

**INQUA Subcommittee on Paleoseismicity – INQUA Scale Project**

January 19<sup>th</sup>, 2005

**MINUTES OF THE MEETING**

**Agenda:**

- 1) COMMUNICATIONS
- 2) JAPANESE REGIONAL WORKING GROUP (RWG) ON THE INQUA SCALE: PRELIMINARY RESULTS
- 3) FUTURE ACTIONS

**List of Participants:**

Mario Aurelio, Takashi Azuma, Glenda M. Besana, Wen Shan Chen, John Clague, Eliana Esposito, Bihong Fu, Luca Guerrieri, Tomoko Kawayoshi, Yoshihiro Kinugasa, Tadashi Maruyama, Alessandro Michetti, Alan Nelson, Yunong Nina Lin, Koji Okumura, Yoko Ota, George Papathanassiou, Micla Pennetta, Sabina Porfido, Taekmo Shim, Eutizio Vittori, Xiwei Xu

**1) COMMUNICATIONS**

Michetti described synthetically the history of the project and remarked that three oral presentations and three posters of the Hokudan Symposium Scientific Program devoted to the INQUA scale have been a great success for the project. Moreover, he outlined that presently several Regional Working Groups (RWG) have been established and are working to test the INQUA Scale to recent and/or historical earthquakes occurred in their country. Colombian, Italian and Japanese RWG have already produced some documents and filled out EEE (Earthquake Environmental Effect) Forms, and other RWGs (Philippines, Taiwan, Egypt, Greece, Israel, Russia and Slovenia) will complete their work in the coming months. The materials produced in the framework of the Project will be published on the web page, which is already active since several months (see below).

**2) JAPANESE REGIONAL WORKING GROUP (RWG) ON THE INQUA SCALE: PRELIMINARY RESULTS**

Ota and Azuma illustrated their field work focused on mapping ground effects produced by the recent earthquake that occurred in the Niigata-Chuetzu region on October 23, 2004 (M = 6.8). They filled out the EEE Forms to compare the INQUA scale and the Japanese Intensity Scale.

Using a similar approach, with EEE Forms, they illustrated the environmental effects of the 1995 southern Hyogo (Kobe, Japan) and the 1999 Chi-chi (Taiwan) earthquakes. These documents can be downloaded from the INQUA Scale web page ([http://www.apat.gov.it/site/en-GB/Projects/INQUA\\_Scale/default.html](http://www.apat.gov.it/site/en-GB/Projects/INQUA_Scale/default.html)).

A debate followed this presentation, with comments by Besana, Clague, Esposito, Lin, Michetti, Papathanasiou, Porfido and Vittori.

The main points outlined in this discussion were:

- the need to use the same “official” EEE Form (available on the web) in order to build a suitable database (better a GIS) providing all the information about EEE effects;
- the need to implement the earthquake database to constrain better empirical relationships between intensity and surface faulting parameters. This is a very important point, because it will allow the comparison between different case histories;
- the need of widely accepted criteria to compare the twelve-point INQUA Scale with other scales having a smaller number of points (i.e. seven-point Japanese scale and ten-point Philippine Scale);
- in Japan and Taiwan, intensity maps are currently replaced by PGA maps, due to the dense network of instruments available in these countries; therefore INQUA Scale intensity in these instances must be compared with PGA data rather than with Mercalli Modified or other intensity scales. It is therefore necessary to establish widely accepted criteria for comparing PGA values and INQUA Scale intensity values; due to the enormous scatter in the data, correlation of Intensity with ground motions is always very approximate, however this is a necessary step for recent seismic events in such countries;
- a very important consequence of this availability of large amount of ground motion data, is that in many countries for future earthquakes Intensity will not be used anymore as a means for the calculation of ground acceleration; this emphasizes the need of using the INQUA intensity scale, because a scale that is based on environmental effects will be very helpful in retrieving better quality information on earthquake parameters of historical and pre-historical earthquakes, for which we have no instrumental data;
- the need to complete / define guidelines aimed at standardizing the output of works produced by RWGs, and in particular the procedure for the assessment of site intensities and epicentral intensity using the INQUA scale; the Italian WG will produce a new isoseismal map of the Nov. 23, 1980, Irpinia-Lucania earthquake, which will include also INQUA Scale intensity assessed at several site; this will be used as an example for drawing isoseismals from site intensities. It is important to remark that the INQUA Scale must always be used in combination with “traditional” scales, especially for the lower degrees of the scales.

After the Congress Ota and Azuma led a group of symposium participants to the epicentral area of the Oct. 23, 2004, Niigata Chuetsu earthquake. Although there was abundant snow, it was possible to make significant observations on liquefaction, landslides and surface faulting effects, and to discuss assessment of INQUA scale intensity in the field. The 2004 Chuetsu earthquake appears to be an excellent case history for testing the INQUA scale.

### 3) FUTURE ACTIONS

- **September 6<sup>th</sup> - September 10<sup>th</sup> 2005, Como, Italy** – The 3<sup>rd</sup> Project meeting of the INQUA Scale Project will be held during the Final Conference of the International Council For Science (ICSU) "Dark Nature - Rapid Natural Change And Human Responses" Project, where specific sessions will be devoted to assessment of natural hazards, including earthquakes.
- **February 2006, Trieste, Italy** - International Workshop on “The Conduct of Seismic Hazard Analyses for Critical Facilities”, promoted by the UNESCO-ICTP (International Center for Theoretical Physics) and IAEA (International Atomic Energy Agency); during this Workshop, two days will be devoted to the presentation and discussion of the results of the INQUA Scale Project.

The efforts of the Regional Working Groups were be summarized and reviewed at these two meetings.

- **July 29<sup>th</sup> - August 6<sup>th</sup> 2007, Cairns, Australia** – XV INQUA Congress

During this meeting, marking the end of the project, the final version of the INQUA Scale will be presented.