEO (Albania) and ARSO (Environmental Agency of Republic of Slovenia, Slovenia), as co-owners of the source code of OHAZ software), agreed to make it available for the other partners of the BSHAP project, and signed the *Protocol on multilateral cooperation in further developing the OHAZ software* with MSO on behalf of the BSHAP Project.

In the framework of NATO SfP BSHAP Project 983054, and taking into account the mutual interest for seismic data exchange between partners (improvement of epicenter determination in the border regions), IGEO has signed *The Protocol on Multilateral cooperation in seismic Data Exchange*. In order to fulfill its obligations undertaken in the context of this protocol, in the period November 2009 – December 2009, IGEO capacities have been broadened so to make possible real-time seismic data exchange. The new monitoring center in the Institute Central building has been equipped with a number of PC and servers, all dedicated to the acquisition and elaboration of seismic data. IGEO has established the real-time seismic data exchange with INGV (Rome) and Thessaloniki University, which run the same data acquisition system (Nanometrics). IGEO is trying to contact GEOFON team in order to get the SeisComp software, which seems to be the only available tool for exchange of seismic data through SeedLink protocol with the Institutions involved in the BSHAP project. A particular contribution to the data exchange between neighboring countries resulted also from the EU project (CoSEESNet, A Collaborative South East Europe Seismic Network: "Towards Early Warning System and Real Time Seismic Monitoring in South East Europe").

The strong motion instruments are ordered from Guralp Systems Ltd., consisting of 8 CMG-5T Strong Motion Sensors and 10 CMG-5TD Strong Motion Sensor System consisting of CMG-5 accelerometer and CMG-DM24 modules, at the total cost of \$ 64,967.50. So, IGEO successfully finished the process of equipment purchase, but IGEO has administrative problems related to tax-free exoneration not yet resolved. IGEO has developed an extensive correspondence with the NATO and Albanian Custom authorities in order to resolve this question, and we hope to resolve it within this month.

According to the agreement with other partner institutions involved in the BSHAP project, the GIS software - MapInfo Professional 9.5 and MapInfo Vertical Mapper - are ordered.

B.2 Actions to insure the implementation of results

The probabilistic seismic hazard map, that is the major objective of the project, shall be adopted by the Albanian authorities as National Annex for the new design standard conform Eurocode 8. IGEO staff is working with the relevant Directorate in the Ministry of Construction for the formulation of the necessary actions that will comprise the relevant Albanian Institutions for the EC8 implementation in our country.

B.3 Milestones for the next six months

Within the next months the deployments of the strong motion instruments should be performed. The process of tax-free exoneration shall be concluded and some other actions related to the land property rights, measurements and selection of sites and houses (structures) shall be concluded.

By the end of April, training of two young scientists for the common GIS software selected for the BSHAP project needs (MapInfo Professional 9.5 and MapInfo Vertical Mapper) will be finished. After that and software installation, we will start in creation of the project related thematic layers.

B.4. Involvement of young scientists

Two young researchers, Dr. Enkela Begu - GIS specialist, and Msc. Irena Ymeti - Remote Sensing specialist, have been involved in the project. The two above mentioned specialists will take part in the GIS training course (MapInfo) in Serbia, and later on they will be involved in the activities for project results visualization. Furthermore, Dr. Begu was involved in the preparation of the presentation in the framework of the "Week of technological, scientific and University cooperation Italy-Albania" entitled "Monitoring infrastructure of the Institute of Geosciences" (Tirana, November, 2008).

B.5 Major travels

Major travels were related to participation to the Project related workshops: Ig, Slovenia (7-9 November 2007), Skopje, Macedonia (17-18 December 2007), Dubrovnik, Croatia (26-27 March 2008) and Budva, Montenegro (16-17 December 2008).

B.7 Visibility of SfP project

A paper dedicated to the NATO Science for Peace and Security Project No 983054 "Harmonization of Seismic Hazard Maps for the Western Balkan Countries", and entitled "The NATO and Albanian Seismology" was published by Prof. Shyqyri Aliaj in Albanian Newspaper "Albania", February 27, 2008 (in Albanian).

B.8 Technical and administrative difficulties

Administrative difficulties have been encountered regarding to the tax-free exoneration of the seismological equipments delivered by the NATO SfP 983054 project. The administration of IGEO is making intensive efforts to resolve the question.

The other technical and administrative difficulties, related to the bank account transfer from the former Co-Director Prof. Aliaj to the new Co-Director, were successfully resolved.

B.9. Changes in personnel

On 1/01/2008, a new research institute – Institute of Geosciences (*IGEO*), started its activity based on a decision of the Albanian Government (VKM No. 561, date 22/08/2007). IGEO includes the former Institute of Seismology of the Albanian Academy of Sciences and some research units of Albanian Geological Survey (geology, geophysics, geoinformation technologies). The Institute of Geosciences is a national research unit that operates under the umbrella of the Polytechnic University of Tirana. According to the above mentioned decision, all the assets and

activities of the former Institute of Seismology, including projects and bilateral contractual agreements, are now transferred to the new Institute of Geosciences.

After retirement of the former Albanian Co-director, Prof. Shyqyri Aliaj, and his resign from the Co-Director function for the Albanian partner, the new Director of the IGEO, Prof. Ismail Hoxha, expressed his interest to take over the Co-Director function for the Albanian partner into the NATO SfP 983054 project, and also his engagement to fulfill all the agreements that comply the project objectives. The necessary documents were sent to the NATO SfP project authorities, and we received their official approval. The Albanian Project team was reorganized, in order to fulfill the related BSHAP project activities. Prof. Neki Kuka, Head of Department of Geoinformation Technologies in IGEO, was involved in the BSHAP project.

C) BOSNIA AND HERZEGOVINA

C.1 Major Accomplishments

In the past eighteen months period (October 2007 to April 2009), Seismological Survey of Bosnia and Herzegovina conducted tasks consistent to the methodology, project structure and activities of the approved Project Plan.

Even we conducted all our best efforts in fulfillment planned tasks and activities, our work on the Project were significantly obstructed by the long delay in seismic equipment delivery, provided through the Project from a vendor Geotech!

Even the deadline for equipment delivery expired for more than eight month we still do not have reliable guarantees that Geotech will keep their (one in line) promise and finally deliver us equipment until the end of April.

For this equipment NATO paid 50 % advance (52244 \$) in mid of May of 2008. Additional payment will be done in much WORST finance situation for us, regarding a much worst EURO – US dollar co-relation, and that might be a cause of additional (finance) problems!

This fact, also, may have significant influence on the Project on the other way and make us to “overlap” deployment of the equipment with training and education of young experts (MapInfo software providing and training) and other planned activities on the Project.

The main objectives of the Project for this eighteen months period are as follows:

- Equipment purchase and deployment.
- completion of the National earthquake catalogue consisting of verified data as
- one of the most important steps in seismic hazard assessment.
- Strengthening of co-ordination and work on Project of two seismic institutions
- Creating pre-conditions for unique seismic network (with two centers)
- Strengthening of professional capacities of (two) seismic institutions in B&H

To fulfill this goal we organized several meetings among representatives of both seismic institutions, and established principles of common work (of both institutions) on the national earthquake catalogue consisting of verified data, data exchange (among institutions) and joint efforts on developing a future unique seismic network with two (main) centers, as described in Project DIRECTE, to be developed.

Within the working package (section 7 of the Project Plan), the participants from Bosnia and Herzegovina finished following tasks: survey of available catalogues of both seismic institutions; unifying of catalogues of both seismic institutions, re-assessment of historical earthquakes and fulfillment of missing data; investigation of the national catalogue completeness according to $M_{min} = 2.5$ and magnitude scales; investigation of possibilities for an unification of magnitude type.

As part of equipment purchase efforts, we decided to accept Geotech offer as the very best and in accordance with existing stations and analysis software of both seismic institutions.

Improvement of an existing seismic station network in the region and real time data exchange is another important objective of the Project.

One of the (major) achievements in a first six months was a meeting with donators (to be) from the Slovak Republic.

Under mediations and facilitation of our Serbian hosts in Belgrade (in December 2007-th) was organized a meeting, in order to provide donation of Slovak Aid for both participating seismological institutions from Bosnia and Herzegovina.

On that meeting is defined a main goals of the future Project (DIRECTE). That are development of infrastructure for rapid earthquake data collection and exchange in the Bosnia and Herzegovina composed of the eight new seismic stations network. It was agreed that the Project within Slovak Aid plan will be prepared by the Slovak partner and that the Project proposal should be complementary to the activities of the NATO Project SfP – 983054. *As for now, we still have NO valid information from the Slovak partners about it.*

C.2 Actions to insure the implementation of results

Providing a consistent background is one of the main objectives of the Project. For that purpose we undertake activities on involving Federal Geological Institute - Sarajevo in Project. This institution developed most recent and most updated Map of Hazard, based on (it's own) Geological survey and catalogue of earthquake of seismic institution of Federation of BiH.

Mr. Hazim Horvatovic, Head of Federal Geological Institute – Sarajevo expressed a wish to his institution participate in the Project.

We also, provide all necessary back up, from Ministry of Civil Affairs and Council of Ministers of B&H, aiming to fulfill all obligations of Bosnia and Herzegovina, regarding administrative, finance and other kinds of support to the this Project.

C.3 Milestones for the next six months

According to the Project Plan, in the next six months period, following tasks should be achieved:

- equipment deployment
- networking; (among institutions and other partners in Project)
- further activity in additional founding and institutional contribution to the Project.
- investigation of the existing geological, neo tectonic, remote sensing and other relevant data in the Bosnia and Herzegovina and surrounding regions for the purpose of seismic source determination (in co-operation with Federal Geological Institute – Sarajevo)
- education and training of the young experts

C.5 Major travel

Four participants from Bosnia and Herzegovina attended the first workshop on November 2007 in Ig, Slovenia. Benefits of first workshop were in terms of presentation of different experiences in preparation of input earthquake catalogue data, treatment of historical earthquakes, as well as presentation of participating countries reports, and in to the training in OHAZ software as an appropriate tool for the fast seismic hazard assessment. The software was tested on preliminary prepared national catalogues.

Mr. Amer Zoranic traveled in Belgrade (December 2007) on a meeting with possible Slovak donors, in order to provide donation of Slovak Aid for both

participating seismological institutions from Bosnia and Herzegovina inside of the future Project (DIRECTE). (All travel costs were covered by Ministry of Civil Affairs of BiH).

