1. Introduction

1.1. Problem description

While numerous lakeside settlements have been studied thus far in Europe (Coles, 2004, Marzatico, 2004, Menotti, 2004, Pétrequin and Bailly, 2004, Ruoff, 2004, Ruttkay et al., 2004, Schlichtherle, 2004, Veluscek, 2004, Menotti et al., 2005), little is still known on the complex taphonomy and post-depositional processes associated with the dynamic lacustrine settings (Wallace, 1999, 2000, 2003, Ismail-Meyer et al., 2013, Ismail-Meyer, 2014, Karkanas et al., 2011). More specifically, lake related contexts include a variety of micro-depositional processes that both protect and destroy archaeological sites (Rapp and Hill, 1998: 57). Low energy anaerobic settings bury and preserve material culture, while in fluctuating lake margins natural processes can extensively modify archaeological contexts. More specifically, artifacts in high energy lacustrine regimes are susceptible to erosion/deposition and bioturbation, mixing the materials from different layers and complicating the archaeological interpretations. At the same time, in cases of pile
dwellings and platforms, the underlying deposits are not directly related to the actual anthropogenic activities (Karkanas et al., 2011), and it is therefore difficult to determine the extent to which natural processes have distorted the anthropogenic signal. Therefore, in order to identify and interpret the above alterations, detailed paleoenvironmental reconstructions are needed (Mallol, 2006).

1.2. Aims, objectives and restrictions
This project aims to provide high-resolution, layered specific microstratigraphic analysis at the lakeside settlement of Dispilio and the lake Orestias (Kastoria, northern Greece) (fig. 1.1), in order to examine the human selection strategies within an alternating lacustrine regime, observe the occupational history of the site in its geomorphological context and therefore highlight the significance of lakes as favorable habitats for the Neolithic dwellers in the Balkans. Dispilio, dated from the Middle Neolithic to the Early Bronze Age is one of the earliest lake site settlements in Europe (cf. Menotti, 2004a). Located in northwestern Greece, where Neolithic mounds predominate (Andreou et al., 1996), it offers the opportunity to investigate a wide range of choices that the Neolithic farmers made in the selection of land (Karkanas et al., 2011). The basic analytical tools for this study are sedimentology and soil micromorphology, through which it is possible to study site formation processes, trace human activities with exceptional resolution, differentiate post-depositional disturbances and observe the relationships and arrangements of the cultural materials in their natural context. As such, micromorphology has recently become an emerging tool in science-based archaeology in Greece, though it has still limited applications on prehistoric lake dwelling studies worldwide (Wallace, 1999, 2000, 2003, Karkanas et al. 2011, Ismail-Meyer et al., 2013, Ismail- Meyer, 2014).

In the numerous lakeside settlements, which have been studied thus far (Coles, 2004, Marzatico, 2004, Menotti, 2004a, Pétrequin and Bailly, 2004, Ruoff, 2004, Ruttkay et al., 2004, Schlichtherle, 2004, Velusek, 2004, Menotti et al., 2005), interest has focused either on cultural questions, i.e. the interpretation of artifacts as part of the lake-dwelling cultural tradition, or environmental ones, i.e. lakeshore reconstructions (Magny et al., 2003, 2006, Magny, 2004, 2007). Micromorphology offers the opportunity to address new topics of investigation related to the interaction of human with the natural environment and decipher the adaptive strategies of the first dwellers. Moreover, through this type of analysis, questions on settlement organization and the use of space are raised.
Dispilio explicitly offers an unequivocal challenge of investigation involving complex stratigraphic sequences and short fragmentary records.

In this line of evidence, previous micromorphological research at the site (Karkanas, 2002, Karkanas et al., 2011) has brought to light a number of complexities related to the formation, the post depositional processes and the chronostratigraphic sequence of the site. More specifically, several microfacies have been recorded, forming a multifaceted pattern of microenvironments, whose distribution and interrelation across the site remain unknown. Moreover, a destruction horizon has been identified in Dispilio comprising of multiple microlayers varying in thickness and characteristics. Further research is, hence, needed to clarify the nature and taphonomy of this episode, to decipher the number of burning incidences represented within the multi-phased layer, to examine the spatial extent and the intensity of the event in space, as well as to discuss its effect to the subsequent depositional history of the site.

Furthermore, Dispilio is the first lake dwelling site being excavated in Greece and therefore several methodological and interpretative challenges have emerged through the
excavation process. Consequently, the stratigraphic complexities confronted during the excavation together with the inconsistency of the chronological results have created a vague chronostratigraphic background for both the integration of archaeological materials and the correlation of the results of specialized studies and analyses (i.e. zooarchaeology, environmental studies, pottery, lithics, etc). This study therefore aims to form a chronostratigraphic background on which the cultural materials will be placed and interpreted.

