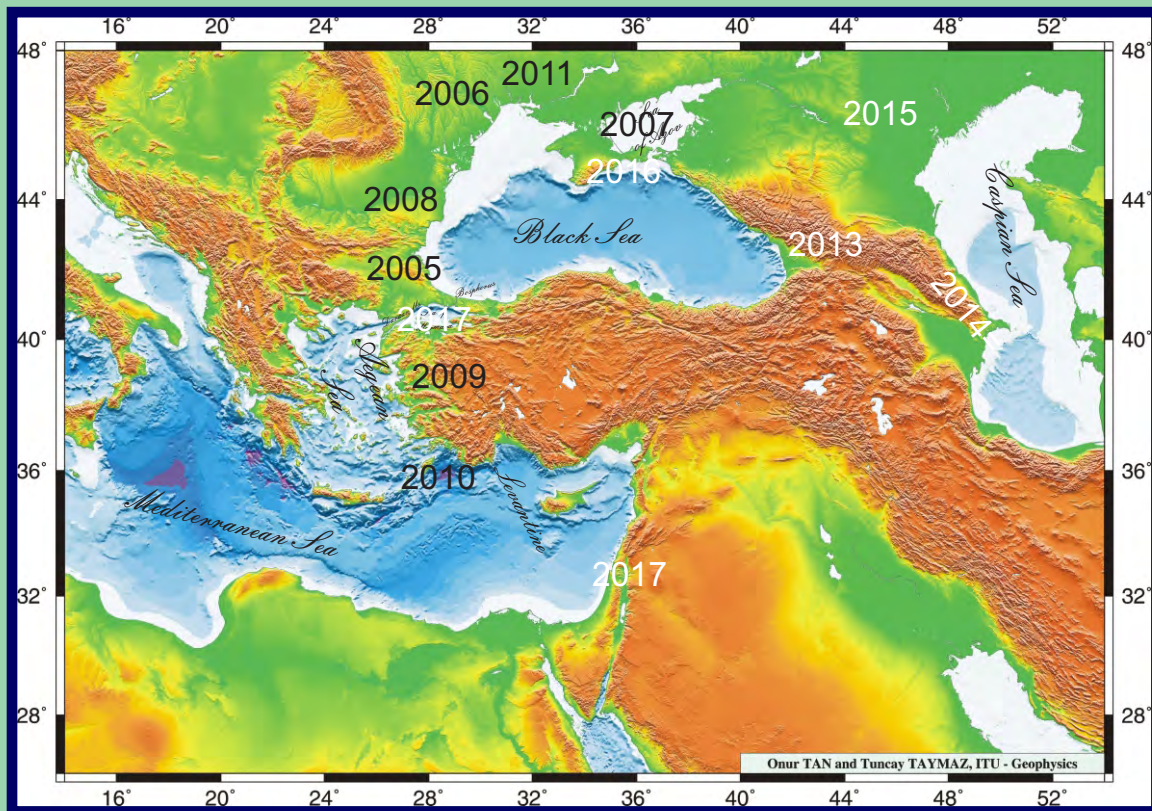




# Institute of Geology and Geophysics of the Azerbaijan National Academy of Sciences, Baku, Azerbaijan

**12-20 October 2014**

## INTERNATIONAL GEOSCIENCE PROGRAMME



# Proceedings of the Second Plenary Conference

**IGCP 610 “From the Caspian to Mediterranean: Environmental Change and Human Response during the Quaternary” (2013 - 2017)**

<http://www.avalon-institute.org/IGCP>

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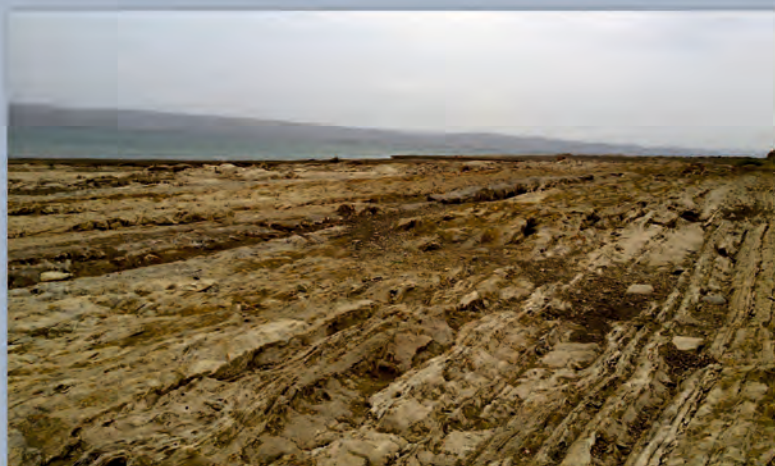


# Stratigraphy and sedimentology of oil-gas basins

*International scientific journal*

## **SPECIAL ISSUE**

devoted to IGCP 610 Second Plenary Conference  
and Field Trip "From the Caspian to Mediterranean:  
Environmental Change and Human Response during the Quaternary"



Azerbaijan National Academy of Sciences  
Institute of Geology and Geophysics

# 1.2014



# IGCP 610 Second Plenary Conference and Field Trip, Baku, Azerbaijan, 12-20 October 2014

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# PROCEEDINGS

**IGCP 610 Second Plenary Conference and  
Field Trip**

“From the Caspian to Mediterranean:  
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## AIMS AND SCOPE

The main goal of the IGCP 610 Project 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 Caspian-Black Sea-Mediterranean Corridor [“CORRIDOR”] for a deeper understanding of Eurasian history, environmental changes and their relevance, and likely future impacts on humans.