One participant attended the second workshop on December 2007 in Skopje, Macedonia. First day session offered an opportunity to find out about state of the art in seismological investigation of Bulgarian and Romanian institutions. Some preliminary conversation has been negotiated with Bulgarian colleagues about possible future cooperation. Also, we have learned valuable information from Prof. Akkar about most recent researches related to strong motion records and prediction formulas. Second day session participants heard more about OHAZ software from Slovenian colleagues. It was further discussed about instrument minimum requirements and bid details; technical suggestions concerning earthquake catalogue contents and policy suggestions concerning usage and modalities of publishing of the final catalogue.

Three participants attended the Workshop in Dubrovnik March 26-27-th. The workshop was dedicated to analysis of seismic instrument bid. The letter of request to provide technical documentation and quotation for instruments was issued by the NPD as result of Skopje Workshop and previous agreement among Co-Directors. The *Guralph* proposal was found most attractive in eyes of most participants. Also, Prof. Marijan Herak from Croatia presented the First progress report on unification of earthquake catalogue.

Four participants attended the Workshop in Budva (Becici) in Montenegro, on 15-18-th December 2008. The workshop was also regarding a question of long delay in seismic equipment delivery of a vendor Geotech, but main activities were tightly connected with further work on Project, as planned. Also, Prof. Marijan Herak from Croatia presented the new progress report on unification of earthquake catalogue.

C.8 Technical and administrative difficulties

During this eighteen months period of time many of technical and administrative difficulties occurred, mostly because of different administrative and financial procedures between NATO and Bosnia and Herzegovina.

However, most of (if not ALL) these administrative and financial difficulties were successfully resolved and created conditions for a further successful work on Project of all participants.

C.9 Changes in personnel

As far as it was no changes in personnel, but we are creating additional possibilities for involvement of new personnel and young researchers in the Project.

C.10 Changes in Project plan

No significant changes in the Project plan were undertaken. Our intention to use all available money in order to provide as much as possible of seismic equipment is in accordance with Project plan.

D) CROATIA

A.1 Major Accomplishments

During the previous time of project realization, Croatian participation in the project was mostly oriented to earthquake catalogue compilation and completion. Croatian team is merging and compiling all the catalogues together.

A.1.1 Process of verification and completing of Croatian catalogue

Process of verification and completion of the catalogue has been continued. Main accomplishments are completion of the catalogues: earthquake catalogue for 2006 - that is now complete, as well as the first iteration of completion of 2007 catalogue.

A.1.2 Process of compiling the catalogues

So far submitted available catalogues are as follows (Fig. 1):

- Albanian catalogue, containing earthquakes from year 58-2000, and no magnitude threshold
- Bosnia and Hercegovina's catalogue, containing earthquakes from 306-2006, and magnitude threshold 3.5
- Croatian, containing earthquakes from 373 BC – 2008 and no magnitude threshold
- Macedonian catalogue, containing earthquakes from 479 BC – 2005 and magnitude threshold 2.9
- Montenegrin catalogue, containing earthquakes from 1444 – 2008 and magnitude threshold 3.0
- Declustered Serbian catalogues with treshold magnitude 3.6
- Romanian catalogue, containing earthquakes from 984 – 2006 and no magnitude threshold.

Additional catalogues that were used are ANSS Catalogue, Shebalin et al. (also known as 'Leydecker catalogue').

During the Budva Work shop Prof. Marijan Herak elaborated the current state of the compilation of the national earthquake catalogues. The missing catalogue from Serbia was delivered just before the Meeting. The preliminary results of de-clustering and completeness investigation imposed to this catalogue (in the same methodology as used to other catalogues previously) shows the inconsistency in de-clustering. Also, the threshold magnitude of 3.6 is significantly higher than in other national catalogues. The completion of catalogues will continue by adding the last year's national catalogues.

The earthquake events are represented by local magnitude type as it was agreed before. The ways to convert this type of magnitude into more useful (from the stand point of recent ground motion prediction models) moment magnitude was discussed. The supplement to this discussion – a scientific paper (*Empirical global relations converting MS and mb to moment magnitude, E.M. Scordilis, Journal of Seismology (2006) 10: 225–236*) related to this question are made available, under the *Downloads*, on the Project Web page.

Catalogues were first declustered, merged and multiplets removed. Declustering was done by spatial – temporal windowing. The important assumption was that all magnitudes were taken as M_L .

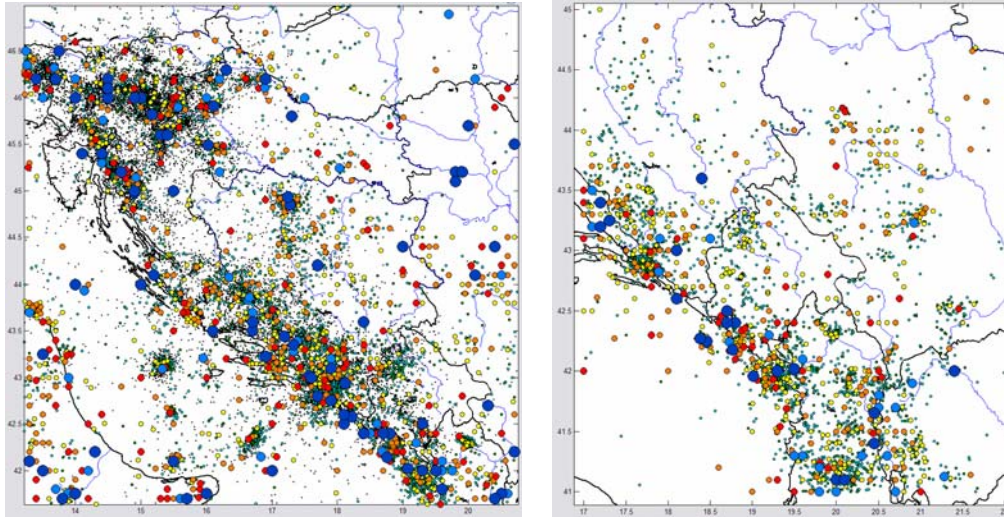


Figure1. *Epicentres from the Croatian (top) and Montenegrin earthquake catalogues, as submitted*

Epicenters from the unified mainshock catalogue are shown in Figure2. This was done without manual checks of the data. It will have to be done as soon as all catalogues will be included. Analyses of completeness were performed for each country separately as a check, and for the whole region.

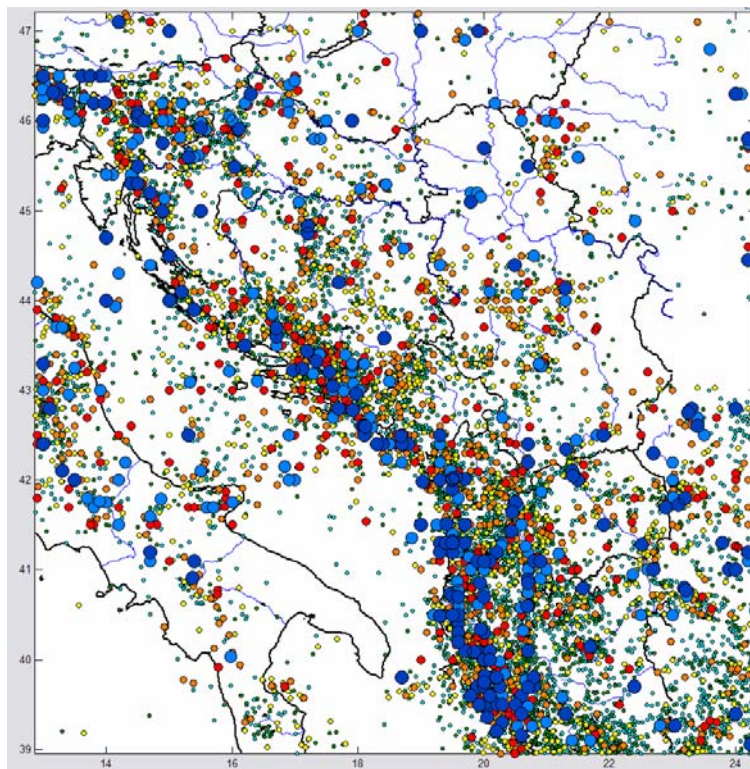


Figure 2. *Unified mainshock catalogue*

Maps showing completeness threshold were also computed, and two examples are presented in Fig. 6.

