



AIQUA CONGRESS IN TURIN
February 24th - 26th, 2015
THE PLIO-PLEISTOCENE CONTINENTAL RECORD IN ITALY:
HIGHLIGHTS ON STRATIGRAPHY AND NEOTECTONICS
In honour of Francesco Carraro

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ABSTRACT: The 2015 AIQUA Congress (Torino, February 24-26) highlighted the advances on the studies concerning the stratigraphy of Plio-Pleistocene continental records and the neotectonic deformation of key representative areas in both Alpine and Apennine contexts. Two field trips that followed the conference focused on the type-area of the Villafranchian succession" and on the Ivrea Morainic Amphitheatre.

Keywords: Quaternary, AIQUA Congress, Torino, Italy

The annual AIQUA (Italian Association for Quaternary Research) meeting took place in Turin, February 24-26, 2015. It was organized in honour of Prof. Francesco Carraro by the Earth Sciences Department of the Turin University, with the collaboration of colleagues from the CNR Institute of Geosciences and Earth Resources.

The conference theme was "The Pliocene-Pleistocene continental record in Italy: highlights on Stratigraphy and Neotectonics". Two topics that have marked much of the research of Francesco Carraro. Francesco was the main promoter and one of the AIQUA founders. He was AIQUA president and adviser for many years.

Attendance at the meeting was intense and warm and showed the maturity and scientific progress achieved by the Italian quaternary community.

On February the 24th the historic "hall of coats of arms" (1893) of the National Mountain Museum "Duca degli Abruzzi" in Monte dei Cappuccini was crowded by researchers (about sixty) coming from all over Italy almost as suggested by the arms of the Italian cities painted on the hall walls.

After the greetings of Mr. Roberto Ferrero, on behalf of the Italian Alpine Club and of the Mountain Museum, and of the Department Director Prof. Daniele Castelli, the conference was opened by Prof. Gabriella Forno, meeting organizer together with Franco Gianotti and Giovanni Monegato.

During the entire day 14 communications, the visit to the posters and the presentation of two excursions to Villafranca d'Asti (G. Forno) and to the Ivrea moraine amphitheater (F. Gianotti) occurred.

The writer of these notes opened the communication section and, based on his blurry memories, tried to summarize the development of Quaternary studies in the last half century (How much Quaternary grew up! 50 years of impressive breakthrough and extraordinary

adventures). Thanks to the progress of research and dating methods and to the urgency of environmental problems, from specialized niche area the Quaternary Geology (a short term for the whole spectrum of stratigraphic, geomorphological, palaeobiological, palaeoenvironmental, palaeoclimatic and neotectonic studies dedicated to the Quaternary) has fully established itself and has attracted a growing number of full-time researchers. So that, for example, from a single scientific journal in the 50s and 60s of the last century it has been reached more than 20 journals having the term Quaternary (or equivalent) in the title, and even more numerous are the scientific journals that routinely publish articles of Quaternary interest.

Then the AIQUA president Adele Bertini took the floor (The history of Late Pliocene-Middle Pleistocene terrestrial settings in Italy: vegetation and palaeoenvironmental changes as a response to the Northern Hemisphere insolation forcing and regional tectonics) summarizing a rich, varied and detailed contribution of palynology to the reconstruction of vegetation and environmental changes that occurred in Italy from the Piacenzian to the middle Pleistocene, in response to cyclical climate change on a global scale, or to tectonic evolution at local-regional scale.

R. Sardella, also on behalf of Russo Ermolli, (Pleistocene large mammals and pollen from the Mercure Basin - Southern Italy) described mid-Pleistocene fauna and pollen and tephrostratigraphic record contained in the fluvio-lacustrine deposits of the Mercure basin (Southern Apennines).

The presentation of Mazzini (Mazzini I., E. Regattieri, B. Giaccio, G. Zanchetta, S. Nomad, RN Drysdale, P. Galli, E. Peronace - The Sulmona Basin Lake during the early Last Glacial: Palaeoclimate vs Palaeohydrology) related to the study of a carbonate lacustrine section of the Sulmona basin, containing four levels of tephra dated 92 to 110 ka BP. The analysis of stable



Fig. 1 - The audience at the AIQUA Meeting of Turin in the "hall of coats of arms" of the National Mountain Museum. In the second row, fourth from right, Francesco Carraro

isotopes and ostracod associations helped to identify and correlate climatic events that have marked the early stages of the last main glacial cycle.

