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# Quaternary International

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## Editorial to IGCP 610 Special Volume of *Quaternary International*



This Special Volume of *Quaternary International* contains ten papers presented at the First and Second Plenary Meetings of IGCP 610 “From the Caspian to Mediterranean: Environmental Change and Human Response during the Quaternary” that were held in Tbilisi (Georgia) and Baku (Azerbaijan) in 2013 and 2014 respectively (Fig. 1).

IGCP 610 Project investigates the influence of environmental change on the development of humankind for the entire Caspian-Black Sea-Mediterranean Corridor [“CORRIDOR”] that encompasses the Eurasian intercontinental basins of the Caspian, Black, Marmara, Aegean, and Eastern Mediterranean seas with their connecting straits and coasts (Fig. 1). During the Quaternary, these basins were repeatedly connected and isolated from each other. This predetermined their environmental conditions and hydrologic regimes and imposed specific impacts on diverse biological populations, including humans inhabiting the coastal domains.

The project commenced on April 1, 2013. Since that time, it has served as a focal point for correlation of scientific data obtained by research projects dealing with environmental change and human response in a variety of settings from the Caspian to the Mediterranean during the Quaternary.

Its main goal is to provide cross-disciplinary and cross-regional correlation of geological, archaeological, environmental, and anthropological records in order to (a) explore interrelationships between environmental change and human adaptation during the Quaternary, (b) create a networking and capacity-building structure to develop new interdisciplinary research initiatives, and (c) provide guidance to heritage professionals, policy makers, and the wider public on the relevance of studying the “CORRIDOR” for a deeper understanding of Eurasian history, environmental changes and their relevance, and likely future impact on humans.

This project has a triple focus: (1) geological history, (2) paleoenvironmental change (climate, sea level, coastline migration), and (3) human response (migration, subsistence strategy, physical and cultural adaptation, etc.) to environmental changes. Six dimensions of evidence are explored by integrating existing data and hypothesis testing: 1. The geological dimension examines the sedimentary record of vertical sea-level fluctuations and lateral coastline change. 2. The paleoenvironmental dimension integrates paleontological, palynological, and sedimentological records to reconstruct paleolandscapes. 3. The archaeological dimension investigates cultural remains. 4. The paleoanthropological dimension studies responses of different *Homo* species to environmental change. 5. The mathematical dimension provides GIS-aided mathematical modeling of climate, sea-level change, and human dispersal linked to environmental change. 6. The geo-information

dimension will try to grasp the “big picture” of geoarchaeological events throughout the Quaternary. Attention is constantly given to synthesizing the wealth of literature published in local languages, stored in archives, and largely unknown in the West.

This Project succeeds IGCP 521 “Black Sea-Mediterranean Corridor during the last 30 ky: sea level change and human adaptation” (2005–2010) that collected, integrated, and analyzed much scientific data and established a strong international team of multidisciplinary scientists from 32 countries. That Project examined the “CORRIDOR” for the last 30 ky only. The new IGCP Project begins in the early Quaternary, examining responses of pre-modern humans to environmental change, and includes the Central Asian basins thereby covering the Eurasian cascade more completely and involving scientists from countries farther east. It links Europe and Asia more closely in the successive conferences and field trips, and like its predecessor, the new Project improves our understanding of the geoscientific factors affecting global environment in order to improve human living conditions; increase understanding of geological processes and concepts of global climate change [GCC], including socially relevant issues; and improves standards, methods, and techniques of carrying out geological and archaeological research, including the transfer of geological and geotechnological knowledge between industrialized and developing countries.

The Project’s wide scope provides a superb opportunity to collaborate with other ongoing/past projects, as well as the MAB Programme of the UNESCO Strategy for Action on Climate Change, LOICZ, IGBP, and especially with SPLASHCOS, in which two co-leaders of this Project (V. Yanko-Hombach and O. Smyntyna) were members of the Management Committee. The Project complements the IGU Commission on Coastal Systems, INQUA CMP, and TERPRO Commissions, with which IGCP 521 cooperated previously through the INQUA 501 project, as well as the HaBCom, SACCOM, and PALCOMM Commissions. The Project also collaborates with geological surveys, archaeological expeditions, and corresponding museums in all countries bordering the “CORRIDOR.”

