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Editorial

Editorial of Special Issue "Quaternary Sedimentary Successions"

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The Quaternary is the chronostratigraphic range spanning from 2.58 Ma to the present. For some time, its lower limit, or the transition from the Pliocene, was uncertain; however, the development of stratigraphic studies and the examination of many bathyal sedimentary sections have allowed us to identify it as beginning 2.58 Ma.

The Quaternary is of interest not only to geologists and palaeontologists, but also to volcanologists, geographers, geomorphologists, biologists, and anthropologists. This is because, unlike previous periods, the biological and geological events that occurred in the Quaternary period have left traces which are still easily detectable, some even happening before our very eyes. The effects of Quaternary glaciation and deglaciation events, for example, are easily identifiable and can be observed in continental (desertification, the expansion and retreat of alpine glaciers and ice caps, and the inception and disappearance of lakes) as well as in marine and transitional environments (coastal evolution, regressions, and transgressions). Most currently living species were present throughout the Quaternary period; however, it was also characterized by the extinction of single species and genera in both the marine and continental realms.

However, the most important event of all terrestrial history which happened in this "period" is the appearance and the evolution of modern humans and, subsequently, the emergence of civilization, thought, and culture. Thus, studies on the Quaternary are of paramount importance for furthering the understanding of the geo-biological evolution of present-day society; from here, the relevance of the many editorial initiatives on the topic of the Quaternary has increased. Among them, this Special Issue, entitled "Quaternary sedimentary successions", includes eight articles about relevant Quaternary geology topics.

The first paper of the special issue entitled "Edifice of fluvial terrace flights, stacks and rows" is written by Wolfgang Schirmer [1] and tackles the theme of the architecture and structures of river deposits in valleys. The author proposes new terminology for some features, presenting the principles of fluvial systems with morphological river terraces and fluments (a new term for terrace bodies); different stages of the morphological terraces; the texture (arrangement) of fluments in the form of terrace flights, terrace stacks, and terrace rows; and the (inner) structure of a single flument. The contact between the valley fill and the bedrock is assigned a new term: "pelma". Special topics deal with flument overlaps and insights into the deepest valley fill down to the bedrock. Furthermore, a comparison with other terms of the fluvial inventory is annexed.

In the next paper entitled, "Evidence of predation on Early Pleistocene freshwater ostracods (Umbria, Central Italy)", Angela Baldanza, Roberto Bizzarri, Francesco Posati, and Manuel Ravoni [2] deal with the theme of predation on freshwater ostracods: for the first time, traces of predation on freshwater ostracods are reported in deep-lake deposits belonging to the Early Pleistocene Fosso Bianco Unit and an outcropping in the Cava Nuova section (Umbria, central Italy). The deposits are mainly clay, silty clay, and sand; the fossil record is sparse and mainly comprises very rare gastropods and bivalves, ostracods, and plant remains (leaves, seeds, and wood fragments). The associations of ostracods consist of Candona (Neglecandona) neglecta, Caspiocypris basilicii, Caspiocypris tiberina,

Caspiocypris perusia, Caspiocypris tuderis, Caspiocypris posteroacuta, and Cyprideis torosa. The Caspiocypris group, considered to be endemic to the grey clays of the Fosso Bianco Unit, represent the majority of specimens affected by predation, with a prevalence of predated female valves and a comparable number of right and left predated valves, whereas only a few Candona (N.) neglecta (adult and juvenile) valves are perforated. Traces of predation for nourishment, represented by microborings of different types, were ascribed to the ichnospecies Oichnus paraboloides Bromley 1981, Oichnus simplex Bromley 1981, Oichnus gradatus Nielsen and Nielsen 2001, Oichnus ovalis Bromley 1993, and Dipatulichnus rotundus Nielsen and Nielsen 2001. Microboring affected both adult and juvenile specimens, evidencing prey–predator coexistence in the same environment over a long period of time. This report makes a fundamental contribution to the knowledge of predation in this peculiar confined environment, also suggesting prey–predator relationships which have developed over a relatively short time interval (80–160 ka).