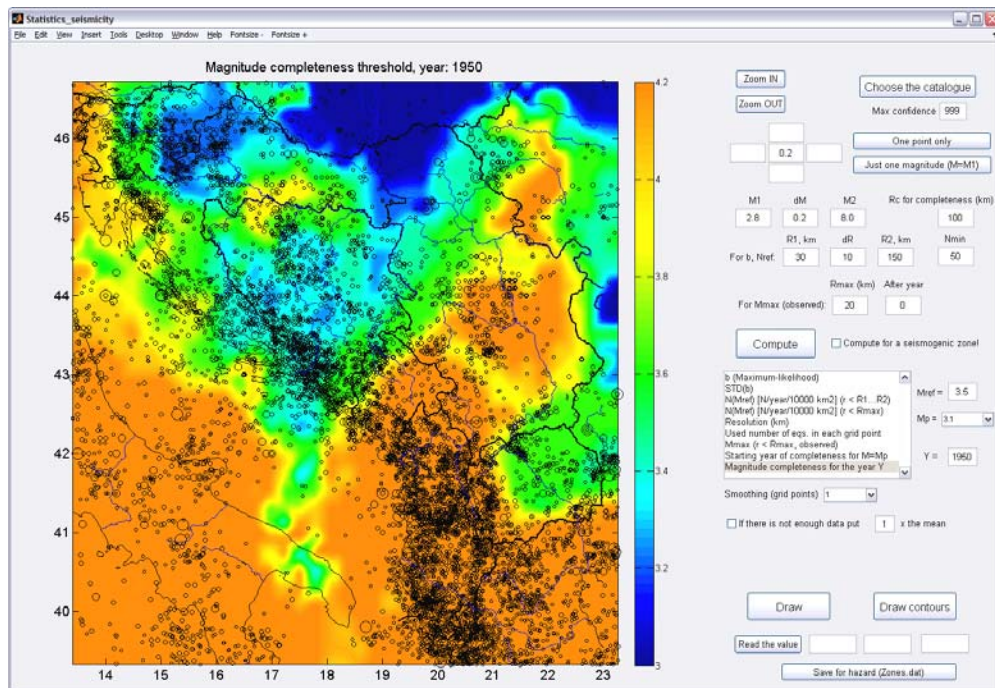
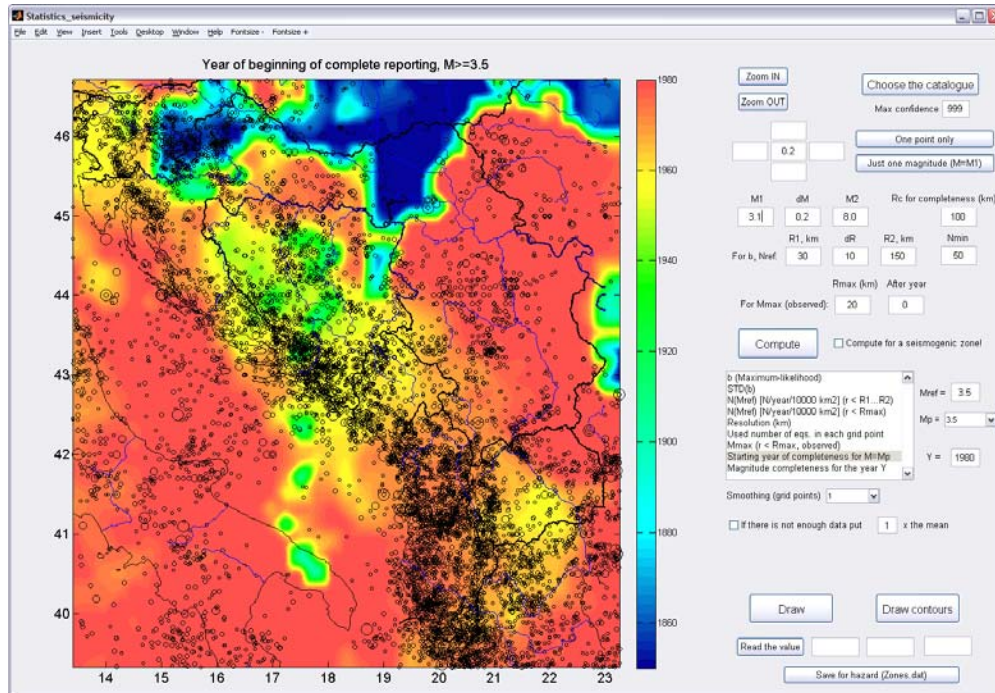


Figure 6. Year of the beginning of complete reporting for $M \geq 3.5$ (top), and magnitude completeness threshold for the year 1950 (bottom).

A1.3 Seismic source modeling

Regarding the source modeling lot has been done in seismotectonical elaboration, collecting and analyzing existing seismotectonical data. The main database is being built for making the seismotectonical map. In respect to the presented form of characterization of seismotectonical faults (Prof. Glavatovic-Montenegro) described in the *UNIFIED METHODOLOGY AND LEGEND FOR SEISMOTECTONICAL FAULTS CHARACTERIZATION* of the Project "ADRIA COST Action 625" - Prof Herak reported about the convenient and very useful possibility to get some of the final results of this project by the end of the spring of current year.

A.1.4 Deployment of purchased instruments

The instruments that have been purchased are currently tested in laboratory facilities. The site selection and investigation for 5 new seismograph stations have been performed. The microseismic tremor measurements were performed on several macro locations on some islands (Ugljan) and Mountain Ucka, as the first step in determining the micro locations of stations.

A.2 Actions to insure the implementation of results

Croatian team representatives in Croatian Technical Committee for Euro code 8 continued their work in harmonization with EU standards.

Collaboration between Croatia and other project partners continued and increased rapidly in the field of real time data exchange. The significant contribution to the data exchange and collaboration between neighboring countries also resulted from other common projects that are going on (CoSEESNet, A Collaborative South East Europe Seismic Network: "Towards Early Warning System and Real Time Seismic Monitoring in South East Europe").

A.3 Milestones for the next six months

In the next six months of project realization, the complete earthquake catalogues should be compiled and unified according to available data. Then the ground motion prediction models should be discussed and investigated, appropriate software chosen, purchased and tested. The final formats and software tools (GIS, etc.) should also be implemented and elaborated and training in GIS performed in already planned Training course.

Croatian team will prepare the locations for purchased instruments. The preparatory work has been slowed-down because of cutting of National budget.

A.4 Involvement of young scientists

One new young scientist has been involved in project activities, as new members of Croatian project team.

A.5 Major travel

Major travel was realized in respect to Project kick of Meeting and related Project Workshops: Ig, Skopje, Dubrovnik and Budva.

A.7 Visibility of SfP project

All international activities of Croatian team, as well as presentations, are permanently being announced and updated on the official web site of the University of Zagreb. The project and ongoing activities were also several times mentioned in national news and television by Croatian project Co-Director Mr Vlado Kuk.

A.8 Technical and administrative difficulties

There were no technical and administrative difficulties in project realization.

A.9 Changes in personnel: Another new researcher is to join the Croatian project team, soon.

E) MACEDONIA

In the period April - October 2008, the Institute of Earthquake Engineering and Engineering Seismology (IZIIS-Skopje) in cooperation with Seismological Observatory, Faculty of Natural Sciences (SO/PMF) conducted tasks compliant to methodology, project structure and activities of the adopted Project Plan, i.e., along activities to fulfill Milestone requirements as declared in the October 2007 – March 2008 six months report:

1. Re-compilation of Macedonian earthquake catalogue;
2. Testing of selected SMA models against parameters of regional SM data; and,
3. Procurement of the SM and WM instruments, selection of station sites and assurance of additional budget for construction of facilities to accommodate SM instruments.

Consequently, the principal activities have continued along the following lines: (1) Re-compilation of the Macedonian Earthquake Catalogue; (2) Assembling of regional strong motion data set; (3) Procurement of strong motion instruments; (4) Selection of locations for installment of instruments; (5) Compilation of other relevant data and other preparatory works; and, (6) Training of young scientists.

A.1 Major Accomplishments

The earthquake catalogue with $M_{\min} = 2.9$ was re-compiled by SO/PMF and delivered to Prof. Herak, Croatia, for further analyses and regional harmonization by the end of 2007. Further refinement of the catalogue continued in the period April-October 2007.

The strong motion instruments are ordered from Guralp Systems Ltd. 12 CMG-5TD Strong Motion Sensor Systems consisting of CMG-5 accelerometers and CMG-DM24 modules at cost of \$58,341.50. While the first allotment to Guralp Systems Ltd. is realized by NATO on 09.06.2008, so far neither instruments were delivered, nor is any explanation presented why the bid condition "delivery in 90 days from the payment" has not been respected. If the instruments are not delivered by the end of October (7 weeks delay) the position of IZIIS is to withdraw the order.

Preparing the strategy for instrument deployment, IZIIS designed typical shelter for the installing free field instruments as well as lounged feasibility study to define the location of instruments. More than 25 locations in Macedonia were inspected and microtremor measurements taken in order to define the level of ground noise. All recordings have been processed, analyzed and catalogued.

A.2 Actions to insure the implementation of results

The main objective of the project is producing the harmonized Seismic Hazard Map as National Annex that conform with EU standards (i.e. Euro code 8) that shall be adopted by Macedonian structural design and construction legislation. Along this line, the collaboration with Macedonian Institute for Standardization (ISRM; <http://www.isrm.gov.mk>) established in 2007 continued in particular within the Working Group 8 (TC/WG8): Design of Structures for Earthquake Resistance.

A.3 Milestones for the next six months

In the next six months of the project performance the following tasks shall be completed:

1. Completion of the re-compilation of Macedonian earthquake catalogue and harmonization with eq. catalogues from neighbor countries (Albania, Greece, Bulgaria and Serbia);
2. Testing of selected SMA models against parameters of regional SM data and NGA attenuation models;
3. Selection of locations for deployment of strong motion instruments, accompanied by shallow geophysical refraction measurements; and,
4. Definition of seismo-tectonic model for Macedonia.

A.4 Involvement of young scientists

From the project commencement, two young scientists (Ms. Radmila Salic and Ms. Irena Gjorgjeska) were involved in realization of project activities. Ms. Radmila Salic, assistant in IZIS-Skopje, is in the first phase of the preparation of her PhD. Thesis: "Advanced Approach to Seismic Hazard Assessment of Republic of Macedonia (Working Title)", whereas Ms. Irena Gjorgjeska completed preparatory works for her MSc Thesis in the field of array microtremor measurements and determination of lithostratigraphic and physical characteristic of surface soil deposits.

A.5 Major travels

The travels were related to Project workshops: 1) Young Seismologist Training Course (YSTC) in association with the ESC2008 General Assembly, Technological Educational Institute of Crete [TEICR] Chania, Crete, Greece (2-7 September 2008) /Ms. R. Salic/; 2) 31st General Assembly of the European Seismological Commission (ESC 2008), International Conference Center "Creta Maris", Hersonissos, Crete, Greece (7 to 12 September, 2008) /Ms. R. Salic/; and, 3) International Exercise on Post-earthquake Damage Assessment (within the boundaries of STEP Project - Strategies and Tools for Early Post-Earthquake Assessment), Centre for Civil Protection and Disaster Relief in Ig, Slovenia, Čezsoča in Bovec, Slovenia, (24-27 September 2008) /Ms. R. Salic/.

A.7 Visibility of SfP project

The project and ongoing activities have several times been mentioned on national television by Macedonian project Co-Director Prof. Mihail Garevski and Prof. Zoran Milutinovic.

The Project was reported and promoted on the several meetings of EUR-OPA Major Hazard Agreement and Annual Board of Directors of the Network of Specialized Euro-Mediterranean Centers of Councils' of Europe Major Hazard Agreement (EUR-OPA MHA), all being both helpful in assuring the additional budget of about 6,000 € annually in the period 2008-2010.

A.8 Technical and administrative difficulties

There were no technical and administrative difficulties in project realization.

A.9 Changes in personnel & project plan

There were no changes in project realization.

F) SERBIA

SERBIA

In the period October 2008/ April 2009, Seismological Survey of Serbia (SSS) conducted the tasks in accordance with the Project structure and activities. The most important activities in the past period have been: a) preparation and compilation of earthquake catalogue; b) deployment of strong motion instruments; b) analysis of the recorded data using accelerogram analysis software, c) GIS software purchase and preparation for the training, d) assigning stipend for the young researchers, e) investigation of available GMP models; f) analysis of magnitude scales and unification of assessed magnitudes; g) seismic hazard assessment for the construction sites and spatial plans using OHAZ software.