Beyond the complexities of the site of Dispilio per se, relevant research in the lakeside settlements of the circum Alpine region and the contemporary Neolithic culture of northwestern Greece, has revealed the multifaceted interaction of man with the lacustrine landscape. Regarding the ecological choices of the first lake dwellers in the circum Alpine region, there is an existing discussion on the role of environmental and hydrological conditions on the emergence of the first lake dwelling sites. The sedimentary record of Dispilio demonstrates that the first occupation of the site is indeed associated with a period of decreased moisture. On the other hand, the foundation of the settlement on an extensive marsh questions the preference of the early farmers for dry fertile land in favor of moist interfluvial terrains (Sherratt, 1980). Detailed sedimentological and micromorphological analysis of the environmental locale at Dispilio illuminates the ecological choices of the early farmers in relation to attractive habitats and land fertility.

This study further explores issues of settlement organization and use of space. The type and location of the dwellings in relation to the lakeshore has been a matter of long debate since the early lake dwelling studies (Keller 1854, Reinerth, 1936). Nowadays, there is a consensus that both raised dwellings and ground constructions existed (Pétrequin, 1986, Menotti, 2001); in certain cases, as the site of Dispilio, both types can be found at the same time in the littoral and supra-littoral zone respectively.

During the habitation history of the site several events, natural or anthropogenic have been recorded, including inundations, destructions and abandonments. The study of these episodes, through which it is possible to examine the continuities and discontinuities in the life-cycle of the site, not only sheds new light on the events per se, but also offers fascinating examples of human strategies, which are vital for the better understanding of the evolution of prehistoric societies. As such, the micromorphological
study of the interaction between lacustrine and anthropogenic processes is considered fundamental to quantify the environmental impact on the lake dwellers strategies and in this way, contribute to the broader discussion of the environmental effect on the emergence and expansion of the Neolithic culture.

1.3. Overview of dissertation
This dissertation comprises nine chapters. After the introduction, which sets out the aims and rationale of this dissertation, Chapter 2 gives an overview of the wetland archaeology paradigm with emphasis on the lacustrine natural processes and the site formation processes of the lake-dwelling sites. The importance of wetlands as archaeological landscapes is examined and the Greek wetlands exploited during antiquity are presented.

Chapter 3 comprises a literature review of the theoretical and methodological approaches applied to the study of the lake dwelling settlements as an independent discipline. As the lake level fluctuations are considered an integral part of the lakeside reconstructions, the methodologies used for this type of research are presented.

Chapter 4 presents the materials and methods used, and contains information regarding the sampling strategy and preparation of materials. The laboratory sedimentology analysis is described (grain size-TGA); the processing and correlation of the textural parameters of grain size analysis are described (comparative diagrams and Passega diagram).

Chapter 5 begins with a presentation of the physical setting of the broader region of the study area, as well as the modern climatic conditions; an overview of the past climatic evolution follows. The second half of the chapter concerns the archaeological data from the early Neolithic to the Mycenaean times.

Chapter 6 comprises the background of the study area. Here, an overview on climate, vegetation, geology and geomorphology, is followed by the presentation of the archaeological site, including the history of research, the stratigraphy and chronology of the site, the previous research regarding site formation processes and lake level reconstructions.

Chapter 7 demonstrates how the results of the sedimentological, micromorphological analysis together with the macroscopic observations, can be used as indicators of natural processes and microenvironments, of water energy and water levels, of post-depositional features and anthropogenic structures and activities.
Chapter 8 describes the results of the sedimentological analysis, followed by interpretation remarks. The sedimentological facies from both the lake and the archaeological site are presented, describing the macroscopic observations, the granulometric results, the correlation of the textural parameters and the Passega diagrams.

Chapter 9 presents the results of the micromorphological analysis; the micromorphological microfacies of both the lake and the site are described, followed by interpretation remarks.

Chapter 10 includes the radiocarbon results and their correlation to the chronological framework of the previous research.

Chapter 11 applies the data presented in chapters 7-10, to interpret and discuss the formation of the site in conjunction to the lake evolution. The evolution of the site is presented including information on the taphonomy, chronology and preservation of the archaeological materials. All the above, are tentatively associated with the environmental and archaeological data of the broader region and with the information available from the previous geoarchaeological multidisciplinary research conducted on the site.

Chapter 12 is the concluding chapter, which reviews the main objectives, limitations and accomplishments of this dissertation, contextualizing what is included in the discussion chapter.