



Abstracts

The Excavation of the Harbours of Istanbul Bathonea

An International team from Kocaeli University, Istanbul University, Bristol University, Eastern Mediterranean University, Cyprus International University and Lahey University have started to the excavations in 2009 at Istanbul – Kucukcekmece Lake after the land and underwater research in 2007 and 2008. This lake is located at the junction of the sea way between Istanbul and Mediterranean sea and just 30 kilometers away from the center of Istanbul. There is still a connection between the lake and the sea for boats, which was much wider in the past. It was a safety natural harbour for ships on the rotation between Aegean and Black seas. The team has found architectural remains at the both sides and peninsula of Kucukcekmece Lake. All remains were under the water, earth and vegetations. Some of them are from Neolithic, Hellenistic, Roman, Byzantium and Ottoman periods. The team also has found a fortification wall and harbours at the peninsula of the lake and some sunken remains 300 meters far from the coast. Excavation grids of the underwater archaeology team are on the harbours of the ancient city.

Byzantine ship graffiti from the church of Prophet Elias in Thessaloniki

The aim of this paper is to bring to the attention of the specialists a remarkable series of medieval ship graffiti preserved on the walls of the Byzantine church of Prophet Elias in Thessalonica. This building was erected around 1360-1385 and functioned as a monastic church only for a few decades, since shortly after the Turkish conquest of the city in the year 1430 it was converted into a mosque by the Ottomans. The new conquerors covered with plaster the walls of the church, sealing and preserving thus a large group of graffiti that can be safely dated within a time-span of 50-70 years.

The ships depicted on the walls belong to various types, ranging from small fishing boats to large merchantmen and galleys. Thanks to the fact that they form a chronologically closed group of images, they afford us for the first time a rare insight into the variety of the vessels that travelled to and from the harbour of Thessalonica during the turbulent years of the late Byzantine period.



The Tantura F Shipwreck: A case study of trade in the eastern Mediterranean between the mid-7th and the end of the 8th centuries AD

Tantura F was discovered in 1996 during a survey at Dor, and was fully excavated between 2004 and 2008. It was dated to between the mid-7th and the end of the 8th centuries AD—the early Islamic period in the region.

Among the finds were carobs (*Ceratonia siliqua*) and olive pits (*Olea europaea*), which could have been the remains of ship's provisions or cargo. The ceramic assemblage included miscellaneous and ovoid amphoras which mainly contained a large amount of fish products. The fish were identified as originating in present-day Israel.

The petrography and chemical composition analyses of the ceramics finds indicate its origins in the Nile Delta, and in the piedmont of the Troodos Mountains in Cyprus or southern Turkey.

This information may provide a clue to sailing routes and maritime trade along the Levant coast between Egypt and Dor, and including Cyprus or southern Turkey.

***Ploion platypegion*: Getreide – und/oder Kriegsschiffe in frühbyzantinischer Zeit**

Im der „Scytia Minor“ gewidmeten Teil der *Notitia Dignitatum* wird unter den im Bereich des Donaudeltas stationierten militärischen Abteilungen eine Marineeinheit unter der Bezeichnung *classis in plateipegiis* angeführt. Diese aus Schiffen mit flachem Kiel bestehende Einheit war in einem der am Donaulimes gelegenen Castra untergebracht, dessen Name mit der Schiffsbezeichnung übereinstimmt: *platypegion*. Es ist die Rede von Flussschiffen mit flachem Kiel und wenig Tiefgang, von mittlerer Größe, die kleinere Truppenteile sowie Getreide zur Truppenversorgung transportieren konnten. Die meisten Informationen über diesen Schiffstyp finden wir in Papyri aus Ägypten aus dem 4.-6. Jahrhundert (P.Oxy. 2715; 3636; SB, 9614). Es ist anzunehmen, dass diese in der *Notitia Dignitatum* genannte, mit für die Region typischen Schiffstypen ausgestatte *classis* aus dem Donaudelta sowohl für die Truppenversorgung als auch für Truppentransporte in der Limesregion Verwendung fand.



Nautical Evidences from *Byzantium* in Seville, Spain

Of the few examples of Byzantine shipbuilding that are known through shipwrecks, the most important ones are located in the eastern Mediterranean. In 1981 during public construction works in Seville, Spain, Spanish archaeologists found a Byzantine anchor and what they thought was the Byzantine ship to which it belonged.

The report of a Byzantine shipwreck found on the western Mediterranean, at the shores of the *Guadalquivir* River, seemed quite an unusual and important discovery. Therefore, in 2007, thanks to the support of the Institute of Nautical Archaeology, the author traveled to Seville to inspect and document the remains of the iron anchor and the wooden ship found in the early 1980s. The study, presented in this paper, revealed that the morphological characteristic of the anchor perfectly matched with some of the anchors found in the *Yassi Ada* shipwreck (seven century A.D.). However, the anchor found in Seville most likely dates from the second half of the sixth century A.D., in concordance with the historical period in which Seville was under the rule of *Byzantium*.

The study also revealed that, although the anchor was made during the Byzantine Empire, the ship remains belonged to a later period. The wooden remains probably dated from the period between 711 and 1090 A.D. when *Ishbiliya* (Seville) was under Muslim rule as part of *Al-Andalus*.



Byzantine Merchant Ships And Marble Trade From Central Mediterranean: New Data

In Antiquity sea-transportation was the primary means of marble-shipment from their quarries to sites that were far removed. No doubts the Marzamemi II, also dubbed the "Church Wreck" by Gerhard Kapitän who conducted the excavation between 1961 and 1967, is the best known shipwreck to have had a marble cargo and to date to the early Byzantine period. Wrecked off the coast of Capo Passero in the early sixth century, this merchant ship may have been directed towards Tripolitania with its load of a "pre-fabricated" marble parts intended for a church, including columns, capitals, bases, and slabs in Proconnesian marble, along with an altar and a double *ambo* made of green Thessalian marble. Others marble pieces recently recognised as belonging to this shipwreck (Castagnino Berlinghieri, Guzzardi, in press) recalls for a reappraisal of the materials that have been recovered over the time from the shipwreck of Marzamemi which, unquestionably, deserve more attention in terms of preservation and cultural enhancement. The new discoveries also suggest to contextualize more precisely the contribution that this shipwreck can make to our knowledge in terms of production and shipping of "prefabricated" marble elements to every corner of the Byzantine Empire.

By combining the "new" and "old" evidence from Marzamemi II with the ancient literary sources and the other shipwrecks of Byzantine *naves lapidariae* recently found off the coast of Syria and in the Sea of Marmara, this paper will gain new insight into the

character of maritime trade of the Byzantine Empire along with its significant achievement in standardization in church construction which brought this art to an high level of monumentality and expressive power.