"Foraminifer and ostracod occurrence in a cool-water carbonate factory of the Cape Adare (Ross Sea, Antarctica): A Key Lecture for the Climatic and Oceanographic Variations in the Last 30,000 Years" is the is the title of the paper written by Romana Melis and Gianguido Salvi [3]. The authors studied foraminifers and ostracods in a gravity core recovered near Cape Adare (Ross Sea, Antarctica), with the aim of identifying the climatic and oceanographic variations during the last 30 ka. The sedimentary sequence represents the conditions of a cool-water carbonate factory, which evidences that during Marine Isotope Stage 2 (MIS2), the area was ice-free and very productive. The overall preservation of delicate skeletal remains, such as bryozoans and molluscs, indicated moderate deep-sea bottom currents. This carbonate factory was interrupted by some terrigenous levels, representing conditions of instability/southward retreat of the ice shelves. The newer levels referred to the meltwater pulse (MWP)-1A and 1B events. The Holocene sequence comprised more terrigenous sediments, reflecting strong bottom currents, similar to present-day conditions. Very abundant and well-preserved foraminifers and ostracods, representative of upper-shelf-slope paleoenvironments, were recovered. Epistominella exigua, among the foraminifers, suggested the influence of circumpolar deep water during some periods of the late Quaternary. Heavy-test taxa, such as Cibicides refulgens, indicated the strengthening of bottom hydrodynamics. As for the ostracods, peaks in the populations of Australicythere devexa, Bairdoppilata simplex, and Pseudocythere aff. caudata species, together with significant numbers of Polycope spp., allowed the authors to identify environments rich in nutrients with the influence of cold- and deep-water upwelling phenomena.

Next comes the study of Oleg Sizov, Alexandr Konstantinov, Anna Volvakh, and Anatoly Molodkov [4], "Timing and sedimentary record of Late Quaternary fluvio-aeolian successions of the Tura-Pyshma Interfluve (SW Western Siberia, Russia)", in which the authors studied important information coming from the sedimentary record of aeolian deposits and from the geomorphic features of the aeolian landforms of Northern Eurasia, which enabled them to better understand the climate and environments of the Late Glacial and Early Holocene periods. At the same time, the degree of scientific knowledge about the timing of aeolian activity, as well as the landscapes that existed during these periods, differs significantly for different parts of this vast territory. Data on the sedimentological record and age estimations of aeolian phases are practically absent for the periglacial zone of Western Siberia, in contrast to that of Europe. This article presents the first data on the Late Quaternary fluvio-aeolian environments of the southwestern part of Western Siberia, using two sections as examples. The methods included field investigations, an analysis of grain size and chemical composition, quartz grain morphoscopy and infrared optically stimulated luminescence (IR-OSL), and AMS dating. The obtained results show that aeolian sands are common, covering deposits within the study area. Two stages of aeolian activity were identified: the first during the Boreal period (9.2–10.2 ka BP) and the second during the Atlantic period, beginning around 7 ka BP.

Jose Dominick S. Guballa and Alyssa M. Peleo-Alampay, in their publication "Pleistocene calcareous nannofossil biostratigraphy and gephyrocapsid Occurrence in Site U1431D, IODP 349, South China Sea" [5], reinvestigated the calcareous Pleistocene nannofossil biostratigraphy of Site U1431D (International Ocean Discovery Program (IODP) Expedition 349) in the South China Sea (SCS). Twelve calcareous nannofossil Pleistocene datums were identified in the site. The analysis confirmed that the last occurrence (LO) of *Calcidiscus macintyrei* was below the first occurrence (FO) of large *Gephyrocapsa* spp. (>5.5 μm). The FO of medium *Gephyrocapsa* spp. (4–5.5 μm) was also identified in the samples through morphometric measurements, which were unreported in the shipboard results. Magnetobiochronologic calibrations of the numerical ages of the LO of *Pseudoemiliania lacunosa* and the FO of *Emiliania huxleyi* have been underestimated and need reassessment. Other potential markers, such as the morphological turnover of circular to elliptical variants of *Pseudoemiliania lacunosa* and a small *Gephyrocapsa* acme, which is almost synchronous with the FO of *Emiliania huxleyi*, may have biostratigraphic significance in the SCS. The morphologic changes in *Gephyrocapsa* coccoliths were also examined for the first time in Site U1431D. Placolith length and bridge angle changes were comparable with other ocean basins, suggesting that morphologic changes are most likely to be evolutionary novelties rather than caused by local climate anomalies.

