First Circular

UNESCO-IUGS-IGCP
International Geoscience Programme
IGCP 521 Fourth Plenary Meeting and Field Trip

Participating countries: Algeria – Australia – Azerbaijan – Belgium – Bulgaria – Canada – Egypt – Finland – France – F.Y.R. of Macedonia – Georgia – Germany – Greece – Israel – Italy – Moldova – Romania – Russia – Switzerland – Turkey – United Kingdom – Ukraine – USA

National Institute of Marine Geology and Geoecology (GeoEcoMar), Bucharest, Romania
Department of Natural History of the Regional Historical Museum, Varna, Bulgaria
October 4-16, 2008

IGCP 521 "Black Sea-Mediterranean Corridor during the last 30 ky: sea level change and human adaptation"
(2005 – 2009)
http://www.avalon-institute.org/IGCP

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Introduction

The Black Sea-Mediterranean Corridor is an integrated oceanographic system defined here as the large geographical area covering the Manych-Kerch Gateway (Manych Valley, the Sea of Azov and the Kerch Strait) that lies to the east of the Black Sea, the Black Sea, the Marmara Gateway (the Bosphorus Strait, the Sea of Marmara and the Dardanelles), the Aegean Sea, the Eastern Mediterranean and their coasts.

The Fourth IGCP 521 Meeting will discuss: (1) the actual status of our knowledge on a range of subjects, and (2) scientific approaches to integrating environmental, anthropological, ethnological, and archaeological data in order to trace the history of ancient humans in the region and to predict their future development in coastal zones under various sea-level scenarios. In addition, it will introduce young scientists, especially from the Eastern countries, to new analytical techniques and state-of-the-art interpretation of data; it will encourage east-west dialogue and integration of researchers from different countries into the international R&D community; and it will contribute to the preservation of cultural and religious heritage through the discussion of ancient cultures, civilizations, and their legends, e.g., the Great Flood, a catastrophe that is deeply rooted in the collective memory of humanity as described in several scriptures (the Christian Bible, Torah and Koran), but recently attributed to the Black Sea by two scenarios. The first scenario dates the Great Flood to the Early Holocene and attributes it to Mediterranean inflow into the Pontic basin at 7.2 ky BP (initial hypothesis of Ryan et al., 1997) or 8.4 ky BP (modified hypothesis of Ryan et al., 2003), rapidly flooding the Neoeuxinian lake. The second scenario proposes that Great Flood occurred much earlier, in the Late Pleistocene, and was caused by Caspian influx into the Pontic basin between 16 and 13 ky BP (Chepalyga, 2007). Both hypotheses claim that the massive inundations into the Black Sea basin and the ensuing large-scale environmental changes had a profound impact on prehistoric human societies of the surrounding areas, and both propose that the event formed the basis for the biblical Great Flood legend.

The meeting will be organized into four panels (subject to change):

PANEL 1: Palaeogeographic and palaeoceanographic reconstructions

Moderators: Allan Chivas (Australia) toschi@uow.edu.au, and Andrei Chepalyga (Russia) igras@igras.geonet.ru

Session 1. Geology, palaeoceanography and palaeogeography

Moderator: Gilles Lericolais (France) Gilles.Lericolais@ifremer.fr
This session will focus on geological, geophysical, sedimentological, geochemical, mineralogical and paleoceanographic proxies for, and radiocarbon dating of, sea-level change and coastline migration in order to reconstruct the palaeogeography and palaeoceanology, namely palaeotemperature, palaeosalinities, palaeoproductivity, circulation patterns, and efficiency of gateways for given time intervals; tracing the evolution of water masses in space and time and identification of their possible sources; reconstruction of climate dynamics and the changes from wet to arid periods; and determination of palaeodepths and co-operation in the construction of sea-level curves.

Session 2: Palaeontology and biostratigraphy

Moderator: Tamara Yanina (Russia) didacna@mail.ru and Andrei Chepalyga (Russia) igras@igras.geonet.ru

This session will focus on mollusks, foraminifera, ostracoda, diatoms, and dinoflagellate cysts in order to develop a regional, high-resolution, chronostratigraphical framework for the entire region, elaborating data on absolute age, bio- and ecostratigraphy.

Session 3: Palynology

Moderator: Petra Mudie (Canada) PMudie@nrcan.gc.ca and Natalia Gerasimenko (Ukraine) geras@gu.kiev.ua

This session will focus on the reconstruction of vegetation and the history of climate dynamics based on GIS-linked maps and models of changing vegetation using available pollen diagrams and surface samples from both marine and lake sites.

Session 4. Hot spot ecosystems

Moderator: Valentina Yanko-Hombach (Canada) valyan@avalon-institute.org

This session will focus on the influence of stressful environments on benthic communities. Study sites will extend from the Caspian Sea to the Western Mediterranean and include open slopes, where landslides and deep-ocean circulation affect ecosystem development, and biodiversity hotspots, such as cold seeps, cold-water coral mounds, canyons and anoxic environments, where the geosphere and hydrosphere influence the biosphere through escape of fluids, presence of gas hydrates and deep-water currents. Past changes for the last 30 ka will be assessed using sediment archives. As so, this session will contribute to HERMES (Hotspot Ecosystem Research on the Margins of European Seas) project by assembling scientists from the HERMES community to coordinate their research and compare their results in order to provide a cross-disciplinary examination of the influence of stressful environments on biota.

Session 5. Active Tectonics

Moderator: Yücel Ylmaz (Turkey) yyilmaz@khas.edu.tr and Hayrettin Koral (Turkey) hkoral@istanbul.edu.tr

This session will consider the influence of active tectonics on coastal morphodynamics in order to understand their contribution to climatically-induced coastline migration. Cases suggesting the influence of tectonics on palaeoceanographic, palaeogeographic or archeological features/data/sites in the BSMC are welcome in this session. General principles for elucidating tectonic effects from climatic influences will be focussed.

PANEL 2: Archaeology, History, and Ethnology

Moderator: Pavel Dolukhanov (UK) pavel.dolukhanov@ncl.ac.uk, Olena Smyntyna (Ukraine) smyntyna_olena@onu.edu.ua and Paolo Biagi (Italy) pavelius@unive.it

This panel will deal with the assessment and correlation of available information on human adaptation to environmental change; the elaboration of databases of archaeological artifacts thus far obtained from the region; and the determination of prospective areas in the search for new archaeological sites (on land and underwater).

PANEL 3: GIS-linked Mathematical and Geological Modeling

Moderator: Alexander Kislov (Russia) avkislov@mail.ru and Anvar Shukurov (UK) anvar.shukurov@newcastle.ac.uk

This panel will concern GIS-linked mathematical modeling of climate change, human and ecosystem dispersal, and air-sea exchange in order to discover a possible correlation between environmental variations and the evolution of biodiversity and human adaptations.

The conference will take place over 10 days. Three days will be spent on the scientific sessions, and seven days will be dedicated to the field trips.