M. Spadi (M. Spadi, M. Nocentini, E. Gliozzi, D. Cosentino - The early evolutive stages of the L'Aquila Basin (central Italy) inferred from paleontological and stratigraphical analyses) showed the Plio-Pleistocene stratigraphic succession representative of the early stages of infill of the intermontane basin of L'Aquila, when it was still divided into two sub-basins separated by a bedrock threshold. The environmental development, also documented with the ostracod assemblages, experienced a main phase of tectonic uplift highlighted by a stratigraphic unconformity occurring in both the two sub-basins.

Thanks to his expertise and knowledge that started right in AIQUA at the instigation of F. Carraro and C. Bosi, Fabrizio Galadini illustrated the current state in Italy of the study of active and capable faults, and of related scientific problems and regulations (The Quaternary Geology applied to the study of active and capable faults: the state of knowledge in Italy).

S. Gori addressed the topic of changes of the hydrographic network (stream piracy, drainage reversal) in central Apennines, caused by erosional phases related to the tectonic evolution of the chain during the Early-Middle Pleistocene transition (S. Gori, E. Falucci, G. Scardia, S. Nomad, H. Guillou, F. Galadini, P. Fredi -

Early capture of a central Apennine (Italy) internal basin as a consequence of enhanced regional uplift at the Early-Middle Pleistocene transition).

In the Tiber Basin (Valle Umbra) palaeocarpological remains and pollen data collected from the section of the Beveragna-Arquata quarry provided information on the Late Pleistocene palaeoclimate and palaeoenvironment, described by R. Bizzarri (A. Baldanza, R. Bizzarri, R. Colacicchi, P. Corrado, D. Magri, E. Martinetto - Early capture of a central Apennine (Italy) internal basin as a consequence of enhanced regional uplift at the Early-Middle Pleistocene transition).

With the note presented by A. Irace (A. Irace, G. Monegato, E. Tema, E. Martinetto, D. Gianolla, E. Vassio, L. Bellino, D. Violanti - The first late Piacenzian-Gelasian fluvial record in Northern Italy: insights from the Alessandria Basin) we moved to Northern Italy: in the Alessandria Basin the coarse river sedimentation started at the end of Piacenzian after a climate deterioration dated to 2.8 Myr, also documented by carpollora. In the late Piacenzian-Gelasian the basin was deformed by a NS shortening related to the north-Apennine thrust front.

On the basis of peculiarities of the lower Cerrina valley (Monferrato) and their stratigraphic and structural data, Carlo Giraudi (Could the low Cerrina Valley - Piedmont, NW Italy - be an Early and Middle Pleistocene trough developed behind the Monferrato thrust



Fig. 2 - The AIQUA President, Adele Bertini, during the Turin Meeting

front?) put forward the hypothesis that this sector, raised after the Messinian, remained emerged during the Pliocene, to become subsiding during Early and Middle Pleistocene, because of the northward migration of the Monferrato thrust beneath the Vercelli plain.

A. Fontana (Late Quaternary alluvial megafans in Northern Italy), on behalf of the co-author P. Mozzi too, described the megafan alluvial system, placed at the foot of the Alps during the Last Glacial Maximum (27-19 ka BP) and incised during the Lateglacial-early Holocene. In the Veneto-Friuli area distal parts of megafans are directly connected to the Adriatic and have been affected by the Holocene sea level rise. P. Mozzi spoke instead about the interpretation problems related to the Montebelluna megafan at the MIS 3-2 transition (P. Mozzi, S. Rossato, V. Pascucci, S. Andreucci, G. Monegato, A. Fontana, D. Sechi - Aggradation of the Montebelluna Megafan (NE Italy) at the MIS 3-2 transition, problems and perspectives.)

M. E. Poli and G. Monegato showed extensive evidence of neotectonic deformations along the Southern Alps thrust-front in western Friuli (Neotectonic evidence of the Plio-Pleistocene activity of the eastern Southalpine thrust front in western Friuli). In particular they showed morphotectonic evidence of faults that displace alluvial fans referred to the LGM with metric height differences, involving sliding rates up to 0.6 mm / year.

