Report on the Workshop “Theory”, SPP 1630
„Häfen von der Römischen Kaiserzeit bis zum Mittelalter“:
HARBOURS AND MARITIME NETWORKS AS COMPLEX ADAPTIVE SYSTEMS

Locality: Römisch-Germanisches Zentralmuseum (RGZM), Forschungsinstitut für Archäologie, Ernst-Ludwig-Platz 2, 55116 Mainz
Date: October 17th-18th 2013
Organisers: Dir. Univ. Prof. Dr. Falko Daim, Dr. Johannes Preiser-Kapeller (both RGZM)

Presenters (in alphabetical order):
- Prof. Dr. Pascal ARNAUD, Professeur des universités à l'Université de Lyon 2
- Prof. Dr. Falko DAIM, Director, Römisch-Germanisches Zentralmuseum (Mainz)
- M.Eng. Guido HEINZ, Römisch-Germanisches Zentralmuseum (Mainz)
- Dr. Flora KARAGIANNI, European Centre of Byzantine and Post-Byzantine Monuments (Thessaloniki); coordinator of the OLKAS-project
- Dr. Allard MEES, Römisch-Germanisches Zentralmuseum (Mainz)
- Dr. Johannes PREISER-KAPELLE, Römisch-Germanisches Zentralmuseum (Mainz)/Austrian Academy of Sciences
- Prof. Dr. Damian ROBINSON, Director, Oxford Centre for Maritime Archaeology
- Dr. Thomas SCHMIDTS, Römisch-Germanisches Zentralmuseum (Mainz)
- Prof. Dr. Søren M. SINDBÆK, University of Aarhus, Dept. of Archaeology
- Dr. Myrto VEIKOU, University of Crete, Postdoctoral Researcher

Theoretical Outline:
The theory of complex systems was intensively discussed and integrated into archaeology in the last decades, but much less so in other historical disciplines. Complex systems elude attempts for simplification and mechanism disintegration into single parts; but they show a number of common characteristics:
- Complex systems can be understood as large networks of individual components, whose interactions at the microscopic level produce “complex” changing patterns of behaviour of the entire system on the macroscopic level (“emergence”); in the field of social systems, these patterns stem from the actions and interactions of individuals, families, small communities, etc. up to the globalized society of today.
- Small variations in the system or minimal differences in initial conditions can lead to significantly different outcomes (“non-linearity”, “butterfly effect”).
- Complex systems are typically open systems, which are entangled with their environment, often in equally complex interrelations.
- Complex systems are often “path-dependent”; their trajectory does not only depend on current conditions, but also on the “history” of the system.
- Many complex systems tend to be attracted toward specific states or sequences of states (“attractors”).

Such phenomena could also be observed within the framework of SPP 1630 on various levels: the selection, construction, utilisation, maintenance or abandonment of a harbour site depended on the interactions of a multiplicity of actors (population
on-site and in the hinterland; local, regional and central authorities; merchants and sailors, etc.) against the background of an equally complex interplay between society and environment (natural conditions on land and on sea and their dynamics). Within this framework, also the concept of path dependence is of relevance: decisions and efforts made for the selection and construction of a harbour determine the parameters for subsequent contexts of decision making. Ports are integrated into local and regional settlement systems via multiplex connections with their hinterland and co-determine the distribution of demographic and economic potentials within these systems. Local, regional and over-regional sea-routes link ports of various sizes and importance in complex maritime networks, which are equally characterized by the emergence of hierarchies of harbours. On the basis of these sea-routes, also individuals and groups in various localities are connected in social networks, which can be characterised by mercantile, political, religious or cultural interactions, but especially through the mobility of individuals. A systematic survey of these entanglements between individuals, groups and localities could contribute to a more adequate analysis of the complexity of these phenomena as would detail studies on the interplay between social and environmental factors for the development of selected ports.

Questions to be discussed within the workshop:

- Complexity, networks and mobility within the framework of SPP 1630
- Ports in the complex interplay between environment and society
- The interplay between actors and decision-makers for the selection, organisation, utilisation and maintenance of harbours
- Ports and their complex entanglements with the hinterland
- The survey, modelling and analysis of maritime networks
- The survey and analysis of social networks: prosopography and maritime mobility.

For each of these questions, specialists in the field have been invited in order to provide food for discussion; the results of the workshop shall also be published in a collection of papers.

Visualisation of a topological nearest neighbour network model of Ancient port sites in the Aegean (791 nodes, 2188 links); nodes are scaled according to their “betweenness”-centrality (© J. Preiser-Kapeller, RGZM, 2013; cf. also http://oeaw.academia.edu/TopographiesofEntanglements)
PROGRAMME:
(Each lecture slot consisted of 30 minutes presentation and 30 minutes discussion)

THURSDAY, October 17th 2013:

13:00-14:00: Welcome, Opening remarks, thematic introduction (Prof. Dr. Falko Däim, Dr. Johannes Preiser-Kapeller)

14:00-15:00: Prof. Dr. Damian Robinson, The Life-Cycle of the Harbour of Thonis-Heracleion: The Interaction of the Environment, Politics and Trading Networks on the Maritime Space of Egypt’s Northwestern Delta

15:00-16:00: Dr. Myrto Veikou, Byzantine ports and harbours in the complex interplay between environment and society: an evaluation of evidence from Greece, Cyprus and Asia Minor

16:00-16:30: Tea/Coffee Break

16:30-17:30: Prof. Dr. Pascal Arnaud, The Interplay between Actors and Decision-makers for the Selection, Organisation, Utilisation and Maintenance of Harbors

17:30-18:30: Dr. Flora Karagianni, Networks of Medieval City-Ports in the Black Sea. The archaeological Testimony

18:30-19:30: Reception at the Collection of the Early Medieval Period, RGZM

19:30: Dinner for presenters

FRIDAY, October 18th 2013:

09:00-10:00: Dr. Allard Mees – M.Eng. Guido Heinz – Dr. Thomas Schmidts, Römisch-Germanisches Zentralmuseum (Mainz), Big Business in Amphoren und Sigillaten. Häfen, Transportrouten und Kosten im GIS

10:00-11:00: Prof. Dr. Søren M. Sindbæk, Northern Emporia and Maritime Networks. Modelling past Communication using Archaeological Network Analysis.

11:00-11:30: Tea/Coffee Break

11:30-12:30: Dr. Johannes Preiser-Kapeller, The Maritime Mobility of Individuals and Objects: Networks and Entanglements

12:30-12:45: Tea/Coffee Break

12:45-14:00: Discussion of the Results
PRESENTATIONS (IN ORDER OF THE PROGRAMME)

HARBOURS AND MARITIME NETWORKS AS COMPLEX ADAPTIVE SYSTEMS – THEMATIC INTRODUCTION
Dr. Johannes Preiser-Kapeller, RGZM/ÖAW
After a presentation of the aims and projects of the SPP 1630, the introduction focused on four topics:

- Social and environmental complexity: some concepts
- Decision-making in a complex environment: establishing and maintaining harbours
- Navigation in a complex environment: the emergence of sailing routes
- Creating complex networks: harbours as nodes, routes as ties

In the following, concepts, tools and findings of complexity theory, geoarchaeology and maritime archaeology, ancient, medieval and environmental history, geographical information systems and network analysis were presented and discussed. All slides (with full references) can also be found online: http://www.academia.edu/4773839/Harbours_and_Maritime_Networks_as_Complex_Adaptive_Systems_-_Thematic_introduction

Prof. Dr. Damian Robinson, Oxford Centre for Maritime Archaeology, University of Oxford

Prof. Robinson presented his research on the now submerged port of Thonis-Heracleion, which sits at the end of the Canopic Branch of the River Nile at the edge of Egypt’s ‘Sea of the Greeks’. Its growth into a major trading harbour was due to three main factors:

- the local environment that favoured the creation of a port in that particular location;
- the rise in political importance of the northwestern Delta in Egypt during the Late Period;
- the development of trading networks with the expanding polities of the Greek world and Phoenicia.