The “CORRIDOR” is perfectly suited for these purposes. (1) It encompasses the large chain of intercontinental basins—the Caspian, Black (together called Ponto-Caspian), Marmara, Aegean, and Eastern Mediterranean (Levantine) seas—with their connecting straits and coasts. Here, sea-level changes are clearly expressed due to geographical location and semi-isolation from the World Ocean, which makes the “CORRIDOR” a paleoenvironmental amplifier and a sensitive recorder of climatic events. Periodic connection/isolation of the basins during the Quaternary predetermined their specific environmental conditions and particular hydrologic regimes, and thus, the area, and especially the Black Sea, represents a “natural laboratory” to study the responses of semi-isolated basins to GCC. (2) It has rich sedimentary and geomorphologic archives that document past environmental changes. (3) It has a substantial archaeological, anthropological, and historical record. In particular, it contains evidence for the transition from *Homo erectus* to *Homo sapiens*. The first appearance of a *Homo* species in the “CORRIDOR” is dated to the Lower Paleolithic, ca. 1.8 million years ago, at Dmanisi in Georgia. After this species migrated into the Ponto-Caspian area, human colonization of the region continued, major cultural and technological inventions (tools, hearths, dwellings, clothes, decorations, etc., as well as the origin of art, ideology, and ritual practice) ensued, and subsistence strategies were elaborated, enabling us to investigate multiple physical, social, and cultural responses of humans to global environmental change. (4) It is easily accessible for study.

To achieve the main goal and objectives, the Project will incorporate six dimensions, each addressed by integrating existing data and testing of hypotheses: 1. The geological dimension will examine the sedimentary record of vertical sea-level fluctuations and lateral coastline change. 2. The paleoenvironmental dimension will integrate paleontological, palynological, and sedimentological records to reconstruct paleolandscapes. 3. The archaeological dimension will investigate cultural remains. 4. The paleoanthropological dimension will study responses of different *Homo* species to environmental change. 5. The mathematical dimension will provide GIS-aided mathematical modeling of climate and sea-level changes, and human dispersal linked to paleoenvironmental variation that can be meaningfully compared with current global changes. 6. The geo-information dimension will grasp the “big picture” of geoarchaeological events over the duration of the Quaternary. Particular attention will be

given to synthesizing the wealth of literature published in local languages, stored in archives, and largely unknown or ignored in the West.

Study sites will include the Caspian, Azov-Black Sea, Marmara, and Eastern Mediterranean. These sites are characterized by rich sedimentary, geomorphological, archaeological, paleoanthropological, and historical records providing a superb opportunity to assess the influence of climate and sea-level change on human development. It is expected that the project will allow us to suggest a groundbreaking, comprehensive theory about the influence of paleoenvironmental changes on human adaptive strategies during most of the Quaternary in the region of the Southern Eurasian seas.

There will be five or six Plenary Conferences and Field Trips in the following regions: 2013 – Georgia; 2014 – Azerbaijan; 2015 – Russia (Northern Caspian and Manych Outlet); 2016 – Crimea and Taman Peninsula (Russia); 2017 – Israel (Eastern Mediterranean) and Turkey (around the Sea of Marmara). They are scheduled for the third quarter of each year. Prior to each Conference and Field Trip, the Conference Proceedings and Field Trip Guide will be prepared. Each Plenary Conference will provide a forum for dialogue between multidisciplinary specialists in the Quaternary history of the “CORRIDOR” and other workers in related areas.

The Field Trips will follow the Plenary Meetings (Fig. 1). They will be focused on observation of geological characteristics of Quaternary stratotypes as well as key archaeological and paleontological sites. All of them are easily accessible for study and will be sampled during the Field Trips for further investigation in various laboratories around the world.