1. Major Accomplishments

Within the Working Package 1 (WP1.), the participants from our institution have been working on the preparation and compilation of the national earthquake catalogue consisting of verified data which are the first and one of the most important steps in seismic hazard assessment. The participants from our institution have been working on the following tasks: survey of available catalogues; re-assessment of historical earthquakes and fulfillment of missing data; investigation of the national catalogue completeness according to accepted magnitude threshold and de-clustering.

One of the in the primary precondition for catalogue homogenization is a selection of unified magnitude which will be used. The basis for earthquake catalogue compilation is different and it is depending on referred time period. For a historical and early instrumental period, Catalogue for Central and Southeastern Europe (1998) is relevant. Magnitudes in this catalogue, determined using macro seismic and other data, are M_s and m_b . For a number of strongest instrumentally recorded earthquakes, magnitude M_{lh} have been determined, which corresponds to M_w magnitude for magnitude range $5 \leq M < 8$. For the period between 1963 and 2005, the catalogue consists of the earthquakes re-assessed according to ISC data in which m_b and m_s , and M_{lh} for the strong earthquakes (from Wiechert and Mainka seismograms) are published. Since 2005, magnitude M_L have been determined for the earthquakes in Serbia. Unification of magnitudes is mostly performed by conversion of M_s to M_w . With a view to published papers, the following relations for a conversion to M_w could be used:

$$\begin{array}{ll} m_b & 4.8 \leq m_b \leq 6.0 \quad M_w = 1.28m_b - 1.12 \text{ Papazachos and Papazachou (1997),} \\ M_L & \quad \quad \quad M_w = M_L + 0.43 \quad \quad \quad \text{Baba et al. (2000)} \end{array}$$

For the area southern from 43°

$$\begin{array}{ll} M_s & M_s < 5.3 \quad \quad \quad M_w = 0.56M_s + 2.66 \text{ Papazachos and Papazachou (1997),} \\ & M_s \leq 5.3 \quad \quad \quad M_w = 0.804M_s + 1.28 \text{ Burton et al. (2004)} \end{array}$$

For the area northern from 43°

$$\begin{array}{ll} M_s & \quad \quad \quad M_w = M_s \quad \text{Oncescu et al. (1999),} \\ & \quad \quad \quad \quad \quad \quad \text{Grunthal and Wahlstrom (2003)} \end{array}$$

According to the analysis of magnitudes published in ISC it was deduced that there are 180 earthquakes with M_s and m_b pair of magnitudes. Based on M_s - m_b pairs, by the regression analysis L2 normalised, the relation for magnitude conversion is defined as:

$$M_s = 1.263(+/-0.054)m_b - 1.505(+/-0.244) \text{ for the magnitude range } 3.5 \leq m_b \leq 6.1$$

Within the (WP2.), seismic sources for the Vojvodina region have been investigated and determined and recurrence of earthquakes inside the identified seismic source zones have been defined (fig. 1).

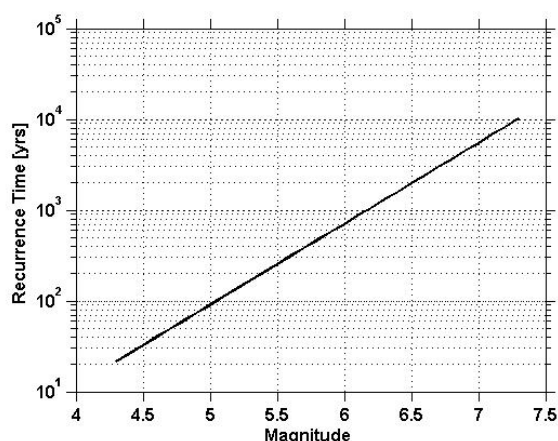


Figure 1. Recurrence of earthquakes for the Vojvodina seismic source zones

Within the (WP3.), available GMP models have been tested: Sabetta, 1996; Ambraseys et al., 1996; vertical acceleration Ambraseys and Douglas, 2000. It was deduced that Sabetta relation is more realistic.

Within the (WP4.), seismic hazard assessment for the several construction sites (e.g. Ada Bridge, Beska Bridge) and for the Spatial Plan of the Vojvodina region has been performed. Spatially smoothed seismicity approach and software OHAZ 6.0 have been adapted.

Within the (WP5.), the activities regarding seismotectonics elaboration have started. Digital map with the main tectonic faults on the territory of Serbia have been performed, in cooperation with the Department for Remote Sensing Geology from the Faculty for Mining and Geology at Belgrade University. In the course of map compilation process, different templates have been used: geo referenced topographic maps, Land sat satellite images originally geo referenced in UTM projection and geological map. All of the templates was processed and prepared up to the level suitable for the interpretation. The resulting rupture model is in the same referent system as used templates. Seismic data were compared with tectonics. The variety of other GIS templates is collected: digital elevation model, geological map and other templates – boundaries, settlements, roads, hydrographic etc.

Within the (WP6.), Seismological Survey of Serbia received twelve (12) units of strong motion instruments; model ETNA on August 11, 2008. We successfully finished the deployment process of ten ETNA units at locations which are showed in 2nd six month report. One unit remained to be installed. Constant field monitoring of recording accuracy and coping of recorded data have been conducted during six month period. Equipment is labeled.

Within the (WP7.), according to previous agreement, "MapInfo +V Mapper" GIS software has been purchased. The best price offer has been obtained with provider. Licensed software for analysis of strong motion data has been received with strong motion instruments and the recorded data have been analyzed using this software. OHAZ 6.0 software is already used for the assessment as it was mentioned earlier.

Within the (WP8.), one participant attended the Budva workshop, Dec. 15-17th, 2009. He presented to the participants the basic aspects on GIS implementation. In the previous period, participants from our institution attended workshops in Podgorica, Ljubljana and Skopje.

Within the (WP9.), according to the previous agreement, we initiated preparation for the training in software application. The training will be held at Divcibare, on April 21-23, 2009.

2. Actions to insure the implementation of results

All the relevant results derived from the Project activities are implemented in seismic hazard assessment for the regional spatial plans and for the design of earthquake resistant structures within the scope of the projects of local civil engineering companies.

3. Milestones for the next six months

In the next six months of project realization, the following tasks should be accomplished: purchasing of licensed software for seismic hazard assessment such as EZ FRISK; training in GIS software application; further identification of seismic sources; analysis of earthquake recurrence inside identified seismic sources; investigation of available GMP models and the comparison of the results.

4. Involvement of young scientists

Young researcher, Dragana Petrovic, a student at Faculty of Mining and Geology in Belgrade, Department for geophysics, has been involved in the realization of the project activities since August 2008. The Contract for assigning the stipend has been made and signed by both sides. In the next six month period the young researcher will participate in Project tasks.

Young researcher, Natasha Kotur, B.S. in geophysics, has been involved in Project activities since Feb. 2009. The Contract for assigning the stipend has been made and signed by both sides. In the next six month period the young researcher will participate in Project tasks.

Two young researchers, Goran Kronic and Stepa Petrovic-Cacic, applied for the "International Training Courses on Seismology and Seismic Hazard Assessment" which will be held in September 2009 in Potsdam, Germany.

5. Major travels

Participants traveled to workshops in Podgorica, Ljubljana and Skopje. Participants from Department for Instrumental Seismology traveled at accelerograph sites in order to monitor the work of the installed instruments.

6. Visibility of SfP project

All activities of the Seismological Survey of Serbia are being announced and updated on the official web site, in national media and through cooperation with civil engineers in seismic hazard assessment at the construction sites.

7. Technical and administrative difficulties

There were no technical and administrative difficulties in Project realization.

8. Changes in personnel

There were no changes in personnel.

9. Changes in project plan:

There were no changes in Project plan.

G) TURKEY

During the 3rd 6-month period, the NPD, Prof. Akkar, realized the following activities:

- Procurement/delivery of seismic instrumentation. Email correspondence with the Guralp Systems Inc. (preferred vendor by Croatia, Albania, and Macedonia) to expedite the delivery time. The seismic instruments from Guralp Systems are delivered to their final destiny. Correspondence with the Albanian Customs for tax exemption.
- Presentations on data processing and predictive model evaluation at the Budva Workshop: Procedures that are followed in the evaluations of ground motion prediction equations from host regions to target regions. General description of data processing software for strong ground motions.
- Regression software for deriving ground motion predictive equations (gmpes): A software developed by Dr. John Douglas from BRGM, France (and latter improved by Dr. Sinan Akkar) for regression on gmpes was sent to Macedonia and Montenegro. The concerned institutions are responsible for deriving and developing gmpes for the project.
- Preparations of a training course on data processing and spectral analysis at one of the participating countries that will be delivered NPD during the summer of 2009.
- Proposal for a training course at INGV, Italy for deterministic methods in ground-motion synthetics
- Other administrative responsibilities such as issuing the replenishments and conveying the requests of participating countries to NATO-SfP office.