These interdependent factors allowed and supported the rise to prominence of Thonis-Heracleion into a major emporium and transhipment port for both imports to and exports from Egypt. The foundation of Alexandria, some 30 km away, in 331 BC and its rise to prominence during the Ptolemaic era witnessed the beginning of the end for Thonis-Heracleion. No longer the hub of international and regional trading networks, the port appears to have survived as a religious and political centre before that role was extinguished by the Romans following their conquest of Egypt. By the time of its submergence in the middle of the eighth century AD, only a small community of nuns lived amongst the ruins of the once grand port and its vast temple to Amun Gereb. The biography of the city consequently illustrates the fundamental importance of the maritime networks upon which it relies. Although an ideal location for a port, Thonis-Heracleion would not have developed without the political will for its existence and the growing maritime networks of its Greek and Phoenician trading partners. The port thrived while the network was maintained, although the complex internal dynamic of the network resulted in the trading partners changing, from Corinth in the early period.
to Athens later on, for example. Thonis-Heracleion ‘died’ because of a political-economic-environmental decision to found a new network centre in Alexandria. Without its raison d’être as a place within the trading network of the eastern Mediterranean, the port of Thonis-Heracleion did not adapt but simply withered.

In the following discussion, Prof. Robinson also presented the methodological toolkit used in the work at the site of Thonis-Heracleion, which represents one of the biggest assemblages of shipwrecks (more than 60) from antiquity detected so far. The impressively documented combination of environmental of socio-economic factors decisive for the "rise and fall" of Thonis-Heracleion makes it also an ideal comparative case study for the development and verification of concepts and methods.

For further information see also:
http://www.arch.ox.ac.uk/DR1.html
http://www.arch.ox.ac.uk/ocma-fieldwork-shipwreck.html
http://www.franckgoddio.org/projects/sunken-civilizations/heracleion.html

BYZANTINE PORTS AND HARBOURS IN THE COMPLEX INTERPLAY BETWEEN ENVIRONMENT AND SOCIETY: AN EVALUATION OF EVIDENCE FROM GREECE, CYPRUS AND ASIA MINOR

Dr. Myrto VEIKOU, University of Crete, Postdoctoral Researcher

In her paper, Dr. Veikou discussed her recent project on certain features of archaeological sites of Byzantine ports and harbours in the Eastern Mediterranean which can be identified as “emporia” emerging and used in Late Antiquity and in the early medieval period in addition to or even instead of nearby port cities of longer tradition. These features revealed aspects of the sites’ history within the complex interplay between environment and society. In that direction, three multidisciplinary factors were set forth as not only interrelating in the development of ports and harbours but also as fundamental in shaping their history: geomorphology, geography, and human geography. Dr. Veikou focused on two theoretical issues:

i) the sites’ performance as Byzantine “gateway communities” of social contacts and cross-cultural exchanges and

ii) the physical, economic, political and cultural conditions which add up to the analytical categories of medieval Mediterranean port and harbour.

The dynamics of these “new” maritime sites as observed by Dr. Veikou were of special interest also as comparative cases to “emporia” emerging in Northwestern Europe in the early medieval period and discussed during the workshop by Søren M. Sindbæk (see below); the potential of a combination of research for the Mediterranean and for the North and Baltic Sea as intended in the SPP 1630 therefore also became visible once more.