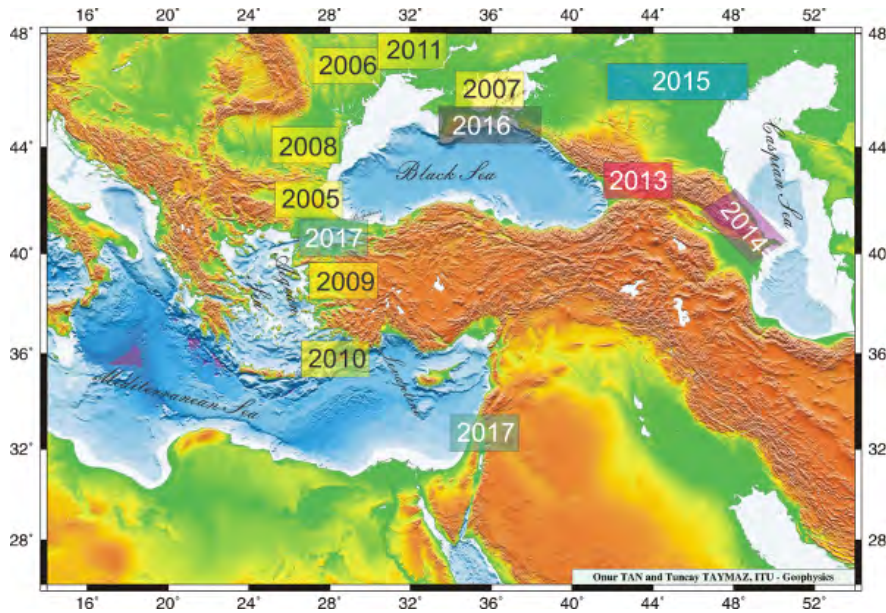


Figure 1. The Caspian-Black Sea-Mediterranean “CORRIDOR”: in yellow are the locations of IGCP 521-INQUA 501 meeting and field trip sites (2005-2011); in other colors are sites to be studied by the present IGCP 601 Project: 2013 – Tbilisi, Georgia; 2014 – Baku, Azerbaijan; 2015 – Volgograd-Astrakhan’ (Lower Volga), Russia; 2016 – Sevastopol (and the Taman Peninsula, Russia; 2017 – Haifa, Israel, and Istanbul, Turkey).

The Second Plenary Meeting and Field Trip will focus 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 ka 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 the Quaternary deposits at Garamaryam and Turianchay in the Ajinour region, and Bozdag located in the Middle 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 Olduvan and Jaramillo episodes will be traced. The archaeological sites in Gobustan with its famous petroglyphs of Mesolithic age will be observed. Plans include 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. We will also visit 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.

## WELCOME

On behalf of the Organizing and Executive Committees as well as the Institute of Geology and Geophysics of the Azerbaijan National Academy of Sciences, Baku, Azerbaijan, and Avalon Institute of Applied Science, Canada, we are delighted to welcome you to the IGCP 610 Second Plenary Conference and Field Trip being held on 12–20 October 2014 in Azerbaijan.

This conference is the second in a series of IGCP 610 Plenary Conferences and Field Trips. It will continue to will bring together multidisciplinary scientists from all over the world in order to enhance West-East scientific dialogue by providing a supportive background for collaboration regarding the correlation and integration of discoveries on the influence of climatically/tectonically induced sea-level changes and coastline migration on humanity. This is an area of strategic importance for Europe and Asia.

The Second Plenary Conference and Field Trip has been organized and sponsored by the Institute of Geology and Geophysics of the Azerbaijan National Academy of Sciences, Baku, and the Avalon Institute of Applied Science, Winnipeg, Canada, with very moderate financial contributions from UNESCO and IUGS.

We are happy to welcome to Azerbaijan distinguished specialists and students in the Humanities, Earth, and Life Sciences from Azerbaijan, Bulgaria, Georgia, Germany, Italy, Romania, Russia, Turkey, UK, and Ukraine.

We wish you a very pleasant stay in Azerbaijan.

Sincerely,

*Organizing and Executive Committees of IGCP 610 Second Plenary Meeting and Field Trip*

## VENUE

The conference will be held in Baku under the auspices of the Institute of Geology and Geophysics of the Azerbaijan National Academy of Sciences ([www.gia.az](http://www.gia.az)). Baku is the capital and largest city of Azerbaijan, as well as the largest city on the Caspian Sea and in the Caucasus region. Baku is located 28 m (92 ft) below sea level, which makes it the lowest lying national capital in the world. Baku is also the largest city in the world located below sea level. It lies on the southern shore of the Absheronian Peninsula, which projects into the Caspian Sea. The city consists of two principal parts: the downtown area and the old Inner City (21.5 ha). Baku's urban population is estimated at just over two million people. Officially, about 25 percent of all inhabitants of the country live in Baku's metropolitan area.

Baku is divided into eleven administrative districts (raions) and 48 townships. Among these are the townships on islands in Baku Bay and the town of Oil Rocks built on stilts in the Caspian Sea, 60 km (37 mi) away from Baku. The Inner City of Baku along with the Shirvanshah's Palace and Maiden Tower were inscribed as a UNESCO World Heritage Site in 2000. According to the Lonely Planet's ranking, Baku is also among the world's top ten destinations for urban nightlife. The city is the scientific, cultural and industrial center of Azerbaijan. Many sizeable Azerbaijani institutions have their headquarters there, including SOCAR, one of the world's top 100 companies, and others. The Baku International Sea Trade Port, sheltered by the islands of the Baku Archipelago to the east and the Absheronian Peninsula to the north, is capable of handling two million tons of general and dry bulk cargoes per year.

The urban landscape of Baku is shaped by many communities. The religion with the largest community of followers is Islam. The majority of the Muslims are Shia Muslims, and the Republic of Azerbaijan has the second highest Shia population percentage in the world after Iran. Zoroastrianism had a long history

in Azerbaijan, evident in sites such as the Fire Temple of Baku or ceremonies like Nowruz, along with Manichean. The city's notable mosques include Juma Mosque, Bibi-Heybat Mosque, Muhammad Mosque, and Taza Pir Mosque. There are some other faiths practiced among the different ethnic groups within the country. By article 48 of its Constitution, Azerbaijan is a secular state and ensures religious freedom. Religious minorities include Russian Orthodox Christians, Catholic Levantines, Ashkenazi Jews, and Sufi Muslims.

Baku has a subtropical, semi-arid climate with warm and dry summers, cool and occasionally wet winters, and strong winds all year long. However, unlike many other cities with this climate, Baku does not see extremely hot summers. This is largely because of its northerly latitude and the fact that it is located on a peninsula on the shore of the Caspian Sea.

The conference will be held under the auspices of the Institute of Geology and Geophysics of the Azerbaijan National Academy of Sciences ([www.gia.az](http://www.gia.az)). The Institute structure includes 24 research departments, the National Data Center of Azerbaijan (established in 2003 on the initiative of the Preparative Committee of Comprehensive Nuclear Test Ban Treaty Organization, or CTBTO), Centre of common use of the analytical devices and equipment, and the Natural History Museum named after H. Zardabi. The Institute staff comprises 230 researchers, including 3 academicians of ANAS, 8 corresponding members of ANAS, 35 doctors of science, and 85 candidates of science. The main directions of investigation are: geology and oil-and-gas geochemistry, oil-and-gas field development, petrology and metallogeny, regional geology, and earth physics.

## ACKNOWLEDGMENTS

We gratefully acknowledge the support and hospitality of Institute of Geology and Geophysics of the Azerbaijan National Academy of Sciences, Baku, Azerbaijan, for hosting the IGCP 610 Second Plenary Meeting and Field Trip, and providing us with their facilities to convene this conference.

Support has also been received from the Avalon Institute of Applied Science, Canada. Financial contributions to underwrite the travel costs for scientists from developing countries and countries in transition were kindly provided by UNESCO, IUGS, and IGCP.

We are indebted also to Prof. Elmira Aliyeva for her extraordinary efforts in organizing the conference and field trips. Particular appreciation is extended to Prof. Talat Kangarli, Prof. Dadash Huseynov, Prof. Ilyas Babayev, Dr. Lala Aliyeva, Nailya Kerimova, Sevinj Shiraliyeva, and Tofik Rashidov for arranging the Field Trips around Baku and preparing the Field Trip Guide.

We gratefully recognize the assistance of Prof. Allan Gilbert together with Prof. Dr. Valentina Yanko-Hombach for editing and layout of the Conference Proceedings.

To the Scientific Committee, we offer sincere thanks for evaluating submissions and managing the abstract review process.

The Scientific Committee, in turn, wishes to thank the anonymous reviewers for their efforts in providing useful comments on submitted abstracts.

For her prompt action, we extend our appreciation to Dr. Irena Motnenko for regularly updating the IGCP 610 website.

We are also very grateful to the journal *Quaternary International*, which has kindly invited us to publish the Baku conference proceedings within their pages just as it did for previous IGCP 521-INQUA 501 and IGCP 610 conferences.

*Valentina Yanko-Hombach*

## SCHEDULE

12 October 2014

### ARRIVAL AND REGISTRATION

Registration:  
12 August  
14.00-18.00

Institute of Geology and Geophysics of the Azerbaijan National Academy of Sciences, 29A H. Javid av., Baku, AZ1143, Azerbaijan  
Tel: +994125100141, Email: e\_aliyeva@gia.ab.az

12 October 2014

### ICE-BREAKING PARTY

19.00

"Ailevi restaurant" located at the Fountain square, Baku

13-14 October 2014

### TECHNICAL SESSIONS

9.00-18.00

Institute of Geology and Geophysics of the Azerbaijan National Academy of Sciences, 29A H. Javid av., Baku, AZ1143, Azerbaijan

15-20 October 2014

### FIELD TRIPS

15 October 2014

#### Field Trip 1

9.00-18.00

Depart from Baku (meeting of all participants near the Maiden Tower). Return to Baku to the same hotel as you booked.

Excursion to Old City: the Maiden Tower and Shirvan Shakh Palace. Exposures of Absheronian stage sediments. The Garagush mountain The Bakinskies Ushi (overnight accommodations in Baku).

16 October 2014

#### Field Trip 2

9.00-18.00

Depart from Baku and

Stratotype of the Mountain of Bakinian stage, examples of the rapid Caspian Sea level changes in the Pleistocene successions. Archeological reserve Gobustan. Mud volcano Dashgil (overnight accommodations in Baku).



return to Baku to the same hotel as you booked.

## 17 October 2014

### Field Trip 3

8.00-18.00  
Depart from Baku to Lagich. Western Azerbaijan and Great Caucasus. Continuous outcrop of the Quaternary continental sediments of Ajinour (outcrop Padar “windows”). Excursion in the historical village Lagich (overnight accommodations in the historical village Lagich).

## 18 October 2014

### Field Trip 4

9.00-18.00  
Depart from Lagich to Gabala. Western Azerbaijan and Great Caucasus. Exposure of the Quaternary continental and marine sediments of Ajinour (outcrop Turianchay) (overnight accommodations in the maintain resort Gabala).  
**Conference dinner in the Sky restaurant.**

## 19 October 2014

### Field Trip 4

8.00-18.00  
Depart from Gabala - return to Gabala. The First Christian church in the Caucasus, I century. Khan palace in the historical town Sheki. Historical museum in Sheki. Western Azerbaijan. Reference outcrop of the marine Baku stage sediments Bozdag (overnight accommodations in the maintain resort Gabala).

## 20 October 2014

### Field Trip 5

8.30-15.00 (excursion)  
Depart from Gabala to Baku around 10:30 by conference bus after excursions; arrival in Baku around 15.00. Archaeological sites: excavations of ancient towns Selbir and Gala, I-XVIII centuries. Archeological museum in Gabala (overnight accommodations in Baku for those who depart to respective countries on October 21).

## 20-21 October 2014

DEPARTURE FROM BAKU TO RESPECTIVE COUNTRIES

## PART I. IGCP 610 PROGRESS REPORT (2013)

Yanko-Hombach, V. <sup>1,2</sup>

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*valyan@avalon-institute.org*

### 1. Website address(es) related to the project

<http://www.avalon-institute.org/IGCP610/> - main  
<http://www.geogr.msu.ru/science/projects/unesco/>  
<http://www.geoecomar.ro/website/proiecte.html>  
<http://archaeology-ethnology.onu.edu.ua/?p=1096>  
<https://www.facebook.com/groups/180481035443572/>  
[http://vk.com/album115218532\\_181815723](http://vk.com/album115218532_181815723)

### 2. Summary of major past achievements of the project

The project commenced on 1 April 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 Mediterranean seas during the Quaternary. In general, nine months of IGCP 610 activity have been carried out in a strict agreement with the Working Plan [[http://www.avalon-institute.org/IGCP610/work\\_plan.php](http://www.avalon-institute.org/IGCP610/work_plan.php)]. The one exception was the creation of the GIS-aided Interactive Data Base that was postponed until the end of 2015.

The following achievements have been obtained by IGCP 610 participants so far:

- Establishing the multidisciplinary team of scientists working on the project. The list includes more than 200 specialists from 18 countries, about 75% of whom are from developing countries surrounding the Caspian-Black Sea-Mediterranean Corridors. Developing world participation has been high in IGCP 610 activities, both through the direct conduct of scientific activities and through participation in the conference.
- Creating a regularly updated IGCP 610 website and mailing list of participants that contains 1054 addresses.
- Disseminating the basic ideas, main activities and achievements of the Project via social networks (Facebook for English and non-English-speaking audience, Вконтакте – for the mostly Russian speaking audience) in order to bring together professionals, representatives of public bodies, and the broader public to promote further studies within the framework of the IGCP 610 Project.
- Organizing the First Plenary Meeting and Field Trip of IGCP 610 in Georgia.
- Publishing a peer-reviewed Conference Proceedings (183 pages) and the Field Trip Guide. The former contains 60 publications written by 151 authors from 19 countries.
- Establishing the Reference List of main publications on Project subjects.
- Correlating the Regional Stratigraphic Scales.
- Collecting regional Paleogeographic and Geological maps.
- Field and laboratory work (for details see Chapter 3).

### 3. Achievements of the project (year 2013 only)

#### 3.1. List of countries involved in the project:

Eighteen countries (all active in 2013): Azerbaijan, Belgium, Bulgaria, Canada, Georgia, Germany, Israel, Italy, France, Kazakhstan, Romania, Russia, The Netherlands, Slovakia, Turkey, UK, Ukraine, and USA

### 3.2. *General scientific achievements and social benefits*

- Revision and integration of scientific materials available in a variety of languages in order to identify the main results of work to date as well as gaps in our knowledge, and to prepare an extensive Reference List. This task is crucially important, as most data are published in Russian and not easily accessible for foreigners.
- Revision of the taxonomy and ecology of recent and fossil mollusks, foraminifera, and ostracoda [MFO] used for ecostratigraphic and paleoenvironmental reconstructions.
- Catalogue of SEM pictures of MFO as well as spore and pollen from Pleistocene-Holocene sediments of the Ponto-Caspian region.
- Development of a common geochronological frame necessary for correlating major events in human prehistory and history with global environmental changes.

In the Black and Marmara Sea region:

- Study of 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 the Medieval-Roman site Vardzia Cave.
- Procuring and processing data on prehistoric cultures. Among the most outstanding results of recent work has been: defining the pace and trajectories of different ways of endemic movements arriving in Southeastern Europe; the development of a new cultural formation in the region around Marmara that would be a new core for further movement of early farming communities into Europe; defining the interaction of the migrant farmers with local hunter-fisher communities particularly in the region around Istanbul.

In the Caspian region:

- Detailed study of chocolate clays in the Middle and Lower Volga region that have enabled the discovery of a direct correlation between their occurrence and morphology of relief. Material collected by the expedition is currently being studied using palynologic, lithologic, geochronologic, and malacofaunal and micropaleontologic methods.
- Developing of a Holocene stratigraphic scale for the Iranian coast of the Caspian Sea.
- Obtaining new material for paleogeographic reconstructions of the Caspian basin from biostratigraphic analysis of five boreholes recovered in the North Caspian. Two marine strata that are absent on the coasts were discovered. Also, obtained a series of new radiocarbon dates for sediments and events of the late Pleistocene in the Caspian.
- A key geological section “Otkaznoe” located in the Tersko-Kumskaya lowland has been studied by paleomagnetic, palynologic, and microteriological methods. Detailed reconstructions of landscape and climate evolution in the NW Caspian region were performed for the Pleistocene and Holocene.

In the Ponto-Caspian region:

- Comparative analysis of environmental evolution enabled a reconstruction of the last climatic macrocycle (MIS 5-1).
- Social benefits: IGCP 610 activity has encouraged East-West dialogue by integrating eastern and western scientists into an international R&D community through scientific collaboration,

workshops, and annual meetings. As a result, eastern scientists have obtained access to western laboratories and advanced scientific methods while western scientists have had access to a vast amount of material stored in the former USSR and Eastern Bloc archives or published in local languages.

### 3.3. List of meetings with approximate attendance and number of countries

1. IGCP 610 First Plenary Meeting and Field Trip, 12-19 October 2013, Tbilisi, Georgia: 151 contributors from 19 countries, 66% of whom are from developing countries (Fig. 1).

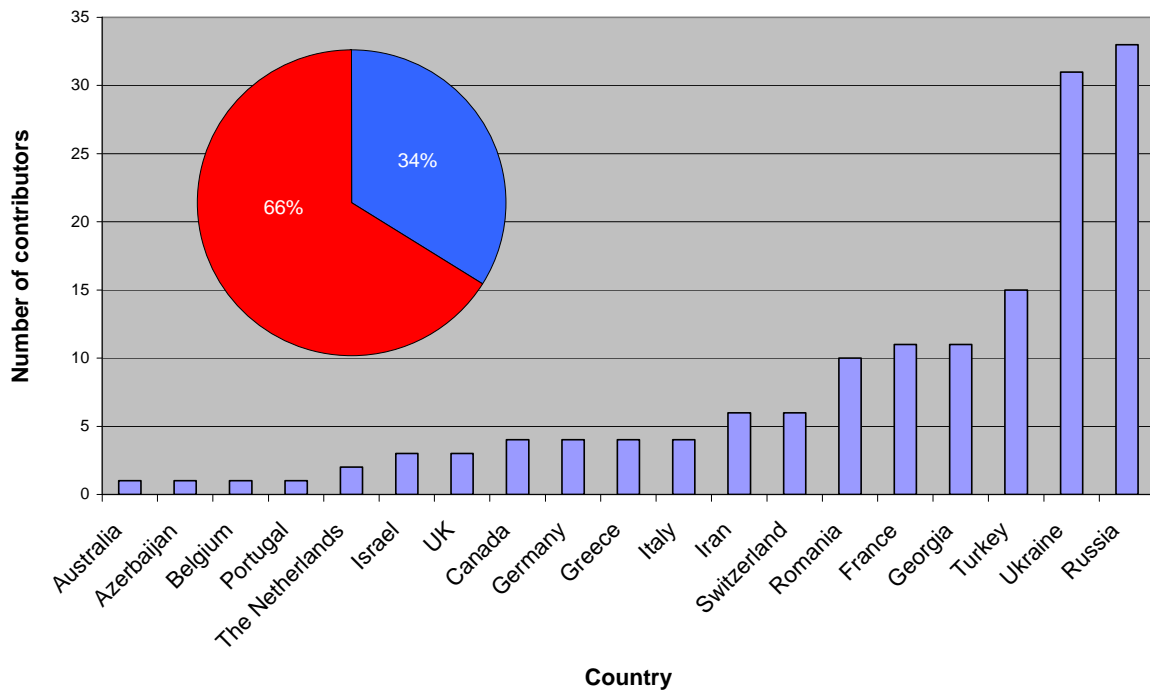


Figure 1. Number of countries and contributors to IGCP 610 First Plenary Conference and Field Trip. The circle shows the percentage of scientists from developing (red) and developed (blue) countries, respectively.