Dor C Shipwreck: An Ottoman period merchantman from Dor Lagoon, Israel

The Dor C shipwreck site was partially excavated in 1999 and 2000 as a joint project under the direction of the Leon Recanati Institute for Maritime Studies at the University of Haifa, with the cooperation of the Nautical Archaeology Society of Great Britain, and the local Aqua Dora Diving Centre. During these two seasons about two-thirds of the shipwreck was excavated, from the stern towards the bow. In 2008 the Recanati Institute made significant progress in underwater documentation of the wreck and its finds.

Dor C was found in a good state of preservation, with keel, bow and stern components, hull planks, framing timbers, ceiling planks, stanchions, cross beams, internal reinforcements, and remains of two masts. The length between stem and sternpost at the highest level was about 16.3 m, while the maximum surviving beam was 4.5 m, giving a ratio of length to beam of 3.6. At the bottom of the keel, in the bow area, the maximum depth reached was 4.5 m below the surface of the sea.

A wide variety of finds, primarily commercial cargo, were found in the shipwreck: stone slabs, roof tiles and floor tiles, pottery, glass items, sacks containing hazel nuts and peanuts, wooden crates and barrels, animal bones, ropes and other miscellaneous items. It seems that construction materials were shipped in Dor C to the nearby town of Zikhron Ya'acov, which was established with the help of the French Baron Edmond J. de Rothschild at the end of the 19th century. There is evidence that some of the cargo originated in

southern France, but it is not clear whether the cargo was loaded in France or at an intermediate port.

The hull construction and cargo indicate that Dor C was a schooner which shipped merchandise to the new town, unloading in Dor lagoon.



Underwater Archaeology of Byzantine Greece

The paper attempts to present the recorded data of archaeological evidence from the Byzantine period, found underwater in the Greek seas.

The Hellenic Institute of Marine Archaeology Survey Project at Pagasitikos Gulf, Greece: the late Roman and Byzantine wrecks

Since 2000 the Hellenic Institute of Marine Archaeology conducts an underwater survey project at the west coast of south Pagasitikos Gulf in Greece, under the direction of Elias Spondylis. Until today, twelve shipwreck sites have been located, all of them dating from the 4th to the 13th centuries AD. This paper is a preliminary report on these sites, some of which present a particular interest: apart from the amphora concentrations, which are the most common, a pithoi wreck as well as an assemblage of iron anchors were also located.

These finds, reflect the maritime activity in the Pagasitikos Gulf, which has a long and particularly important maritime history. The importance of the late roman harbour sites at Nea Anchialos (ancient Demetrium) and Demetrias, as well as the byzantine city of Almyros, located on a busy sea route between the northern and southern Greek mainland centres, have gradually increased after the 4th century AD. Accordingly, the predominance of byzantine wreck sites adds significantly to our knowledge about the sea routes and commerce in the area, especially during the byzantine period, when the pre-existing trade networks and mechanisms were enhanced due to the new political and economic conditions that prevailed in the Eastern Roman Empire.



The provincial harbours of Hellas and Thessaly in the Byzantine period - The question of Roman heritage and its importance for Byzantium

The regions Hellas and Thessaly, including the islands of the Northern Sporades (Skiathos, Skopelos, Alonnisos and the so called “Erimonisia”) and Euboea, played due to its geographical position a significant role in the Mediterranean sea-trade. Already numerous shipwrecks and other underwater sites demonstrate that at its coast must have been important stations for regional and supra-regional trading routes, not only in the Prehistory and Antiquity, but also in the entire Byzantine period. Although the Byzantine Empire with its economic potential and trading power was as great as that of Rome, the pattern of harbour structure is changing in Late Antiquity. But the discontinuity between Roman and Byzantine Mediterranean ports is not a consequence of economic decline. Similar to the change of ship construction, the need, use and character of Byzantine harbours is just a consequence of changing political impacts during centuries.

The aim of this paper therefore, is to examine the question of continuity, reuse or abandonment of regional harbours, staple markets and other coastal structures in the regions of Hellas and Thessaly in comparison to so called super-ports like that of Dor or Caesarea. Furthermore the focus of research will be to investigate not only the role and importance of those harbours as stations for the regional and supra-regional trade, but also to prove their coherence with underwater archaeological finds on the one hand and commercial infrastructures on land on the other hand.



Apollonia and its Harbours

On the coast, some 12 km north of Tel Aviv are situated two ancient towns. Tel Michal, 17th century BC to 6th century BC and Apollonia, continually from the 6th century BC to 1265, when it was destroyed together with most coastal towns by Sultan Baybars to prevent the Crusader from returning.

In the Late Roman and Byzantine periods a network of roads from inland converged at Apollonia and the route along the coast, from Egypt to the north, passed closed by. The excavated layers belonging to the Byzantine period indicate a lively trade between the Eastern Mediterranean, Italy and Northern Africa. Industry flourished, there are traces of glass manufacture, winery and of purple-dye being produced from murex mollusks. The town reaches its peak and largest expansion during the 6th - 8th century, when its agricultural hinterland started to flourish. Imported finds from the Byzantine world indicate that the seaborne commerce contributed substantially to the city's growing wealth, which made it the chief commercial, industrial and maritime centre of the southern Sharon plain.

In AD 614 the city was taken by the Persian and in AD 640 was conquered by the Arabs. Because of the constant threat from the Byzantine navy, the Muslims fortified one third of the city. Nevertheless, Apollonia with a well planned market street, became one of the main twelve cities in Early Islamic Palestine. The Crusaders conquered the town in 1101 and restored its fortifications and made it a royal city.

Below the Crusader castle, built on Byzantine remnants, is a small harbour, an anchorage. Considering the trade connections with the Eastern Mediterranean countries, it is obvious that it could serve only local needs.

Surveying the shore to the south, we found scattered amongst architectural remains a large quantity of pottery shards of Late Roman pithoi and mainly of Late Byzantine bag-shaped amphorae. Westwards, some 150 m offshore we discovered a big number of stone anchors and a breakwater, approximately 150-200 m long, from north to south and 50 m wide, completely covered by encrustation and giving the impression of natural rock. Only the cut-off corners and edges, protruding from this conglomerate, show that the underwater ridge is man-made, supposedly using the natural reef as its base. It is important to excavate both harbours, because they originate in the Byzantine period and are not, as most harbours in the Mediterranean, reconstructed harbours from the Roman period.

