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OF ENGINEERING GEOLOGY

ASSOCIATION INTERNATIONALE
DE GEOLOGIE DE L'INGENIEUR

Proceedings of the
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ENGINEERING GEOLOGY PROBLEMS IN SEISMIC AREAS

PROBLEMES DE GEOLOGIE DE L'INGENIEUR DANS LES ZONES SISMIQUES

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INTRODUCTION TO THE WORK OF THE SYMPOSIUM

Time and again the tragic results of natural calamities focus public attention on the question of research in the field of Engineering Geology in seismic regions. The opinion generally voiced on such occasions is that research should be concentrated on gaining a deeper insight into the background causes of all the phenomena related to seismic hazards and on defining more clearly methodologies that may help to assess and mitigate risks.

In many countries today, the subject of protection is highly topical, because of the catastrophic earthquakes that have occurred in recent years, often causing massive loss of life and irreparable damages. With its specific setting in the global seismotectonic scene – and more particularly in the Mediterranean Region – Italy is certainly one of the countries with the highest seismic hazard. The Belice Valley earthquake in 1968, and those of Friuli (1976), Irpinia (1980), and Abruzzo, Molise and Lazio (1984) all bear dramatic testimony to this fact, as too does the recurrent bradyseismic activity in the Phlegraean Plain around Pozzuoli, which reached its peak in 1983.

These circumstances, and the very special interest of the world of Engineering Geology in Italy's difficult soils, have prompted the Italian IAEG Group to organize this Symposium, thus contributing to the time-honoured tradition of holding important International Symposia on matters of the moment in the periods between the four-yearly Congresses.

The scientific community in Italy and abroad has responded very well to this initiative, as is evident from the great number of papers to be found in these Proceedings.

The Scientific Committee felt it appropriate to accept all contributions exactly as submitted, so as to permit everyone belonging to scientific organizations working in this field to obtain an objective account of knowledge acquired in the various parts of the world most frequently affected by earthquakes.

Minor editing and some redrawing had to done in some cases without consulting the authors owing to pressure of time. It is hoped that they will forgive any mistakes which may have been perpetrated as a results.

SYMPOSIUM PROGRAM

Sunday, April 13

Registration at the Fiera del Levante, Bari

Welcoming addresses and introduction to the Symposium

Presidential address by L. Langer

Chilean Earthquarke, 1960. Lecture by H. Tazieff (France)

«Ground Displacement and Slope Instability triggered by the Earthquake of November 23, 1980 in Campania and Basilicata» Lecture by V. Cotecchia (Italy)

Monday, April 14

Registration continues at the Fiera del Levante, Bari

FIRST SESSION

Theme 1: Seismic Geology related to Engineering Practice (Chairman: M. Arnould, France)

Presentation of Lectures

1. P. Scandone (Italy): Seismical Hazard: Seismotectonic Approach
2. V. Petrini (Italy): Seismical Hazard: Probabilistic Analysis
3. D. Veneziano (U.S.A.): Statistical Analysis of Earthquake Catalogs for Seismic Hazards
4. E. Boschi (Italy): Earthquake Prediction
5. C. Bosi (Italy): First Neotectonic Map of Italy: Realization and Inferences

Invited Papers and Discussion

SECOND SESSION

Theme 2: Geological Hazards due to Earthquakes, their possible Control and Remedial Measures. Fault Rupture, Land Subsidence, Soil Liquefaction, Landslides, Erosion Phenomena, Changes of Hydrographic Pattern and Underground Water Conditions. Possible Remedial Measures and Control. **(Chairman: R. Chandler, England).**

Presentation of Lectures

1. Wang Zhong Qi (China): Fault Rupture
2. M. Jamiolkoski, E. Pasqualini (Italy): Assessment of Soil Behaviour at Small Strains
3. C. Viggiani, F. Vinale (Italy): Soil Liquefaction
4. K. Ishihara (Japan): Landslides Triggered by Earthquakes