The Project is linked to the EU-ITN programme “Drivers of Pontocaspian biodiversity rise and demise”; EU-WAPCOAST BS-ERA-NET 076 “Water Pollution Prevention Options for Coastal Zones and Tourist Areas: Application to the Danube Delta Front Area”; ICOMOS – The International Council on Monuments and Sites; COCONET “Towards COast to COast NETWORKS of marine protected areas (from the shore to the high and deep sea), coupled with seabed wind energy potential”; SPLASHCOS “Submerged Prehistoric Archaeology and Landscapes of the Continental Shelf”; “Study of the formation processes and spatial distribution of methane in the Black Sea and theoretical considerations of their influence on

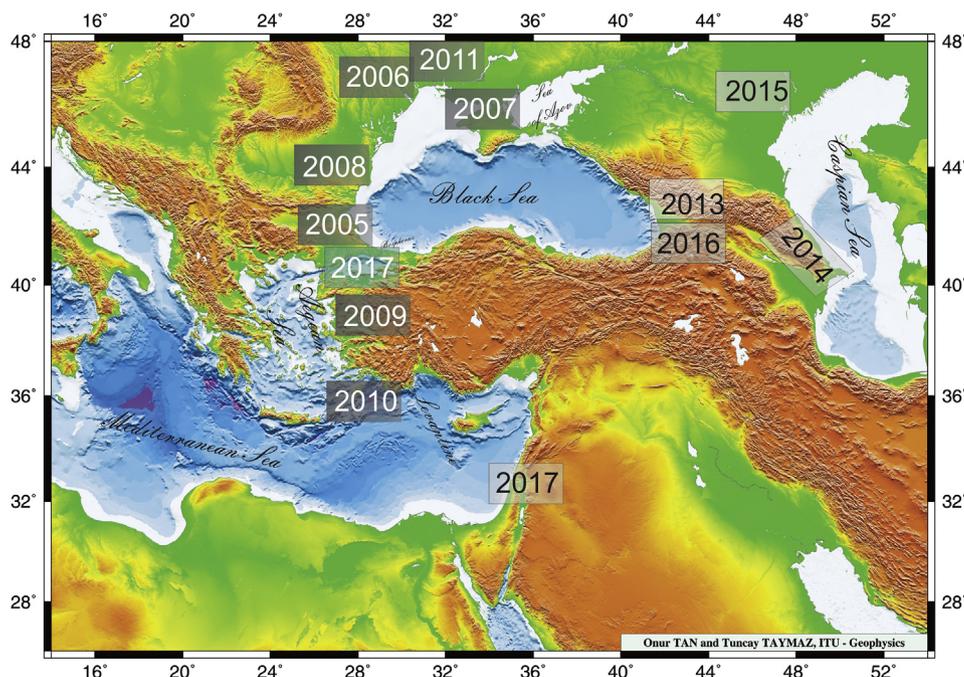
basin eco- and geosystems,” supported by the Ministry of Education and Science of Ukraine; and “Paleogeographical evolution of the Gulf of Taman with special regard to the underwater excavations in Phanagoria” funded by the University of Cologne and Russian Foundation for Basic Research (RFBR); and the series of projects supported by RFBR: № 14-05-00227 “Environmental evolution of the Caspian and Black Sea under the multiscale changes of climate”, № 13-05-00086 “Pont-Manych-Caspian oceanographic system in the late Pleistocene: Systematics and correlation of events, evaluation of character and degree of interaction, paleogeographic consequences in the region”, № 13-05-00242 “Radioisotope stratification of age and synchronization of the Quaternary deposits of the Ponto-Caspian”, № 13-05-00625 “Peculiarities of the evolution of relief in the Northern Caspian region in the late Pleistocene: Main stages of the development, chronology, and correlation with climatic rhythms in the Black Sea-Caspian region”, № 14-05-00227 “Regularities of evolution of environment of the Caspian Sea and the Black Sea in the conditions of multi-scale climate changes” and several others. Disseminating the project events and activities via regular updating of Project websites and mailing list of the project contributors, which increased from 957 in 2013 to 1054 in 2014, as well as social networks (Facebook for English and non-English-speakers, and Вконтакте for mostly Russian speakers) <https://www.facebook.com/groups/180481035443572/>, [http://vk.com/album115218532\\_181815723](http://vk.com/album115218532_181815723).

The First Plenary Meeting and Field Trip was organized by the Institute of Earth Sciences, Ilia State University and the Avalon Institute of Applied Science, Winnipeg, Canada, and hosted by Ilia State University, on 12–19 October 2013, in Tbilisi, Georgia. President of the conference was Prof. Zurab Javakhishvili. Executive Director was Prof. Valentina Yanko-Hombach.