For more information, see:
http://ouc.academia.edu/MyrtoVeikou

THE INTERPLAY BETWEEN ACTORS AND DECISION-MAKERS FOR THE SELECTION, ORGANISATION, UTILISATION AND MAINTENANCE OF HARBOURS

Prof. Dr. Pascal ARNAUD, Professeur des universités à l’Université de Lyon 2

As Prof. Arnaud pointed out, trustful available evidence about decision making as well as management of ancient ports and harbours is so tiny that we cannot find any firm ground for understanding any aspect of the decision-making process. We
nevertheless know at least part of the actors: representatives of the central power, municipal elites, actors of maritime trade at different levels, and the main rules of the social game. Based on literary and epigraphic evidence (which due to its limited number he was able to present almost exhaustively in his handout), Prof. Arnaud focused upon three main aspects:

- **The emperor, its agents, and the culture of epimeleia.**
  Ruling nature is a privilege of the emperor. Altogether with road- and aqueduct-building, harbour making illustrates the domination of nature by human cleverness and the emperor's providentia/pronoïa. Having the theoretical and/or technical keys for such realizations was the privilege of the emperor and a mark of the sovereign's epimeleia. The emperor is the main port-builder. A study of Dio's description of the decision process of the building of Portus Augusti will show the importance of the emperor and his entourage, and that emperor could decide alone, against his entourage and architects. Many imperial realizations connected with harbours have direct relationship with imperial travel. Parallels with other huge realizations, such as canals, where the decision process is better known, show that governors probably played a great role. We also know from an inscription at Ephesus that governors were in great concern with harbours.

- **The corpora, as an interface between actors and elites, with special attention to the curatores navium.**
  The importance of networking, lobbying and clientelism are typical of the Roman social game. The corpora were one of the tools for interplay between decision-makers and actors. These have been much studied in harbour context during the last decade (D. Steurnagel). Widely opened to non-professional members from the municipal elites, they were an essential bridge. A study of the relationships between ship-owners, curators navium, the municipal elites of Ostia and the emperor's entourage will provide some light on these phenomena.

- **The place left to private initiative:**
  Last but not least, one must have in mind that creating new harbours although spectacular was the exception rather than the norm. Limited or larger refitting was probably less exceptional. Ports are not to be considered as a whole. These were often architectural patchworks. Entire parts of Roman ports, especially specialized ones, could be built and re-built separately, apart from the rest. Based on his earlier work, Prof. Arnaud paid special attention to the case study of Marseilles to wonder whether private initiative may have been involved. As became clear in the discussion, a comparison with other large scale building projects or other processes of decision-making (in trade, for instance) may allow for further conclusions also for the case of harbour building and maintenance. Still, the limited amount of source evidence, which at the same time illustrates that other motivations for ancient communities and rulers were of relevance than for modern-day observer, very much impedes attempts to develop a “matrix” of decision-making in this regard.

For more information, see: [http://univ-lyon2.academia.edu/PascalARNAUD](http://univ-lyon2.academia.edu/PascalARNAUD)
NETWORKS OF MEDIEVAL CITY-PORTS IN THE BLACK SEA. THE ARCHAEOLOGICAL TESTIMONY
Dr. Flora KARAGIANNI, European Centre of Byzantine and Post-Byzantine Monuments; coordinator of the OLKAS-project

Dr. Karagianni presented the results of the large scale collaborative project OLKAS which focused on the documentation and also preservation of medieval harbour sites at the Black Sea and in the Northern Aegean.

As it is historically and archaeologically proven, after its establishment as the capital of the Roman Empire in 330, Constantinople became the main centre of the whole Eastern world. Strategically located at the edge of a peninsula and surrounded by seas, from the very beginning of its establishment Constantinople succeeded to become a big political, commercial, cultural and religious capital which influenced a lot all the civilizations developed inside and outside the borders of the Byzantine Empire.