Conference Venue

The conference will be held under the auspices of:

1. Tthe National Institute of Marine Geology and Geoecology (GeoEcoMar), Romania, Dimitrie Onciul Street No. 23-25, Bucharest RO-70318, Romania, Telephone/Fax +40-21-252.25.94.

2. Museum of Natural History, 41 Maria Louisa Blvd., 9000 Varna, Bulgaria, Telephone +359-52-610243, Fax +359-52-681025.

Bucharest is the capital city and industrial and commercial centre of Romania. It is located in the southeast of the country, at 44°25′N, 26°06′E, and lies on the banks of the Dâmbovița River. It was originally known as Dâmbovița citadel. Bucharest existence first being referred to by scholars at 1459. Since then it has gone through a variety of changes, becoming the state capital of Romania in 1862 and steadily consolidating its position as the centre of the Romanian mass media, culture and arts. According to January 2006 official estimates, Bucharest proper has a population of 1,930,390. It is the 6th largest city in the European Union by population within city limits. Economically, the city is the most prosperous in Romania and is one of the main industrial centres and transportation hubs of Eastern Europe. As the most developed city in Romania, Bucharest also has a broad range of educational facilities.

GeoEcoMar, the National Institute of Marine Geology and Geoecology, is a governmental research-development institution, co-ordinated by the Romanian Agency for Science and Innovation. Presently GeoEcoMar has 105 scientific and technical personnel working in Bucharest and in a branch in Constantza. The structure of GeoEcoMar corresponds to its main scientific aims. GeEcoMar has four scientific departments (laboratories), a technical and navigational department and an operational-financial-administrative one.

The scientific departments are: Marine Geology and Sedimentology Laboratory, Laboratory for Seismo-acoustics and Physics of the Sea, Marine Gravimetry and Magnetometry Laboratory, Laboratory of Marine Geo-ecology and Biogeochemistry, and GIS and DataBases Group.

The scientific activity of the GeoEcoMar is oriented towards the following main directions: (I) Marine and fluvial geo-ecological studies regarding the macrogeosystem River Danube - Danube Delta; (2) Coastal Zone - Black Sea and the environmental impact of the hydrotechnical works carried out along the Danube course and in the Danube Delta; (3) Geological and geophysical survey of the Black Sea, mainly of the Romanian continental shelf, as well as of other marine areas. Bathymetric, geologic-sedimentologic, magnetometric a - ecology, studies of the environmental and geological impacts of the climate and sea-level changes in the past and in the present; (4) Land-sea interactions in the Coastal Zone and its integrated management; and (5) Studies, technical assistance and consulting for littoral and offshore marine engineering, industrial and environmental impact studies.

Varna is the largest city on the Bulgarian Black Sea Coast, third-largest in Bulgaria, and 92nd-largest in the European Union, with a population of 357,752. Commonly referred to as the marine capital (or the summer capital) of Bulgaria, Varna is a major tourist destination, seaport, and headquarters of the Bulgarian Navy and merchant marine. Varna occupies an area of 205 km² on verdant terraces descending from the calcareous Frangen Plateau (height 356 m) along the horseshoe-shaped Varna Bay of the Black Sea, the elongated Lake Varna, and two waterways bridged by the Asparuhov most. Varna is accessible by air (Varna International Airport), sea (Port of Varna Cruise Terminal), railroad (Central Train Station), and automobile. Major roads include European routes E70 and E87 and national motorways A-2 and A-5; there are bus lines to many Bulgarian and European cities from two bus terminals.

Varna is among Europe's oldest cities. Miletians founded the apoikia of Odessos in 570 BC at the site of an earlier Thracian settlement. Long before the Thracians populated the area by 1200 BC, several prehistoric settlements best known for the eneolithic necropolis, eponymous site of the Varna culture and the world's oldest large find of gold artifacts (mid-5th millennium BCE radiocarbon dating), existed within modern city limits. For centuries, Odessos was a contact zone between the urban Ionians and the Thracians of the hinterland. In the 4th century BCE, it was a mixed Greco-Thracian community. The Roman city, Odessus (annexed in 15 CE to the province of Moesia, later Moesia Inferior), occupied 47 hectares in present-day central Varna and had prominent public baths, Thermae, built in the late 2nd century, now the largest Roman remains in Bulgaria (the building was 100 m wide, 70 m long, and 20 m high) and fourth largest known Roman baths in Europe. Odessus was an early Christian centre, as testified by ruins of early basilicas and monasteries.

Theophanes the Confessor first mentioned the name Varna, as the city came to be known with the Slavic conquest of the Balkans in the 6th-7th century. In 681, Asparukh, the founder of the First Bulgarian Empire, routed an army of Constantine IV north of the Danube delta and reached the so-called Varna near Odessos. By the late 13th and 14th century, it had turned into a thriving commercial hub frequented by Genoese, Venetian and Ragusan merchant ships and flanked by two fortresses, Kastritsi and Galata, within sight of each other and each with a smaller port of its own. On November 10, 1444, arguably the last major battle of the Crusades in European history was fought outside the city walls. The Christian army was attacked by a superior force of 55,000 or 60,000 Ottomans led by sultan Murad II. The Russians temporarily took over the city in 1773 and again in 1828, following the prolonged Siege of Varna, returning it to the Ottomans in 1830 after its medieval fortress was razed. The British and French campaigning against Russia in the Crimean War (1854-1856) used Varna as headquarters and principal naval base; many soldiers died of cholera and the city was devastated by a fire. With the national liberation in 1878, the city, which numbered 26 thousand inhabitants, was ceded to Bulgaria and Russian troops entered it on July 27.

The Regional Historical Museum in Varna has constantly carried out archaeological investigations and excavations on various sites all over Northeast Bulgaria thus enriching its funds during the whole period of its existence which is more than 120 years. The Varna Archaeological Museum keeps more than 100 000 objects – monuments of past epochs from Varna, the Region and Northeast Bulgaria. The most important of them /one tenth of the whole Museum collection/ are represented in the Museum exhibition halls.

Schedule

October 4: Arrival to Bucharest (Romania)

October 5-7: Opening ceremony, Technical Sessions (oral and poster), meetings of working and regional groups, project business meetings.

October 8-11: Field Trips in Romania

October 12-14: Field Trips in Bulgaria.

October 15. Closing ceremony at the Regional Historical Museum, Varna; Guided visit to the Archaeological Museum in Varna famous with the oldest gold in the world. Coctail from the Director of the Museum. Closing session and ceremony in Varna. Departure to Bucharest.

October 16: Departure from Bucharest or if somebody prefers from Varna.

Technical Sessions

The final number of technical sessions will depend upon the number of participants and accepted presentations. To be accepted, the presentation has to deal with results obtained from the study of the Black Sea-Mediterranean region. It can also have a more general scope, for example, GIS-based modeling of the water exchange between adjacent basins: Application to the Manych-Kerch Outlet; Bosphorus Strait and Dardanelles; Geoinformation System: An overview with regard to the Caspian-Black Sea-Mediterranean region. Topics that go beyond description of data and address interpretation and broader understanding are especially encouraged.

