SfP983054 – BSHAP Project "Goals and their contribution to similar regional and global scale projects"

Sinan Akkar
NATO Project Director
Earthquake Engineering Research Center
Middle East Technical University
06800 Ankara, Turkey

Outline

- Summary of major BSHAP goals (achievements) and my personal comments / interpretations,
- Conclusive remarks.

Major goals of BSHAP

- To improve regional scientific collaboration among the participating countries,
- To improve seismic monitoring infrastructure,
- To improve the hazard maps for the region,
- Dissemination of project outputs and training of younger researchers,
- To form strong grounds for participating in other international projects.

Scientific collaboration among participants

- Series of workshops / seminars:
  - Ljubliana, November 2007: Hazard software (OHAZ) and PSHA related topics,
  - Skopje, December 2007: Earthquake catalogs, seismic zonation,
  - Dubrovnik, March 2008: Seismic instrumentation, magnitude thresholds in earthquake catalogs,
  - Budva, December 2008: Declustering and completeness of earthquake catalogs and topics on GIS,
  - Divcibare, April 2009: Training on GIS software,
  - Banja Luca, October 2009: 1st version of earthquake catalog, likely ground-motion models for PSHA, thematic maps in GIS environment,
  - Ohrid, May 2010: Seismic source characterization, unification of catalogs, training on the hazard software (OHAZ),
  - Sarajevo, April 2010 and Tirana, October 2010: Coordination meetings on specific project deliverables.

Many decisions were taken during these workshops. Most of them were implemented to a certain level to achieve BSHAP objectives. The most important benefit out of these gatherings is to start learning from each other for future collaboration.

Seismic monitoring infrastructure

- ALB: 10 SM accelerometers and 8 SM sensors,
- BIH: 5 BB and SM accelerometers and 1 SM accelerometer,
- HRV: 8 data acquisition systems, 2 SM sensors and 5 BB seismometers,
- MKD: 12 SM accelerometers and digitizers,
- MNE: 3 BB seismometers and 3 SM accelerometers,
- SRB: 12 SM accelerometers

Instrument Procurement

- Seismic data exchange protocol between the participants

Most of these seismic instruments are already installed. The locations are identified for those that are not installed yet. Some of the installed instruments ran into technical problems, which is a common experience in many similar cases. The most important product of this collaborative effort is the multi-lateral data exchange protocol. Now the participating countries have a power to contribute to the databank oriented projects (e.g., NERA) with this protocol.

Improvement of seismic hazard maps

- Revisiting the regional seismicity and tectonic features in the Western Balkans,
- Compilation of earthquake catalog:
  - Magnitude unification,
  - Completeness and declustering studies,
- Magnitude-recurrence models,
- Revisiting the current ground-motion predictive models/ their adaptation to the region,
- Development (improvement) of a hazard software (OHAZ)
- Running the first version of hazard maps for the entire region.

Studies on hazard maps are the much debated issue and this project will not be the exceptional one. There will be many discussions on the components of PSHA during this meeting. They will certainly lead to improvements for the final delivery. Starting to discuss these issues using state-of-the art developments in this field should be considered as an important achievement of the project.

Dissemination of outputs and training of young scientists

- Some early results of the project were presented in local and international conferences / workshops
  - *14th European Conf. on Earthq. Eng.*, Ohrid Skopje
  - *Int. Conf. on Earthq. Eng. On Occasion of the 40th Anniversary of Banja Luka Earthq.*, Banja Luka BIH.
  - *EUROMED and PPRD South Program Training Workshop on Earthquakes*, Rome Italy
  - *2nd EUROMED – Accelerometric Data Exchange and Archiving Workshop*, Ankara Turkey.
  - *ORFEUS Observatory Co-ordination Meeting, Institute d'Estudis Catalans*, Barcelona Spain
- Young scientists involved in the project attended training seminars either during the workshops held within the project or those organized in other institutions (e.g., GFZ-Potsdam)

The current publications from BSHAP should be improved and compiled to be published as a book in the NATO Advanced Science Series. Such a bi-product of the project will make our efforts public to both engineering and seismological community.

Collaboration with similar projects in regional and global scale

- SHARE (FP7): Limited involvement in this project is already achieved. BSHAP benefited the SHARE results in terms of ground-motion prediction equations and weights to be used in logic-tree. BSHAP contributed to SHARE with some part of the earthquake catalog,
- NERA (FP7): BSHAP group can actively involve in the establishment of new European accelerometric databank,
- EPOS (FP7): BSHAP group can also contribute to this project with the collected data during the entire project duration.

The outlined contributions can be seen as only providing the already collected data in the BSHAP project. However, this initial step would make the participants of BSHAP project more visible that can provide more opportunities for higher level contributions in the future projects. Also such collaborative work has the benefits of improving the quality of collected data for other research possibilities. (This is what my institute experienced in the past).

Conclusive Remarks

- Deliverables of all scientific projects are open to discussion among the scientific and professional community. BSHAP results will also be evaluated and discussed by these communities.
- The most important outcome of BSHAP is the initiation of collaborative work among the partners.
- The fruitful products of this collaborative effort should now be spread at the governmental level for their implementation.

Thank you