

GRUPPO NAZIONALE PER LA DIFESA DAI TERREMOTI
FRAMEWORK PROGRAM 2000-2002
COORDINATED PROJECT

**REVISION OF THE THEORETICAL AND OBSERVATIONAL GROUNDS OF THE
SEISMIC HAZARD ESTIMATES AT A NATIONAL SCALE**

SCIENTIFIC COORDINATOR

Gasperini Paolo
Dipartimento di Fisica, Università di Bologna
Viale Berti Pichat, 8 - 40127 Bologna
Tel:0512095024
Fax:0512095058
e-mail:paolo@ibogfs.df.unibo.it

SEMESTRAL REPORT (at 28.3.2001)

Premise

As already communicated by fax to the Director of GNDT (in date December 4, 2000) the research activities in the ambit of the present Project, really started on November 23, 2000 (the time when the funds became available to the research units). In the same fax we also noted that due to the delay in the funds transfer with respect to the formal start of the project (July 2000) as well as to the uncertainty about further funds assignments for next years, I would be mandatory a prorogation of the funds up to the end of year 2001. Although up to now we had not received yet neither an acceptance nor a declination of the above request, in the present report we will assume that such prorogation could be accorded and thus the researches will be completed within the end of November 2001.

Seeing the strong reduction of the allotted funds with respect to the original request, upon request of the Director of GNDT, we prepared a "Reformulation" of the objectives and products. In this Reformulation we had tried to interpret the comments of the Evaluation Commission (that are very synthetic and sometimes contradictory) in order to privilege the researches considered "new and innovative" by the Commission. But at the same time we had also tried to save somehow the original aims of the project that would be completely compromised following literally the indication of the Commission. In particular, as already shown by the Coordinator of the present Project at the presentation meeting of the GNDT 2000/2002 Projects (held in Rome on October 5,2000), an abrupt elimination of Tasks 1,2,8,10 and 11, would make the Project illogical and almost completely lacking of links among the residual Tasks. For this reason, in the Reformulation we devoted a significant part of the funds (40%) for uses, generically indicated as "Other", concerning activities in the ambit of the Tasks considered not interesting (or not well formulated) in view of their future re-proposal. About this aspect (the effectiveness of new funds availability) in the cited fax message of November 23, 2000 we also requested to the Director of GNDT as well as to the Responsibles of the other involved institutions a clarification that up to now is not came us yet. As in the previous case we assume here that such availability could be obtained (at least in principle) and thus that activities that are preliminary to a new proposal are appropriate.

Account of the activities in the period from November 23, 2000 to March 28, 2001

At the starting of the activities, by an e-mail sent to the mailing list of the Project, the Coordinator signaled the need to convene at least two meetings. The first concerning the geodetic and seismotectonic ambits and the second one the historical seismicity field. On the first subject two informal meetings had actually been held, one in Bologna (at the Department of Physics) and the other in Rome (at the INGV). In the first one we discussed the problems concerning the cataloguing of the available geodetic data and of the already existing sites as well as the activation of new semi-permanent stations on the Apennines. In the second instead we broadly discussed about the effectiveness of observing evidences of the interseismic cycle by geodetic measures. About the second theme (historical seismicity) we were not able to organize a plenary meeting up to now, and only some personal contacts among single researchers were kept.

Following the program indicated in the Reformulation, the researches in the ambit of Tasks considered “new and innovative” were started off, in particular:

Task 3 – SEISMOGENIC MODEL (Resp.: Valensise)

The activities of this Task were carried on essentially inside other research projects. In particular in July 2000 the Public Release 1.0 of the “Database of potential sources for earthquakes larger than magnitude 5.5 in Italy” (Basili et al., 2000) was presented during the Workshop “La sismogenesi in Italia” held at the ING. Moreover the collection and the input in the database of new data was also prosecuted.

Task 4 – DYNAMICS OF THE SEISMIC SOURCES (Resp.: Bonafede)

The studies of this Task (not funded by the project) continued as scheduled by the research projects that fund them.

Task 5 – STATISTIC OF SEISMIC SOURCES AND CATALOG COMPLETENESS (Resp.: Mulargia)

As indicated in the Reformulation no activities are scheduled in this phase.

Task 6A – SEISMIC TOMOGRAPHY (Resp.: Morelli)

The compilation of available data on the crustal structure and the building of the phase database for the tomographic inversion have been started off.

Task 6B, SEISMIC ATTENUATION TOMOGRAPHY (Resp.: Mele)

The activity in this field, essentially preliminary to the real researches, regarded the verification of the available data.

Task 6C, SEISMIC INTENSITY TOMOGRAPHY AND SITE EFFECTS (Resp.: Gasperini)

Subtask 6C.1 – Tomography of seismic intensity – A tomographic analysis was performed varying the grid step from 25 to 50, 100 and 200 km in order to determine the best possible representation of the lateral variations of macroseismic attenuation in Italy. The formulation of the attenuation model has been updated on the basis of a recent work (Gasperini, 2001) now in press.

Subtask 6C.2 – Site effects in terms of intensity. The locality empirical residuals resulting from the application of the tomographic model above have been computed. Now we are approaching an

analysis of the geological and geophysical properties of the soils to establish correlations with the observed residuals.

Subtask 6C.3 – Site effects in terms of ground motion parameters. As indicated in the Reformulation no activities are scheduled in this field.

Task 7, FOCAL MECHANISMS (Resp: Morelli)

Subtask 7.1 CMT Focal Mechanisms. The application, backward in time, of the CMT method to analyze the event of the last decade for which broadband and long period seismograms do exist was started off.

Subtask 7.2 First motion focal mechanisms. The control and the inclusion in the database of the focal mechanisms found in the literature was carried on. Up to now, the collected earthquakes are more than 3000 (for the entire Mediterranean area). Modifications and improvements of the control and cataloguing software had been made.

Task 9A, GEODETIC MEASUREMENTS (Resp. Riguzzi)

SubTask 9A.1 – Materialization of the vertices of the Apenninic network. A compilation of the permanent, semi-permanent and temporary sites that operated in Italy has been completed. At this stage we decided to concentrate our efforts on a reduced area (from the surrounding of Aquila to Pollino Massif, instead of from Umbria to Calabria). The weakest parts of the network (coast of Lazio, southern Tuscany and Abruzzo), where the strengthening of the network is most urgent, has been determined. Some inspection has been done in possible sites of future semi-permanent station.

Subtask 9A.2 – Execution of two measurement campaigns at least. No activities scheduled.

SubTask 9A.3 – Data-Bank. A preliminary version of a GIS for the cataloguing of the sites of GPS station of former campaigns has been prepared.

SubTask 9A.4 – Processing. No processing scheduled in this phase.

Obiettivo 9B, DEFORMATION FIELD (Resp. Baldi)

Even in this case the activities are put off to next years.

Among the activities, in the ambit of Tasks not approved by the Evaluation Commission, we want to note that some participants to the present Project recently made available to the GNDT researchers the databank of the “Instrumental Seismic Catalog of Italian Earthquakes from 1981 to 1996” (Instrumental Catalog Working Group, 2001) which is the results of the Subproject 5.1.3 (Responsible P. Gasperini and G. Monachesi) of the Executive Project 1998 of the GNDT. This consists of a CDROM including both the data and the reports (in HTML form) which will be distributed soon inside GNDT but that has been already delivered to A. Amato (Responsible of a Project for the current Framework Program) as well as to the Director of GNDT and the President of INGV.

References

Basili R., Bordononi P., Burrato P., Pantosti D., Spinelli A. e Valensise G. (Eds.), (2000) Database of Potential Sources for Earthquakes Larger than M 5.5 in Italy, Public Release No. 1.0.

Gasperini P., (2001). The attenuation of seismic intensity in Italy: a bilinear shape might indicates the dominance of deep phases at epicentral distances longer than 45 km, Bull. Seism. Soc. Am., (in press).

Instrumental Catalog Working Group (2001), Catalogo Strumentale dei terremoti italiani dal 1981 al 1996, versione 1.0 CD-ROM.