Topics:

- Palaeontology, bio-, and ecostratigraphy of the BSMC
- Palynology, GIS maps and models of changing vegetation based on available pollen diagrams and surface samples from both marine and lake sites of the BSMC
- Geophysical records and sequence stratigraphy of the BSMC
- Correlation of sea-level changes in different areas of the BSMC based upon sediment fingerprints, geomorphological features of ancient coastlines supplemented by palaeontological and palynological data, and radiocarbon dating

- Geochemical proxies for climate and sea-level changes in the BSMC, and palaeochemistry of isolated basins
- Delineation of the effects of active tectonics on coastal changes in the BSMC
- Effects of active tectonics on coastal, paleocographic and paleocenographic features in the BSMC and delineation of such tectonic effects
- Palaeoceanographic evolution in terms of palaeotemperature, palaeosalinities, palaeoproductivity, and circulation patterns of the BSMC
- Efficiency of the Kerch-Manych and Marmara gateways
- Evolution of the BSMC water masses and their possible sources in space and time
- Reconstruction of climate dynamics and tracing the evolution from wet to arid periods
- Elaboration and comparison of sea-level curves
- Assessment and correlation of available information on human adaptation to environmental change in the BSMC
- Preparation of databases of archaeological artefacts and determination of prospective areas in the search for new archaeological sites (on land and underwater) in the BSMC
- GIS-linked mathematical modeling of climate change, human and ecosystems dispersal and air-sea exchange in the BSMC
- Environmental security and sustainable development of the BSMC
- Compilation and integration of palaeontological, micropalaeontological, bibliographical, radiocarbon, sedimentological, and palaeoceanographic data sets cartographically into a unified and constantly updated Geoinformation System

Field trips (Figure 1)

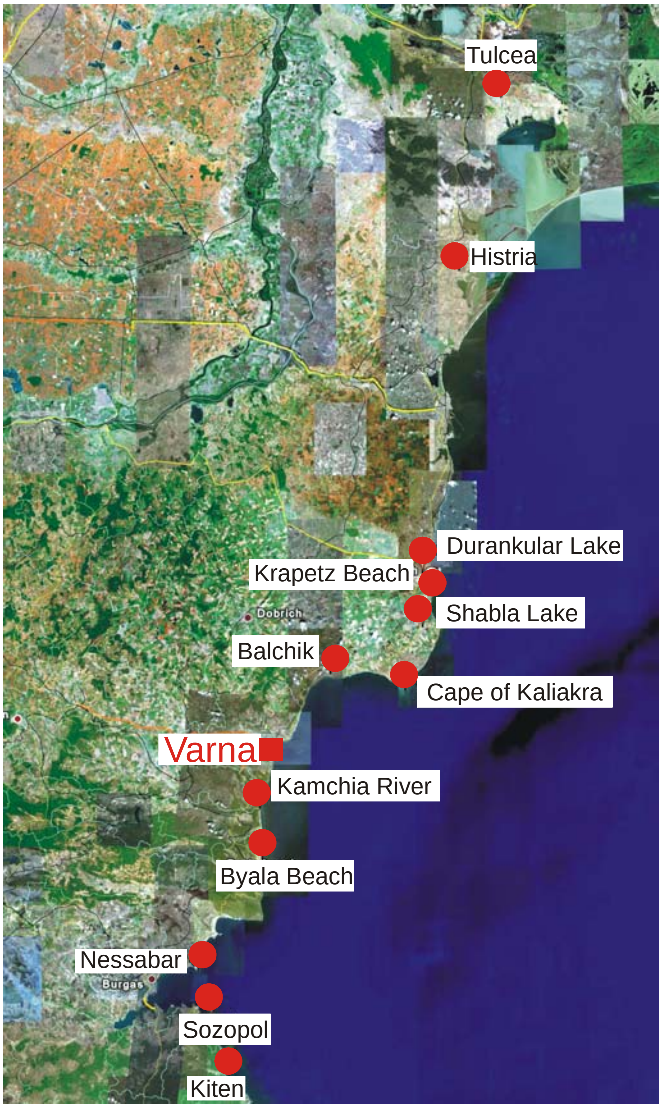

Figure 1. A – Locations of IGCP 521 Plenary Meetings and Field Trips: 2005 – Istanbul, Turkey; 2006 –Odessa, Ukraine; 2007 – Gelendzhik, Russia; Kerch, Ukraine; 2008 – Bulgaria, Romania; 2009 – Greece. Red square indicates locations of the Meeting and Field Trip in Romania (Figure B, red circles indicate geological and archaeological sites to be visited during the Field Trips).

October 8-11 The field-trips in the Danube Delta and Dobrogea are focused on observations of two distinct environments of the Danube Delta: (1) the mouth zone of the St.George distributary, with a small secondary delta and lateral arcuated beach ridge - the Sakhalin Island, and (2) the oldest sandy littoral body, Caraorman Formation.

The Danube River is one of the most important European waterways flowing 2,857 km across the continent from the Schwarzwald Massif down to the Black Sea. The Danube is listed after the River Volga as the second biggest river in Europe. Its drainage basin extends on 817,000 km^2, more than 15 countries sharing the Danube catchment area and about 76 million people living within this area.

The Danube Delta is situated in the north-western part of the Black Sea, between 44°25' and 45°30' northern latitude and between 28°45' and 29°46' eastern longitude, being bordered by the Bugeac Plateau to the North and by the Dobrogea orogenic area to the South. The Delta represents one of the main elements of the Geosystem River Danube - its delta - Black Sea. The Danube Delta can be divided into three major depositional systems: the delta plain, the delta front and the prodelta (Figure 2). To these is to be added the Danube deep-sea fan placed beyond the shelf break reaching from several hundred meters water depth down to the abyssal plain (just over 2,200 m).

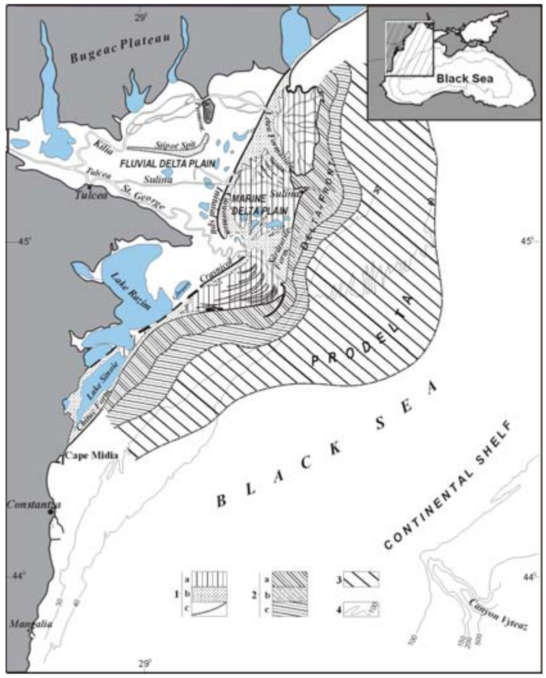

Figure 2. The Danube Delta Major morphological and depositional units (after Panin, 1989): Delta Plain: a) Fluvial Delta Plain; b) Marine Delta Plain; c) Fossil and modern beach-ridges and littoral accumulative formations built up by juxtaposition of beach ridges; 2. Delta Front: a) Delta Front platform; b) relics of the Sulina Delta and its Delta Front; c) Delta Front slope; 3. Delta Prodelta; 4. Continental shelf area; 5. Depth contour lines

The three major depositional systems of the Danube Delta are characterised as follows: the delta plain, with a total area of about 5,800 km^2, from which the marine delta plain area is of 1,800 Km2; the delta front with an area ca. 1,300 km^2, divided into delta front platform (800 km2) and delta-front slope (ca. 500 km^2), extending off-shore to a water depth of 30-40 m; the prodelta lies off-shore at the base of the delta-front slope to 50-60 m depth, covering an area of more than 5,500 - 6,000 km^2.