Through the already existing and the newly established land and sea routes, Constantinople managed to secure connections with all the main coastal cities of the Mediterranean and the Black Sea Basin and to create several networks of communication among them. Besides the information preserved in the written sources, the archaeological material (sculpture, pottery, coins, seals, objects of the everyday life or liturgical objects) as well as the standing monuments offer a very reliable basis for the study of these networks, since they provide us with information on the origin and the circulation of artefacts in the medieval world. The case of the Black Sea is a very characteristic example. Around the Basin are located some very important city-ports, such as Sozopol, Odessos (modern Varna), Messemvria (modern Nesebar), Tomis (modern Constanta), Balaklava (modern Cembalo), Chersonessos (modern Sevastopol), Pantikapaion (modern Kerch), Batumi, Trebizond, Sinope etc. Among them, since antiquity have been developed a lot of networks of communication mainly based on trade, which continued and extended during the early Christian and medieval era.

Following the sea routes of the Black Sea, the medieval ships not only transported products from one place to the other but also established commercial and cultural routes of communication among the city-ports of the Byzantine Empire and those of the Bulgarian, Russian or Georgian polities. Within the same frame one can argue that the circulation of common trends in architecture of many medieval monuments preserved in almost all the countries around the basis is following the traces of existing networks of communication mainly with Constantinople as well as among several other cities.

Based on the impressive data basis of sites and artefacts created for OLKAS over the last years, Dr. Karagianni presented these networks based on the testimony of the archaeological material and the architectural monuments preserved in the city-ports around the Black Sea. She highlighted the function of the maritime networks and their influence in the formation of common cultural routes in the architecture and art of the medieval era in the Black Sea.

Again, in the discussion also the value of a combination of studies on south and on the north of medieval Europe as intended in the SPP 1630 became evident, since especially the Black Sea became also a hub of encounters of maritime traditions of the eastern (Byzantium) and western Mediterranean (Venetians and Genoese, since the 13th century) and of the North (due to the advance of the Varangians via the river systems of Eastern Europe since the 9th century).

For more information, see: http://www.olkas.net/
As Dr. Mees, M.Eng. Heinz and Dr. Schmidts demonstrated in their joint presentation of their large scale project at the RGZM, Roman traders were prepared to take long detours in order to deliver their commodities as cheaply as possible. The cheapest way was their aim. The largest archaeological research database with more than 200,000 name-stamped vessels from more than 3,500 archaeological sites allows researchers at the Roman-Germanic Central Museum (RGZM) in cooperation with the i3mainz, the University of Reading and the University of Leeds to gain completely new insights into Roman economic history. The Europe-wide transport of these goods mainly took place on rivers, sea and land. The ports were the transition points between these transport systems.

As the presenters highlighted, then as now, the straight path is not always the best one. So amphoras were shipped from southern Spain as long as possible across the sea to the ports and then along the rivers, which could lead to detours of up to 1,000 kilometers from the more direct route across land. Yet, this was cheaper than the expensive land transport. Also terra sigillata came from the South of France on some detour to southern Germany. Thus, for example, the longer route over the river Neckar was used, which was not only the cheapest way, but led also to many striking discoveries along this route. The spreads of findings were analysed by the researchers at the RGZM with the help of statistical methods (chi-square, Mócsy coefficient) and visualized; on this basis, trade routes were reconstructed.

The traditional information on transport costs, which comes mainly from the late antique price edict of Emperor Diocletian, can be checked for the first time seriously against this huge collection of material. The information in the ancient literature on transport costs on the sea (factor 1), on rivers (factor 5) and on land (varying between factor 8 and factor 68) are highly variable. Starting from the actual distribution, the project brought about differing values and factors that apply to both amphorae and Sigillata. In contrast to common GIS-based least-cost path methods, in this project not only the relief of the landscape is taken into consideration, but also the known Roman road network with consideration to its topography. Ports as links between the different networks can be provided with specific cost factors in the GIS.

A first prototype for a web-based application that allows for interactive computation of paths has been already created. It is the basis for the implementation of variable cost estimates and actual visualisation.

