

Sensitivity analysis on the input parameters in probabilistic seismic hazard assessment

A. Rebez, D. Slejko*

Istituto Nazionale di Oceanografia e de Geofisica Sperimentale, Borgo Grotta Gigante 42c, 34010 Sgonico, Trieste, Italy

Abstract

A project has been implemented in recent years for assessing seismic hazard in the Italian territory on probabilistic bases, to be used as scientific background for the revision of the current seismic zonation. A consolidated approach was considered for the purpose; seismic hazard was estimated in terms of peak ground acceleration and macroseismic intensity. As the computer code employed allows the user to make specific choices on some input data, some rather unorthodox decisions were taken regarding earthquake catalogue completeness, seismicity rates, boundaries of the seismogenic zones, definition of the maximum magnitude, attenuation relation, etc. The overwhelming amount of geological and seismological data for Italy (just consider, for example, that the earthquake catalogue collects events which occurred over the last ten centuries) permits the operator to make different choices, more or less cautiously. It is quite interesting, then, to evaluate the influence of the specific choices on the final hazard results as a comparison to traditional possibilities. The tests performed clearly indicate the critical choices and quantify their contribution. In particular, we consider thorough comprehension of the space geometry of the earthquake source boundaries and the adequacy of the attenuation relation in modelling the radiation pattern very important. © 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Probabilistic seismic hazard; Italy; Input parameters

1. Introduction

A global project of seismic hazard assessment in Italian territory was defined in the framework of the 'Gruppo Nazionale per la Difesa dai Terremoti' (GNDT) for updating the national seismic zonation. The project consisted of three main objectives: compilation of an earthquake catalogue and a seismological data base, preparation of the seismogenic zone (SZ) map, and hazard assessment by probabilistic methodologies. In the summer of 1996, the final results were obtained and presented officially to the Civil Protection Department, financier of the project. The results will be considered by the Ministry of Public Works for use in legislation. The hazard assessment was done according to the Cornell [1] approach applying the code Seisrisk III [2]; the details of the computation are exhaustively described in Slejko et al. [3], and the final maps in terms of peak ground acceleration (PGA) and macroseismic intensity are therein reported.

The project developed a kind of homogeneity, in other words all the phases were planned by pointing to the final goal. Nevertheless, several subjective choices were taken,

which undoubtedly condition the final results. More precisely, the subjective choices regarded:

1. the definition of maximum magnitudes for the SZs;
2. the definition of variable soft boundaries for the SZs;
3. the choice of the seismicity rates for the SZs;
4. the use of individual seismicity rates as an input;
5. the PGA attenuation relation chosen.