The land excavations and our findings revealed the importance of the town and confirm the writings of Josephus Flavius and others, who mentioned Apollonia among the important towns on the coastal plain.



Unterwasserarchäologie in Cenoten und gefluteten Höhlensystemen Mexikos

In Zusammenarbeit mit dem Instituto Nacional de Antropología e Historia (National Institute of Anthropology and History, INAH) untersuchen Unterwasserarchäologen der Arbeitsgruppe für maritime und limnische Archäologie (AMLA) des Instituts für Ur- und Frühgeschichte der Christian-Albrechts-Universität Kiel seit Sommer 2009 geflutete Höhlensysteme und Cenoten (Einsturzdolinen) im nördlichen Teil der mexikanischen Halbinsel Yucatán. Ziel dieser einmaligen Kooperation ist die Erfassung, Erforschung und Erhaltung von archäologischen Funden und Befunden unterschiedlicher Zeitstellung aus den weit verzweigten Höhlensystemen der Bundesstaaten Yucatán und Quintana Roo.

Die Kieler Forschungstaucher sind die ersten deutschen Wissenschaftler, die zusammen mit ihren mexikanischen Kollegen diese komplizierten Untersuchungen in den gefluteten, labyrinthartigen Höhlensystemen durchführen und das nötige Know-how für diese aufwendigen Tauchgänge mitbringen.

Seit Beginn der Untersuchungen konnte bereits reichhaltiges Fundmaterial dokumentiert werden; darunter Knochen der pleistozänen Fauna, prähistorische Feuerstellen und intentionelle Bestattungen sowie sakrale und profane Hinterlassenschaften der Maya. Diese neuen Funde und Befunde sollen im Vortrag vorgestellt werden.

Weitere Informationen zu unserem Projekt finden sie unter:
www.mexiko.amla-kiel.de



Tantura E, hull construction report

Dor (Tantura) lagoon is situated on the Israeli coast south of Tel Dor, about 30 km south of Haifa. The Tantura E shipwreck was discovered in 1995 during a survey by a combined expedition of the Leon Recanati Institute for Maritime Studies at the University of Haifa (RIMS) and the Institute of Nautical Archaeology at Texas A&M University (INA). It was excavated systematically in 2006, 2007 and 2008 by the RIMS, with volunteers from the Nautical Archaeology Society of Great Britain (NAS). The wreck is located about 25 m offshore, on the western side of the lagoon's navigable channel, in a water depth of 2.5 m, oriented North-West/South-East.

The wood remains are spread over an area of 7.6 m by 3.1 m, and comprise sections of the keel, false keel, a transition timber (gripe), a small fragment of one endpost, a central longitudinal timber, 44 frame timbers, 23 strakes, 7 stringers, 13 ceiling planks, a bulkhead support, and a stanchion. Based on ¹⁴C and preliminary ceramic analyses, the wreck has been provisionally dated to the 8th century CE, which is the early local Islamic period.

The surviving length of keel and adjacent longitudinal members is 7.6 m. The framing pattern was of alternating floor timbers and half-frames. The hull planks were short, nailed to frames, and butt-jointed at frame stations. The planks were butt-jointed at frame stations, and caulked in the seams with no planking edge joints. The ship was built of eastern Mediterranean tree species. Some of the timbers were of poor quality—short, narrow, and sometimes roughly worked, but the construction was strong and solid.

Construction elements of Tantura E are similar to other ships found in Dor lagoon, but the scantlings of Tantura E seem to be the heaviest. Tantura E is additional evidence from Dor lagoon for the completion of the transition in ship construction from shell-first to frame-based in the Mediterranean in the local Early Islamic period. Based on a longitudinal section, several cross-sections, underwater measurements and high resolution laser scans of constructive components, we put forward a preliminary reconstruction of the ship's hull.



**Shipwrecks dated to the second half of the 1st millennium
CE from Dor lagoon, Israel**

Five shipwrecks excavated in the last 15 years in Dor lagoon indicate that the transition in hull construction from shell-first to frame-based in the Mediterranean occurred up to about 500 years earlier than is generally accepted. These shipwrecks (in chronological order): Tantura A, Dor2001/1, Tantura F, Tantura E and Tantura B, are presented here. They span the period between the 5th and the 9th centuries CE. Construction features which are related directly to the transition will be summarized and discussed.

Dor 2001/1 is one of the most significant shipwrecks in the group. It presents a frame-based hull, with flat floor timbers and half-frames creating the turn of the bilge with a hard chine and straight sides. It has frames connected to the keel, planks nailed to the frames, plank butt-joints at frame stations and caulking in the seams. Because of its importance, a section of the shipwreck was retrieved from the seabed and investigated in the laboratory. This confirmed its frame-based construction. Dor 2001/1 will be discussed in more detail.

Another wreck, Dor D, which hints at a non-linear process of evolution of the transition, will also be discussed.

This paper will give a general outline of the wrecks from Dor, focusing on two shipwrecks and their contribution to the question of the transition in construction, with an updated discussion on the development of ship hulls.



Istanbul University Yenikapi Byzantine Shipwrecks Project

Salvage project at Yenikapi-Istanbul, begun in 2004 November, conducted under the auspices of Istanbul Archaeology Museums revealed probably the biggest nautical site ever found. *Portus Theodosiacus*; the major harbour of Constantinople during the early days of Byzantine empire, was located to this former cove now silted by the ancient Lycos river.

To date, 34 shipwrecks preliminarily dated between 5th to 11th centuries have been uncovered in this former harbour. Istanbul University's Department of Conservation of Marine Archaeological Objects has completed the fieldwork of twenty-one shipwrecks so far also the department's team has undertaken the conservation-restoration and reconstruction projects of those shipwrecks.

Ongoing studies on Yenikapi wrecks present unique information about the ship typology, the ship construction technologies and the evolution of this technology. Well-preserved ships of the tenth – eleventh centuries uncovered at Yenikapi have planks aligned with dowels below the waterline level. These wrecks have revealed the edge fastening systematic and may display the last phase of the transition towards the frame based design. Change and development in shipbuilding philosophy had its turning point in the Byzantine period and the traditional route of transferring the cruces via the master-apprentice relation gave way to a pre-planned structure resulting in engineering and transferable to the future generations. This transitional period technique, the turning point in the history of

skeleton-first construction, allowed the shipbuilders to test the new technique and develop their knowledge and skills about it.

Recent research has shown that the shipbuilding technology across the Mediterranean did not follow a linear process particularly based on the shipwreck studies at Tantura Lagoon off the Israel coast. The construction techniques of Yenikapi 15, 17, 22 and 29, preliminarily dated to the eighth – ninth centuries AD (i.e. from the sediment unit 5) may suggest frame based technology and thus confirm the idea yielded by Tantura wrecks.

