

PREFACE

QUATERNARY: Past, Presente, and Future 40 years of Italian Quaternary in an Alpine-Mediterranean perspective

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The aim of the 2018 AIQUA (Italian Association for Quaternary Studies) annual congress (Earth Science Department, Florence University, 13-15 June) was three-folded: i) to provide an overview on the status of Quaternary research in Italy, focusing on the new lines of research, in particular those performed by early-career researchers; ii) to discuss the most intriguing and multifaceted aspects related to Quaternary studies, also in the perspective of correct public outreach and effective responses to societal challenges; iii) to celebrate the anniversary of four significant events, which fall in 2018.

- i) In 1928, International Union for Quaternary Research INQUA was nominally founded during a Congress devoted to celebrate the founding (1888) of the Danish Geological Institute (General International Conference, Copenhagen 17-30 June 1928). During the plenary session on the second day of the conference (26 June 1928) it was unanimously accepted the proposal presented by Prof. M. Limanowski (University of Vilnius in Lithuania) for the establishment and organisation of the "Association for Investigations of the Quaternary of Europe". It taken some years before the European Association became a World organisation (INQUA), devoted to promoting Quaternary researches and collaborations among scientists around the world, and reached its current structure (Porter, 2003; Smalley, 2011).
- ii) 70 years ago, during the 18th International Geological Congress held in London in 1948, it was agreed to place the Pliocene-Pleistocene boundary "... at the horizon of the first indication of climatic deterioration in the Italian Neogene succession" (King & Oakley,

1949). The Italian stratigraphers provided an outstanding contribution in defining the Plio-Pleistocene boundary, first formally defined in the stratotype section at Vrica (Calabria, southern Italy) (Aguirre and Pasini, 1985) and successively lowered, after decades of discussion and following the recommendation of the 2008 International Geological Congress (IGC), to the Global Stratotype Section and Point (GSSP) of the Gelasian Stage/Age at Monte San Nicola (Sicily, Italy) (Gibbard et al., 2010), to encompass the time during which Earth's climate has been strongly influenced by bi-polar glaciation, while the GSSP at Vrica remained available as the base of the Calabrian Stage/Age.

- iii) 40 years ago (19 June 1978) the Italian Association for Quaternary Studies (AIQUA) was founded, with the objective of gathering scholars working in the various fields of research dealing with the Quaternary, promoting Quaternary study and knowledge in Italy and elsewhere, and enhancing the Quaternary cultural and environmental heritage.
- iv) 30 years ago, on January 1st, 1988, the AIQUA journal "Il Quaternario - Italian Journal of Quaternary Science" (since 2012, "Alpine and Mediterranean Quaternary") started to be published. Since that time hundreds of papers were published spanning nearly all the main Quaternary issues and disciplines, from geomorphology, to archaeology, geodynamics, climatology, palaeontology, volcanology, palaeobotany, palaeoanthropology, ichnology, among others.

Since the beginning of the last century, besides its relevance for defining the Plio-Pleistocene boundary Italy has been, indeed, a key territory for the study (sometimes pioneering) of the most recent events in the history of our planet, whose synergetic dynamics led to the modern geographical, climatic, and biogeographical setting, and Italian researchers have been undisputed protagonists in various dedicated scientific disciplines, contributing to deconstruct the complex Quaternary scenarios.

The outstanding role of Italy in Quaternary studies is related to the variety and the complex history of its territory that has to be analysed and deconstructed in the context of the geodynamic, climatic, palaeobiogeographical and environmental evolution of the Mediterranean basin, as well as of the Alpine orogenesis and related phenomena. The Mediterranean region, in fact, is geologically young and active and represents a hot-spot of biodiversity and endemisms that characterise a region particularly suitable for discussing the dynamics interaction of processes and events that have shaped the physical and biotical scenarios succeeding each other in the last 2.6 millions of years.