E. Falcucci (E. Falcucci, M.E. Poli, F. Galadini, G. Paiero, G. Scardia, A. Zanferrari - First paleoseismological evidence of active deformation along the eastern front of the Southern Alps - NE Italy, Friuli) described evidence of recent deformations induced by faults related to seismic events that occurred in the VI-VII and in the XV-XVI centuries AD.

Before the lunch offered by the organization, Marco Giardino brilliantly and nicely sketched with spirit the figure and work of Francesco Carraro, Quaternary Geologist and disseminator of knowledge on surface environments, adding to his say with numerous photos of the celebrated professor. Francesco Carraro replied with a brief greeting, sincere and heartfelt, welcomed by the audience with a prolonged applause.

At the end of the day, G. Forno shortly illustrated the field excursion to the area of Villafranca d'Asti, where two deltaic and fluvial sedimentary sequences

separated by an angular unconformity are attributed respectively to Piacenzian and Calabrian. A regional transcurrent N-S structure at the western margin of the area was also described.

The displayed posters:

- D. Barbero, A. Doglione, M.G. Forno, M. Gattiglio - The importance of stratigraphic and structural aspects in the mitigations of landslides involving slopes near Aguggia (San Damiano d'Asti).
- F. Finocchiaro, S. Furlani, D. Lenaz, G. Boschian, E. Zordan - Sedimentological and mineralogical reconstruction of a Quaternary sequence in Val Rosandra (Trieste, NE Italy).
- G. Fubelli, G. Amato, M. Della Seta - Evidence of fault inactivity: a multidisciplinary approach integrating Geomorphology, Stratigraphy and Paleontology.
- E. Martinetto, A. Irace, G. Monegato, E. Vassio - An updated overview of the distribution of biochronologically relevant fruit and seed taxa in the Plio-Pleistocene of Italy.
- M.R. Palombo - Dispersal bioevents of large mammals in SW Europe during the Early Pleistocene: implications for biochronology and faunal dynamics.
- P. Sassone, R. Gamba, L. Navone - Strutture recenti nord-vergenti a basso angolo in Val Cerrina (Monferrato Casalese): nuove segnalazioni.

Abstracts of communications and posters are published on n. 26 (2015) of *Miscellaneous INGV* (<http://istituto.ingv.it/l-ingv/produzione-scientifica/miscellanea-ingv/>)

Allow me here a personal thought and a tribute to Francesco Carraro. Strong and determined in his choices, Francesco came across the problems of Quaternary geology in the late 60s of last century, coming from that group of young geologists who worked in universities, attending to the survey of the geological map of Italy, thanks to the law 15.01.1960 ("Completion and updating of the Geological Map of Italy"), which brought within fifteen years to survey and publication of 276 new sheets at 1:100,000 scale and the related notes.

In particular Carraro took a part in the survey of the sheets Biella (43), Peschiera del Garda (48), Verona (49), Carmagnola (68), Dronero (78-79), Demonte (90), in many of which large areas are occupied by quaternary continental glacial or fluvial deposits. Heir of the teachings of Sergio Venzo and Roberto Malaroda with his colleague and inseparable friend Franco Petrucci, in the following years he devoted himself to the survey of the Ivrea and Tagliamento morainic amphitheaters.

Studies of the last one, that were carried out after the Friuli 1976 earthquake, brought him to further reflection on modality of the construction of the moraine systems left behind by Pleistocene piedmont glaciers at the foothills of the Alps.

All his subsequent work was dedicated with admirable perseverance and conviction to the study of "geology of surficial formations" (his definition) with all its aspects, from stratigraphy to the geological survey, from neotectonics, to relationship with geomorphology and applied geology. Francesco had a decisive role, gener-

ous and disinterested in promoting Quaternary studies in Italy, he was tireless in raising initiatives, debates, even provocation, in order to attract attention and stimulate young researchers to this field of study.

His book "Quaternary Geology", which aimed to collect and systematize knowledge and reflections coming from its long and direct experience of study, survey and analysis was recently published.

The book, which is rich in illustrations, diagrams, drawings and photographs, is a compendium of knowledge, problems, experiences that in recent decades have characterized the study of the continental Quaternary in Italy. It stands for new generations of researchers as an achievement on which further advances should be grounded.

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