Among the wrecks in Yenikapi, three well preserved oared vessel with long and narrow hulls recently subject to detailed examination. These possible naval ships, about 20 meter in length, constitute the first archaeological evidence of this type during this period in the Mediterranean.

A 'Closer Look' at the Late Roman 1 Amphoras from the Cargo of the 7th-Century Shipwreck at Yassiada, Turkey

An ongoing program of restudy of the transport amphoras from the 7th-century AD Yassiada shipwreck in Turkey provides occasion to take a closer look at the origin of these ceramic jars, the cargo composition and, more generally, the nature of maritime trade during the tumultuous political and economic climate of the early Byzantine period. Because of its Christian graffiti and the identity of its captain, Georgios, as a priest, the Yassiada merchant vessel has been identified as a church venture, traveling as logistical support for the state and military. The present paper integrates petrographic analysis of the LR1 amphora group -- which comprised 100-200 of the estimated original total of 850-900 jars -- with previous studies of typology, capacity, standardization, and reuse among the assemblage (van Doorninck 1989, van Alfen 1996). Investigations at the fabric level into the diversity and composition of the ship's LR1 amphoras may provide insight into the production of the Yassiada cargo and the agricultural regions linked to the vessel's final voyage. Such regional identifications may shed light on the mechanisms of the state's *annona* redistribution, the office of *quaestura exercitus* responsible for military provisioning, and the church's potential role as an integral auxiliary force behind this supply.

The Byzantine navy VII-XI centuries AD

The period of these five centuries, VIIth-XIth c. AD, is very important for the maritime history of Byzantium. The Emperors were faced with the challenge to defend and control the expanded borders of the Empire against enemies threatening their sovereignty, Arabs being the most dangerous ones. This presentation attempts to overview the efficiency of the solutions put into practice in relation to the historical circumstances, the political orientations of the Emperors and the available shipbuilding technology.

Byzantine shipwrecks discovered along Aegean sea coast of Turkey.

Maritime trade developed naturally as seafront island towns began to trade with each other and with the continent, quickly becoming central to the economy of the established Anatolian city states. Since the Aegean Sea connects the Mediterranean, the Marmara, and the Black Sea together, it has always had a central role in the history of maritime trade. Hundreds of safeguarded bays and natural harbors along the shoreline of the Aegean, which contains a great number of islands, provided a favorable environment for ancient seafaring. As the population of metropolitan cities increased, their basic needs required products from other settlements, and the shipment of those products by sea became preferred as the cheaper and faster route.

During this survey of the region, several shipwrecks were discovered. The shipwrecks of the Roman period show a wide distribution area, with a concentration of information to be gleaned from the Central and Northern Aegean regions. The most prevalent of the shipwrecks found to date are those of the Byzantine period. On almost every shoreline of Aegean region, objects from this period can be found. Most of the shipwrecks discovered and re-examined on the coast of the Aegean sea can be dated between the 5th cent AD and the 12th cent AD, and in total 20 shipwrecks (4 tile, 1 marble capital, and 15 amphora wrecks) were recorded during the 5-year survey. The results of this survey indicate there was great economical loss during the transportation of cargo in this region. The evidence also serves as an indicator for Aegean trade routes.



The Yenikapı 12 Shipwreck: A Local Trading Vessel from Middle Byzantine Age

Yenikapı 12 shipwreck was uncovered together with its cargo of amphorae and it is the second shipwreck still containing its cargo uncovered at Yenikapı. Following the documentation and removal of the cargo first, the shipwreck was exposed and the surviving part of its bottom was found to be 7 m. long and 2.30 m. wide. The vessel is thought to be approximately 8 – 8.50 m. long and 2.80 m. wide originally. The shipwreck was found at -1.30 m. level, extending in the east-west direction and it is dated to the ninth – tenth centuries AD.

Yenikapı 12 was a cargo ship used for coastal cargo shipping around the Marmara Sea as inferred from the Ganos-type amphorae and it had no deck but a single mast and sailed with a lateen sail. The ceiling timbers clinker-built by overlapping systematically were fitted on the frame system with iron nails and their thicknesses vary from 5 to 12 mm. The floor timbers are sequenced with one long arm and one short arm alternating on the planking. There was a compartment, close to the stern, which contained the personal belongings of the vessel's captain. The bottom of the vessel is quite well-preserved; on top of the eight planking strakes on the starboard side were one wale and the ninth planking representing the beginning of the side-board. On the port side, seven strakes of planking have survived. The symmetry between the planking of port and starboard sides, a characteristic for shell-first vessels, is clearly discernible on this shipwreck. All the surviving planking strakes of the shipwreck were

fastened with dowels – which clearly shows that the extant part of the vessel bottom was built with shell-first method. The first wale on the starboard side is fastened on the bottom's planking with dowels.



Die genähte Rumpfbauweise. Ein Vergleich innerhalb Europas

Wasserfahrzeuge mit vernähten Rumpfteilen sind fast überall auf der Welt zu finden, wobei verschiedene Techniken angewandt wurden. Die ältesten Nachweise für genähte Boote stammen aus dem 3.Jt.v.Chr. aus Ägypten. Am besten belegt ist diese Bauweise am Cheops-Schiff. Auch in den Küstenregionen Großbritanniens wurden im 2.Jt.v.Chr. Boote mit verschnürten Planken hergestellt. Ab dem 1.Jt.v.Chr. setzen weitere Funde aus dem Mittelmeerraum ein (z.B. Bon-Porté, Giglio, Jules-Verne 7+9). Dort ist eine Entwicklung vom vollständig genähten zum partiell genähten Rumpf festzustellen. In der Po-Ebene existieren komplett genähte Boote bis in die ersten nachchristlichen Jahrhunderte. Anders als im Mittelmeerraum, wo vor allem die Überreste seegehender Schiffe das Fundbild beherrschen, kennen wir aus Großbritannien Küstenfahrzeuge. Es handelt sich um die früh- bis spätbronzezeitlichen Boote von North Ferriby, Dover, Gwent und Brigg, die meist in der Nähe von Flussmündungen zum Vorschein kamen. Auch im nordischen Raum lässt sich in dieser Zeit - vor allem anhand des Hjortspringbootes und einiger Plankenfragmente aus Norwegen - eine Tradition genähter Bootsrümpfe fassen. Anhand des Vergleiches von bestimmten Konstruktionsmerkmalen wie der Plankendicke, der Größe und des Abstandes der Nahtlöcher sowie der Nähetechnik (soweit feststellbar) wird der Frage nach einem möglichen Zusammenhang bzw. eines Technologietransfers nachgegangen. Neben den schiffsarchäologischen Belegen selbst werden Importfunde,

Schiffsdarstellungen und Schiffsladungen näher betrachtet, um über mögliche Kontakte Aufschluss zu geben. Anhand von ethnologischen Parallelen aus Lappland und Französisch Polynesien soll zum einen die Entwicklung genähter Boote aus einer früheren Tradition und die unabhängige Entwicklung einer genähten Bootsbautradition gezeigt werden.



