

Preface

Forty years have passed since the terrible earthquake that destroyed central Friuli (north-eastern Italy) in 1976. Since then many things have changed in almost all fields of Science as well as in the social life; it is our conviction that it is worth to maintain the memory of that event nevertheless, because it initiated a fruitful design of seismic risk reduction.

This volume aims at collecting a summary of what our scientific community and administrative boards have learnt in fields of seismology, engineering, communication, and management from the 1976 event.

In this occasion, we wish to remember the late Francesco Giorgetti, who had the difficult task to coordinate the seismological work and to manage the information dissemination during the seismic crisis.

Many thanks are due to D. Albarello, P.M. Alves, A. Amato, R. Camassi, R. Caputo, M. Crescimbene, D. Kaiser, V. Kouskouna, G. Mirabella-Roberti, R. Musson, L. Peruzza, V. Petrini, M.E. Poli, G. Santarsiero, and M. Santulin, who acted as reviewers for the papers of this volume and to S. Conway, who checked all English manuscripts.

Dario Slejko, Ina Cecić and Marcello Riuscetti

Friuli '76

*Per cinquantotto secondi tremasti.
 Con te prendesti un migliaio di vite,
 e solchi son, sulle mura, rimasti:
 ricordi come dischiuse ferite.
 Noi nelle tenebre siamo scappati,
 ma i nostri averi la terra inghiottiva.
 Sono così grandi i nostri peccati
 per meritare una tal, furiosa ira?
 Vidi persone aiutarsi a vicenda,
 un bimbo piangere, un padre gridare;
 fu la mia casa, per mesi, una tenda.
 Ci fu il coraggio di ricominciare.
 Soldati ovunque, ma senza una guerra:
 sono a difesa di un mondo venturo.
 Poiché se trema, tremenda, la terra
 non vi è luogo davvero al sicuro.*

Emanuele Alberto Slejko
 vincitore dell'ottava edizione del concorso "Poeta anch'io"

*For fifty-eight long seconds you shook.
 You took away a thousand lives,
 and the cracks in the walls are still there:
 memories like unclosed wounds.
 We fled into the dark night,
 but all we had was swallowed by the ground.
 Are our sins so severe
 to deserve such furious rage?
 I saw people helping each other,
 a child weeping, a father crying out;
 my home, for months, was a tent.
 There was determination to start anew.
 Soldiers everywhere, though there is no war:
 they are safeguarding a future world.
 For if the ground shakes so formidably
 then no place can truly be safe.*

Emanuele Alberto Slejko
 winner of the 8th edition of the contest "Poet me too"

Francesco Giorgetti (11 August 1937 - 14 April 2016)

Francesco Giorgetti was born in Cividale del Friuli on 11 August 1937 and there he returned, unfortunately forever, on 18 April 2016, leaving a heartfelt grief at his loss, not only among the family, but also with friends and throughout the scientific community of Earth Sciences.

His curiosity to discover the aspects of nature and his spirit of adventure led him from his youth to participate in the explorations of the caves of his beloved Friuli, enrolling in the celebrated Friulian Speleological and Hydrological Club, in whose periodical “In Alto” he published his first work on a cavity in northern Carnia in 1963. Over the years, he was elected as one of the *Probiviri* of the Board of Directors of the club.

He graduated in Padua in 1963 in Geological Sciences. He, then, began his working life with an adventurous geotechnical experience at a road construction company in Nigeria.

He returned to Italy at the end of the 1960s and was employed by OGS (Experimental Geophysical Observatory, now the National Institute of Oceanography and Experimental Geophysics) of Trieste. These are the years when, following the dynamic activity of prof. Carlo Morelli, founder and first president of OGS, Giorgetti carried out intense campaigns of bathymetry, gravimetry, geomagnetism, oceanography, and seismic reflection exploration in the Gulf of Trieste, which were extended successively to the entire Adriatic and the Mediterranean seas. The marine geology researches were carried out through geophysical instruments installed, sometimes, in a precarious and rudimentary way, on board deep-sea fishing vessels, deep-sea tugboats, or coastal support ships refitted as oceanographic vessels. They were hard, tiring, and long campaigns but the love



of the sea and for the research, feelings that would accompany him throughout his life, as well as his spirit of adventure, drove Francesco Giorgetti (whose friends will always remember by the nickname Checco) to participate in most of these marine activities of which he kept an indelible memory.

Closely related to his first speleological studies is, instead, the hydrogeological research, on both continental and marine waters, which Checco developed during his mature years. His investigations into continental waters referred to the origin of Karst waters, to the distribution of the deep-water layers in the northern Friuli plain, and



to the geochemistry of water, aiming at the protection of groundwater resources. Regarding the marine waters, with the mentioned geophysical campaigns, he investigated the morphological, physical, and chemical characteristics of the sea bottom of the Gulf of Trieste, as well as the distribution and nature of the coastal and bottom sediments of the entire Adriatic Sea.

Francesco Giorgetti continued his scientific career at OGS, from 1974 as researcher in the field of seismology and, then, as director of the institute from 1977 to 1981. He was the supervising scientist during the 1976 earthquake crisis, coordinating the seismological investigation and managing the communication with media and public to provide accurate scientific information on the seismic evolution of the disastrous

phenomenon. During the 1976 seismic crisis, he would often arrange a meeting at OGS in the late afternoon to summarize the sequence evolution, discuss the research produced during the day, and plan the future steps. Everything was summarized in a short daily report that he disseminated to the media. In such a way, he became very popular for his reassuring interviews.

Of the many dozens of works of his scientific production, related to Applied Geophysics, Hydrogeology, Seismology, Geophysical Prospecting, and Geodynamics, as many as 58 works





concern Friuli Venezia Giulia and about 30 of these deal with regional seismicity, in general, and the earthquake of 1976, in particular. Checco produced the first isoseismal map of the 6 May earthquake; that map appeared in international scientific journals as well as in widely read newspapers.

Significantly, it is well worth citing that Giorgetti is one of the authors of the first Italian earthquake catalogue. This was presented at the 13th General Assembly of the European Seismological Commission, held

in Brasov (Romania) in 1972, and edited and disseminated by the Italian Committee for Nuclear Energy (CNEN) a year later. The catalogue was the first approach to problems of seismic hazard and risk, topics that he further developed in the following years, especially in relation to the territory of north-eastern Italy.

In the 1980s, he conveyed with great passion to his students, reciprocated by their esteem and respect, his deep knowledge of geophysical methods for the exploration of the seas and the Earth, especially using the methods of resistivity measurements of the land through electrical survey systems and induced polarization and seismic tomography. He became professor of “Geophysical prospecting” at the University of Trieste, first at the faculty of Engineering and later at the faculty of Sciences.

After his retirement in 1998, he enjoyed sailing along the coasts of Istria and Dalmatia and was elected President of the celebrated nautical society Pietas Julia of Sistiana. His last great sea adventure was the mythical crossing of the Pacific Ocean on a sailboat.

During his life, he travelled the world for teaching and research, sometimes in daring scientific expeditions, from Indonesia to Russia, from Angola to Nepal and Pakistan, from Ecuador to the South Pole. In this distant land, he participated in the 1990-91 Antarctic campaign of the National Program of





Research in Antarctica as scientific coordinator, on board the Cariboo oceanographic vessel.

Beyond his scientific and academic life, it is worth noting the considerations on his nature, his character and his moral qualities remain: his friends, his colleagues, and his students will always remember him as an honest man, wise, good, coherent, devoid of rancour, loyal, a man of yore, a true gentleman.

Giovanni Battista Carulli

Marcello Riuscetti

Dario Slejko