FINANCIAL STATUS

6.1 Annex 4a: Sfp NATO BUDGET TABLES

A) MONTENEGRO

Project number: Sfp - 983054	Project short title: Sfp - BSAP	Harmoniz. of Seis. Haz. Maps for West. Balkan Countries
Report date: 31.03.2009	Duration of the Project ¹ :	1.10.09. 2007 – 1.10. 2010 / 3 years
Project Co-Director: Prof Branislav Glavatovic, Podgorica, Montenegro		

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
	(1) from start until 31.03. current year	(2) for the following six months	(3) for the following period until project's		
(a) Equipment					
(A1) Three integrated weak and strong motion instr.	23,575	27,644.28			50% on hold calculated according to currency rate US\$=0.752994 EUR. The installation cost cut for the currency rates difference
(A2) Accelerograph installation		780.72			
Subtotal "Equipment"	23,575	28,425			
(b) Computers - Software					
(B1) PC laptop and Printer	1,574	1,311			
(B2) Norton fire wall and antivirus, avira AntiVir premium software	65				
(B3) PC monitor	750				
(B4) EZ FRISK licence		2,000	500		
(B5) GIS licence"MapInfo Professional 9.5"+DMT	1,890	1,610			
Subtotal "Computers - Software"	4,279	4,921	500		
(c) Training					
(C1) Training of three younger researchers	2,076	2,924	4,000		3000 Eur not spent in 1 st year redirected to 2 and 3 year
Subtotal "Training "	2,076	2,924	4,000		
(d1) Books and Journals (global figure)	300	200			
(d2) Publications (global figure)					
Subtotal "Books - Publications"	300	200			
(e) Experts - Advisors					
(E1) Mr. Mladen Zivcic from ARSO, Slovenia to Project Official Launching	769		1,231		231 Eur not spent in 1 st year redirected to following period
Subtotal "Experts - Advisors "	769		1,231		
(f) Travel					
(F1) Meetings	4,675	1,825	2,500		
(F2) Conferences		2,000	2,000		
Subtotal "Travel"	4,675	3,825	4,500		
(g) Consumables - Spare parts:	1,010	490	500		
Subtotal "Consumables - Spare parts"	1,010	490	500		
(h) Other costs and (i) stipends (specify)					
(H1)Web:design, domain registration and one year lease	1197	303			
(H2) Mailing costs- DHL service etc.	423	77	250		
(H3)Missellaneous	1,790	660	1,300		
(I1)Stypends for Ms Ljiljana Vucic	2,850	900	1,650		
(I2)Stypends for Ms Jadranka Mihaljevic	2,850	900	1,650		
Subtotal "Other costs"	9,110	2,840	4,850		
TOTAL (1), (2), (3) :	45,794	43,625	15,581		
CURRENT COST OUTLOOK =(1)+(2)+(3)			105,000		

B) ALBANIA

Project number: SFP - 983054	Project short title: SFP - BSHAP	Harmonization of Seismic Hazard Maps for West. Balkan Countries
Report date: 12 April 2009.	Duration of the Project ¹ :	1.10.09. 2007 – 1.10.2010 / 3 years
Project Co-Director: Prof. Ismail Hoxha, PhD in Geoinformatics, Albania		

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
	(1) from start until 31.08. / 31.03. (current year) ²	(2) for the following six months	(3) for the following period until project's end		
(a) Equipment					
(A1) Guralp Systems CMG-5T Sensor & CMG-5TSM	20,845	24,460			40%+10% o hold stated according to currency rate US\$=0.752994 EUR.
Subtotal "Equipment"	20,845	24,460			
(b) Computers - Software					
(B1) 2 PC laptops		2,000			
(B2) 2 printers		1,000	1,000		
(B3) 1 computer code EZ- FRISK		1,000	1,500		
(B4) 1 license for GIS software		2,000			
Subtotal "Computers - Software"		6,000	2,500		
(c) Training					
(C1) Training of three younger researchers		4,000	5,500		
(C2) Study tours for two younger researchers			3,000		
Subtotal "Training "		4,000	8,500		
(d) Books and Journals					
(d1) Books and Journals		1,000	1,000		
Subtotal "Books - Publications"		1,000	1,000		
(e) Experts - Advisors					
(E1) Invited		1,000	1,000		
Subtotal "Experts - Advisors "		1,000	1,000		
(f) Travel					
(F1) Meetings	6,735	760	3,200		
(F2) Conferences		1,000	2,000		
Subtotal "Travel"	6,735	1,760	5,200		
(g) Consumables - Spare parts:		1,500	3,000		
Subtotal "Consumables - Spare parts"		1,500	3,000		
(h) Other costs and (i) stipends (specify)					
(I1) Stipends for two young scientists	2,100	3,300	5,400		
Subtotal "Other costs"	2,100	3,300	5,400		
TOTAL (1), (2), (3) :	29,680	43,020	26,600		Total budget reduced for 1.800 Euros according to Grant Letter

CURRENT COST OUTLOOK =(1)+(2)+(3)

99,300

C) BOSNIA AND HERZEGOVINA

Project number: SfP - 983054	Project short title: SfP - BSHAH	Harmoniz. of Seis. Haz. Maps for West. Balkan Countries
Report date: 31.03.2009	Duration of the Project ¹ :	1/10/2007 – 1/10/2010
Project Co-Director: Mr. Amer Zoranic, Sarajevo, Bosnia and Herzegovina		3 years

Detailed Budget Breakdown <small>(to be completed in EUR³)</small>	ACTUAL EXPENDITURES	FORECAST EXPENDITURES		Comments on changes, if any, in the financial planning compared to the approved
	(1) from start until 31.03. current year	(2) for the following six months	(3) for the following period until project's	
(A) Equipment				
<i>(A1) Three seismograph stations for the national network & (A2) five strong-motion accelerograph for the national strong-motion network improvement</i>	33,540	39,790		1USD=0,761264
Subtotal "Equipment"	33,540	39,790		
(B) Software				
<i>(B1) EZ-FRISK licence with two years extension</i>		2,500		
<i>(B2) GIS software-Mapinfo+Vertical Mapper</i>		4,000		
Subtotal "Computers - Software"		6,500		
(C) Training				
<i>(C1) Training of two young researches</i>		2,000	3,000	
Subtotal "Training "		2,000	3,000	
(E) Experts - Advisors			1,000	
Subtotal "Experts - Advisors "			1,000	
(f) Travel				
<i>(F1) Meetings</i>	2,987	1,833	3,700	
<i>(F2) Conferences</i>		1,500	2,000	
Subtotal "Travel"	2,987	3,333	5,700	
(h) Other costs and (i) stipends (specify)				
<i>(h) Other costs</i>		1,000	2,000	
<i>(i) stipends</i>	1,800	900	2,700	
Subtotal "Other costs"	1,800	1,900	4,700	
TOTAL (1), (2), (3) :	38,327	53,523	14,400	
CURRENT COST OUTLOOK =(1)+(2)+(3)	106,250			

D) CROATIA

Project number: SFP - 983054	Project short title: SFP -	Harmoniz. of Seis. Haz. Maps for West. Balkan Countries (BSHAP)
Report date: 31.03.2009	Duration of the Project ¹ :	31.10.2007 – 31.10.2010 / 3 years
Project Co-Director: Vlado Kuk, Zagreb, Croatia		

Detailed Budget Breakdown <i>(to be completed in EUR²)</i>	ACTUAL EXPENDITURES		FORECAST EXPENDITURES		Comments on changes, if any, in the financial planning compared to the approved
	(1) from start until 31.03. current year	(2) for the following six months	(3) for the following period until project's		
(a) Equipment					I. 1 USD = 0.761264 EUR . The over/ Equipment cost exceeded since the 40+10% payment risen over the \$/EUR currency rate change. II. Due to the State Budget reduction, the costs of the site preparation for new stations can not be covered from State Budget, as planned earlier.
(A1) Two integrated systems (weak / strong motion) (A2) Three weak motion seismographs (A3) Site preparation for 5 new seismological stations	54,080	10,000			
Subtotal "Equipment"	54,080	10,000			
(b) Computers - Software					
(B1) PC, laptops and printers					
(B4) EZ FRISK licence			2,500		
(B5) GIS software licence+DMT		3,750			
Subtotal "Computers - Software"		3,750	2,500		
(c) Training					
(C1) Training of two younger researchers		1,000			
Subtotal "Training "		1,000			
(f) Travel					
(F1) Meetings	7,734	2,000	2,100		
Subtotal "Travel"	7,734	2,000	2,100		
(h) Other costs and (i) stipends (specify)					
(H3)Missellaneous		486	500		
(I1)Stypends for Mr Kresimir Kuk	2,700	900	1,800		
(I2)Stypends for Mr Josip Stipcevic	2,700	900	1,800		
(I3)Stypends for new young researcher	450	900	1,800		
Subtotal "Other costs"	5,850	3,186	5,400		
TOTAL (1), (2), (3) :	67,664	19,936	10,500		98100
CURRENT COST OUTLOOK =(1)+(2)+(3)					

E) MACEDONIA

Project number: SfP - 983054	Project short title: SfP - BSHAP	Harmoniz. of Seis. Haz. Maps for West. Balkan Countries
Report date: 31.03.2009.	Duration of the Project ¹ :	1.10.09. 2007 – 1.10. 2010 / 3 years
Project Co-Director: Prof. Mihail GAREVSKI, Skopje, Macedonia		

Detailed Budget Breakdown <i>(to be completed in EUR²)</i>	ACTUAL EXPENDITURES	FORECAST EXPENDITURES		Comments on changes, if any, in the financial planning compared to the approved
	(1) from start until 31.03. current year (current) year ²	(2) for the following six months	(3) for the following period until project's	
(a) Equipment				
(A1) Guralp System Ltd	18,726.33	17,700.00	4,400.00	on hold summ estimated 1USD=0.761264EUR
(A2) Instalation costs			8,174.00	
Subtotal "Equipment"	18,726.33	17,700.00	12,574.00	
(b) Computers - Software				
(B1) Dell Latitude E4300		2,200.00		
(B4) EZ FRISK licence		2,500.00		
(B5) Map info profesional + Vertical Mapper		4,000.00		
(B7) Ploter&Printer		3,800.00		
(B8) Printer			300.00	
Subtotal "Computers - Software"		12,500.00	300.00	
(c) Training				
(C1) Training Dr Z. Milutinovic, Ig, slovenia	140.00			
(C2) Training Msc R. Salic, Ig, Slovenia	175.00			
(C3) Training Dr L. pekevski, Ig, slovenia	182.20			
(C4) Training Msc R. Salic, Ljubljana, Slovenia	168.00			
(C5) Study tour Ms I. Gjorgjeska, Istanbul, Turkey	1,156.50			
(C6) Study tours for two young scientists			11,178.30	
Subtotal "Training "	1,821.50	0.00	11,178.30	
(e) Experts - Advisors			1,000.00	Planned 1,000 redirected to computers and software
Subtotal "Experts - Advisors "		0.00	1,000.00	
(f) Travel				
(F1) Meetings	4,519.72	4,500.00	2,545.80	
(F2) Conferences	1,434.30			
Subtotal "Travel"	5,954.02	4,500.00	2,545.80	
(g) Consumables - spare parts				Item Micheleneous redirected to Spare part and cut from 4,100 to 2,000. (rest redirected to Computers)
(G1) Network card for HP Designjet 510 ps 42 in		500.00		
(G2) Cartridges& paper		500.00		
Subtotal " Consumables - spare parts "		1,000.00		
(h) Other costs and (i) stipends (specify)				
(I1) Stypends for Ms Irena Gjorgjeska (18 months)	1,800.00	600.00	1,200.00	
(I2) Stypends for Mr Goran Jekic	1,800.00	600.00	1,200.00	
Subtotal "Other costs"	3,600.00	1,200.00	2,400.00	
TOTAL (1), (2), (3) :	30,102	36,900	29,998	Total budget reduced for 400 Euros according to Grant Letter
CURRENT COST OUTLOOK =(1)+(2)+(3)			97,000	