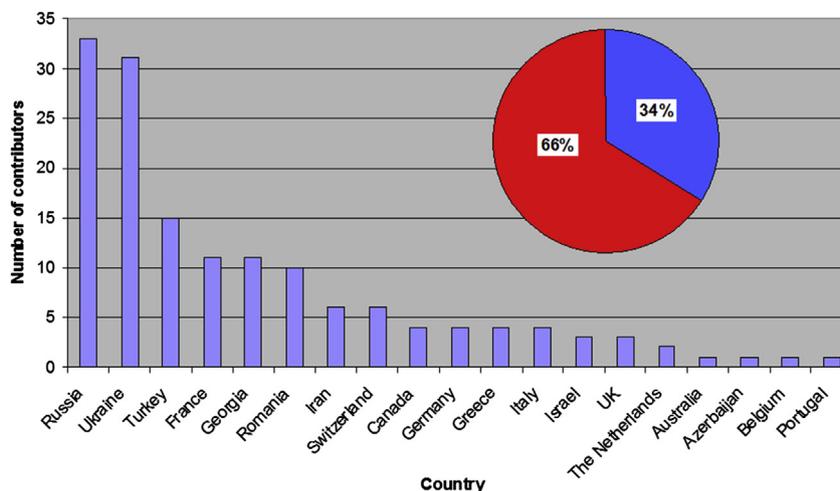
One hundred and fifty one scientists from 19 countries contributed to the conference; 66% of them were from developing countries (Fig. 2). Their peer-reviewed contributions are assembled in a 182-page Conference Proceedings volume (Gilbert and Yanko-Hombach, 2013).

The two days of Technical Sessions were organized into four panels and five Oral/Poster sessions. Panel 1 was titled “STRATIGRAPHY AND PALEOENVIRONMENTAL RECONSTRUCTIONS” (Moderators: Nikolay Panin, Romania, and Andrei Chepalyga, Russia) and included 24 presentations with two key-note talks by Prof. Teller (Canada) and Prof. Okrostsvardize with co-authors (Georgia). The presentations covered a wide range of topics including Quaternary geomorphology, geology, stratigraphy, paleogeography, volcanism, seismicity, and mineral resources of the Ponto-Caspian and Marmara region. Panel 2 was titled “RECENT ECOSYSTEMS” (Moderators: Nelly Sergeeva, Ukraine, and Valentina Yanko-Hombach, Ukraine, Canada) and included four presentations on recent fauna of the Black Sea. Panel 3 was titled “ARCHAEOLOGY, HISTORY, AND ETHNOLOGY” (Moderators: Nikoloz Tushabramishvili, Georgia, and Olena Smyntyna, Ukraine) and included ten presentations. The presentations covered a wide range of topics, such as Paleolithic of Georgia, new data on Oldowan migration to Europe via the northern Black Sea Corridor in the light of the latest discoveries in the northern Caucasus and Dniester Valley, the Aegean route: an alternative route for Neanderthals and Anatomically Modern Humans (AMHs) traveling from Asia to Europe and vice-versa. Panel 4 was entitled “MODELING” (Moderators: Nikolay Esin and Alexander Kislov, Russia) and included four presentations, such as a mathematical model of Black Sea coast and shelf evolution during the Quaternary period, etc.

The POSTER session included 17 posters that were organized into five topics: GEODYNAMICS AND ACTIVE TECTONICS (Moderator: Hayrettin Koral, Turkey), RECENT ECOSYSTEMS (Moderators: Nelly Sergeeva, Ukraine, and Valentina Yanko-Hombach, Ukraine, Canada), SEA LEVEL CHANGES AND PALEOENVIRONMENTAL RECONSTRUCTIONS (Moderators: Nikolay Panin, Romania, and Andrei Chepalyga, Russia), and PALYNOLOGY AND PALEONTOLOGY (Moderators: Petra Mudie, Canada, and Valentina Yanko-Hombach, Ukraine, Canada), ARCHAEOLOGY, HISTORY, and ETHNOLOGY (Moderators: Nikoloz Tushabramishvili, Georgia, and Olena Smyntyna, Ukraine). The Technical Sessions were followed by the Round



**Fig. 1.** The Caspian-Black Sea-Mediterranean “CORRIDOR”: in yellow are the locations of IGCP 521-INQUA 501 meeting and field trip sites (2005–2011); in other colors are sites studied/to be studied by the proposed project: 2013 – Tbilisi, Georgia; 2014 – Baku, Azerbaijan; 2015 – Astrakhan’ (Volga delta), Russia; 2016 – Gelendzhik, Russia; 2017 – Haifa, Israel, and Istanbul, Turkey. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)



**Fig. 2.** Number of countries and contributors to IGCP 610 First Plenary Conferences and Field Trips, Tbilisi, Georgia, 12–19 October 2013. The circle shows the percentage of scientists from developing (red) and developed (blue) countries, respectively. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

Table that enabled the formation of 12 Working Groups for the Project and the selection of their coordinators. It also led to decisions about the future strategy in running the project. For more details see Conference Programme.

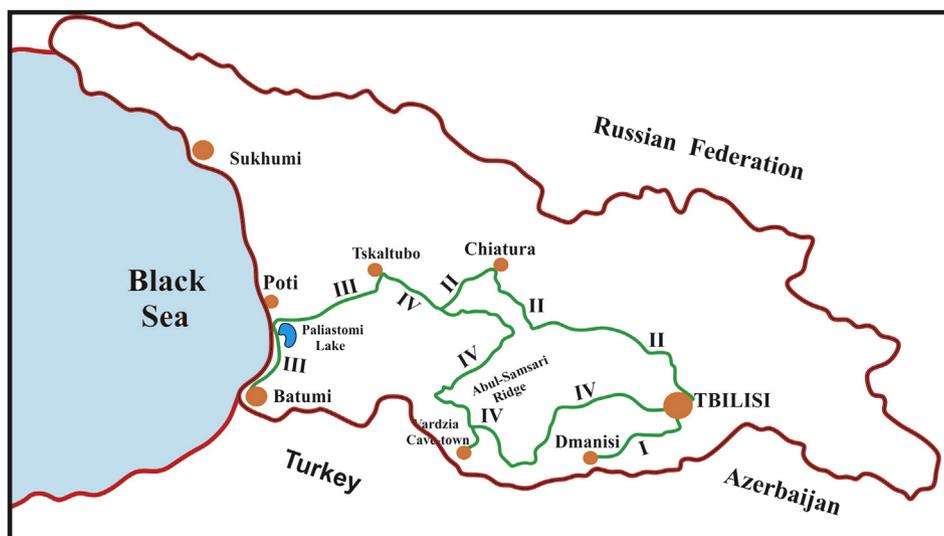
The four days of field trips (by bus) were led by prominent Georgian geologists and archaeologists (Okrostsvaridze et al., 2013) and were focused on the Eopleistocene geological sequence of Tsvermaghala Mountain that represents a stratotype of the Gurian Chauda; it possesses a thickness exceeding 1000 m deposited prior to the Matuyama-Brunhes Reversal (i.e., 780 ka BP) as well as archaeological sites of Lower to Upper Paleolithic age that include Dmanisi, Mashavera Gorge, Tetrtskaro, Tsalka-Bedeni Plateau, Faravani Lake, Akhalkalaki, Diliska, Chiatura, Bondi Cave, Undo Cave, Djrchula Gorge, as well as the Neolithic site Samele Cave and Medieval-Roman site Vardzia Cave (Fig. 3).

The Second Plenary Meeting and Field Trip was organized by the Institute of Geology and Geophysics of the Azerbaijan National Academy of Sciences ([www.gia.az](http://www.gia.az)) and the Avalon Institute of

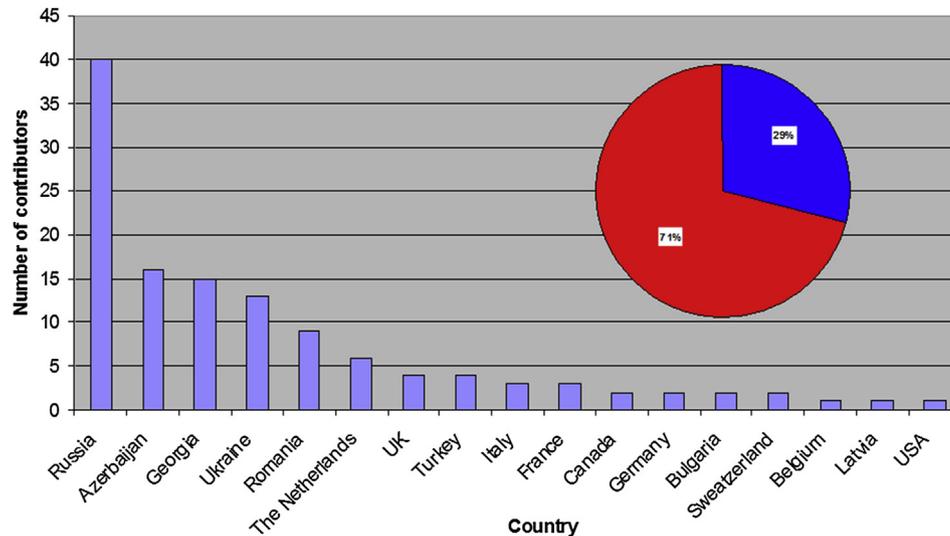
Applied Science, Winnipeg, Canada, and hosted by the Institute of Geology and Geophysics, on 12–20 October 2014, Baku, Azerbaijan (Fig. 4). President of the conference was Corresponding Member of the Azerbaijanian Academy of Sciences Prof. Elmira Aliyeva. Executive Director was Prof. Valentina Yanko-Hombach.

One hundred and twenty four scientists from two continents and 18 countries contributed to the conference; 71% of them were from developing countries (Fig. 2). Their peer-reviewed contributions are assembled in a 186-page Conference Proceedings volume (Gilbert and Yanko-Hombach, 2014).

The meeting was focused on the whole spectrum of Quaternary geological sequences exposed in the terraces and ridges of the Caspian region. This includes the stratotype of the Mountain of Bakinian stage (ca. 600–450 k BP) located in the suburbs of Baku on the Absheronian Peninsula; major exposures in the southwestern part of the peninsula of Garagush mountain, Bakinskies Ushi. This includes outcrops of Quaternary deposits at Garamaryam and Turianchay in the Ajinour region, and Bozdag located in the Middle



**Fig. 3.** Map of the Field Trips of IGCP 610 in Georgia. I. Tbilisi-Dmanisi-Tbilisi; II. Tbilisi-Chiatura-Tskaltubo; III. Tskaltubo-Paliastomi Lake-Batumi-Tskaltubo; IV. Tskaltubo-Borjomi-Vardzia-Tbilisi.



**Fig. 4.** Number of countries and contributors to the IGCP 610 Second Plenary Conference and Field Trips in Baku, Azerbaijan. The circle shows the percentage of scientists from developing (red) and developed (blue) countries, respectively. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

Kura region, which is a reference section of the marine sediments of the Bakinian stage in western Azerbaijan. The Neogene-Quaternary boundary as well as the Matuyama-Brunhes Reversal with Olduvai and Jaramillo episodes were traced. The archaeological sites in Gobustan with its famous petroglyphs of Mesolithic age were observed. Plans included visits to some archaeological and historical places in Baku: the Shirvanshakh Palace constructed during the period from the XIIIth to the XVIth century; the Maiden Tower (the most mysterious monument of Baku) of which the unique construction has no analogs in the East. The Palace complex and Maiden Tower are included in the UNESCO list of World heritage sites. The participants also visited the historical-cultural reserve of Lagich that dates from the XV-XIX centuries, the first Christian Church in the Caucasus dated to the 1st century, excavations of an ancient town located in the suburbs of Gabala city, which for six centuries (until the VIth century) was the capital of Caucasian Albania, and famous for the beautiful wall paintings of Khan Palace in the old Sheki town.

The two days of Technical Sessions were organized into five panels and five Oral/Poster sessions. Panel 1 was titled “RECENT ECOSYSTEMS AND PROCESSES”—moderators: Nelly Sergeeva (Russia) and Valentina Yanko-Hombach (Ukraine, Canada)—and included five ORAL presentations. The presentations covered a range of topics on recent environments and ecosystems of the Caspian-Black Sea-Mediterranean Corridors. Panel 2 was titled “STRATIGRAPHY, PALEONTOLOGY, AND PALEOENVIRONMENTAL RECONSTRUCTIONS”—moderators: Nikolay Panin (Romania) and Andrey Chepalyga (Russia)—and included 19 ORAL presentations with a key-note talk by Profs. Yanina and Svitoch (Russia). The presentations covered a range of topics on Quaternary ecostratigraphy and paleogeographic reconstructions of the Ponto-Caspian and Marmara region. Panel 3 was titled “TECTONICS”—moderator: Hayrettin Koral (Turkey)—and included three presentations on the earthquakes of Eastern Turkey, interrelationships between sea-level changes and tectonics along the southern Black Sea coasts of Turkey, and modern active tectonics in Azerbaijan. Panel 4 was titled “MODELING”—moderators: Nikolay Esin and Alexander Kislov (Russia)—and included five presentations devoted to modeling of coastline migration, climate change and infilling of the Black Sea by Mediterranean salt water over the course of the