The Construction of the Yassiada 7th-century A.D. Shipwreck, Reconsidered

Excavated between 1961 and 1967 at Yassiada, Turkey, the 7th-century Byzantine shipwreck continues to maintain its rank as the archetypal seagoing ship of the Early Byzantine Period. Its exemplary excavation during the formative years of nautical archaeology, the thorough documentation of its poorly preserved hull remains, and the comprehensive and long-term post-excavation study of its cargo and the surviving portion of its poorly preserved hull, has significantly contributed to the understanding of construction philosophy and practices of early medieval shipwrights. The proposed sequence of hull assembly, its configuration, and the restored ship's lines continue to shape our concepts of Byzantine ship construction for this period. Yet, the extent of hull preservation of the Yassiada 7th-century ship was extremely limited, with the forward half completely missing, and all but a pair of partially preserved frames below the turn of the bilge having completely disappeared. The proposed hull construction sequence of the ship and its final form, therefore, was based on an exhaustive scrutiny of these minimal remains and secondary evidence gleaned from the disposition of its cargo and other goods carried on the ship.

Since the completion of the Yassiada shipwreck study, several other shipwrecks of the same general date have been excavated. This, combined with a corpus of better-preserved shipwrecks and expanded comprehension of medieval shipbuilding concepts and practices, enables us to examine and re-evaluate the unique but

seemingly peculiar aspects of the Yassiada ship. Certain features of the hull's construction sequence, as well as its configuration, such as its framing sequence, keelson form, and the use of edge-joinery with unpegged mortise-and-tenon joints, will be critically reviewed in light of new evidence, and alternate interpretations will be proposed.



Zur ökonomischen und fiskalischen Bedeutung des Bosphoros in byzantinischer Zeit

Der Bosphoros und die Dardanellen waren zu allen Zeiten für Seefahrt und Handel von herausragender Bedeutung. Um die Vorherrschaft in den Meerengen wurden erbitterte Kriege geführt, zuletzt etwa die verlustreiche Schlacht um die Dardanellen 1915. Erst mit den internationalen Abkommen auf den Konferenzen von Lausanne und Montreux wurde die umstrittene „Meerengenfrage“ endgültig gelöst¹. Bis dahin waren Schifffahrt und Handel durch Dardanellen und Bosphoros völlig von den lokalen Machtverhältnissen abhängig gewesen. Bereits im Altertum war die Kontrolle der Meerengen militärisch wie auch ökonomisch essentiell und deshalb ständiger Zankapfel zwischen Anrainern, imperialen Mächten und Händlern². Über den gesamten Zeitraum der antiken Geschichte lassen sich entsprechend Versuche beobachten, die Meerengen dauerhaft einer fiskalischen Kontrolle zu unterziehen. Dass Durchgangszölle dabei als reguläres Mittel der Ressourcengewinnung systematisch erhoben worden sein könnten, wird in der Forschung oft skeptisch betrachtet, sieht man in den in Quellen sporadisch auftauchenden Hinweise auf den Durchgangszoll am Bosphoros meist nur ad hoc-Maßnahmen, die einer bestimmten Krisensituation geschuldet seien. Gerade aber auch der Blick auf die byzantinische Zeit³ zeigt uns aber, dass der Zoll am Bosphoros dauerhaft etabliert war und durch einen speziellen, auch inschriftlich belegten Steuerbeamten⁴ eingetrieben wurde, der über ein Geschwader der „Dromon“-Klasse verfügte, um die Zolleintreibung auch durchsetzen zu können⁵. Dieser Befund und

weitere, spätere Quellenbelege (Prok. Anek. 25 (bes. 1–6), Theophanes, A. M. 6293 (De Boor, 475, 15–18)) bis zur Übernahme des Durchgangszolls durch Mehmet II.⁶ verweisen auf ein wohl organisiertes Durchgangszollsystem.



**The evolution of the ‘closed’ military harbours during the
Byzantine Era**

This report has as its main goal to provide with data of the evolution of the ‘closed’ military harbours in the Byzantine period, derived from several examples from the Aegean, mainly from the cases of Thasos, Samos, Rhodes and elsewhere.

In addition to the abovementioned harbour examples, there is also the phenomenon of parallel Early Christian basilicas scattered all over the Aegean, which beyond their religious quality, they mark the existence of harbours as well. These harbours were primarily a station to the sea route between Constantinople and Egypt.

Furthermore, there are several shipwrecks dated to this period, in vast dispersion in the Aegean and in great concentration in some specific areas. One of these areas is Pagasitikos, where seven shipwrecks lay the one close to the other. This is a fact that requires further research. All the aforementioned form a research area of great importance and till now not examined in the science of Underwater Archaeology.

The conclusions of this report will be highly positive and will contribute to the understanding of some significant questions about the trade in the Byzantine Times.



Import of Marble Architectural Components in Odessos, 4th- 6th century

This paper examines and analyses the rich collection of marble architectural components, from the 4th – 6th century A.D., originating from the ancient town of Odessos (present day Varna) and its region. The main questions answered here are: 1) the origin of the marble components; 2) the means by which the components were reaching the town; 3) the characteristics of the trade with marble; and 4) the role of Odessos as a reexporting marble center.

The collection consists of capitals; impostes; columns; bases; cornices; slabs, pillars and columns form alter screens; elements from ambos; plots and legs from liturgical tables and others. Almost all artifacts are made of marble coming from the island of Proconnes in the Sea of Marmara. The shapes and the decoration patterns also point to the workshops on the island, which were holding the monopoly on the trade with marble components in a vast area, including the Balkans. Artifacts with origin different than the island of Proconnes are rare. Their origin is still not identified but the lack of marble-quarries producing such marble in the region of Odessos shows that they were also imported.

In the 4th-6th century A.D. Odessos is the biggest port in the province of Moesia Secunda. Some of the materials imported here by sea were the marble components. The proximity of Odessos and Proconnes, which were connected through the busy trade corridor passing by the west coast of the Black Sea, explains the domination of products from Proconnes and almost the complete lack of local production.

Interesting exceptions are a few alter screen slabs made of marble from Proconnes, which imitate the standard decoration patterns for the island center, but are made unskillfully, probably by a local craftsman. In fact the archeological data shows that the production imported in Odessos was 1) ready, 2) half-manufactured and 3) raw material.

The marble components from the region of Odessos and the nearby Marcianopolis are identical to those in the town itself. Because of that we can claim that the production imported in Odessos was reexported to the inner parts of the region and to the smaller towns on the coast. The transportation towards Marcianopolis was by land and for the settlements on the coast the cheaper and more convenient water transport was used.

A Preliminary Report of Yenikapi 17 Wreck from the Harbour of Theodosius

The salvage project begun in November 2004 at Yenikapi-Istanbul revealed *Portus Theodosiacus*; one of the earliest harbors of Byzantine capital, Constantinople. The harbour was known to be built in the late 4th century during the reign of Theodosius I (376-395 AD) and played a crucial role in flourishing of the imperial capital.

The ongoing excavations yielded 34 shipwrecks. To date, 21 wrecks have been documented at field and then removed by a team of the Istanbul University`s Department of Conservation of Marine Archaeological Objects. Undoubtedly the studies of those shipwrecks will shed new light on Medieval shipbuilding in Mediterranean. Among those, Yenikapi 17 shipwreck is the focus of this paper.

Yenikapi 17 wreck has been preliminarily dated to 8-9th century AD based on the various artefacts uncovered within its stratigraphical context. One side of the ship`s bottom is well preserved and measures some 8.20 in length, its maximum width is about 2.25 m. 3 stringers, 23 extant frames, 11 planking strakes including 2 wales are the surviving parts of the wreck.

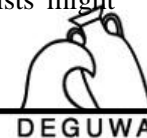
Although being preliminary, the studies indicate that YK 17 was possibly presents a frame based construction. The technical features such as the lack of fasteners on plank edges, butt joints and framing pattern confirm the idea of frame based design. YK 17 represents a new link in the chain of transition from shell based to frame based design, maybe an earlier completion of this transition ever found off the Turkey coast.

Meinerswijk rediscovered

In May 2009, the remains of a medieval river-going vessel were recovered near the town of Arnhem, the Netherlands. They form the aft part of a craft, which was excavated and researched in the late 1970`s and early 1980`s. Both parts are now being researched as a whole and will be compared to a similar vessel which was found in 1974 near Krefeld (Germany). In the presentation the ongoing research will be presented and both boats will be compared and analysed.

During construction works near Arnhem in the 1970`s, three medieval shipwrecks were discovered. The Meinerswijk 3 boat, which is an almost unique vessel was found on the edge of the construction pit. Unfortunately only the fore part could be rescued and the aft part fell down into the water. In the early 1980`s, divers tried to find the remains of the aft part of the vessel but this was all in vain. It was thought that the other parts were lost forever, until divers found wood remains in 2006 which were now recovered and investigated.

The research on this wreck showed that the vessel is quite unique and shows a very odd construction. Only one other similar vessel has been found. That is the (according to D.Ellmers) so-called “kleine Oberländer” from Krefeld. Although the function, propulsion and type of the vessel is still unknown, continuing research and collaboration between the Dutch and German archaeologists might shed new light on this medieval river-going vessel.



Innovation in ship construction at Tantura Lagoon, Israel: Results of the INA/CMS joint expedition

Tantura Lagoon is one of the few natural harbors along Israel's long Mediterranean coast. For at least the past four millennia it has served as an anchorage for Tel Dor, one of the country's largest ancient mounds, and its immediate environs. The cove acts as a natural mechanism for trapping and preserving the remains of vessels and their related remains as it tends to rapidly bury shipwrecks under a protective cover of sand. These two considerations make Tantura Lagoon an ideal location for the study of historically and archaeologically significant shipwrecks.

From 1994 to 1996 the Institute of Nautical Archaeology (INA) at Texas A&M University and Haifa University's Leon Recanat Institute for Maritime Studies (RIMS, formerly the Centre for Maritime Studies) joined forces to locate and study shipwrecks buried in the cove. During these three seasons seven shipwrecks (Tantura A-G) were located in an area the size of a basketball court. Although the wrecks date from the Roman period to recent times, most of the vessels cluster in the Byzantine (A.D. 324-638) and Early Arab periods (A.D. 638-1099).

Tantura A and B were excavated in their entirety in situ. Although Tantura A dates to the late-fifth or early-sixth century A.D., it was built frame-first, without mortise-and-tenon joinery, a construction technique which till its discovery had been documented only a half millennium later, on the Serçe Limani shipwreck. An earlier date for this transformation was soon corroborated by the early-ninth century A.D. Tantura B wreck.

Since that time additional wrecks in the cove have confirmed this earlier date, and suggest that in the Mediterranean frame-first construction first evolved along its eastern littoral, a region that appears to have been throughout antiquity an area of maritime innovation, apparently contributing the introduction of pegged mortise-and-tenon joinery construction, the brailed rig, and bireme.





Poster-Abstracts

The Shipwrecks of Heracleion-Thonis (Egypt)

The European Institute of Underwater Archaeology's studies have gone a long way toward answering questions regarding ancient sites near the Mediterranean sea, Heracleion-Thonis, which is located on the West part of the Egyptian Nile Delta. Begun in 1996 in the Bay of Abukir, the geophysical and geological surveys have made it possible to determine the outline of the submerged Canopic region, the circumstances and chronology of the phenomena of its submersion, the course of the riverbed of the Nile's former western channel, the position of the principal archaeological deposits mentioned in the ancient texts, as well as the site's morphology and the configuration of human communities. The archaeological excavations clarified the geophysical issues concerning Heracleion-Thonis's topography. The specificities of the ground of the site need to be considered in connection with economic organization and political space. From the 8th century B.C.E., this town was the custom and border post, and the *emporion* which controlled access to the Canopic channel, traded with the Greek regions and supervised foreign ships. Heracleion-Thonis can be examined through the place of maritime trade in ancient Egyptian society and the analysis of the organisation and evolution of its infrastructure. Included in the study will be the scope and reach of the trade – trade routes, ports and trading vessels. Sixty-one shipwrecks, from the 6th to the 2nd centuries B.C.E., were discovered giving evidence of intense maritime and fluvial activity in this coastal region. A paleo-botanical

examination and a carbon 14 dating were performed on several wood ship pieces. These data constitute an exceptional source of preliminary documentation to pursue investigations first of evolution and changes in shipbuilding in the eastern Mediterranean, secondly of maritime trade and regional activity, finally on the interaction between human society and natural environment.