- IGCP 610 participated as the main partner in a workshop at Sozopol attended by 22 scientists (archaeologists, geologists, marine scientists) from Turkey and Bulgaria.
- IGCP 610 was represented at the International Conference “Under the Sea: Archaeology and Palaeolandscapes”, 23–27 September 2013, Szczecin, Poland..

### 3.4. Educational, training or capacity building activities

So far IGCP 610 activities: (1) enabled participants to visit relevant sites in the Black Sea part of the study area under the guidance of local experts with on-site discussion of scientific issues; (2) formed a platform for young undergraduate and postgraduate students to benefit from international exposure and interaction with scientists from different parts of the world and varied specialties (for example, a project involving geomorphological study of the Kolkheti lowlands has been initiated between Illia State University and the University of Cologne, Institute of Geography by young scientists: Dr. Kelterbaum and Mr. Sukhishvili); (3) encouraged students to take new educational courses related to project topics, and to start working within a multidisciplinary approach that has been intensively discussed during the conferences; (4) involved about 25 students from Georgia in the organization of the First Plenary Meeting and Field Trip in Georgia in 2013, thus providing them with experience to develop their organizational skills and abilities in order to cultivate traditions of “European style” scientific fora as well as scientific discussion and informal meetings. This also promoted their interest in particular specialties and motivated them to learn foreign languages in order to improve communication skills with

western colleagues; (5) promoted a multidisciplinary approach in paleoenvironmental studies, which has encouraged students in geology to take archaeological courses and vice versa. This stimulated teachers to modify their curricula for undergraduate and graduate students (e.g., “Paleogeography,” “Paleoecology,” “History of the cultural exploration of the Northwestern Pontic region,” “Geoarchaeology of the Stone Age”); (6) promoted the preparation of several MA and PhD theses on subjects within the IGCP 610 project; (7) promoted the establishment of direct contacts between western and eastern youth, creating the background for better understanding of modern priorities in the developing world of science and humanities; (8) exposed the younger generation in developing countries to new analytical techniques and state-of-the-art data interpretation in the field of sustainable development and environmental risk protection, as well as human cultural development; (9) informed the wider public about the evolution of the environment during the last climatic cycle; (10) provided consultations on stratigraphy, paleogeography, palynology, macro- and microfauna to specialists from Russia, Azerbaijan, Ukraine, Iran, Bulgaria, the Netherlands, and Georgia.

### *3.5. Participation of scientists from developing countries, and in particular young and women scientists*

Out of about 150 scientists contributing in the project, most of them attended the meeting and field trip in Tbilisi (Fig. 2). About 50% are female scientists; 40 participating scientists are young, among whom 35% are female. About 66% of participants are from developing countries.



Figure 2. Group photo from the IGCP 610 First Plenary Meeting and Field Trip, Ilia State University, Tbilisi, Georgia, 2013..

### *3.6. List of most important publications (including maps)*

See Annex 1.

### *3.7. Activities involving other IGCP projects, UNESCO, IUGS, or others*

There are several projects closely related to IGCP 610 in which participants work. They are as follows:

Project № 11-05-00093 “Caspian region: Peculiarities of development of the environment under climate and sea level change,” supported by the Russian Foundation for Fundamental Research.

Project № 12-05-01052 “Evolution of the relief of the Azov and Black Sea coast, climate, and sea level change: Comparative analysis and chronology of environmental processes for the last 20 ka,” supported by the Russian Foundation for Fundamental Research.

Project № 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,” supported by the Russian Foundation for Fundamental Research.

- Project № 13-05-00242 “Radioisotope stratification of age and synchronization of the Quaternary deposits of the Ponto-Caspian,” supported by the Russian Foundation for Fundamental Research.
- Project № 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,” supported by the Russian Foundation for Fundamental Research.
- Project № 12-05-31281 “Khvalynian epoch in the history of the Caspian region: Paleoclimates and environmental evolution,” supported by the Russian Foundation for Fundamental Research.
- Project WAPCOAST “Water pollution prevention options for coastal zones and tourist areas: Application to the Danube Delta front area,” supported by the BLACK SEA ERA.NET - Pilot Joint Call “Networking on Science and Technology in the Black Sea Region.”
- Project MAREAS “Black Sea Joint Regional Research Centre for Mitigation and Adaptation to the Global Changes Impact,” Joint Operational Programme “BLACK SEA 2007–2013.”
- Project № Ф28/428-2009 “Northern Black Sea Region under GCC: environmental changes during the last 20 ka and forecast for the present century,” supported by the Ukrainian Foundation for Basic Research and the Russian Foundation for Fundamental Research.
- Project ECOST-MEETING-TD0902-090310-001280 SPLASHCOS “Submerged Prehistoric Archaeology and Landscapes of the Continental Shelf.”