Holocene transgression. Panel 5 was titled “ARCHAEOLOGY, HISTORY, AND ETHNOLOGY”—moderators: Andrey Chepalyga (Russia) and Olena Smyntyna (Ukraine)—and included five presentations with a key-note talk by I. Babaev (Azerbaijan). The presentations were devoted to the North Black Sea passageway for the first peopling of Europe, ties between Southeast Caucasus and Mediterranean countries in antiquity, influence of paleoecological changes on migration and economic activities of the Neolithic people of Azerbaijan, and archaeological landscape of Gobustan at the end of the upper Pleistocene and early Holocene. The POSTER session included 23 poster presentations that were organized into five topics: GEOMORPHOLOGY—moderator: Ekaterina Badyukova (Russia); RECENT ECOSYSTEMS AND ENVIRONMENTAL MONITORING—moderators: Nelly Sergeeva (Russia) and Valentina Yanko-Hombach (Ukraine, Canada); SEA LEVEL CHANGES AND PALEOENVIRONMENTAL RECONSTRUCTIONS—moderators: Nikolay Panin (Romania) and Andrey Chepalyga (Russia); PALYNOLOGY AND PALEONTOLOGY—moderators: Petra Mudie (Canada) and Valentina Yanko-Hombach (Ukraine, Canada); ARCHAEOLOGY, HISTORY, AND ETHNOLOGY—moderators: Mehmet Özdoğan (Turkey) and Olena Smyntyna (Ukraine). The Technical Sessions were followed by the Round Table that enabled participants to discuss the progress of IGCP 610 and to plan future strategy in running the project. For more details see Conference Programme.

The five days of field trips (by bus) were led by prominent Azerbaijani geologists and archaeologists and were focused on the Apsheronian stage sediments, the classic stratotype of the Mountain of Bakinian stage, examples of the rapid Caspian Sea level changes in the Pleistocene successions, Azerbaijan mud volcanoes, Western Azerbaijan and the Greater Caucasus continuous outcrop of Quaternary continental sediments of the Ajinour, reference outcrop of the marine Bakinian sediments at Bozdag, as well as archaeological sites of Gobustan, Gabala, and historical sites of Baku and Lagich (Fig. 5). For more information see the Field Trip Guide 2014 and reference to it (Aliyeva and Kengerli, 2014).

Both meetings and field trips enabled participants: (1) To discuss the actual status of our knowledge in a range of subjects, as well as scientific approaches to integrating environmental, anthropological, ethnological, and archaeological data in order to trace the history of ancient humans from the Caspian to the



Fig. 5. Map of Azerbaijan with geological and archaeological sites visited during the Field Trips on October 15 (# 1), 16 (# 2), 17 (# 3), 18 (# 4), 19 (#5), and 20 (#6), 2014.

Mediterranean during the duration of the Quaternary. (2) Introduced young scientists, especially from the Eastern countries, to new analytical techniques and state-of-the-art interpretation of data. (3) Encouraged east-west dialogue and integrated researchers from different countries into the international R&D community, as well as contributed to the preservation of cultural and religious heritage through the discussion of ancient cultures, civilizations, and their legends.

This special volume (organized by author in alphabetical order) brings together selected papers on aspects of the geology, paleontology, palynology, paleomagnetism, microtheriology, mathematical modeling, climatology, and precipitation of the “Corridor,” encompassing regions from the Caspian to the Mediterranean Seas.

Data and discussions reflect efforts at articulating paleoenvironmental history, climate dynamics, sea-level changes and coastline migration, regional hydrological variations, and geomorphology in the “Corridor.”

The paper by **Bolikhovskaya et al.** describes new results from a high-resolution palynological, paleomagnetic, and microtheriological study (together with previously published lithological and paleopedological data) of a geological sequence that is unique in its stratigraphic completeness and thickness (~160 m). The sequence is located near the village of Otkasnoye and situated in the middle reaches of the River Kuma. Combining palynostratigraphic and paleomagnetic data enables one to justify the position of boundaries between stratigraphic units within the Brunhes and late Matuyama chrons that were provisionally correlated with interglacial and glacial, interstadial and stadial stages established in Europe and linked to global MIS events over the past ~1.0 Ma (Jaramillo subchron to Holocene time). The paleomagnetic and palynological records indicate that the Matuyama-Brunhes reversal corresponds to the transition from the Pokrovka glacial horizon (correlated with global MIS 20) to the Gremyachye interglacial (MIS 19). The Brunhes epoch contains eight interglacial stages (including the Holocene) and seven glacial or cold periods. The

environment of the Terek-Kuma Lowland during the Middle-Late Pleistocene was characterized by gradual changes of interglacial forests, forest-steppes, and steppes during the warm epochs to periglacial forests, forest-steppes, steppes, and semi-deserts during the cold epochs. For the most part of this ca. 780 ky period, the Terek-Kuma Lowland was occupied by interglacial forest-steppes or by periglacial forest-steppes. The principal aim of future research on the Otkasnoye sequence is to obtain representative pollen assemblages from all strata of the Matuyama chron sediments sampled in this region.

The paper by **Esin et al.** describes the filling of the Black Sea basin by Mediterranean salt water during the Holocene. Based on mathematical modeling, the authors argue that the bottom counterflow breakthrough occurred when the depth of the strait was 16.5 m, at about 9400 years ago. Before this, salt water penetrated into the Black Sea in the autumn-winter seasons during short periods of time, when the Bosphorus upper stream was absent. The water circulation is described with help of the Navier–Stokes equations. It was found that the halocline reached the depth of –100 m (relatively present sea level) about 7200 years ago, and a situation close to present one had arisen, i.e., the lower Bosphorus flow brought salt into the Black Sea, and the upper stream returned it to the Sea of Marmara. Water discharge in the lower water layer was insignificant during the time interval from 9400 to 8400 years ago. Then it quickly rose to about 700 km<sup>3</sup>/year.

The paper by **Kislov** is devoted to the origin of large irregular transgressive/regressive stages of the Caspian Sea (CS) during the Holocene. Theoretical analysis based on a stochastic Langevin equation suggests that they could be generated due to accumulation of fast variations of river runoff (mainly the Volga River), precipitation, and evaporation. Under these conditions, the CS is represented by a system undergoing random walk. The results showed that the CS level fluctuations under steady state conditions are characterized by rms ~1.1 m, close to the empirical value. Hence, based on modeling results, the possibility of “self-development” effects is

not prohibited by the theory: there need not be any cause for specific level changes or shifts, merely the expected behavior of red noise processes.

The paper by **Makshaev and Svitoch** provides exclusive new data on chocolate clays that commonly comprise a part of the Lower Khvalynian sequence in the northern Caspian Lowland and in the Volga region. The authors emphasize that the mode of occurrence of chocolate clays varies from continuous to mosaic, and they also occur in large areas near the Volga River valley and in its delta, in the adjacent part of Kalmykia, in depressions east of Akhtuba, and in the middle reaches of the Ural River. There are also regions almost completely devoid of the chocolate clays, such as high terraces of the Volga (above the 2nd terrace level), a zone along the western margin of the Syrt elevations, as well as considerable areas of the Volga–Ural interfluvium, vast lowlands in Kalmykia, and the area east of Inder Lake. In the majority of cases, their distribution is confined to Pre-Khvalynian depressions of various origins. The chocolate clays are polymineral in composition and composed of kaolinite and illite. The “chocolate” color of the clays results mainly from the presence of iron oxides impregnating the entire clay series. According to the authors, the chocolate clays represent an exotic facies of the Lower Khvalynian sediments and cannot be considered as an individual stratigraphic unit. Radiocarbon dating of the mollusk shells in chocolate clays has shown their young age (12–15 ka BP).

The paper by **Naidina and Richards** deals with pollen evidence for Plio-Pleistocene vegetation and climate change in the North Caucasus and Northwestern Caspian Region. On the basis of pollen assemblages in sediment cores and outcrops, they reconstruct climatic fluctuations and related changes in vegetation between 3.6 and 0.8 Ma. The lower Akchagylian is characterized at first by an open landscape dominated by steppe vegetation. In the middle of the lower Akchagylian, the transgression of the paleo-Caspian spread, and the treeless landscapes of the earliest Akchagylian were replaced by forests with thermophilic relicts. During the middle-upper Akchagylian and Apsheronian periods, the vegetation cover of the North Caucasus gradually changed: forests were replaced with steppe vegetation in response to episodes of aridification, and changes were evident in the structure of the dendroflora. The vegetation of the North Caucasus shows changes consistent with climatic warming at around 3.2 Ma, which coincides with a period of warming in the Mediterranean and probably represents the “Mid Pliocene Warm Period.”

The paper by **Okrostsvaridze et al.** focuses on the mythical “gold sands” of the ancient Colchis Kingdom and the “Golden Fleece” phenomena. According to the authors, the interest in these phenomena is connected with the sheepskin (fleece) technique of gold mining from the rivers, the final result of which was a gold imprinted sheepskin. It was the fanciful characterization of this factual process which resulted in the formation of the romantic concept or social phenomenon of the “Golden Fleece,” that has existed in the civilized world ever since Homer's time.

The paper by **Voskresenskaya et al.** concerns climate variability of winter anticyclones in the Mediterranean–Black Sea region. The study was based on NCEP/NCAR reanalyses for 1951–2012. Time series of average anticyclone frequency were calculated for different parts of the region. It was found that the anticyclone frequency is increased significantly over the Black Sea and Western Mediterranean regions while decreases over the Eastern Mediterranean. Regional manifestation of global climate processes in the variability of anticyclone frequency is investigated.

The paper by **Voskresenskaya and Vyshkvarkova** concentrates on extreme precipitation over the Crimean peninsula. Based on daily precipitation data for 1951–2009 from 18 hydrometeorological stations all over the Crimean peninsula, the 58-year-long data series of extreme precipitation parameters (precipitation

concentration, level of extreme precipitation, and number of days with extreme precipitation) were calculated by the authors. Linear trends of calculated parameters were estimated, and manifestations of the Pacific decadal oscillation (PDO) of the extreme precipitation changes were analyzed. It was found that precipitation concentration increases in the Crimean Mountain region in the winter season, while in the summer season, it is characterized by uniform distribution. Linear trends of winter and summer precipitation concentration during the last 58 years are predominantly negative over Crimea. The maximum values of precipitation level in the winter season are typical for the Crimean Mountain region. In the summer season, values of precipitation level change insignificantly. The number of days with extreme precipitation exhibits decreasing trends in the winter season over the territory of Crimea. In the summer season, the number of days with extreme precipitation in the southeastern part of Crimea shows increasing trends. The number of extreme precipitation days in the winter season is up to 30% higher in negative PDO phases over the whole territory of Crimea, while in the summer it is up to 60% lower in the southeastern part of the peninsula.

The paper by **Yanina et al.** is focused on the age of the Khvalynian deposits of the Caspian Sea coasts based on  $^{14}\text{C}$  and  $^{230}\text{Th}/^{234}\text{U}$  data. The authors argue that the second half of the late Pleistocene in the Caspian has experienced repeated transgressions (Early and Late Khvalynian) and regressions (Enotaevsk and Mangyshlak) with oscillations up to 120–150 m. The age of the Khvalynian deposits is based on the shells of index-genus *Didacna* from the deposits of marine terraces with different elevations, supplemented by the age of an *Equus* sp. bone fragment. Obtained results show that during the maximum of the Late Valdai (Würm) glaciation, the Khvalynian basin was in a regressive situation. The maximum stage (+48 to +50 m) of the Early Khvalynian transgression was not dated. Transgressive stages of the Early Khvalynian basin with sea levels of +35 and +22 m occurred during the period of deglaciation approximately 16 ky cal BP to 14 ky cal BP. The transgressive stages of the Late Khvalynian basin with sea level at about 0 m and –12 m occurred at around 14–12 ky cal BP. The age of Makhachkala stage deposits with sea level at about 0 m probably reflect the Allerød warming, and the age of Sartassy stage deposits with sea level about –12 m corresponded to the warming at the end of the Younger Dryas. Under cold climatic conditions of the Younger Dryas, the level of the Late Khvalynian basin dropped. Increasingly continental climatic conditions during the Boreal period of the Holocene resulted in the Mangyshlak regression.

## Acknowledgments

Acknowledgment must be given for the financial assistance that made these two conferences and the first IGCP 610 special volume of *Quaternary International* possible. Our sincere thanks are offered to the Institute of Earth Sciences of Ilia State University, Tbilisi, Georgia, and the Institute of Geology and Geophysics of the Azerbaijan National Academy of Sciences, Baku, Azerbaijan, for hosting the IGCP 610 First and Second Plenary Meetings and Field Trips, respectively, and providing us with their facilities to convene these conferences. The Avalon Institute of Applied Science, Canada, is gratefully acknowledged for its tremendous support in organizing and carrying out the project.

We are indebted to both presidents of the conferences, Profs. Dr. Zurab Javakhishvili and Elmira Aliyeva for their extraordinary efforts in organizing the conferences and field trips. Particular appreciation is extended to Profs. Avtandil Okrostsvaridze, Mikhail Kakabadze, Mikhail Elashvili, Nikoloz Tushabramishvili, Zurab Janelidze, Lasha Sukhishvili, Talat Kengerli, Dadash Huseynov, Ilyas Babayev, Dr. Lala Aliyeva, Nailya Kerimova, and Tofik Rashidov for

arranging the Field Trips around Tbilisi and Baku and preparing the Field Trip Guides. We gratefully acknowledge the assistance of Tinatin Ghviniashvili and Sevinj Shiraliyeva, Executive Secretaries of the Conference in Tbilisi and Baku, respectively. We gratefully recognize the assistance of Prof. Allan Gilbert together with Prof. Dr. Valentina Yanko-Hombach for editing and layout of the Conference Proceedings.

For her prompt action, we extend our appreciation to the Administrator of the Project, Dr. Irena Motnenko. We are indebted to Prof. Dr. Peter Hombach of Osorno Enterprises, Winnipeg, Canada, and Dr. Irena Motnenko for the project website design; and we acknowledge the assistance provided toward this goal by Sea-level Special Projects (<http://sealevel.ca/>).

We are also very grateful to the journal *Quaternary International*, and Editor-in-Chief Prof. Norm Catto in particular, who kindly invited us to publish the Georgia and Baku conference proceedings within their pages, just as was done for the IGCP 521 and INQUA 0501 projects.

We sincerely thank all participants for their contributions to the IGCP 610 project.

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