Byzantinischer Hafen und seine Artefakten: Bleisiegel – ein immanenter Bestandteil antiker Häfen

Durch komparative Studien zum byzantinischen Hafen, denen zugrunde die jüngsten Unterwasseruntersuchungen im Hafen von byzantinischem Sougdaia auf der Krim liegen, werden Molybdobullen – byzantinische Bleisiegel – in einen grundsätzlich neuen Kontext gestellt. Siegel, die sich als einen immanenten Bestandteil der Hafenkompexe erweisen, sollten eine wesentlich größere Rolle im byzantinischen Güter- als Schriftverkehr gespielt haben. Das bezeugen zahlreiche Funde an Siegeln, die sich mit den Konstantinopolitanen Häfen am Marmarameer verbinden lassen sowie aus anderen Häfen im Mittelmeer- und Schwarzmeerraum bekannt sind.



Die Arbeitsgruppe für maritime und limnische Archäologie am Institut für Ur- und Frühgeschichte der Christian-Albrechts-Universität Kiel

1997 gründete sich am Institut für Ur- und Frühgeschichte der Christian-Albrechts-Universität Kiel die Arbeitsgruppe für maritime und limnische Archäologie (AMLA). Sie besteht aus ausgebildeten Archäologen und Studenten der Ur- und Frühgeschichte, die zum überwiegenden Teil geprüfte Forschungstaucher sind.

Das Interesse der Arbeitsgruppe besteht in der Integration von Land- und Unterwasserarchäologie in Schleswig-Holstein. Das Forschungsobjekt der AMLA ist die maritime bzw. limnische Kulturlandschaft, die es zu rekonstruieren gilt. Die maritime bzw. limnische Kulturlandschaft Schleswig-Holsteins ist durch eine 1190 Kilometer lange Küstenlinie an beiden Meeren, etwa 360 Binnenseen und 21.700 Kilometer lange Fließgewässer geprägt. Diese Gewässer dienten zur Nahrungsmittelgewinnung, als Verkehrsweg, als abgrenzendes topographisches Element und waren gleichzeitig Gefahrenquelle für die damalige Bevölkerung.

Im Zentrum der Fragen steht der Lebens- und Wirtschaftsraum des Menschen. Insbesondere die Wechselwirkungen zwischen naturräumlichen Veränderungen und menschlicher Besiedlung sind Gegenstand der Untersuchung. Welche Rolle spielten die Gewässer bei Art und Wahl des Siedlungsplatzes, wie waren sie in Wirtschaft, Handel und Verkehr eingebunden und welche Auswirkungen hat die Besiedlung rückwirkend auf die Küstenregion? Voraussetzung, um diese Frage zu klären, ist eine repräsentative Landesaufnahme über und unter Wasser durch terrestrische und subaquatische

Arbeitsmethoden. Neben der Basisaufgabe der Landesaufnahme ist jedoch auch eine adäquate Vermittlung der Unterwasserarchäologie in der Lehre und der Öffentlichkeit Ziel der AMLA.



The Medieval Boats from Nin, Croatia: Wood Species Identification and Origin

Two boats (Nin 1 and Nin 2) were discovered in the 1960s at the entrance to the Nin harbor, fifteen km northwest of Zadar, Croatia. In 1974 the boats were lifted from the sea bed, were preserved in PEG and presented to the public in the Nin Museum. According to radiocarbon evidence the ships date to between the end of the eleventh century and the beginning of the twelfth centuries AD. The boats are about 8 meters long. They were built in skeleton first technique. The frames and planks were fastened together with nails and trenails. Instead of a central keel they were provided with a keel plank and two parallel bilge keels, which run below the garboards. A wooden base for the mast step was also found, as was one oarlock. The boats are narrow and were probably used as fast rowboats.

A sampling of the wooden elements to identify wood species was realized in 2008. Sixty-one samples were taken from various elements of the Nin 1 (frames, futtocks, stem, bilge keel, planks and central plank), and 91 samples were taken from Nin 2 (frames, planks, bilge keel and central plank). The majority of the components from both wrecks were made of *Quercus petraea*. In Nin 1, 43 of 61 samples were of *Quercus petraea*, and 12 samples were of *Quercus cerris*. One plank was made of *Platanus orientalis*, another of *Ulmus campestris*. Four analyzed components were identified as *Abies alba* and are probably modern insertions in the construction. In Nin 2, 84 of 91 samples were made of *Quercus petraea*, 6 of *Quercus cerris*. One plank was identified as *Ulmus campestris*.

The native distribution area of *Quercus petraea* and *Quercus cerris* coincide. Both oak species are very common in Croatia and the Balkans. Anatomical features indicate that both species of oak that were used as construction timber for the Nin boats grew in a region characterized by high mountains and very cold winters, resulting in trees which are better fit for shipbuilding because of their strength and lack of insect and fungal damage. While it is logical to assume that local boatyards building small boats would have exploited local timber sources, or whatever was locally available, it is possible that such timbers were depleted in this region, thus forcing the procurement of timber from mountainous areas.



Byzantine shipwrecks in the Eastern Adriatic

In 2006, the Department for Underwater Archaeology of the Croatian Conservation Institute was engaged in a seabed survey off the shore of central Dalmatia. During the time of the exploration, they came across a new archaeological site featuring Byzantine amphorae from the 10th or 11th century. It is important to emphasize that, up to now, apart from some sporadic finds, there were only two Byzantine cargo shipwrecks, near the island of Mljet and the isle of Merara.

The site is located in the vicinity of the Merara islet, south of Rogoznica. Most of the finds which cover the area of 80 m² - belong to Byzantine amphorae that were produced in the surroundings of Constantinople during the 10th and 11th century. Another shipwreck featuring Byzantine amphorae from the same period was discovered in 1975 in the vicinity of the Stoba promontory on the north-eastern side of the island of Mljet. Due to the lack of financial assets the site hasnt been thoroughly researched. During the preview of the site (performed in 2009.) one complete amphora has been found, and the research will be excavated and explored thoroughly. In the area of the shoulders there is a monogram which had been carved into the surface before the amphora was heated and finished. The amphora was found sealed with a wooden plug.