F) SERBIA

Project number: SfP - 983054	Project short title: SfP - BSHAP	Harmoniz. of Seis. Haz. Maps for West. Balkan Countries
Report date: 31.03.2009	Duration of the Project ¹ :	1.10. 2007 – 1.10.2010 / 3 years
Project Co-Director: Ms Svetlana Kovacevic, Belgrade, Serbia		

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
	(1) from start until 31.03. current year	(2) for the following six months	(3) for the following period until project's	
29200(a) Equipment				
(A1) Seven strong-motion accelerograph stations	43,000		7,000	Equipment 50% of advance paid and rest to be paid within next six months.
(A2) Accelerograph installation				
Subtotal "Equipment"	43,000		7,000	
(b) Computers - Software				
(B1) One data storage unit			1,000	
(B2) Software for creating and managing acc .data base		1,000		
(B3) Upgrade for Arc view 8.1 Gis sofware	4,447.70		52	
(B4) EZ FRISK licence			2,500	
Subtotal "Computers - Software"	4,447.70	1,000	3,552	
(c) Training				
(C1) Training of three younger researchers		3,000	6,000	
Subtotal "Training "		3,000	6,000	
(d1) Books and Journals (global figure)	542	1,000	1,458	
(d2) Publications (global figure)				
Subtotal "Books - Publications"	542	1,000	1,458	
(e) Experts - Advisors		700	1,300	
Subtotal "Experts - Advisors "		700	1,300	
(f) Travel				
(F1) Meetings	1,116.8		7,883.20	
(F2) Conferences		1000	2,500	
Subtotal "Travel"	1,116.80	1,000	10,383.20	
(h) Other costs and	147.50	252.50	3,100	
(i) stipends (specify)	1,200	1,800	6,000	
Subtotal "Other costs"	1347.50	2052.50	9100	
TOTAL (1), (2), (3) :	50,454	8,753	38,793	
CURRENT COST OUTLOOK =(1)+(2)+(3)			98,000	

G) TURKEY

Project number: SfP - 983054 Report date: 30.04.2009 Project NPD: Prof Sinan Akkar, Ankara, Turkey	Project short title: SfP - Duration of the Project ¹ :	Harmoniz. of Seis. Haz. Maps for West. Balkan Countries 31.08 2007 – 31.08 2010 / 3 years
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Detailed Budget Breakdown <i>(to be completed in EUR²)</i>	ACTUAL EXPENDITURES		FORECAST EXPENDITURES		Comments on changes, if any, in the financial planning compared to the approved Project Plan
	(1) from start until 30.04.09		(2) for the following six months	(3) for the following period until project's end	
(f) Travel					
(F1) Meetings	6,851		3,500	6,149	
(F2) Conferences	1,852		3,500	5,148	
Subtotal "Travel"	8,703		7,000	11,297	
(g) Consumables - Spare parts:	1,560		4,440	3,000	NATO-SfP office permitted to buy 2 mathematics software (SIGMAPLOT and SYSTAT) with the money allocated for this item.
Subtotal "Consumables - Spare parts"	1,560		4,440	3,000	
(h) Other costs and (i) stipends <i>(specify)</i>					
(H1) Contingency	497		503	500	
(H2) Administrative Costs			2,500	5,000	
Subtotal "Other costs"	497		3,003	5,500	
TOTAL (1), (2), (3):	10,760		14,443	19,797	
CURRENT COST OUTLOOK = (1)+(2)+(3)					45,000

6.2 Annexes 4b: SfP NATO SUMMARY BUDGET TABLES

Project number: SfP - 983054	Project short title: SfP - BSHAP	Harmonization of Seismic Hazard Maps for The Western Balkan Countries
Report date:	Duration of the Project ¹ : 1.10.09. 2007 – 1.10. 2010 / 3 years /	
The Project is in the year (please indicate): <u>1</u> - 2 - 3		

Breakdown per Project Co-Director			ACTUAL EXPENDITURES	FORECAST EXPENDITURES		Comments on changes, if any, in financial planning compared to the approved Project Plan
	APPROVED BUDGET: Total year 1-5	CURRENT COST OUTLOOK:	since start until 31/03/ 2009 of current year ²	for the following 6 months	for the following period until project's end	
Prof Branislav Glavatovic, Podgorica, Montenegro	105,000	105,000	45,794	43,625	15,581	
Prof. Dr. Ismail Hoxha, Tirana, Albania	96,000	99,300	29,680	43,020	26,600	<i>Current cost outlook overpasses approved caused by EURO/US\$ currency rate change</i>
Mr.Amer Zoranic, Sarajevo,B&H	100,000	106,250	38,327	53,523	14,400	<i>Current cost outlook overpasses approved caused by EURO/US\$ currency rate change</i>
Vlado Kuk, Zagreb, Croatia	97,000	98,100	67,664	19,936	10,500	
Ms. Svetlana Kovacevic, Belgrade, Serbia	98,000	98,000	50,454	8,753	38,793	
Prof. Mihail GAREVSKI Prof. Zoran MILUTINOVIC,	97,000	97,000	30,102	36,900	29,998	
Prof. Sinan Akkar, Ankara,Turkey, PPD	45,000	45,000	10,760	14,443	19,797	
TOTAL	638,000	648,650				

Breakdown per item (to be completed in EUR ³)			ACTUAL EXPENDITURES	FORECAST EXPENDITURES		Comments on changes, if any, in financial planning compared to the approved Project Plan
	APPROVED BUDGET: Total year 3	CURRENT COST OUTLOOK:	since start until 31.03. 2008 of current year ²	for the following 6 months	for the following period until project's end	
(a) Equipment.	306,000	333,715	193,766	120,375	19,574	<i>The overall sum of the purchased equipment overcame the approved figure. Additionally this item grew because of the EUR / \$ conversion rate change. Consequently the other costs have been changed so to fit the overall project sum.</i>
(b) Computers - Software	50,900	52,750	8,727	34,671	9,352	
(c) Training	61,000	49,500	3,897	12,924	32,679	
(d) Books - Publications	5,500	5,500	842	2,200	2,458	
(e) Experts - Advisors	12,000	8000	769	1700	5,531	
(f) Travel	104,700	103,049	37,905	23,418	41,726	
(g) Consumables - Spare parts:	19,000	16,500	2,570	7,430	6,500	
(h) Other costs and (i) stipends	78,900	79,636	24,305	17,481	37,850	
TOTAL :	638,000	648,650	272,781	220,199	155,670	648,650

6.3 Annexes 4c: Sfp NATO NATIONAL CONTRIBUTION TABLES

A) MONTENEGRO

Project number: Sfp - 983054
Project Co-Director: Prof. Branislav Glavatovic, Podgorica, Montenegro
Report date: September, 2008

A. TYPE OF EXPENDITURE

Budget breakdown	Year of expenditure		
	1st year	2nd year	3rd year
(a) Salaries (Name and qualification of research and support personnel)			
1. Mr. Branislav Glavatovic, Prof, director	5,000	5,000	5,000
2. Ms. Jadranka Mihaljevic, consultant in eq. engineering, civil engineer	2,000	2,000	2,000
3. Ms. Ljiljan Vucic, applied mathematician	1,500	1,500	1,500
4. Mr. Marin Cavelish, electrical engineer	2,000	2,000	2,000
5. Ms. Velisa Supic, MS geologist, senior consultant in seismology	2,500	2,500	2,500
6. Ms. Natasa Kaludjerovic, applied physicist		2,000	2,000
7. Mr. Vladan Dubljevic, MS, director of Geological Institute	5,000	5,000	5,000
Subtotal "Salaries"	18,000	20,000	20,000
(b) Overhead Costs (specify: consumables, energy, local transportation)			
(B1) Energy, local transportation etc.	500	500	500
(B2) Consumables	500	500	500
Subtotal "Overhead"	1,000	1,000	1,000
(c) Equipment - Computers			
(C1) Equipment - Computers, scanners etc.	1,000	1,000	1,500
(C2) Office tolls: photocopiers, faxmachine etc.	800	800	1000
Subtotal "Equipment"	1,800	1,800	2,500
(d) Other costs			
(D1) Local experts and consultantss	1,500	1,500	1,500
(D2) National workshops	2,000	2,000	3,000
Subtotal "Other costs"	3,500	3,500	4,500
	24,300	26,300	28,000
TOTAL :		78,300	

Name of sponsoring institution	1st year	2nd year	3rd year
TOTAL :	(1)	(2)	(3)
GRAND TOTAL = (1) + (2) + (3) + (4) + (5)			

B) ALBANIA

Project number: SFP - 983054
Project Co-Director: Prof. Dr. Shyqyri Aliaj ,Tirana, Albania
Report date: September, 2008

A. TYPE OF EXPENDITURE

Budget breakdown	Year of expenditure		
	1st year	2nd year	3rd year
(a) Salaries (Name and qualification of research and support personnel)			
<i>Prof. Dr. Shyqyri Aliaj , Director</i>	3,000	After the formal nomination of Project Co-Director the new team will be appointed along with the expenditures for the 2 nd and 3 rd year	
<i>Prof.Dr. Eduard Sulstarova, Secretary General</i>	3,000		
<i>Mr. JaniSkrami, Head of Dep Eng. Seism.</i>	1,000		
<i>Mr. Rexhep Koci, Geologist, MS</i>	500		
<i>Mr. Edmond Dushi, Head of Dep. of Seismic Network, MS Cand.</i>	2,000		
<i>Mr. Ilir Shinko head of Electronic Laboratory, MS Cand.</i>	1,000		
<i>Mr. Llambro Duni, Eng. Seismologist,Ass. Prof., Dr.</i>	1,000		
<i>Ms. Albana Zotaj,Head of GIS and Remote SensingDepartment</i>	500		
<i>Ms. Anuela Prifti,Specialist in GIS, MS</i>	500		
Subtotal "Salaries"	12,500		app. 12,500
(b) Overhead Costs (specify: consumables, energy, local transportation)			
<i>(B1)Energy, local transportation etc.</i>	500	500	500
<i>(B2) Consumables</i>	500	500	500
Subtotal "Overhead"	1,000	1,000	1,000
(c) Equipment - Computers			
<i>(C1) Equipment - Computers, scanners etc.</i>	1,000	1,000	1,000
<i>(C2) Office tolls: photocopiers, faxmachine etc.</i>	800	800	800
Subtotal "Equipment"	1,800	1,800	1,800
(d) Other costs			
<i>(D1) Local experts and consultantss</i>	1,500	1,500	1,500
<i>(D2) National workshops</i>	2,000	2,000	3,000
Subtotal "Other costs"	3,500	3,500	4,500
	18,800	18,800	19,800
TOTAL :		57,400	