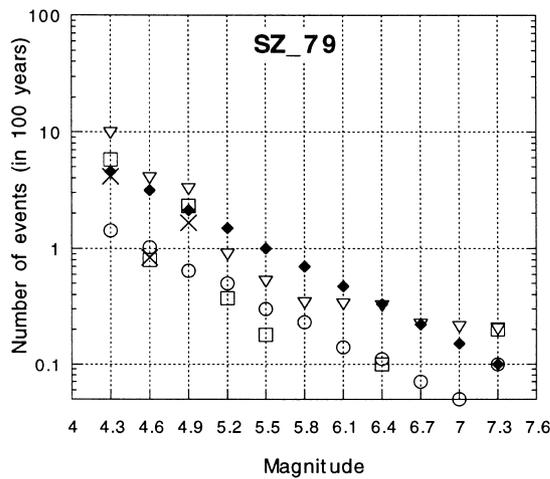
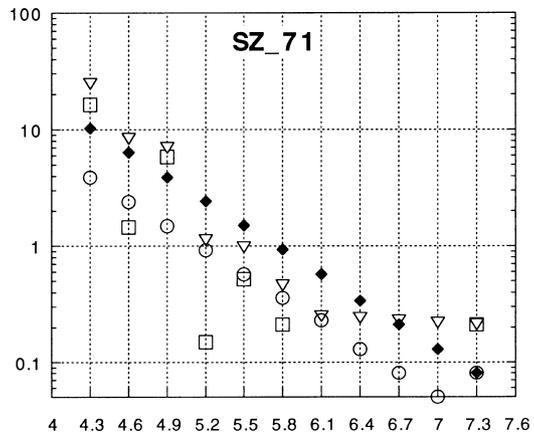
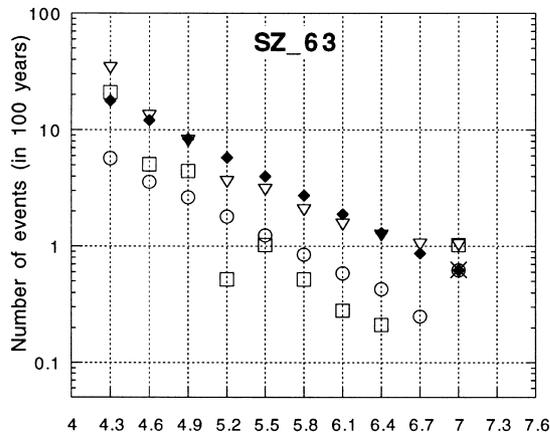
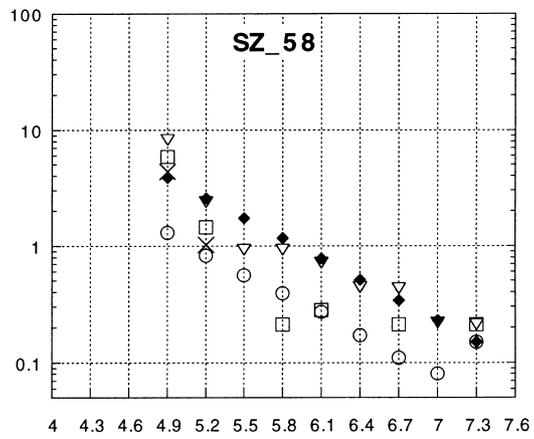
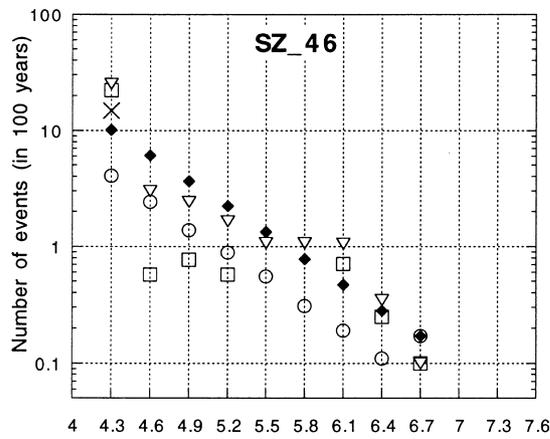
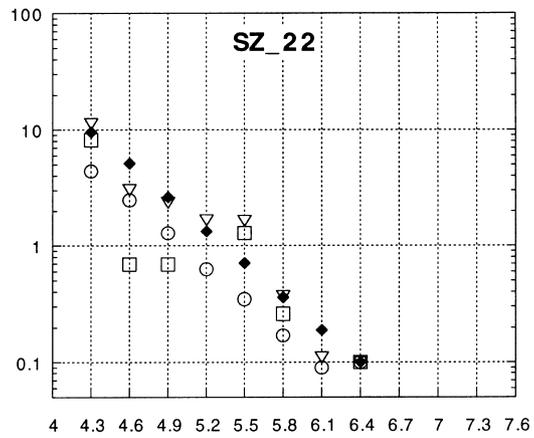
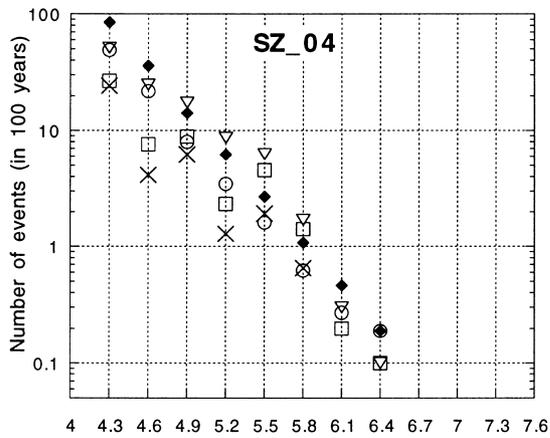
All the topics cited above are rather specific and strictly refer to the application of the Cornell [1] approach. The choices done for the Italian hazard map, for most of the above-cited topics, are not standard and deserve detailed investigation to quantify their influence in the hazard estimates.

The scope of this work is to analyse the sensitivity of the hazard estimates when different choices are considered for the above-cited input parameters. All the choices considered in the present work reflect realistic possibilities for the situation in Italy and are not, therefore, mere speculation.

2. The seismic hazard map of Italy

The seismic hazard map of Italy was drawn up according

* Corresponding author. Tel.: +39-040-2140248; fax: +39-040-327307.
E-mail address: dslejko@ogs.trieste.it (D. Slejko).



متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات