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Tradition and innovation: pre and protohistoric pottery at Lipari in a wider environmental and cultural perspective

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ABSTRACT - Lipari, the largest island in the Aeolian archipelago, commands a strategic position in the Central Mediterranean, and its pre and proto history extends over 5000 years of continuous habitation. This paper aims to discuss the Lipari cultural sequence in a new interdisciplinary perspective juxtaposing the different spheres of innovation, connectivity, territory, demography and environment to explore the continuity and the variability of its pottery tradition. For the occupational pattern at Lipari we propose the definition of seven areas (or regional *foci*) formed by clusters of sites characterized by geographic proximity and similar orientation/elevation above the sea level. This approach allows a general evaluation of the territorial occupation (new areas, continuity, reoccupation, abandonment), also combined with the estimated demographical trend. Among the environmental and economic aspects, we considered the volcanic activities in the Archipelago and some recent studies about agricultural practices. The study presents in detail the archaeological implications of pottery analysis at Lipari, where 384 samples have been classified in 33 distinctive ceramic fabrics. A single, main local fabric characterize the entire sequence showing the foundation of a strong native tradition. The other 16 local fabrics are specifically linked to some cultural phases or wares and testify the potter's vibrant creativity. In addition to local products various imported vessels from diverse centres and cultural environments within the Mediterranean are observed. In order to define a scale of innovation and connectivity in each phase we quantify the occurrence of new and imported fabrics. Innovation and connectivity were stronger at the beginning and at the end of the occupation, whilst the local tradition was very consistent from the Chalcolithic till the Middle Bronze Age 2. We tentatively define the potters as conservatives, reformers, innovators or revolutionaries and we explore the continuity or change in pottery-making traditions in relationship to the cultural and environmental changes at Lipari.

RIASSUNTO - TRADIZIONE E INNOVAZIONE: LA CERAMICA PREISTORICA E PROTOSTORICA A LIPARI IN UNA PIÙ AMPIA PROSPETTIVA AMBIENTALE E CULTURALE - Lipari, la più grande isola dell'Arcipelago eoliano, occupa una posizione strategica nel Mediterraneo centrale e la sua pre e protostoria durano oltre 5000 anni di occupazione ininterrotta. Questo studio intende discutere la sequenza culturale di Lipari in una nuova prospettiva interdisciplinare che giustappone le differenti sfere di innovazione, connettività, territorio, demografia e ambiente per esplorare la continuità e la variabilità della sua tradizione ceramica. Per le dinamiche di occupazione a Lipari proponiamo la definizione di sette aree (o *foci* regionali) costituiti da raggruppamenti di siti caratterizzati da prossimità geografica e da simile esposizione/altitudine sul livello del mare. Questo approccio consente una valutazione complessiva dell'occupazione territoriale

Parole chiave: Isole Eolie, Petrografia, Paesaggio, Demografia, Identità culturale, Cambiamento culturale

Key words: Aeolian Islands, Petrography, Landscape, Demography, Cultural identity, Cultural change

(nuove aree, continuità, rioccupazione, abbandono) in combinazione con la fluttuazione della stima demografica. Tra gli aspetti ambientali e economici abbiamo preso in esame le attività vulcaniche nell'Arcipelago e alcuni studi recenti circa le pratiche agricole. Lo studio presenta nel dettaglio le implicazioni archeologiche dell'analisi ceramica a Lipari dove 384 vasi sono stati classificati in 33 diversi impasti ceramici. Un solo impasto principale caratterizza l'intera sequenza locale e rappresenta la base di una forte tradizione indigena. Gli altri 16 impasti locali sono specificamente legati a alcune fasi culturali o classi ceramiche e testimoniano la vivida creatività dei vasai. In aggiunta ai prodotti locali sono stati riconosciuti diversi vasi importati da differenti centri e ambiti culturali del Mediterraneo. Al fine di individuare una misura di innovazione e connettività consideriamo la presenza di impasti nuovi e importati in ciascuna fase. L'innovazione e la connettività sono state più marcate all'inizio e alla fine dell'occupazione, mentre la tradizione locale è risultata essere assai costante dall'età del Rame fino al Bronzo medio 2. Proponiamo quindi di definire i vasai come conservativi, riformatori, innovatori o rivoluzionari e mettiamo in relazione la continuità o il cambiamento nelle tradizioni artigianali con le trasformazioni culturali e ambientali avvenute a Lipari.

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1. INTRODUCTION

The Aeolian Archipelago is formed of a group of seven volcanic islands strategically located to the immediate North of the Straits of Messina on an important Mediterranean navigational route (fig. 1). The islands have been included in the UNESCO World Heritage List because of their unique and outstanding volcanic environments. Throughout the prehistory and protohistory the islands have sustained a vibrant and virtually unbroken occupation from the 6th to 1st mill BCE. The rich archaeological heritage is represented by at least 50 known sites, and their investigation has formed a milestone in the development of Central Mediterranean archaeological studies (Martinelli and Lo Cascio 2018). The maritime environment of the islands is encapsulated in the iconic "map" incised on a Capo Graziano bowl discovered in the prehistoric excavations of the Lipari Acropolis (Bernabò Brea and Cavalier 1980, fig CXXVIII,2; Levi *et al.* 2014b fig. 9).

Lipari is the largest (37.6 km²) and most central island in the archipelago, its influence supporting a dominant hegemonic role, and its remarkable continuity of habitation is based in part by its early control of the trade in obsidian in the western Mediterranean. Its antiquarian history, and that of the archipelago in general, has been brought to light by the sustained and rewarding archaeological excavations conducted by Luigi Bernabò Brea and Madeleine Cavalier (Bernabò Brea and Cavalier

1960, 1980, 1994; Bernabò Brea-Cavalier-Villard 1998). Their pioneering efforts have been maintained in a series of recent excavations at Lipari, Salina, Filicudi and Stromboli (Martinelli 2005a, 2010, 2016; Martinelli *et al.* 2010; Levi *et al.* 2014a, 2017a, 2018; Bettelli *et al.* 2016; Cannavò *et al.* 2017a; Martinelli and Giordano 2017; Martinelli and Speciale 2017; Vidale *et al.* 2018). Such investigations have also created a renewed interest in the geology, topography, landscape and demography of the islands providing a more meaningful background to understanding the environment which sustained these communities (Robb 2007; Castagnino Berlighieri 2011; Caracuta-Fiorentino-Martinelli 2012; Dawson 2014; Di Renzoni *et al.* 2016; Manni-Coltelli-Martinelli 2019; Martinelli and Lo Cascio 2018; Rosi *et al.* 2019). The chronostratigraphic sequence is summarized in tab. I.

Complementary to the above studies an analytical program has been conducted into the composition of the pottery from the archipelago, starting with a petrographic study in the 60's (Williams 1967, 1980, 1991, 2018; Williams and Levi 1995, 2001, 2008) and culminating in the characterization work which has currently investigated 730 petrographic samples from 14 sites on five of the islands, and of which a further 124 have been chemically characterized and approximately 250 samples examined by microanalytical techniques: SEM, EMPA and ICP-MS (Brunelli *et al.* 2013; Jones *et al.* 2014; Cannavò *et al.* 2017b; Levi-Cannavò-Brunelli 2019).



Fig. 1 - The Aeolian Islands in Southern Tyrrhenian Sea.

Le isole Eolie nel Tirreno meridionale.

Phase		Cultural Facies	BCE
Bronze Age	Final	Ausonian 2	1150-900
	Recent	Ausonian 1	1300-1150
	Middle 3	Milazzese	1500-1300
	Early & Middle 1-2	Capo Graziano	2300-1500
Chalcolithic	Late	Piano Quartara	3000?-2300
	Middle	Pianoconte	3800-3000?
	Early	Spatarella	4000-3800
Neolithic	Late	Diana	4500-4000
	Middle	Tricromica, Serra d'Alto	5000-4500
	Early	Stentinello	5500-5000

Table 1 - Lipari's stratigraphic sequence: archaeological phases, cultural facies and chronology.

Sequenza stratigrafica di Lipari: fasi archeologiche, facies culturali e cronologia.

In this paper it is proposed to present an interdisciplinary reconstruction of the pre and protohistoric communities in the cultural sequence of Lipari in which the results of the ceramic analytical program are combined with the environmental and demographic data. The following parameters will be presented and discussed:

- a. The environmental constraints imposed by volcanic activity and the awareness of occupation, territorial continuity and demographic control within a restricted insular environment.
- b. The role of tradition and innovation in the production of native pottery with reference to technological expertise and awareness of stylistic influences.
- c. The openness of Lipari to external exchange.

2. THE PRE AND PROTOHISTORIC LANDSCAPE AND DEMOGRAPHY OF LIPARI

Environment, habitation and demography are aspects which have contributed significantly into this new synthesis. These aspects require to be reviewed against the background of fear and disruption occasioned by episodes of destructive volcanic activity within the archipelago. It is episodes such as this that would have established whether, at times, the islands were habitable or not, and would have been a critical factor in determining the distribution of settlement and the permanency of residency. Such trends will be significantly reflected in the demographic history of the entire archipelago.

2.1. Environment

The landscape of Lipari is the product of several geological episodes which have resulted in the formation of a number of upstanding consolidated volcanic plugs and domes (Mont Guardia, Monte Rosa, Forgia Vecchia, etc) and extensive areas of unconsolidated ashes that were spewed out in the course of violent eruptions. Nine phases of volcanic activity have been identified to account for the geologic formation of the island (Forni *et al.* 2013). Strata and deposits from the

earlier episodes are represented on the southern and western side and the latest eruptive phase accounts for the construction of the North Eastern quadrant (fig. 2). The highest point of the island is at 602 m (1975 ft).

The volcanic history of Lipari (Manni-Coltelli-Martinelli 2019) indicates that the development of its pre and proto-historic societies coincided with a long phase of volcanic quiescence, which would have been beneficial to their continued and

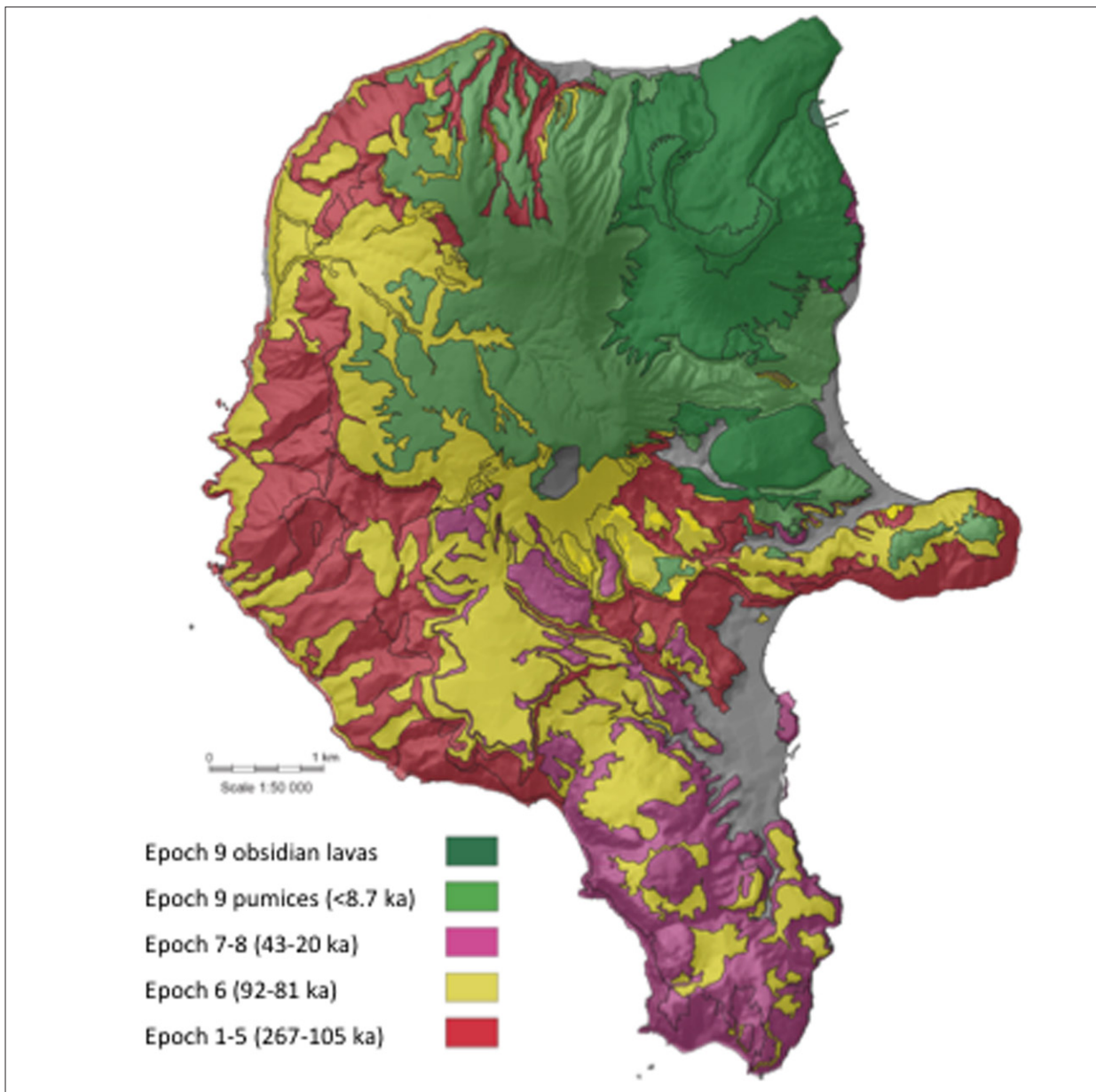


Fig. 2 - Simplified geological map of Lipari's Island modified after Forni *et al.* 2013. The geological history of the volcano is summarized according to the eruptive Epochs as defined by Forni *et al.* 2013.

Carta geologica semplificata dell'Isola di Lipari modificata da Forni et al. 2013. La storia geologica del vulcano è riassunta sulla base delle fasi eruttive come definite da Forni et al. 2013.

successful growth. This phase, lasting for approximately 5000 years, was however preceded by catastrophic events that would have affected the Mesolithic/Early Neolithic occupancy of the island, whilst in the historical Imperial Roman and Early Middle Ages severe volcanic activity disrupted parts of the island. These earlier and later eruptions were to impact directly on the archaeology of the island, with the valuable obsidian lava flows and pumice deposits in the north eastern sector resulting from the earlier episode, while in the later episode parts of this very same north eastern geographical landscape were to be disrupted and partly obliterated. The inhabitants of Lipari would, however, have been acutely aware of the disruptions in the neighboring island of Vulcano, lying a mere kilometer or less to the south, where major activity formed the Gran Cratere in the northern part, at periods that were coeval with the Chalcolithic and Early Bronze Age. Likewise, the still active volcanic island of Stromboli, the easternmost isle in the archipelago at a distance of about 30 km from Lipari, was characterized by explosive activity during phases corresponding to the Neolithic, the Chalcolithic and again in the late Medieval period (Rosi *et al.* 2019).

The geomorphology of Lipari is characterized by steep unstable hills which have been eroded and gouged to form deep waterless ravines that bisect the internal landscape, the result of massive and unpredictable former episodes of flood water runoff. The inland mass rises steeply either directly from sea level or from narrow coastal plains of which the largest accommodates the modern urban town of Lipari. Within the island areas of relatively flat ground are at a premium and terracing of steep hilly slopes dating from at least the protohistoric period, was undertaken as a necessity to consolidate and expand the agricultural potential of the inhabited areas (Martinelli and Giordano 2017; Vidale *et al.* 2018: fig. 2).

Archaeobotanical evidences from the Archipelago are rare, but the village of Filo Braccio at Filicudi provides an insight into the natural environment in which the settlement pattern of the islands developed (Martinelli *et al.* 2010; Speciale *et al.* 2012; Martinelli and Speciale 2017). At the beginning of the Bronze Age the settlements contained individual households which practiced a form of subsistence agriculture with accumulated food reserves stored in underground silos. The landscape was dominated by low shrub vegetation in which

broom (*Genista sp.*) and heather (*Erica sp.*) were abundant, while fragments of burnt wood pointed to the presence of a Mediterranean type low tree canopy that included poplar/willow (*Populus/Salix*), mastic (*Pistacia lentiscus*), myrtle (*Myrtus communis*), olive (*Olea europaea*), plum (*Prunus sp.*), apple (*Pomoideae*) and the strawberry tree (*Arbutus unedo*). Extensive stands of these trees would not have been a common feature and while olive, plum, apple and strawberry could have contributed marginally to the food supply, the lack of extensive woodland would presuppose certain limitations on the source of fuel to be used for firing pottery. The inhabitants of Filicudi practiced a form of subsistence farming based on a 'neolithic' type package of domesticated cereal and leguminous plants (Caracuta *et al.* 2012). Identified are the cereals barley (*Hordeum vulgare var. vulgare*; *H. vulgare var. distichum*), dressed and naked forms of wheat (*Triticum dicoccum* and *Triticum aestivum / durum*) and a range of legumes that include faba or broad bean (*Vicia faba var. minor*), lentil (*Lens culinaris*), pea (*Pisum sativum*) and ervil or bitter vetch (*Vicia ervilia*), the latter renowned as an excellent animal concentrate but consumed sparingly by humans, particularly in time of famine, because of its bitterness. Finally, grape seeds (*Vitis vinifera*) signify another food source although possibly belonging to the wild species rather than the cultivated variety.

The pollen investigation at San Vincenzo in the island of Stromboli show the presence of oak wood, Mediterranean *macchia* and plants requiring a water habitat during the Bronze Age (Mercuri *et al.* 2020). Human activities include cereals, ruderal/nitrophilous plants and other wild synanthropic plants. Pollen of barley was found only in one hut and the *Hordeum* group record was significant suggesting that some straw was accumulated at the floor of the hut. Some pastoral activity is suggested by coprophilous fungi which are common and show a significant presence. The economy of the island must have also been enriched, and probably heavily sustained, by its role in maritime activities, most particularly in fishing and the collecting of edible marine fauna. This important aspect can only be speculated upon since the acidic soils of the island will have destroyed most of the fragile archaeological evidence that would have been preserved in shell middens and the refuse of human occupation (Vidale *et al.* 2018).

2.2. Occupation and demography

The pre and proto-historic occupation appears to be linked to strategic locations on the south and western side of the island to establish more permanent agricultural residency. Their distribution is governed, in general, by an adherence to areas where the earliest and most stable ash formations are located. In the north eastern part of the island the most recent historical volcanic episodes have erased the traces of the earlier occupation, thus projecting perhaps an unbalanced view of the extent of the occupation. The distribution of the settlements indicates the emergence of the most favored geographical locations some of which have also predetermined the formation of the modern urban and rural settlement pattern of the island. The villages represent stable permanent communities that prospered over protracted periods of time. Associated with these focal points are the designated burial sites of the respective communities, sites commanding respect and reflecting individual ritual and funerary practices. Complete and detailed information about the sites are available in the numerous excavations reports (Buchner 1949; Bernabò Brea and Cavalier 1956, 1957, 1960, 1980, 1991, 1994; Bernabò Brea 1978, 1985a; Ciabatti 1978; Cavalier 1979; Bernabò Brea-Cavalier-Villard 1998; Martinelli 2001; Castagnino Berlinghieri 2003; Martinelli and Giordano 2017; Nomi and Speciale 2017).

In order to better understand the occupational pattern, instead to consider individually the archaeological sites (Martinelli and Lo Cascio 2018), we propose the definition of seven areas (or regional *foci*) formed by clusters of sites characterized by geographic proximity and similar orientation/elevation above the sea level (fig. 3); (tab. II). The defined areas (A-G) are the following:

- Area A - is the dominant south-eastern coastal focus point which includes the defensive bastion of the Acropolis (Castello) and the fertile plain of the Contrada Diana below. It served as the natural port of the island and lies within close proximity to the Portinenti clay deposit. It is of significance that the important Bronze Age shipwreck of Pignataro di Fuori was discovered in the sea close to the eastern peninsula of Monte Rosa and within the territorial waters facing area A;

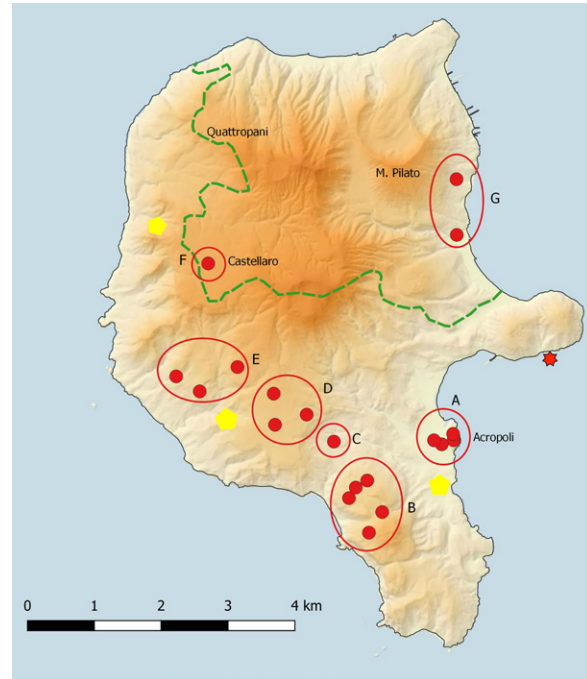


Fig. 3 - Lipari's regional areas. A-G: inhabited areas; star: Pignataro di Fuori shipwreck (see table 2). The North Eastern area affected by post-protolithic eruptions is marked (see Epoch 9 in fig. 2). Yellow: clay deposits.

Aree regionali di Lipari. A-G: aree abitate; stella: relitto di Pignataro di Fuori (vedi tab. 2). È segnata l'area nord-orientale interessata da eruzioni post-protostoriche (vedi Età 9 in fig. 2). Giallo: depositi di argilla.

- Area B - is situated in the southern part of the island in an elevated position which was well protected by Monte Guardia;
- Area C - commands a central inland position in the island;
- Area D - another central, inland group of villages at a higher elevation than the nearby Area C. The area is near Fuardo-Fontanelle clay deposit;
- Area E - demarcates an elevated position the eastern side of the island in close proximity to the kaolin and Fuardo-Fontanelle clay deposits. The area include a Bronze Age Tholos, a thermal water station with an Aegean-type architecture;
- Area F - forms a small, fertile inland plateau commanding the highest occupational location in the north western sector of the island. The plateau overlooks the neighbouring island of Salina and is close to the obsidian source in the northern portion of the Island;
- Area G - the archaeological importance of this coastal area in the north eastern quadrant of Lipari cannot be easily assessed since the area

Area	A		E	F	D	C	G	B	*
Location	south-east		west	north-west	center	center	north-east	south	east coast
asl	10-20 m	40 m	199-278 m	380-410 m	230-245 m	105 m	30-150 m	150-270 m	
Sites	Civita, Piazza Monfalcone, Contrada Diana	Acropolis	Pianoconte Cicirata, San Calogero	Quattropani Castellarò	Pianoconte, Contrada Mulino a Vento	Piano Greca	Canneto Lami, Papesca	Monte Giardina, Monte Guardia, Spatarella	Pignataro di Fuori
Function	settlements	settlement	settl.+ ritual	settlement	settlements	settlement	quarry	settlements	skipwreck

Phase	Facies	A	E	F	D	C	G	B	*
Bronze Age	Ausonian 2	1							
	Ausonian 1	1							
	Milazzese	1						1	
	Capo Graziano 2	1	1	1					
	Capo Graziano 1	3							1
Chalcolithic	Piano Quartara	1	1		1				
	Pianoconte	3	1		1				
	Spatarella		1					2	
Neolithic	Diana	3		1	1	2	1	2	
	Serra d'Alto	1	1			1			
	Tricromica	1	1						
	Stentinello	1		1	1				

Table 2 - Lipari's diachronic occupation in the various regional areas (see Fig. 3). The areas are ordered according the chronological occupational sequence: grey = settlements; white = other sites (necropolis not included).

Occupazione diacronica di Lipari nelle diverse aree regionali (vedi Fig. 3). Le aree sono ordinate secondo la sequenza cronologica di occupazione: grigio = insediamenti; bianco = altri siti (necropoli escluse).

was engulfed by massive medieval volcanic eruptions (Monte Pilato-pumice 785-780/776 AD; Rocche Rosse-obsidian flow 1220±30 AD; Lami-obsidian flow 0.7±0.17 ka, see Manni-Coltelli-Martinelli 2019).

The sequential occupation of the areas is illustrated in fig. 4.

The coastal Area A emerges as the focal point of the island, as also testified by the continuity of occupation.

Areas B-F conform to small inland basins at various altitudinal levels that supported the pre and protohistoric agricultural self-sufficiency and food producing capacity of the island. The pre-historic occupation of these basins tends to be intermittent with evidence for abandonment and re-occupancy a common phenomenon of the village sites. Area D appears to be the most stable showing a practical continuous occupation from the Neolithic (Serra d'Alto) to the Chalcolithic (Piano Quartara) with a notable absence only in the Early Chalcolithic (Spatarella).

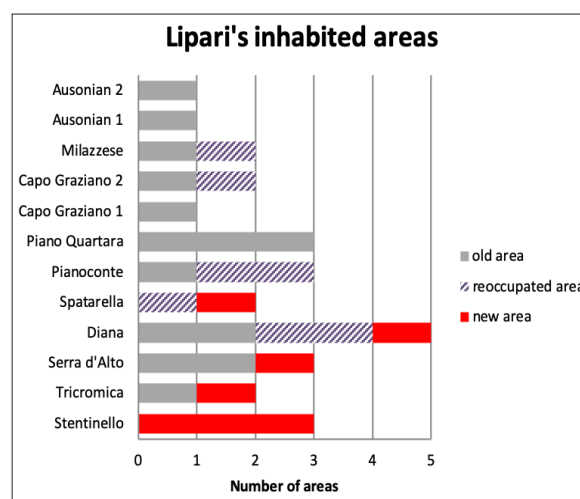


Fig. 4 - Lipari's inhabited areas: old area = continuity with the previous phase; reoccupation = area already occupied but not in the previous phase; new area = first evidence of the occupation (for the area A the Acropolis is considered separately from the other sites, see table 2).

Aree abitate di Lipari: area vecchia = continuità con la fase precedente; rioccupazione = area già occupata ma non nella fase precedente; nuova area = prima evidenza dell'occupazione (per l'area A l'Acropoli è presa in esame separatamente dagli altri siti, vedi tab. 2).

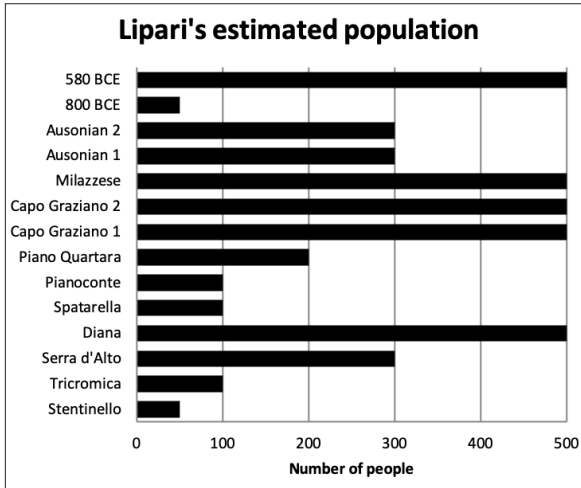


Fig. 5 - Estimated Lipari populations during pre-protolithic times (modified from Manni-Coltelli-Martinelli 2019).

Stima delle popolazioni di Lipari durante l'epoca pre-protostorica (modificata da Manni-Coltelli-Martinelli 2019).

The economic importance of Area G can be surmised from the distribution of obsidian in areas outside Lipari (Tykot 2017; Levi *et al.* 2019): the trade in obsidian confirms the central role of Lipari in the central Mediterranean that allowed the island to exert territorial influence far greater than its relatively minute size might have suggested.

We will briefly summarize here the occupational pattern and the estimated demographical trend (fig. 5). In the pre and protohistoric periods estimates of population densities, based on the size of the accompanying village clusters, have suggested that in times of greater prosperity Lipari could have supported a maximum population of approximately 500 people (Manni-Coltelli-Martinelli 2019). It is worth to not that this is a first quantitative evaluation and further investigation, including more economic and environmental aspects such as food production and water resources, are in progress (Di Renzoni *et al.* 2016).

Neolithic

In the Early and Middle Neolithic (Stentinello, Tricromica and Serra d'Alto) settlement is attested in a limited number of sites with a scattered distribution in various parts of the Island, including the elevated site of Castellaro in the north western sector (Area F) which is in direct visual contact with the contemporary village of Rinicedda in the nearby Island of Salina.

In the Late Neolithic (Diana) five areas are occupied (A, C, D, E, F) with eight villages. The obsidian quarry in the north east, Area G, can also be referred to this phase, although as noted previously, the distribution of obsidian in primary Neolithic sites outside the Aeolian Islands would indicate quarrying at an earlier stage in time. This phase represents the peak of occupation of the island.

Chalcolithic

During the Chalcolithic (Spatarella, Pianoconte and Piano Quartara) fundamental changes occur in the settlement pattern with fewer areas occupied, old sites abandoned and a preference for habitation in more protected locations such as in Area B. This is the first demographic crisis in the history of Liparean society and the demographic downturn may be ascribed to the strong eruptive activity in the Archipelago. It is quite possible that Lipari may not have been inhabited during the most intense episodes of this activity. No new areas were occupied after the Early Chalcolithic (Spatarella) although various sites were frequently reoccupied.

Bronze Age

During the Bronze Age there is a progressive repopulation and centralization of the island, the same trend observed in other central Mediterranean regions, as for example in the Plain of Sybaris (Vanzetti 2002) or in the Terramare area (Cardarelli 2009). This phenomenon may imply the onset of a more centralized and complex social organization culminating at end of the Bronze Age when, in the entire Archipelago, only the defensive site of the Acropolis in Area A is inhabited. The destruction by fire of the Late Bronze Age (Ausonian 2) village of the Acropolis marks the second demographic crisis of the island.