The paper written by Antonietta Rosso, Agatino Reitano, and Rossana Sanfilippo, entitled "Cemented on the rock. A Pleistocene outer shelf lithobiont community from Sicily, Italy" [6], describes the lithobiont community encrusting an Early Pleistocene palaeocliff outcrop north of Augusta (SE Sicily, Italy). Bryozoans, serpulids, brachiopods, and bivalves encrusted part of the exposed surfaces, which were bored mostly by clionaid sponges. Bryozoans, with at least 25 species detected on the rocky samples, are the most diversified skeletonized lithobionts, also accounting for the highest number of colonies/specimens and the highest coverage. Brachiopods, with the only species being *Novocrania anomala* and a few but large cemented valves, cover wide surfaces. Serpulids, with two species identified on the sampled rocks and a further two on the outcrop, were intermediate. Multiphase colonization was present, including a final epilithobiont community locally formed on the eroded surfaces, exposing a network of pervasive borings. The co-occurrence of very sciaphilic species with circalittoral to bathyal distributions suggests that the studied community thrived on a rocky substratum located near or at the shelf break, probably belonging to the shelf break (or RL) biocoenosis, which was also in agreement with observations on the fossil content of the neighbouring marly sediments. The observed relationships among colonisers largely represented mere superimpositions, and real interactions were not sufficient to state species competitiveness.

Nikolay I. Akulov and Varvara V. Akulova in the paper "Pyrolysis of technogenic-redeposited coal-bearing rocks of spoil heaps" [7], presenting the results of a study of epigenetic changes in technogenic redeposited coal-bearing rocks of the Irkutsk and Kuznetsk coal basin spoil heaps (Russia). Hydrocarbon products formed under the high-temperature and low-temperature pyrolysis of coal-bearing rocks were studied using a gas chromatography–mass spectrometer GCMS-QP2010NC Plus (made by Shimadzu Company). The average temperature of natural low-temperature pyrolysis does not exceed 120 °C, and its average speed is approximately 2 m/year. In this case, three pyrolysis zones which had gradually built a metamorphic rock mass (from bottom to top) were clearly established: heating (focal), activated, and enriched. The average temperature of high-temperature pyrolysis reached 850 °C, and its average speed was approximately 20 m/year. Unlike low-temperature pyrolysis, high-temperature pyrolysis was accompanied by the presence of two major zones (from bottom to top): pyrogenic (focal) and enriched (coke). The chemical composition of the enriched pyrolysis zone was studied in detail. It has been established that hydrocarbon compounds in samples of the pyrolysis zone are present in six classes: asphaltic–resinous substances, polycyclic aromatic hydrocarbons, heterocyclic compounds, organic sulphur compounds, pyrolytic hydrocarbons, and heavy hydrocarbon

residue. The quantitative contents of hydrocarbon compounds in the analysed samples varied from 0.35% to 41.88%.

The final paper is by Roberto Bizzarri and Angela Baldanza: "Integrated stratigraphy of the marine Early Pleistocene in Umbria" [8]. Through time, the wide area between south-eastern Tuscany, north-eastern Latium, and western Umbria has been revealed as a crucial area for understanding the evolution of Neogene basins in the northern Apennines. In this study, the results of 20 years of research on the Early Pleistocene marine deposits are summarised, and the biological and physical events are presented and discussed in order to propose an integrated stratigraphic scheme. The proposed reconstruction is also included in a wider context, taking into account both local and regional geological evolution.

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