The delta development is controlled by: the Danube sediment input (the average sediment discharge is ca. 40.106 t/y, of which 4-6.106 t/y sandy material); the prevalence of winds from the northern sector (40-50% of instances) of the delta front area; the predominance of southward oriented marine currents; the long shore sediment drift directed also towards the south; the relatively important values of wave power etc. The interaction of these factors determines the delta morphological type, the geometry of the volumes of deltaic deposits, the asymmetry of the deltas of the Danube distributaries and their development and evolution.

The Danube Delta overlaps the Predobrogean Depression, which, in its turn, lies mainly on the Scythian Platform (Figure 3).

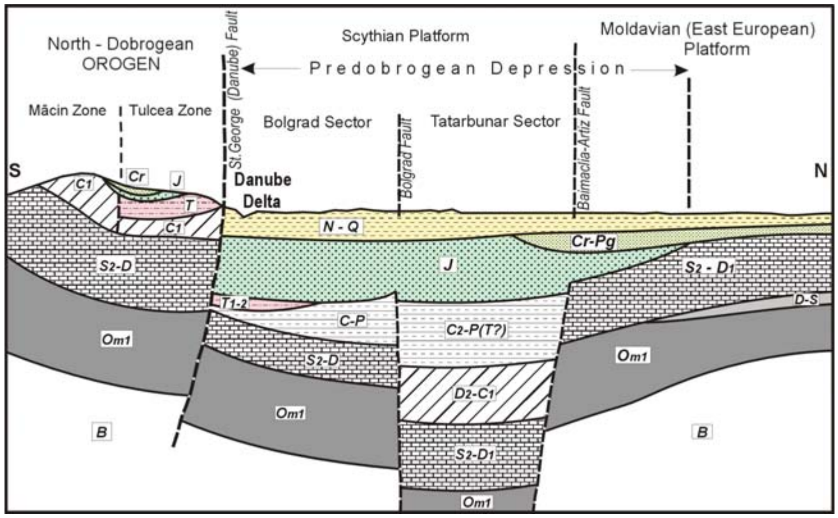

Figure 3. Geologic section showing the location of the Danube Delta within the major structural units of the region. B: Basement; O: Ordovician; S: Silurian; D: Devonian; C: Carboniferous; P: Permian; T: Triasic; J: Jurassic; Cr: Cretaceous; Pg: Paleogene; N: Neogene; Q: Quaternary.

The Delta edifice is built up of a sequence of detrital deposits of tens to 300-400 m thickness formed mainly during the upper Pleistocene (Karangatian, Surozhian, Neoeuxinian) and the Holocene (Figure 4).

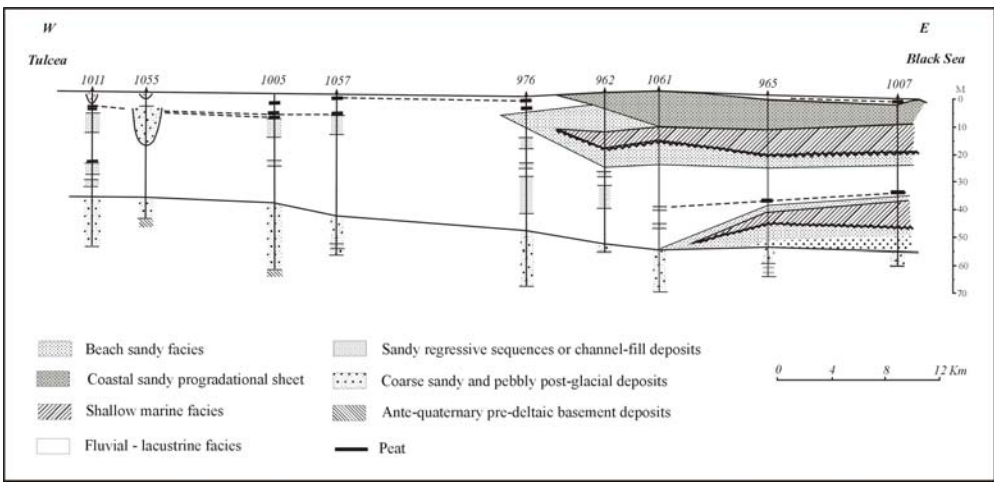

Figure 4. Schematic cross section through the Danube Delta.

The Holocene evolution of the Danube Delta includes the following main phases: (1) the formation of the Letea-Caraorman initial spit, 11,700-7,500 yr. BP; (2) the St. George I Delta, 9,000-7,200 years BP; (3) the Sulina Delta, 7,200-2,000 years BP; (4) the St. George II and Kilia Deltas, 2,000 years BP - present; (5) the Cosna-Sinoie Delta, 3,500-1,500 years BP (Figure 5).

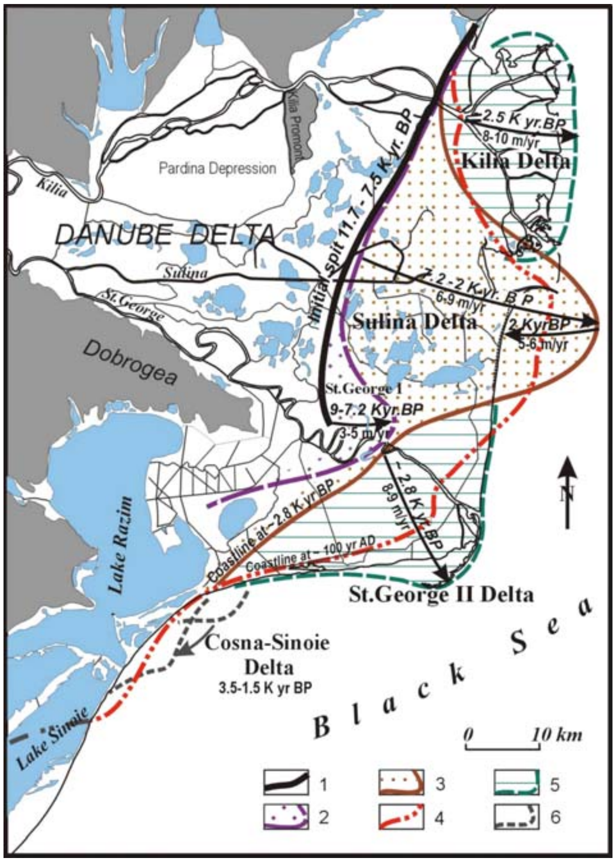

Figure 5. The Danube Delta evolution during the Holocene and correspondent coastline position changes (after Panin, 1997).

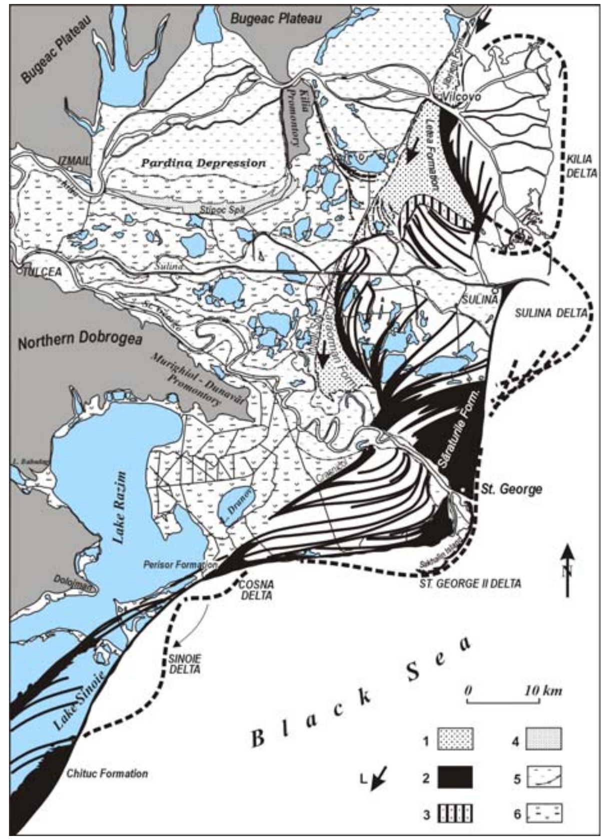

Figure 6. Areal distribution of the main types of deposits within the Danube Delta territory (after Panin 1989). 1: marine littoral deposits of type “a”, formed by the littoral drift from the rivers Dniester and Dnieper mouths; 2: marine littoral deposits of type “b”, of Danubian origin; 3: deposits of littoral diffusion, formed by mixing of “a” and “b” types; 4: lacustrine littoral deposits; 5: fluvial meander belt deposits; 6: interdistributary depression deposits; L: direction of the longshore sediment drift.

The Danube Delta plain displays the following main facies of sediments: (I) marine littoral deposits of two types: type "a", formed by the longshore drift from the North (from the mouths of rivers Dniester, Southern Bug and Dnieper), and type "b", of Danubian origin; (II) lacustrian littoral deposits, forming the Stipoc and Rosca-Suez lacustrian spits; (III) fluvial deposits, genetically related to the Danube distributaries system, include several types: bed-load and mouth-bar deposits, sub-aqueous and subaerial natural levees deposits, crevasse and crevasse-splay deposits, point bar and meander belts deposits, decantation deposits into intra-deltaic depression and inter-distributary area etc.; (IV) marsh deposits; (V) loess-like deposits (Figure 6).

October 8. Transfer of participants from Bucharest to Tulcea and visit of the town in the evening. Overnight in Tulcea.

Tulcea is the main town on the Danube Delta border (Figure 2). The road from Bucharest to Tulcea, is running (about 370 km) across the very flat Danube Plain, crosses the River Danube at Vadu Oii on an imposing bridge, almost one kilometre long, and continues through the Dobrogea hilly and mountainous region.

Tulcea is a town of 97,000 inhabitants, placed on the border of one of the River Danube distributaries -Tulcea branch. It is an industrial town with shipyards, aluminium plant and food industry; at the same time it is the capital of Tulcea county, in the northern part of Dobrogea with an area of almost 8,500 km^2 and a population of 267,000 people. The Danube Delta Biosphere Reserve Authority and the Danube Delta Research Institute are located in Tulcea. The apex of the Danube Delta – the first bifurcation of the Danube River (called Ceatal Izmail) is placed very close to Tulcea.

October 9: Field trip on a boat to the mouth zone of the St. George distributary - the St.George village, the secondary delta, the Sackaline island, and the beach. Return to Tulcea in the evening. Overnight in Tulcea.

The route to the mouth zone of St.George distributary (Figure 7) takes about 5 hours of continuous sailing downstream the river along of the most picturesque distributary of the delta. The first about 10 km are along the Tulcea distributary. After its bifurcation called Ceatal St.George the St.George branch flows east 108 km.

Recently, in the eighties, a meander cut-off programme has been carried out along the St.George distributary. In about 10 years all its meander bends were rectified and the total length of the branch was shortened by about 32 Km causing the beginning of a new process of water and sediment discharge redistribution among the delta distributaries.

The St.George branch is rather wide (350 - 650 m) and the depth is varying from 6 m to 25-30 m. The levees are very well expressed; crevasses can be observed even from the motorboat.

The river lateral levees are covered by abundant vegetation represented mainly by white, black and trembling poplars (Populus alba, P.nigra, P.tremula) and numerous species of willows (*Salix alba, S. fragilis, S.pentandra, S.purpurea, S. triandra, S.aurita, S.amygdalina, S.rubra, S.cinerea*). To these numerous other species are associated *Tamarix gallica, Hyppophae rhamnoides, Myricaria germanica, Fraxinus oxyphylla* (Asian origin*), Fraxinus pallisae* (Balkan origin), etc.

The boat will steam along a section of free meandering of St.George branch (from Km 65 where "Halmyris" is moored, to Km.22) crossing five meander bends. At Km.22 Ivancea old beach ridges set is limiting the free development of the last meander bend occurring on the St.George arm. Further on, from Km.16 to the river mouth there are no more active meander bends; the river course is slightly curved southward being limited to the north by the Saraturile Littoral Accumulative Formation.

St.George village

St.George village is situated nearby the distributary mouth, on the left bank of the river (Figure 7). Already in the year 1327 The Genovese traveller Visconti cites the locality as a place where the ships coming from the Mediterranean Sea could moor. The village has over 1,000 inhabitants. An important part of its population is of Russian origin. They are called "Lipovani" after the denomination of an orthodox "old believers" sect. This sect migrated from Russia to the Danube Delta area under the pressure of the official church (especially of the Patriarch Nikon) and of the Russian empire administrative authorities in 18-th century. The population is still keeping their orthodox "old believers" religion and their traditional customs. The main occupation is fishing in the river but especially in the neighbouring coastal sea.

At about 1.5 km from the village to the east, at the seaside, there is a nice beach used by tourists. The beach is almost 10 km long, very wide, with small to medium size dunes within the backshore zone. The sand of Danubian origin (type "b") is fine grained, with an important heavy minerals fraction (3-5%). The heavy minerals are underlining the internal structure of the beach berms.

The village is situated on the Saraturile Littoral Formation, which represents the northern wing of the St.George II Delta. The sets composing the Saraturile Formation are Câsla Vãdanei, Iepurilor, Morilor, Lung, Câsla and St.George. The Formation is characterised by a divergent structure due to the backstepping of the coastline in the north, the Sulina Delta being continuously eroded, while in the south, nearby St.George distributary mouth, the coast was prograding at the same rate as the St.George II was developing. About 10 km north of the village there is the most important zone of coastal paleo-erosion in the entire Danube Delta area: here the older beach ridges were successively cut by younger ridges, whose directions were following the Sulina Delta recession and the St.George II progradation. The paleo-erosion zone is characterised by a residual enrichment in heavy fraction up to 15-17 %.

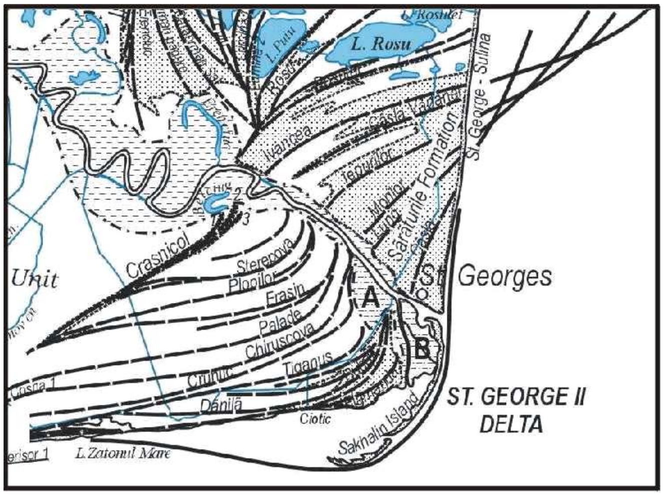

Figure 7. The St.George distributary mouth zone and old beach-ridges forming the St.George II Delta.

Figure 8. St.George distributary mouth zone and the Sakhalin Island.

St.George secondary delta and Sakhalin Island

The secondary delta of the St.George distributary has started forming ca.200 yr. BP. The delta is placed on the southern bank of the St.George branch and presently has two distributaries: Turcului and Seredne. The last one is clogged consequently to the closing of its mouth by the backstepping of the Sakhalin Island (Figure 8).

The mouth of Turcului arm is a typical frictional one, with successive bifurcations of the channel, underwater levees and middle-ground bars. At almost 1 Km upstream from the mouth one can observe the remnants of an old lighthouse, which was built in 1865 when the secondary delta was in a very incipient stage of development.

After the exceptionally high flood of 1897 at the St.George arm mouth a lateral bar began to develop into an arcuated lateral beach ridge. This littoral bar, called Sakhalin Island, continuously grew during a century reaching nowadays a length of ca. 17 Km. Due to over-washing the ridge shifted inward up to the front of the St.George distributary delta described above. In the 80's the island joined the secondary delta front nearby the mouth of Seredne branch stopping its outflow and favouring the clogging of the distributary.

The south-western end of the island is still floating, having the tendency of joining the Delta coast in the Ciotic-Zãtoane area.

The littoral section represented by the Sakhalin Island is characterised by a steeper and narrower delta front zone and consequently by a higher wave energy regime. The longshore sediment drift is very strong, being oriented towards the south-west. The main supplier of sandy sediments is the St.George distributary, which was bringing (before the meander cut-offs) into the littoral zone 0.8 - 1.0 million cubic meters per year. The potential sediment longshore transport is computed at more than 1.2 million cubic meters per year, meaning that the sedimentary budget of this section seems to be undercompensated. Taking into consideration that the longshore sediment drift in the northward neighbouring section is partly passing over the St.George mouth one could consider the coastal sedimentary budget of the Sakhalin Island section in a very unstable equilibrium, depending on water and sediment discharges of the St.George distributary, as well as on the sea wave and current energy regime in the considered period of time.

The yearly mapping of the island carried out by GeoEcoMar since 1978 allows a precise record of its evolution and development tendency.

The St.George secondary delta, the Sakhalin Island and the Ciotica-Zãtoane area represent one of the core reserves established within the Danube Delta Biosphere Reserve. It is a key area for the ecological equilibrium of the Delta and for the preservation of its biodiversity.

October 10: Field trip on a boat to Caraorman accumulative formation, the Caraorman village, the lakes Puiu - Rosu, the Old Danube. Return to Tulcea in the evening. Overnight in Tulcea.

The route from Tulcea towards Caraorman village and Caraorman Formation takes about four hours. It goes downstream Sulina distributary until the Mile 14, by the Crisan village, and along the Caraorman canal. The Sulina distributary was rectified by the Danube European Commission for sea navigation in the 1868-1902 period by cutting off its meander loops, and at present it is 63 km long. Its water discharge, very low before meander loops cut-off (7-9 %), represents today about 19-22% of the total Danube discharge.

Caraorman village

Caraorman means in Turkish the “Black Forest”. So, few people know that the River Danube flows from the Black Forest Mountains to the Black Forest Village about 2,700 km downstream. The presence of population on the Caraorman dry land is already mentioned during the Greek and Roman colonisation of the Black Sea coastal zone. In the writings of Ancients is mentioned the Peuce Island at about 120 stadia (about 25 Km) from the Hieron Stoma (mouth of St.George distributary).

The village has less than 1000 inhabitants, mostly of Ukrainian origin (Khakhols). The general impression is given by nice and very clean paint in white and blue or green houses, with characteristic Danube Delta architecture, broad sandy streets in geometric alignment, three orthodox churches with strong Russian influence, all placed in a very flat sandy landscape.

In the 80’s the communist regime imposed a forced industrialisation of this area. The officials intended to utilise the very clean quartzy sand of Caraorman Formation (of type “a”, see description of main types of Danube Delta Deposits, pag.28) for metallurgy and glass manufacture. The Caraorman Village port was intended for this exploitation as well as the Caraorman canal was dug for transporting the sand by barges to Galatzi metallurgical plants. Presently, after the political changes in Romania in 1989 and the establishment of the Danube Delta Biosphere Reserve in 1992, the plans of exploiting the Caraorman sands were abandoned and consequently all the buildings and port equipment were also abandoned showing a really distressing image.

The Caraorman littoral accumulative formation

The Caraorman formation (Figure 9) represents the northern flank of the St.George I Delta and one of the oldest littoral bodies (9,000 - 7,200 yr. BP). The main old beach ridges sets forming the Caraorman Formation are: the Initial spit, which is the starting line for the Caraorman Formation development, flanked to the east by the Erenciuc, Caraorman-pãdure and Caraorman-sat sets (from oldest to youngest).

The Caraorman village is placed on the Caraorman-sat set. This set is formed exclusively of the Ukrainian rivers sediments drifted along the seashore (type“a”). Low and very long ridges with swales among them make up the general landscape in the area of the village.