3. POTTERY ANALYSIS

3.1. Materials and methods

The great majority of Aeolian pottery belongs to the traditional *Impasto* ware: coarse, handmade and burnished (technologically similar to the Handmade Burnished Ware-HBW of the Eastern Mediterranean). For this textural characteristic some tests using chemical analyses have been performed mainly in order to define local

reference groups to compare with Aegean imports (Jones *et al.* 2014) but the bulk chemical composition is often insufficient or even misleading (Neff-Bishop-Sayre 1989; Day and Kiriati 1999; Levi 2010).

In order to better discriminate the provenance of archaeological pottery from distinct Aeolian islands we moved to an integrated microchemical-petrographic investigation and the study focused on a statistically significant sampling of volcanic temper-bearing potteries from Lipari, Filicudi and Stromboli (Brunelli *et al.* 2013). Volcanic tempers have been first investigated through multivariate analyses of relative abundances of mineral and rock clasts along with petrographic characters. The in-situ mineral chemistry microanalyses by Electron Microprobe and Laser Ablation-Inductively Coupled Plasma Mass Spectrometry was used to assess major and trace element composition of the most common mineral phases (clinopyroxenes, plagioclase, hornblende). Products from different islands clearly show distinct petrographic composition and trace elements.

The results of those studies indicate that, although we cannot rule out the relevance of chemical analysis for some Aeolian finer wares, petrography is the main tool to investigate the majority of Aeolian pottery in the present study, following and reinforcing the tradition established by the pioneering work by John Williams in the '60 (Williams 1967, 1980, 1991).

The Aeolian petrographic project has been subsumed into a broader one (Wikipottery) promoted by University of Modena and CNR-ISMA in Rome, which evaluates the composition of pre and protohistoric pottery within the Central Mediterranean region and so far includes about 2000 samples from more than 100 sites (Cannavò and Levi 2018; Levi-Cannavò-Brunelli 2019; Cannavò *et al. in press*).

Within this expanded project 384 pots from Lipari have been analysed, dated from the Early Neolithic to the Final Bronze Age, the majority having been selected from excavations in the Acropolis whilst others are from Castellaro Vecchio, Pianoconte, Diana and the shipwreck of Pignataro di Fuori. The samples represent different wares, stylistic groups and, therefore, a range of technological traits (fig. 6).

The broad category of *Impasto* ware includes all the typical local productions and also the Apennine (typical of Middle BA 3 mainland Italy: Macchiarola 1987; Cocchi Genik *et al.* 1995), the Nuragic (typical of Bronze Age in Sardinia: Campus and Leonelli 2000) and the Late Neolithic glossy red burnished Diana ware.

The Final Bronze Age painted pottery, South Italian Protogeometric (typical of southern Italy: Yntema 1990; Bettelli and Levi 2003) and Piumata pottery from Sicily (typical of Sicily: Procelli *et al.* 1999) found at Lipari are relatively coarsely textured in comparison with the “mixed Italian products” of the Italian South-East peninsula (Bettelli and Levi 2003, Levi 2010), and from a technical angle would be classified as *Impasto* with engobe and painted decoration rather than as highly refined clay wares. Fine painted products include the Neolithic wares Capri-Tricromica and Serra d'Alto.

The petrographic classification has been articulated on two main levels: groups and fabrics.

This system follows a monothetic (hierarchical) structure (Whallon and Brown 1982) for the definition of the Groups and uses an approach typical of the polythetic classification (Clarke 1970) for the Fabrics.

a) **Groups** define the geological/lithological characteristics of the temper and are articulated with the following nomenclatures: EB=Effusive Basaltic, EA=Effusive Andesitic, ED=Effusive Daci-rhyolitic, I=Intrusive, I+M= Intrusive+Metamorphic, M=Metamorphic, MS= Metamorphic + Sedimentary, S=Sedimentary, G=Generic. Grog, namely crushed redundant pottery, is a rare component usually represented in the Sedimentary and Generic Groups (Levi 2010; Cannavò and Levi 2018). When a non negligible background fraction, such as detrital quartz, is present alongside a dominant introduced Effusive component, a lowercase letter is added to indicate the presence of this detrital fraction (q=quartz groundmass): EBq, EAq, EDq.

b) **Fabrics** define the characteristics of the main constituents, noting in general the size, abundance and shape of the major clasts and the texture and granularity, or otherwise, of the matrix. The description follows the main crite-



Fig. 6 - Examples of pottery from Lipari: 1. Tricromica (Acropoli, trench L cut 2-3), 2. Serra d'Alto (Acropoli, trench AO cut 19), 3. Diana (Mulino a Vento, grave), 4. Pianoconte (Pianoconte, trench XXI), 5-6. Piano Quartara (C.da Diana, trench XXII), 7-8. Capo Graziano (Acropoli, hut delta IV), 9-10. Milazzese (Acropoli, outside hut gamma VIII), 11. Protogeometric (Acropoli, hut alfa II), 12. Piumata (Acropoli, trench AH cut 5), 13. Ausonian 2 *Impasto* (Acropoli, trench AG).