Invited Papers and Discussion

Tuesday, April 15

Registration continues at the Fiera del Levante

THIRD SESSION

Theme 3: Soil-structure Interaction during Earthquakes. Behaviour of Large Constructions (Dams, Railways, Highways, Nuclear Power Plants, Underground Constructions etc.) with Reference to Both Structural Characteristics and Local Effects Induced by the Earthquake
(Chairman: M. Langer, F.R. Germany)

Presentation of Lectures

1. G. M. Roesset (U.S.A.): Fundamentals of Soil Structure Interaction and Soil Amplification
2. M. K. Yegian (U.S.A.): Geological Considerations in Seismic Hazard and Risk Assessment
3. F. Muzzi (Italy): Definition of the Design Seismic Ground Motion for Engineering Purposes
4. S. Prakash (U.S.A.): Rigid and Flexible Retaining Structures Under Dynamic Conditions
5. A. Gürpinar (Belgium): Design Considerations for Nuclear Facilities in Seismic Areas

Invited Papers and Discussion

FOURTH SESSION

Theme 4: Seismic Zoning related to Engineering Practice. Criteria and Methodologies of Seismic Zoning Related to Urban and Country Planning
(Chairman: G. S. Zolotarev, USSR)

Presentation of Lectures

S. T. Algermissen (U.S.A.): Seismic Zoning Applied to Engineering Practice

C. Basi, A. Bottari, I. Firretti, B. Gasparini, G. Grandori, L. Vezzani: Seismic and Tectonic Problems for Permanent Crossing of Messina Straits

Invited Papers and Discussion

Poster Session

Wednesday, April 16

FIFTH SESSION

Case Histories

1. Calabrian Earthquake, 1783
   Lectures: V. Cotecchia, G. Melidoro, A. Guerricchio (Italy)
2. Friuli Earthquake, 1976 (Chairman: B. Martinis)
   Panelists: A. Brambati, L. Broili, A. Cavallin, M. Mele, D. Sleiko
3. Irpinia- Basilicata Earthquake, 1980 (Chairman: M. Manfredini)
   Panelists: M. Basili, C. Cesi, N. Ciaranfi, V. Cotecchia, I. Finetti, C. Gavarini, F. Mostardini, R. Scarpa
4. Unique site response Conditions of two Major earthquakes of 1985 Chile and Mexico
   Lecture: M. Celebi, USA.
5. Mexico Earthquake, 1985
   Lecture: L. Esteva, Mexico

Final Discussion

Closing Ceremony

POST SYMPOSIUM TECHNICAL TOUR

The tour across Italy from the Adriatic to the Tyrrhenian sea provides a complete idea of the principal structural units of the Italian peninsula: foreland, foredeep, the Apennine chain, backdeep.

On the way to the area hit by the 1980 earthquake, the tour passes through foreland and foredeep, in succession, into the Apennine chain.

The foreland consists of lagoon neritic carbonate deposits (Jurassic-Cretaceous), maximum thickness over 5000 m. The foredeep, superimposed on the western internal edge of the foreland, lowered by a series of direct faults, is filled with marine deposits (clays, sands, gravels) (Pliocene-Lower Pleistocene).

Thickness growing from E to W to a maximum of about 3000 m. Along the western edge the ceno-mesozoic deposits of the Apennine chain are sumperimposed and interbedded in the filling of the foredeep by gravity flow.

On the first two days the tour mostly passes through the sector of the Apennine chain delimited by the VII degree isoseismal line of the 1980 earthquake. The lithostratigraphical and structural interpretation of this Apennine sector is very complex as illustrated in the Symposium session relative to Case Histories. The tectonic structure of this Apennine sector is generally interpreted as the result of superimposed nappes during Miocene. From the morphological point of view, the tour landscape is varied and the area is affected by a great number of mass movements.

Documents concerning present geology, geomorphology and the state of seismogenetic features of the area are to be distributed to the participants.

On the third day, the tour completes the crossing of the Southern Apennines

THEME 1: Seismic geology related to engineering practice

La géologie séismique et la pratique de l'ingénieur

(*Chairman*: M. ARNOULD, France)