Name of sponsoring institution	1st year	2nd year	3rd year
TOTAL :	(1)	(2)	(3)
GRAND TOTAL = (1) + (2) + (3) + (4) + (5)			

C) BOSNIA AND HERZEGOVINA

Project number: SfP - 983054
Project Co-Director: Mr. Amer Zoranic, Sarjevo, Bosnia and Herzegovina
Report date: September, 2008

A. TYPE OF EXPENDITURE

Budget breakdown	Year of expenditure		
	1st year	2nd year	3rd year
(a) Salaries (Name and qualification of research and support personnel)			
Mr. Amer Zoranic	5,000	5,000	5,000
Mr. Ivan Brlek, BS	5,000	5,000	5,000
Mr. Rusmir Gorusanin, BS	3,800	3,800	3,800
Dr. Drago Trkulja	5,000	5,000	5,000
Ms. Snjezana Cvijic, BS	4,000	4,000	4,000
Mr. Sveto Vrhovac, BS	4,000	4,000	4,000
Subtotal "Salaries"	26,800	26,800	26,800
(b) Overhead Costs (specify: consumables, energy, local transportation)			
(B1) Energy, local transportation etc.	1,000	1,000	1,000
(B2) Consumables	800	800	800
Subtotal "Overhead"	1,800	1,800	1,800
(c) Equipment - Computers			
(C1) Equipment - Computers, scanners etc.	2,000	2,000	2,000
(C2) Office tolls: photocopiers, faxmachine etc.	1,600	1,600	2,000
Subtotal "Equipment"	3,600	3,600	4,000
(d) Other costs			
(D1) Local experts and consultantss	1,500	1,500	2,500
(D2) National workshops	2,000	2,000	2,000
Subtotal "Other costs"	3,500	3,500	4,500
	35,700	35,700	37,100
TOTAL :	108,400		

Name of sponsoring institution	1st year	2nd year	3rd year
TOTAL :	(1)	(2)	(3)
GRAND TOTAL = (1) + (2) + (3) + (4) + (5)			

D) CROATIA

Project number: SfP - 983054

Project Co-Director: Mr.Vlado Kuk, Zagreb, Croatia

Report date: September, 2008

A. TYPE OF EXPENDITURE

Budget breakdown	Year of expenditure		
	1 st year	2nd year	3rd year
(a) Salaries (Name and qualification of research and support personnel)			
1. Mr. Vlado Kuk, Ms, director	4,000	4,000	4,000
2. Mr. Marijan Herak, prof.	4,000	4,000	4,000
3. Mrs. Davorka Herak, prof.	3,000	3,000	3,000
4. Mrs. Snjezana Markusic, dr.	2,500	2,500	2,500
5. Mr. Ivo Allegretti, M.S.	2,200	2,200	2,200
6. Mr. Kresimir Maric, M.S.	2,200	2,200	2,200
7. Mr. Ivica Sovic, M.S.	2,160	2,160	2,160
8. Mr. Kresimir Kuk, B.SC.	2,000	2,000	2,000
9. Mrs. Ines Ivancic, B.SC.	2,000	2,000	2,000
10. Mr. Josip Stipcevic, B.SC.	2,000	2,000	2,000
11. Mr. Vladimir David, dr.	2,500	2,500	2,500
Subtotal "Salaries"	28,560	28,560	28,560
(b) Overhead Costs (specify: consumables, energy, local transportation)			
(B1) Energy, local transportation etc.	1,000	1,000	1,000
(B2) Consumables	500	500	500
Subtotal "Overhead"	1,500	1,500	1,500
(c) Equipment - Computers			
(C1) Equipment - Computers, scanners etc.	1,000	1,000	1,500
(C2) Office tolls: photocopiers, faxmachine etc.	1,000	1,000	2,000
Subtotal "Equipment"	2,000	2,000	3,500
(d) Other costs			
(D1) Local experts and consultants	2,000	1,000	2,000
Subtotal "Other costs"	2,000	1,000	2,000
	34,060	34,060	35,560
TOTAL :		103,680	

Name of sponsoring institution	1st year	2nd year	3rd year
TOTAL :	(1)	(2)	(3)
GRAND TOTAL = (1) + (2) + (3) + (4) + (5)			

E) MACEDONIA

Project number: SFP - 983054

Project Co-Director: Prof. Dr. Mihail Garevski, Skopje , Macedonia

Report date: September, 2008

A. TYPE OF EXPENDITURE

Budget breakdown	Year of expenditure		
	1 st year	2nd year	3rd year
(a) Salaries (Name and qualification of research and support personnel)			
<i>Dr. Mihail Garevski</i>	7,000	7,000	7,000
<i>Dr. Zoran Milutinovic</i>	6,000	6,000	6,000
<i>Dr. Snezana Stamatovska</i>	6,000	6,000	6,000
<i>Dr. Dragi Dojcinovski</i>	6,000	6,000	6,000
<i>Slobodan Micajkov, BS</i>	3,000	3,000	2,000
<i>Dr. Lazo Pekevski</i>	6,000	6,000	6,000
<i>Ms Radmila Salic, MS</i>	3,500	3,000	3,000
<i>Mr Kemal Edip, MS</i>	3,500	3,000	3,000
<i>Ms Irena Gjorgjeska</i>	3,000	3,000	
<i>Mr Goran Jekic</i>	1,840	1,640	1,800
Subtotal "Salaries"	45,840	44,640	40,800
(b) Overhead Costs (specify: consumables, energy, local transportation)			
<i>(B1)Energy, local transporttion etc.</i>	500	500	500
<i>(B2) Consumables</i>	500	500	500
Subtotal "Overhead"	1,000	1,100	1,000
(c) Equipment - Computers			
<i>(C1) Equipment - Computers, scanners etc.</i>	1,500	1,500	1,500
<i>(C2) Office tolls: photocopiers, faxmachine etc.</i>	800	800	1000
Subtotal "Equipment"	2,300	2,300	2,500
(d) Other costs			
<i>(D1) Accelerograph installation, site preparation,</i>		4,000	
<i>(D2) Purchase of digital and other relevant national digital data</i>	5,000		
<i>(D3) Procurement of licensed software</i>	3,500	1,500	
<i>(D4) Local experts and consultants fees</i>	1,500	1,500	1,500
<i>(D4) Organization of national workshop</i>	2,000	2,000	3,000
<i>(D5) Miscellaneous</i>	1,000	1,000	1,000
Subtotal "Other costs"	13,000	10,000	5,500
	62,140	57,940	49,800
TOTAL :		169,880	

Name of sponsoring institution	1st year	2nd year	3rd year
TOTAL :	(1)	(2)	(3)
GRAND TOTAL = (1) + (2) + (3) + (4) + (5)			

F) SERBIA

Project number: SFP - 983054

Project Co-Director: Ms. Svetlana Kovacevic, Belgrade, Serbia

Report date: September, 2008

A. TYPE OF EXPENDITURE

Budget breakdown	Year of expenditure		
	1 st year	2nd year	3rd year
(a) Salaries (Name and qualification of research and support personnel)			
<i>SvetlanaKovacevic,MS</i>	2200	2200	2200
<i>SlavicaRadovanovic,MS</i>	2400	2400	2400
<i>BrankoDragicevic,BS</i>	1,500	1,500	1,500
<i>VladanKovacevic,B.Sci</i>	1,500	1,500	1,500
<i>MiodragPetrovic,PhD</i>	2400	2400	2400
<i>Vidosava Knezevic,B.Sci</i>	1,400	1,400	1,400
<i>BrankaVeselinovic,BS</i>	1,400	1,400	1,400
<i>StepaPetrovicCacic, BS</i>	1,400	1,400	1,400
<i>GoranKronic, BS</i>	1,400	1,000	
<i>Dejan Valcic,BS</i>	1,400	1,400	1,400
<i>Dr MiraPetronijevic</i>		2000	2400
<i>Dr RadmilaPavlovic</i>	2400		
Subtotal "Salaries"	19.400	18.600	18.000
(b) Overhead Costs (specify: consumables, energy, local transportation)			
<i>(B1)Energy, local transporttion etc.</i>	500	500	500
<i>(B2) Consumables</i>	500	500	500
Subtotal "Overhead"	1,000	1,000	1,000
(c) Equipment - Computers			
<i>(C1) Equipment - Computers, scanners etc.</i>	3000	3000	3000
<i>(C2) Office tolls: photocopiers, fax machine etc.</i>	500	500	500
Subtotal "Equipment"	3.500	3.500	3.500
(d) Other costs			
<i>(D1) Local experts and consultants</i>		3.000	3.000
<i>(D2) Organization of national workshop</i>		2.000	2.000
Subtotal "Other costs"		5,000	5,000
	23.900	28.100	27.500
TOTAL :		79.500	

Name of sponsoring institution	1st year	2nd year	3rd year
TOTAL :	(1)	(2)	(3)
GRAND TOTAL = (1) + (2) + (3) + (4) + (5)			

6.4 SFP NATO REPORT ON CO-FUNDING

REPORT ON CO-FUNDING (SfP 983054)