Change in Boatbuilding Traditions at the Coast of Myanmar

An expanded and extended logboat is still a very prominent vessel amongst traditional fisheries at the coast of Myanmar, as a small fishing boat or as a base for bigger ships as well. The goal of this study is first to introduce and present the different traditional water-crafts in Burman waters. Traditionally built boats like the *Thanban*, the *Pathein- and Moulmeinboat*, the *Kat'tu*, the *Canoe-hlei* and *Boatma* of Dawei can be presented as a result of three research journeys between 2004 and 2008.

Additionally this study will attempt to describe the expanded and extended logboat of Myanmar. The focus lies on the description of constructional change and usage of this fishing vessel. Is it possible to recognize the transition of this traditionally built fishing boat to a modern, very functionally designed wooden water-craft?

**Between Venice and Constantinople
The medieval trading port of Almiros (Thessaly, Greece)**

In 1881 the Turkish city of Ermiye was renamed Almiros after its medieval predecessor. Written sources mention Almiros as a trading port in the 12th and 13th centuries AD, where an international community of Venetians, Pisans, Genoese and Jews lived. Several authors give a survey of the written sources and some of them even consider the city of Almiros to be the second harbour of the Byzantine Empire, after Constantinople.

Medieval Almiros is also known from archaeological sources. In the period 1990-2006 an archaeological survey was conducted in the Almiros and Sourpi plains. The survey resulted in the location of the medieval city of Almiros, a fort, small villages, farmsteads, a storehouse and small monasteries. About 30 of these sites can be dated to the Middle and Late Byzantine periods.

Key words of the poster presentation: sailing routes along the western part of the Aegean sea, the maritime cultural landscape of the Pagasitic gulf, the location of medieval Almiros, the nature of the archaeological sites, products of the Thessalian plains, shipwrecks along the coast, the location of the Venetian stronghold Fitellio.

Licht ins Dunkel. Mit dem Sector Scan Sonar im Werbellinsee

Im Frühjahr 2009 wurde erstmals im Werbellinsee das Sector Scan Sonar MS 1000 (Kongsberg Mesotech Ltd.) zur Dokumentation von Holzwracks erprobt.

Seit dem Juli 2007 beschäftigen sich der Verein für Unterwasserarchäologie Berlin-Brandenburg e. V. (VfUBB e. V.) und der Kaffenkahn e. V. (KK. e. V.) mit der Erforschung und Dokumentation von Schiffswracks, die auf dem Grund des brandenburgischen Werbellinsees liegen. Die ehrenamtlich arbeitenden Vereine setzen sich aus Archäologen, Forschungstauchern, Sporttauchern sowie unterwasserarchäologisch interessierten Mitgliedern zusammen. Bis zum heutigen Tage sind etwa ein Dutzend Wracks bekannt, wobei es sich hauptsächlich um so genannte Kaffenkähne des 18. und 19. Jahrhunderts handelt.

Die hölzernen Transportschiffe unterscheiden sich nicht nur in ihrer Qualität und Größe, sondern auch in ihrer Bauweise erheblich voneinander. Leider sind sie aber aufgrund des Ankerns von Schiffen und infolge unvernünftiger Taucher bereits stark zerstört, was eine Dokumentation der Kähne immer dringlicher macht.

Zur Unterstützung der taucherischen Prospektionsarbeiten wurde im Frühjahr 2009 ein geophysikalischer Survey in der Bucht am Kap Horn durchgeführt. Die Untersuchungen fanden in Zusammenarbeit des VfUBB e. V. und des KK. e. V. mit der Deutschen Gesellschaft zur Förderung der Unterwasserarchäologie (DEGUWA e. V.) sowie der Firma Kongsberg Mesotech Ltd. statt.

Im Rahmen der Prospektion wurde ein NAS 3 Kurs durchgeführt, der interessierte Sporttaucher in die Methoden der geophysikalischen Prospektion einführte.

Während einer effektiven Arbeitszeit von 1,5 Tagen gelang die Untersuchung der fünf Wracks am Kap Horn, wobei das Sector Scan Sonar MS 1000 zum Einsatz kam. Dieses Sonar ermöglichte eine detailgetreue Abbildung und Vermessung der unterwasserarchäologischen Befunde.



Vrbnik-pile dwelling settlement in Ohrid Lake

Located in the south-western part of the Republic of Macedonia, in the south of Europe, in a closed basin, surrounded by mountains, at 695m above sea level, the Ohrid Lake is among the biggest and deepest lakes in the world. Traditions of different ethnic population overlapped through this territory in the past and leaving traces of their existence, known to us from the rich archaeological discoveries. Besides the already known pile dwelling sites in the Ohrid lake, Ustie na Drim at the outflow of the river Crni Drim of the lake and Crkveni Livadi near village of Vraništa, several new underwater sites were registered in the past two decades as Ploca Michov Grad in the Bay of the Bones, in the south coast of Gradiste peninsula, site Nadol in the Bay of the Swans, Bay of the Bombs, and Vrbnik situated in the bay between Struga and the village of Kališta, 200 meters away from the coast, on a depth of 3–5 meters in the lake. First excavations began in 1998, and continue in the years 2001–2003. So far, approximately 500 wooden posts are registered on the bottom of the lake, organized in groups (diameter is 20–30 cm.) However, in this stage of the researches, the questions about their organization and diffusion are still open, as well as the ground plan of the houses. The movable finds consists mostly of fragmented pottery and few completely preserved vessels kantharos-like vessels with globular body and handles overhanging the rim and fragmented jug with cut away neck, bronze and iron objects: salteleon, bronze bracelet and bronze double pins with simple triangular head., fishnet

weights, spindle whorls etc. The excavations and movable finds have shown that the palafite site of Vrbnik culturally and chronologically belongs to the well-known group of sites from the later phase of the Iron Age in the region of Ohrid and Prespa Lakes in Macedonia, Albania and Greece.



**Underwater archaeological trainings in Kaş Arkeopark,
Turkey**

Underwater archaeological training methodologies conducted in Kaş Arkeopark Project in southern Turkey was established in 2006. Kaş Arkeopark Project aims the re-creation of the unusual environment of underwater wreck sites, in order that scholars and researchers improve methods for archaeological data collection and train members of their teams for specific research projects. Since 2007, SAD (Sualtı Arařtırmaları Derneđi / Underwater Research Association) has been developing a training methodology for research purposes in this area. In 2009, DEGUWA (Deutsche Gesellschaft zur Förderung der Unterwasserarchäologie e.V.) started the first NAS (Nautical Archaeology Society) 2 course in the Kaş Arkeopark area. The aim of the two voluntary organizations was a prolific cooperation, the sharing of knowledge and the discussion about the preservation of cultural heritage under water. This paper aims to compare and contrast the two methodologies conducted by these two institutions in Kaş Arkeopark Project.