The trip continues towards the Caraorman-pãdure set by making the tour of village and going westwards almost 1.5 km. Here the ridges are higher and the relief is complicated by the occurrence of barchans type dunes, up to 7-8 m high. This set is the "locus typicus" for studying the type “a” littoral sands.

The southern and western parts of the Caraorman-pãdure set, as well as the Erenciuc set area lying westward, are occupied by a beautiful and very old forest formed mainly of high up to 25 m white, black and trembling poplars (Populus alba, P.nigra, P.tremula), oak trees (*Quercus sessiliflora*), ash trees (*Fraxinus excelsior*), elm trees (*Ulmus campestris*), white willows (*Salix alba*), osier willows (*Salix fragilis*), crab trees (Malus sylvestris), lime trees (*Tilia platyphyllos*), hazel trees (Corylus avellana) with lianas like vegetation of Virginia creeper (*Vitis sylvestris, Ampelopsis quinquefolia* and *A.hederacea*), hop plants (*Humulus lupulus*), tendrils (Clematis), eglantines (*Rosa canina*), juniper trees (*Juniperus communis*), sea buckthorns (*Hippophae rhamnoides*), etc. The most interesting of this lianas-like vegetation is Periploca graeca of Mediterranean origin, the Caraorman area being the northernmost limit of its living areal. In the depressions among the dunes the vegetation is represented by Elymus sabulosus, Bromus tectorum, Agropyrum junceum, Salix rosmariniflora etc.

Few kilometers to the south an important zone of paleo-erosion occurs. The above mentioned sets are successively cut by the younger sets Iacob, Puiulet I, Puiulet II, Lumina I and Lumina II, Rosu and Rosulet and finally Ivancea. These younger sets make up the eastern part of the Caraorman Formation and represents the southern wing of the Sulina Delta and consist of Danube-borne sediments (type "b"). The paleo-erosion zone is underlined by a residual enrichment in heavy mineral fraction.

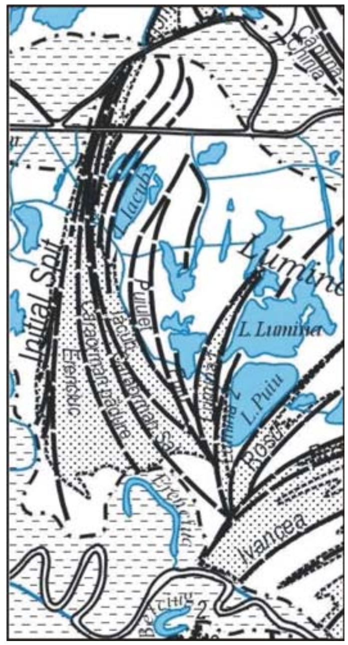

Figure 9. The structure of the Caraorman littoral accumulative formation

October 11: Field trip to Istria (by bus), visit of Istria, continuation of traveling to Romanian-Bulgarian border, passing the border and travel to Varna. Overnight in Varna. Follows by the Bulgarian part of the field trip.

Histria fortress is one of the most important archaeological sites in Romania and on the Black Sea coast. It has been officially designated part of the European cultural heritage.

The Histria archaeological site was discovered in 1914 by Vasile Parvan. The town of Histria came in existence in the middle of VIIth century BC (in 657 BC according to Eusebius) when sailors from Miletus colonised the western coast of the Black Sea. Histria is the first Greek settlement on the western coast of the Black Sea and the oldest town of Romania. Altogether, it was in continuous existence for over 1,300 years, up to the Roman-Byzantine time. In the seventh century AC, the settlement was almost totally destroyed by the Avar and Slavic invasions and, therefore, gradually deserted.

The Histria town was located on the shore of the Sinoe Lake, 500 stadia away from the sacred mouth of Istros River (as described it Strabo) and 65 km north of Constanza.

During the Greek period (VIIth century – Ist century BC), Histria included two different sections (following the ancient city planning pattern) the acropolis and the marketplace (agora), both of them separately walled. They covered almost 35ha. To the end of the VIth century BC, the settlement was violently destroyed. A new wall was erected which reduced the settlement by half. Meanwhile, Histria reaches its height in trade, joins the Delian League, and passes from oligarchy to democracy and strikes coins of its own.

The first wave of Scythians trying to settle in the territory south of the Danube River and the rebellion of the Pontic cities against Lysimachus caused another destruction of the city at the end of the IVth century BC.

After this event the town was rebuild and knew a flourishing epoch and also the first alliances with gaethic kings (Zalmodegikos, Rhemaxos). The Ist century BC brings about both internal turmoil and external dangers: Mithridates the VIth Eupator, king of Pontus sent one of his strategists to Histria; in 72 BC the first Roman armies, lead by M. Terentius Varro Lucullus, pushed Eupator out of Pontus. Several years later, the Gaeto-Dacian king Burebista took the town under his influence.

After Burebista's death, Histria came under Roman rule and this put an end to its autonomy. Under the Roman rule, the settlement thrives again.

While in the early Roman period (the IInd and the IIIrd century BC) the settlement walls enclosed a rather large area, the violent Carpo-Getae attacks that lead to the almost total destruction of Histria, reduced the urban zone, during the late Roman period (IV – VII centuries AD) to a mere 7ha area which can be now seen at the excavated precinct.

Excavations, started in 1914, have borne witness to several stages of construction. Discoveries have revealed a remarkable collection of early sacred buildings, including an archaic temple of Aphrodite (rebuilt in the Hellenistic epoch) and a fifth-century BC sanctuary of Zeus Polieus. Parts of a Hellenistic rampart can also be seen, and traces of the various successive Roman defences. From the Roman period (II – III century BC) there are the thermae and the paved streets.

The final epoch of Istrus, extending between the IVth and VIIth centuries AD, is represented by three separate zones: an official quarter including pagan basilicas and subsequent Christian buildings, a business district comprising shops and industrial works, and a residential area (domus) containing large and luxurious houses.

Recent studies evidenced the types of sedimentary, metamorphic and igneous rocks used to build the Histria Fortress (Baltres et al., 1993). They include Turonian spongolites, spongolitic limestones and sandstones, with a typical yellow coloration and beautiful Thalassinoides bioturbations, and rare siliceous sponges. They were used for the Aphrodite's Temple (550-525 B.C.), Temple of Zeus Polieus (5th century B.C.) and Temple C. Large blocks of white, Jurassic limestones were used mostly for epigraphic and architectural monuments of Histria. Santonian grey sandstones and microconglomerates, rich in ostreids, were almost exclusively used to build the protection wall from the Hellenistic times. Red, biolithitic limestones with sponges, belemnites and hydrozoans and white, Sarmatian limestones were seldom used, as well as glauconitic sandstones with Exogyra. Late Cretaceous chalky limestones were used for building the Roman wall (2nd century), the Basilica and so on.