Initiatives Undertaken and Results Obtained for Project Co-funding

Report by: prof Branislav Glavatovic, Project Co-Director Montenegro Seismological Observatory					
Date	Organization Contacted (Name & Full Address)	Name Person Contacted (incl. telephone number; e-mail)	Results and Comments	Co-Funding	
				Duration Period	Amount
September 26, 2008	XV DPPI SEE REGIONAL MEETING,	Mr. Miroslav Vujanic, DPPI Office, Srajevo	Reccomandation to contact national UNDP offices		
February 2008	Denish Emergency Managament Agency	Mr. Michael Elmquist, senior advisor, +45 45 906000 , +45 45 6060, elm@brs.dk	Co-funding realized through Bilateral Ageement between DEMA and Montenegrin Ministry of Internal affair	one year	35,000 Eur
Report by: Svetlana Kovacevic, Project Co-Director Seismological Survey of Serbia					
Date	Organization Contacted (Name & Full Address)	Name Person Contacted (incl. telephone number; e-mail)	Results and Comments	Co-Funding	
				Duration Period	Amount
December 14, 2007	Geophysical Institute, Slovak Academy of Sciences, Bratislava	Peter Labak	Agreement on preparation of Project plan for BiH	one year	8 seismic stations
Report by: Prof. Mihail GAREVSKI/Prof. Zoran MILUTINOVIC IZIIS, Skopje					
Date	Organization Contacted (Name & Full Address)	Name Person Contacted (incl. telephone number; e-mail)	Results and Comments	Co-Funding	
				Duration Period	Amount
31/03/2008	Council of Europe "European and Mediterranean Major Hazards Agreement" (EUR-OPA MHA), ECILS-Skopje	Eladio FERNANDEZ-GALIANO, Executive Secretary; Council of Europe F-67075 Strasbourg Cedex; Tel:+33.3.88.41.22.59 Fax.+33.3.88.41.27.87; e-mail : eladio.fernandez-galiano@coe.int;	ECILS Skopje on annual basis is obliged to apply for budgeting for a next year. 2007 application has been approved, and Euro 6,000 used to organize a Workshop by inviting all NATOSfP983054 countries. Application for 2008, amounting at Euro 6,000 and for the same purpose has already been submitted in February 2008 and results will be known by end of April 2008.	2007-2009	3 x 6,000 = 18,000

6. EQUIPMENT INVENTORY RECORDS

	Inventory Label No.	Property Item	Manufacturer	Model Number	Serial Number	Date of Purchase	Cost (EUR)	Location
MONTENEGRO	601	PC laptop	HP	Pavilion DV276EA	CNF7060M TD	21/09/2007	1,345	MSO, Podgorica - central station
ALBANIA								
BOSNIA AND HERZEGOVINA								
CROATIA	0641-0655	Two integrated systems (weak / strong motion) (A2) Three weak motion seismographs +digitizers	GuralpSystem Ltd.				54,080	All equipment is currently in Laboratory facilities for testing purposes
MACEDONIA								
SERBIA	0681	accelerograph	Kinematics Inc.	ETNA	6441	25.06.2008.	4,300	Valjevo 44.26/19.91
	0682	accelerograph	Kinematics Inc.	ETNA	6444	25.06.2008.	4,300	Gruza 43.89/20.71
	0683	accelerograph	Kinematics Inc.	ETNA	6438	25.06.2008.	4,300	Zajecar 43.81/22.23
	0684	accelerograph	Kinematics Inc.	ETNA	6439	25.06.2008.	4,300	Radoinja 43.52/19.74
	0685	accelerograph	Kinematics Inc.	ETNA	6443	25.06.2008.	4,300	Svilajnac 44.23/21.2
	0686	accelerograph	Kinematics Inc.	ETNA	6437	25.06.2008.	4,300	Banatski Dvor 45.51/20.50
	0687	accelerograph	Kinematics Inc.	ETNA	6440	25.06.2008.	4,300	Sjenica 43.28/19.98
	0688	accelerograph	Kinematics Inc.	ETNA	6433	25.06.2008.	4,300	Novi Pazar 43.13/20.51
	0689	accelerograph	Kinematics Inc.	ETNA	6434	25.06.2008.	4,300	Sabac 44.75/19.7
	0690	accelerograph	Kinematics Inc.	ETNA	6435	25.06.2008.	4,300	Zavoj 43.29/22.61
	0691	accelerograph	Kinematics Inc.	ETNA	6436	25.06.2008.	4,300	Jagodina 43.97/21.26
0692	accelerograph	Kinematics Inc.	ETNA	6442	25.06.2008.	4,300	Gornjak 21.26/21.55	

7. CRITERIA FOR SUCCESS TABLE

Project number: 983054	Project short title:
Report date: March 31, 2008.	Duration of the Project : 1.10.2008-1.10.2010 /3 years/
The Project is in the year : <u>1</u> - 2 - 3 - 4 - 5	

Criteria for Success as approved with the first Grant Letter on: 20-06-2007	%	Criteria for Success: Achievements as at 1.10. / 31.03. of current year ³ (changes should be reflected here)	%
1) Consistent GIS database of earthquake catalogue information for the participating countries	15	1) Earthquake catalogues of participating countries with threshold magnitude 3.0 collected; magnitude type unified	10
2) Unique seismotectonical regional GIS database	15	2) Presented all available seismotectonical data related to referred region	5
3) Hazard assessment applying unified methodological approach consistent to EU standards and GIS hazard maps	35	3) First preliminary hazard results from testing of OHAZ software for the territory of Montenegro and Serbia	4
4) Seismic instruments deployments and integration into national networks	30	4) The 50% of advance payed for the instruments for all the countries. Some of the countries already installed equipement.	20
5) Dissemination of the results	5	5) Web presentation operable and regularly updated	3
TOTAL :	100%	TOTAL :	42%

SUMMARY REPORT

SfP – BSHAP

SfP – 983054

Project Co-Directors: *Prof. Sinan Akkar, METU, Ankara, Turkey (NPD)*

Prof. Branislav Glavatic, MSO, Podgorica, Montenegro (PPD)

Prof. Ismail Hoxha, Institute of Geosciences, Tirana, Albania (PPD)

MS Vlado Kuk, Faculty of Sciences, Zagreb, Croatia (PPD)

Amer Zoranic, Ministry of Civil Affairs, Sarajevo, Bosnia and Herzegovina (PPD)

Prof. Mihail Garevski, IZIS, Skopje, FYR Macedonia (PPD)

MS Svetlana Kovacevic, Seismological Survey of Serbia, Belgrade, Serbia (PPD)

Approval Date: 20th July 2007 Effective Date: 1st October 2008

Duration: 3 years till 1st October 2010

NATO Budget: 638 000 EUR

Information about the SfP Project through Internet: www.wbseismicmaps.org

Abstract of Research

Seismic hazard maps for the territory of participating Western Balkan countries will be realized. In the methodological approach unified earthquake catalogues, seismotectonic data and a consistent ground motion prediction model will be implemented to the probabilistic seismic hazard analysis. The output ground-motion parameter(s) describing the seismic hazard in the region will be provided that is consistent with the EUROCODE 8 and the design regulations of the countries involved in the project. All seismic input and output results will be presented through a consistent GIS database. Future researches in this field will be enhanced by new data collected by seismic instruments that will be deployed within this project realization.

Major Objectives

- *Establishing complete and consistent GIS database for the regional earthquake catalogue, seismotectonics and seismic hazard.*
- *Methodological improvement and harmonization of seismic hazard maps of the participating countries to surmount the existing artificial differences in the cross-border seismic hazard levels.*
- *Improvement of existing seismic monitoring networks through the deployment of strong- and weak-motion stations in the participating countries.*
- *Providing a consistent background for tailoring the seismic provisions of the participating countries harmonized with EU standards (Eurocode 8).*
- *Establishing active scientific collaboration between the participating countries, and training of future-promising young scientists in earthquake-hazard related topics,*
- *Publishing the major project findings that include the improved seismic hazard maps to share the outcomes with the seismological and engineering community.*
- *Encouraging the implementation of harmonized and upgraded seismic hazard maps by the concerned civil authority of each participating country to improve the seismic safety and seismic risk management.*

Overview of Achievements since the Start of the Project until 30 September of current year

- *The complete earthquake catalogue information with threshold magnitude 3.0 was collected for the territory of involved countries; Agreements on providing earthquake catalogues have been reached with neighboring countries: Greece, Bulgaria, Romania,*
- *Magnitude scaling for the unified earthquake catalogue has been adopted,*
- *Unified earthquake catalogue was filtered from the dependant earthquake events (foreshocks and aftershocks),*
- *Training of last version of Software OHAZ 6.1 was realized during the Ig workshop, sponsored by ARSO, Slovenia. The essential elements about the calculation procedure, type and format of input data were explained; First results in computing seismic hazard for the territories of Montenegro and Serbia are assessed.*
- *Upon of the International bidding call procurement of the instruments is done; some of the instruments already installed; for the instruments that are not delivered yet the site preparations are ongoing.*
- *Memorandum on real-time data exchange was signed, as well as Memorandum on further development of OHAZ software source code.*

Payments through NATO Funds: 284,579 EUR

Milestones for the Next Six Months

- *Within next six-month period it is planed to finalize the compilation of unified earthquake catalogue with treshold magnitude 3.0 for the , except for the earthquake catalogue for Serbiaof treshold magnitude 3.6.*
- *Various GMP models will be investigated for their applicability to the region. The selected number of GMP formulas will be implemented in OHAZ software.*
- *The zones of the region where sufficient information on seismotectoncs are available will be delineated and accordingly defined.*
- *The preparation of sites for the deployment of seismic instruments will commence. Upon the acquiring of procured instrument the final installation should take place.*
- *The GIS software will be purchased and training in GIS realized in coordination with project partner from Serbia. Compiled earthquake catalogues and the seismotectonic information will be implemented to the GIS software.*
- *The planned software for the seismic hazard will be purchased and tested.*
- *The above results will be published on regular basis on the project Web page.*

Implementation of Results

The Civil Engineering Faculties/Departments of the regional universities as well as the concerned Ministries and Engineering Chambers are the major civil entities that will make use of the outcomes of this project to upgrade the national seismic provisions for their further adoption to EUROCODE 8 standards.

Other Collaborating Institutions

- *Environmental Agency of Republic of Slovenia, Ljubljana, Slovenia*

Intellectual Property (IP) Rights: *Participating institutions made an agreement to exchange the earthquake catalogue information for the scientific purposes of the Project.*

Abbreviations:

ARSO	<i>Environmental Agency of Republic of Slovenia</i>
B&H	<i>Bosnia and Herzegovina</i>
IZIIS	<i>Institute for Earthquake Engineering And Engineering Seismology of University of "St Cyril And Methodius", Skopje, Macedonia</i>
GMP	<i>Ground motion prediction</i>
IGEO	<i>Institute of Geosciences, Tirana, Albania</i>
METU	<i>Middle East Technical University, Ankara, Turkey</i>
MSO	<i>Montenegro Seismological Observatory</i>