The presenters also pointed out that turnover of commodities in the ports of southern Gaul in Narbonne and Arles was apparently dependent on market developments in the vast "hinterland" of Germania and Britannia. Inscriptions from Gaul, dealing both with private ceramic dealers as well as state-organized trade colleges, seem to confirm these dynamics of the markets.

In the discussion, it became clear that the concepts and tools developed in this project can be of enormous use also for other case studies both in the Mediterranean and beyond. Equally, the complexity of the feedbacks over long distances within traffic-systems in Antiquity and the Middle Ages became visible on an impressive scale.

For more information, see:
http://www.rgzm.de/transportroutes
http://www.rgzm.de/samian
NORTHERN EMPORIA AND MARITIME NETWORKS. MODELLING PAST COMMUNICATION USING ARCHAEOLOGICAL NETWORK ANALYSIS.
Prof. Dr. Søren M. SINDBÆK, University of Aarhus, Dept. of Archaeology
Prof. Sindbæk presented aspects of his research project “Entrepot. Maritime Network Urbanism in Global Medieval Archaeology”, which aims at a comparative archaeological and historical analysis of maritime “emporia” as hubs within networks of trade and exchange in early medieval Northern Europe, the Mediterranean and the Indian Ocean (with one case study on the island of Zanzibar). In particular, he focussed on concepts and tools for the reconstruction of networks and connectivity based on the diffusion of artefacts.
As Prof. Sindbæk pointed out, long-distance communication has emerged as a particular focus for archaeological exploration using network theory, analysis, and modelling. The promise is apparently obvious: communication in the past doubtlessly had properties of complex, dynamic networks, and archaeological datasets almost certainly preserve patterns of this interaction. Formal network analysis and modelling holds the potential to identify and demonstrate such patterns, where traditional methods often prove inadequate.
The archaeological study of communication networks in the past, however, calls for radically different analytical methods from those employed by most other forms of social network analysis. The fragmentary archaeological evidence presents researchers with the task of reconstructing the broken links of a ruined network from observable distributions and patterns of association in the archaeological record. In formal terms this is not a problem of network analysis, but network synthesis: the classic problem of cracking codes or reconstructing black-box circuits. It is proposed that archaeological approaches to network synthesis must involve a contextual reading of network data: observations arising from individual contexts, morphologies, and use patterns. Prof. Sindbæk demonstrated this approach for the reconstruction of connections between sites on the basis of Viking-period communication and exchange of objects in the North Sea region.
Pitfalls of this method, especially with regard to decisions on the selection of data and the limitations of the network model, became clear and were also discussed in detail.
At the same time, the potential of this approach in order to re-construct at least aspects of the actual complexity of the connections emerging due to the mobility of individuals and object also in absence of a larger number of written evidence (as would be the case for the late medieval period, for instance) is evident.
For more information, see:
http://projekter.au.dk/en/entrepot/
http://au.academia.edu/S%C3%B8renSindb%C3%A6k

THE MARITIME MOBILITY OF INDIVIDUALS AND OBJECTS: NETWORKS AND ENTANGLEMENTS
Dr. Johannes PREISER-KAPELLE, Römisch-Germanisches Zentralmuseum (Mainz)/Austrian Academy of Sciences
As Dr. Preiser-Kapeller pointed out in continuation of his remarks in the introduction, tools of network analysis enable us to integrate information on the interactions, communications and affiliations of individuals into “social topographies”, which make visible the actual complexity of these entanglements beyond selective or serial depictions of this data. Researchers and other observers are able to detect patterns of social interaction – sometimes previously unnoticed within the mass of information. But network analysis claims “not only that ties matter, but that they are organized in a
significant way - that this or that individual has an interesting position in terms of his or her ties.” One central aim of network analysis is the identification of these structures of social relations which emerge from the sum of interactions and connections between individuals within a group or society and at the same time influence the scope of actions of everyone entangled in such relations. For this purpose, data on the categories, intensity, frequency and dynamics of interactions and relations between individuals is systematically collected in a way which allows for further mathematical analysis. This information is organised in the form of matrices and graphs, which are not only instruments of data collection and visualisation, but also the basis of further mathematical operations (matrix algebra and graph theory). Furthermore, network analysis can be combined with tools of Historical Geographical Information Systems (HGIS), thus establishing the connection between “social” and “geographical topography”, whose correlation can also be inspected.