The scientific program of the 2018 AIQUA annual congress included five sessions (Coastal and Marine Processes, Human and Biosphere, Palaeoclimate, Stratigraphy and Chronology, Terrestrial Processes), devoted to discuss the focal issues (e.g. climate change and its effects on ecosystems, main terrestrial processes in the short, medium and long term, rising sea level, volcanic and seismic activity, dynamics of plant and animal communities in a perspective of conservation of biodiversity and cultural heritage, dynamics of human population in the Pleistocene and impact that human activity had on ecosystems during the most recent Quaternary period in an Alpine-Mediterranean perspective).

In particular, the session coordinated by M. Anzidei and G. Mastronuzzi was devoted to analyse and discuss the **Coastal and Marine Processes**, especially focusing on the past relative sea level rising as the effect of climate change, but looking at expected scenarios for the coming decades. During the session, 8 oral communications have been presented that dealt with a number of different topics, such as issues possibly deriving from the extensive use of models in the face of a few new direct observations and data collection, methods and geodatabase related to palaeo-sea level markers, morphodynamics and landscape changes of coastal areas, as well as more punctual methodological approaches such as the determination of the friction coefficient for estimating sea storm.

The session **Human and Biosphere**, coordinated by D. Magri and M. Peresani, included 13 oral presentations presented by palaeontologists, palaeoecologists, archaeologists, and geochemists, who introduced and examined, also in an interdisciplinary perspective and by means of advanced methodological approaches, a number of noteworthy and intriguing issues, such as the effects of climate changes on organisms, factors behind

palaeoenvironment and ecosystems evolution, mainly focusing on terrestrial domain, and Palaeolithic hominin behaviour and human impact on Holocene environments (including pollution in the so called Anthropocene recent and present time).

The **Climate and Palaeoclimate** session, coordinated by F. Lirer and F. Toti, was devoted to present records and expected changes, processes and models, highlighting the results of research on all the aspects of Quaternary climate, discussing the usefulness of proxies, presenting data syntheses, methods for inferring past climate, modelling and simulation of palaeoclimatic models. In line with the session aim, the 13 oral communications included in the session deal with different issues including case studied on palaeoclimate changes and climate instability and variability in marine and terrestrial domains, within and outside the Mediterranean Basin, studies on multiproxies environmental evolutionary dynamics and palaeoenvironmental evolution in different terrestrial contexts, and results obtained by means of quantitative methodological approaches and modelling.

A fundamental basis for the reconstruction of Quaternary events is provided by data coming from researches in the field of stratigraphy and chronology. The 8 contributions to the **Stratigraphy and Chronology** session, coordinated by M. Balini and A. Negri present classic and new methods of stratigraphical investigation, new data useful for an integration into a multidisciplinary stratigraphy, and critical evaluations of some principles of stratigraphic classification and correlation, and principles to be adopted in biostratigraphy and biochronology, as well as the criteria behind the Database of Terrestrial Quaternary Stratigraphical Sites of Europe currently under construction by an international teams of researchers working in the different Quaternary disciplinary fields.

The **Terrestrial Processes** session, coordinated by M. Di Vito, E. Falcucci and P. Mozzi, was planned to address the multiple and complex aspects and phenomena that regulate and constrain the history of continental environments, from tectonics to volcanoes, from extreme climatic events to earthquakes. Following the session aim, the 13 oral communications addressed different themes even highlighting the role of Quaternary research in the analysis of factors regulating environmental evolution and in the study and assessment of past, recent and present geological hazard. Results presented by some contributions underlined the importance of multidisciplinary approaches to deconstruct complex Quaternary geological events.

The 2018 AIQUA congress held in Florence contributed to present the state-of-the-art and the diversity within the field of Quaternary study, the most advanced researches on climate and landscape changes, marine and terrestrial processes, and ecosystems dynamics, highlighting the contribution of young researches in promoting the comparison and enhancing the analysis of the different Quaternary evolutionary scenarios. Deci-

phering the complex network of mechanisms leading to the present geological setting and biodiversity status is, likewise, of crucial relevance to understand the actual meaning of the processes acting today, and to plan appropriate actions for biodiversity conservation in view of the ongoing climate warming, correct public outreaches and effective responses to societal challenges, stretching our imagination beyond the present, and collects insights into the Earth's future scenario through a lesson from the past.

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