The Late Proterozoic sandstones and siltstones of the Histria Formation (which constitute the bedrock of the fortress) were largely used for building the fortifications, walls of Roman-Byzantine houses, and Domus V, the Zeus Polieus Temple and other edifices). They display a typical green colour, sometimes reddened by weathering. Igneous rocks are andesites (not known in Dobrogea) and various rocks from North Dobrogea (rhyolites, Iacobdeal alkali granites and mylonitic Pricopan biotite granites).

Close to Histria fortress there is an interesting archaeological museum that displays Byzantine, Roman and Greek archaeological collections resulted from excavations which took place at Histria and in its surrounding area: amphoras, inscriptions, ceramics, glassware, rush candles, jewellery, Hellenistic bas-reliefs, epigraphs.

October 12: Field trip along the northern Bulgarian Black Sea coast (more information about field trips will be available in the Second Circular):

- Durankulak Lake: Archaeological park Durankulak and Museum in Durankulak.
- Shabla Lake: Palaeoecological reconstructions and human activities for the last 7 kyrs.
- Krapetz coastal area: Loess section and buried soils; boundary Pleistocene/Holocene.
- Cape of Kaliakra, the ancient Thracian, Byzantine, Roman and Bulgarian city; The boundary of Middle and Upper Sarmatian.
- Town of Balchik; archaeology and history of the ancient Greek city of Dionisopolis. Lunch nearby the Durankulak Lake. Dinner and night in Azalia Hotel in Varna

October 13: Field trip along the southern Bulgarian Black Sea coast:

- Kiten Archaeological Museum; archaeology of Early Bronze Age settlement.
- Town of Sozopol: Submerged praehistorical settlements of Late Eneolithic and Early Bronze Age in the Harbor of Sozopol; Archaeological excavations of the Apolonia Pontica necropolis of Early Hellenistic Period; Sozopol Archaeological Museum;
- Town of Nessebar: archaeology and history of the ancient Greek city of Mesembria. Lunch in Sozopol, dinner in Nessebar, night in Azalia hotel.

October 14: Field trip to the Kamchia River estuary with flooded riverine forests "Longoz" and Byala anticline, section with the boundary of Upper Cretaceous/Tertiary profile.

October 15: Closing session and ceremony in Varna. Guided visit to the Archaeological Museum in Varna famous with the oldest gold in the world. Coctail from the Director of the Museum. Departure to Bucharest.

October 16: Departure from Bucharest or if somebody prefers from Varna.

Social program

During the conference, a series of tours and entertainment will be organized. More details will be announced in the Second Circular.

Hotel Accommodation (Please refer to the "Hotel Form")

Hotel	Room	Per night/per person* Euro	Date
Ibis Nord Hotel (Bucharest)	Double (single occupancy)	84	October 4-8, 2008
Ibis Nord Hotel (Bucharest)	Double (double occupancy)	42	October 4-8, 2008
Ibis Nord Hotel (Bucharest)	Single	72	October 4-8, 2008
Egreta Hotel (Tulcea)	Double (single occupancy)	45	October 8-11, 2008
Egreta Hotel (Tulcea)	Double (double occupancy)	23	October 8-11, 2008
Egreta Hotel (Tulcea)	Single	40	October 8-11, 2008
Azalia Hotel (Varna)	Double (single occupancy)	40	October 12-14, 2008
Azalia Hotel (Varna)	Double (double occupancy)	19	October 12-14, 2008
Azalia Hotel (Varna)	Single	29	October 12-14, 2008

*Subject to change

Conference venue in Bucharest: Conference Hall at the Romanıan Academy of Scıences, 125, Calea Victoriei (Romanian Academy Library building). Conference venue in Varna: Regional Historical Museum, Varna).

Registration Fee (Please refer to the "Registration Form")

	Registration before July 31, 2008	Registration after July 31, 2008
	Euro	Euro
Participant	250	350
Accompanying person	200	300
Student*	170	250

* Student identification is required

The registration fee covers conference kit, refreshments during coffee breaks, portable lunches during field trips, museum entrance fees, and bus transportation during the field trip. **It does not cover hotel accommodation during the conference and field tips.**

Refund policy

Fifty percent refund before July 31, 2008. No refund is possible after July 31, 2008.

Financial Support

IGCP 521 has very limited funds available to distribute, and rarely is it able to fully support the full cost of meeting attendance. Therefore, applicants should show evidence of seeking or having obtained funds from elsewhere to help underwrite the costs of attendance. Preference in allocations of funds will be given only to those from the developing world who present a paper that will be accepted by the Scientific Committee. Awards will be made only after receipts and proof of travel have been submitted. Awards are conditional on successful applicants submitting the necessary scientific material for the annual report IGCP521 has to make to UNESCO. Please send the “Application Form” together with your abstract and “Registration Form.”

Conference Language

The official conference language is English.

Abstract

Preference will be given to extended and informative abstracts containing new data and arguments. Your abstract(s) should not exceed 2 pages (1000 words). In case an abstract is not in a print-ready format following the specifications of the template, it will be returned to authors for editing. The guidelines for abstract preparation and submission are outlined in the Abstract Template. You must specify the mode of your presentation: ORAL or POSTER. No abstracts will be accepted without registration of at least one of the authors. Every registered participant has the right to submit up to two extended abstracts.

Oral and Poster Presentation

Each speaker will have 15 minutes for presentation and 5 minutes for discussion. Authors are allowed to present only one paper for each session. However, it is permissible to be listed as the co-author in another contribution. Poster format is 100x180 cm.

Projection Equipment: Screens, LCD (PowerPoint presentation) projectors, tabletop 35-mm slide projectors and overhead projectors are available. If other or additional equipment is requested by a presenter, reasonable attempts will be made to accommodate the individual request.

Publication

Accepted abstracts will be published in the Abstract Volume. The full papers will be published in an IGCP 521 Special Volume of the journal *Quaternary International*. For preparation of the manuscript, refer to Instructions for Contributors.

Visa

Visitors from other countries must carry a valid passport and, in certain cases, visas to be able to enter Bulgaria and Romania. For more information on visas and other required travel documents, please contact the Bulgarian and Romanian Embassy or Consulate in your area before your departure. Invitation Letters will be provided upon your request. Each attendee is responsible for obtaining his/her visa.

Climate

Early-October is the most favorable time of the year for field trips. Daily temperature is about 20°C, and at night, it is about 15°C.

Travel

Please inform the organisers before the meeting how you intend to travel and when you expect to arrive, so that arrangements can be made for people to be collected from the airport, railway station or the bus station in Bucharest.

Dates and Time

March 15, 2008	First Circular on IGCP 521 website (www.avalon-institute.org/IGCP)
March 15, 2007	Abstract submission and registration opens
June 30, 2008	Abstract submission closes
July 15, 2008	Notification of abstract acceptance
March 15, 2008	Submission of application for financial support opens
May 31, 2008	Submission of application for financial support closes
July 31, 2008	Deadline for early registration
August 1, 2008	Second Circular on IGCP 521 website (www.avalon-institute.org/IGCP)
September 15, 2008	Program of the conference available
March 15, 2008	Paper for submission to Quaternary International journal opens
December 31, 2008	Paper submission to Quaternary International journal closes