Coastlands constitute a frontier between the terrestrial landscape and the sea, where possibilities for the control of mobility of individuals and objects were limited; Gilles Deleuze has defined the sea as the “realm of the unbound, unconstructed, and free”. Christer Westerdahl has described the emergence of peculiar “maritime communities” in these “maritime cultural landscapes”, “the people who in their daily practice engage with the sea in roles such a fishermen, coastal traders, seafarers, and shipbuilder” and construct their identities often in deliberate differentiation from the “landsmen”. Other studies have called for the study “of communities of mariners aboard ships, or shipboard societies”, also integrating Michel Foucault’s notion of the “ship as the heterotopia par excellence”, capable “of juxtaposing different places that are in themselves incompatible in a single real place”. Finally, the relational approach also includes concepts which highlight the entanglements not only between humans at one time at one place, but also between individuals, localities and objects across space and time; in his book “Reassembling the social”, Bruno Latour, one of the proponents of Actor-Network-Theory, stated: “we have to lay continuous connections leading from one local interaction to the other places, times, and agencies through which a local site is made to do something. (…) If we do this, we will render visible the long chains of actors linking sites to one another without missing a single step.” Thereby, the aim is to “globalise the local” respectively to “localise the global”, to demonstrate how far reaching connections are present in various local assemblages of humans and artefacts (such as on a ship).

Dr. Preiser-Kapeller demonstrated this approach for several case studies:

- Connecting ports: one ship (entangling individuals and objects in the Middle Ages): the mobile social network of a Venetian ship (1414 CE) and the enormous assemblage of the Belitung Shipwreck (Indonesia, 825-850 CE)
- Connecting ports: 60 ships (Genoese maritime traffic in the Black Sea, 1290 CE)
- Connecting ports: trading diasporas (the mercantile community of Ragusa/Dubrovnik, 1250-1450 CE)
- Connecting ports: 792 anchorages, harbours and ports (a model of cabotage and connectivity in the ancient and medieval Aegean)

Here thereby demonstrated how these theoretical approaches can be combined in a useful way in order to survey, visualise and analyse the actual complexity and dynamics of entanglements between individuals, groups, sites and objects due to maritime mobility. As became clear in the discussion, the quality and density of archaeological or source evidence very much determines the degree to which such tools can be used to develop meaningful models of past complexity; yet, where their application is possible, they have a significant potential for analysis.
CONCLUSION
In total, the significant explanatory value of the theoretical framework of the workshop – to define “Harbours and Maritime Networks as Complex Adaptive Systems” was demonstrated in all presentations. While several papers illustrated the complex interplay between environmental and socio-economic factors for the selection, establishment, maintenance or abandoning of harbour sites (Robinson, Veikou, Arnaud), the relevance of a harbour’s embedding in connections of exchange and mobility for its dynamics was equally highlighted (Karagianni, Mees – Heinz – Schmidtts, Sindbæk, Preiser-Kapeller). Likewise, the validity of these phenomena across regions and periods became clear; therefore, this approach is of high relevance for research design within the SPP 1630.
Proceedings of the workshop will be published as quickly as possible within the series “RGZM-Tagungen” (publication planned for summer 2014) in order to make the results of the event accessible within the SPP (maybe also in form or pre-circulated papers before print) and beyond. Invited speakers were also invited to lay a special focus on theories, concepts and methods in the written versions of their presentations.