#### **4. Activities planned**

##### *4.1. General goals*

Efforts go on: (1) to maximize IGCP 610 exposure via diffusion of results in key international journals and updates of our web pages to ensure wide accessibility and increased interactive potential for project participants, the scientific community at large, relevant agencies, and the public; (2) to consolidate scientific achievements as a basis for developing a future strategy; (3) to continue to augment the funding base with upcoming and submitted research proposals through various funding agencies; and (4) to publish a special volume of *Quaternary International* devoted to the achievements of IGCP 610.

##### *4.2. Tentative list of specific meetings and field trips with identification of participating countries*

The Second Plenary Meeting and Field Trip will be held in Azerbaijan on 12–20 October 2014 and will be hosted by the Institute of Geology and Geophysics of the Azerbaijan National Academy of Sciences. Contributors will be from the following countries: Azerbaijan, Belgium, Bulgaria, Canada, France, Georgia, Germany, Greece, Iran, Italy, Romania, Russia, The Netherlands, Turkey, UK, Ukraine, and USA.

#### **5. What tangible improvements has your project obtained? (Besides publications, we are interested to hear about improvements to research, scientific contacts, policy implications, etc).**

Within the framework of the Project, students of archaeology and geoarchaeology at the BA, MA, and PhD level have been taking an active part in training, developing the capacity to run projects, work in the field, and analyze material. There are also a number of post-doc participants taking part in various installments of our project. Usually, there are more female participants than males, as most of our students are female. Besides, IGCP 610 activities, including the First Plenary Meeting and Field Trip in Georgia, promoted the establishment of direct contacts between western and eastern scientists, creating the background for better understanding of modern priorities in the developing world of science and humanities.

#### **6. What kinds of outreach and training has your project undertaken? Please describe how this project specifically benefited women scientists, young scientists and/or scientists from developing countries.**

See Part 3.4 for details.

## 7. What kind of public information (media reports, etc) has your project generated? And how do you evaluate their impact?

The media broadcast of IGCP 610, in particular the First Plenary Meeting and Field Trip that was held in Tbilisi, Georgia in 2013, attracted a lot of attention to the Project. Its activity was broadcast by the First Georgian Channel as well as a series of publications in periodicals for the mass media. A series of video films devoted to professional descriptions of the most prominent archaeological and geological sites of the Caucasian part of study region have been produced. All together, these contributed to the dissemination and popularization of IGCP 610 ideas, in particular, the preservation of human heritage by re-evaluating and clarifying existing archaeological questions to arrive at a better understanding of the human response to environmental change in order to improve human living conditions, sustainable development, and wise management of the Earth as a human habitat.

## 8. Attach any information you may consider relevant

### *Annex 1. Selected references published in 2013 (or in press) by IGCP 610 participants.*

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## PART II. PROCEEDINGS

### Late Pleistocene-Holocene Caspian Sea level and climate changes

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**Keywords:** *Caspian Sea high stand, low stand, Kura river delta, progradational and retrogradational cycles*

High resolution studies on the new core and seismic data from the Kura River delta in the southwest Caspian Sea has provided deep insight into its late Pleistocene-Holocene history, enabling characterizations of short-term climatic variations and an improving of the Caspian Sea level curve. The data display several phases of delta retrogradation during the Caspian Sea highstands, interrupted by erosional phases during lowstands, recognizable in the seismic profiles as prominent reflectors. The first phase is represented by coarse sands with numerous shell fragments encountered at the base of the deepest well A at the subCaspian depth of 34 m. The data obtained allow us to assume that sand deposition took place during the late Pleistocene Caspian lowstand (24–25 <sup>14</sup>C ky BP) (Sequence 1).

Overlying dark reddish-brown sandy shales (interval 3034 m) were deposited during the time interval 18–23.7 ky BP (Atelian regression), which corresponds to the last glacial phase (Lunkkaa et al., 2001; Svitoch, 2013). These sediments are characterized by a lack of, or very rare fresh-brackish water mollusks (*Dreissena*) in the lowermost portion, and enriched in Fe<sub>2</sub>O<sub>3</sub> and MnO suggesting sedimentation in the continental environment. We assume a deep Caspian Sea regression in the late Pleistocene (1825 ky BP) with the sea level falling to 102 m (Svitoch, 2013).

The subsequent warming recorded in the peaks of warm temperature and subtropical palynomorphs was accompanied by a sea-level rise and accumulation of grey shales with abundant mollusk and ostracod shells (core interval 25–30 m). The deep Mangyshlak regression at the beginning of the Holocene is recognized in the core samples as peat deposits or shallow water grey sandy shales with sand laminae and shallow water ostracods (interval 21–25 m) (Sequence 2). Recovered palynomorphs display cool temperature and a peak in halophytes. The sea level was gradually falling from –92 m (12 ky BP) to –96.5 m (9.24 ky BP).

The overlying Kura delta's Holocene sediments consist of a 20 m thick interval of thinly bedded silty clays and laminated dark grey clays. Locally, sand and shell-rich horizons occur.