*Esempi di ceramica da Lipari: 1. Tricromica (Acropoli, trincea L tagli 2-3), 2. Serra d'Alto (Acropoli, trincea AO taglio 19), 3. Diana (Mulino a Vento, sepoltura), 4. Pianoconte (Pianoconte, trincea XXI), 5-6. Piano Quartara (C.da Diana, trincea XXII), 7-8. Capo Graziano (Acropoli, capanna delta IV), 9-10. Milazzese (Acropoli, esterno della capanna gamma VIII), 11. Protogeometric (Acropoli, capanna alfa II), 12. Piumata (Acropoli, trincea AH taglio 5), 13. Ausonio 2 *Impasto* (Acropoli, trincea AG).*

ria proposed for ceramic petrology accounting for the distribution and percentage volume of clasts, grains, voids and clay matrix in the total fabric (Quinn 2013; Whitbread 1986, 1989; Williams and Jenkins 1997, 1999). The results of

the micro-chemical analyses are also considered (Brunelli *et al.* 2013). Each Fabric has been assigned a unique number in the general lithological Group classification (the first number for the Southern Tyrrhenian fabrics is 101).

Group	Fabric	Main components	n.	Cultural Facies	Phase
EA	EA102	andesite - hornblende andesite	19	Tricromica, Serra d'Alto, Diana, Pianoconte	Middle & Late Neolithic, Chalcolithic
	EA104	plagioclase - andesite - green pyroxene	1	Stentinello	Early Neolithic
	EA105	vitreous andesite	3	Diana	Late Neolithic
	EA107 (+grog)	grog - plagioclase - pyroxene	1	Diana	Late Neolithic
ED	ED101	volcanic glass - pumice	167	ALL	ALL
	ED102	pumice - vitreous rhyolite	2	Tricromica	Middle Neolithic
	ED103	rhyolite	25	Serra d'Alto, Diana, Piano Quartara	Middle & Late Neolithic, Chalcolithic
EBq	EBq101	basalt; quartz groundmass	3	Ausonian 2	Final BA
	EBq102	basalt - grog; quartz groundmass	1	Pianoconte	Chalcolithic
EAq	EAq101	pyroxene andesite; quartz-muscovite groundmass	1	Serra d'Alto?	Middle Neolithic?
	EAq102	andesite; sandy quartz groundmass	2	Stentinello?, Ausonian 2	Early Neolithic?, Final BA
	EAq103	coarse andesite - pyroxene; quartz groundmass	2	Ausonian 2	Final BA
	EAq104	fine andesite; silty quartz groundmass	2	Ausonian 2	Final BA
EAqm	EAqm101	andesite; quartz-mica groundmass	2	Ausonian 2	Final BA
EDq	EDq101	volcanic glass; quartz groundmass	9	Diana?, Milazzese	Late Neolithic?, Middle BA 3
	EDq102	glass shard; quartz groundmass	36	Ausonian 1 & 2	Recent & Final BA
	EDq103	pumice; quartz groundmass	1	Ausonian 2	Final BA
	EDq104	dark vesicular pumice; quartz groundmass	2	Ausonian 2	Final BA
	EDq105	obsidian ankaramite; quartz groundmass	1	Ausonian 2	Final BA
	EDq106	obsidian; quartz groundmass	1	Ausonian 2	Final BA
I	I101	granite	5	Serra d'Alto, Ausonian 2	Middle Neolithic, Final BA
	I102	granite	5	Stentinello	Early Neolithic
	I108 (+grog)	grog - quartz - granite	1	Stentinello	Early Neolithic
IM	IM101	granite - schist	32	ALL	ALL
	IM103	quartz - schist - granite	1	Ausonian 2	Final BA
M	M101	quartzschist - muscovite schist	2	Pianoconte, Ausonian 2	Chalcolithic, Final BA
MS	MS102	quartz; micaceous groundmass	47	Tricromica, Serra d'Alto, Diana	Middle & Late Neolithic
	MS103	siltstone; micaceous groundmass	1	Tricromica	Middle Neolithic
S	S103	quartz - feldspar; organic detritus	3	Stentinello	Early Neolithic
	S104 (+grog)	fossiliferous grog	1	Stentinello	Early Neolithic
	S107 (+grog)	grog; fossiliferous groundmass	1	Ausonian 2	Final BA
G	G112 (+grog)	grog - quartz - feldspar	1	Stentinello	Early Neolithic
	G117 (+grog)	grog	3	Pianoconte, Piano Quartara	Chalcolithic
			384		

Table 3 - Fabrics classification: white = local products; grey: imported vessels (detailed description in Levi-Cannavò-Brunelli 2019).

Classificazione degli impasti: bianco = prodotti locali; grigio: vasellame importato (descrizione dettagliata in Levi-Cannavò-Brunelli 2019).

		Origin																		
		Lipari							Lipari with imported clay											
		Fabric		Wares																
		ED101	impasto																	
		EA104	impasto																	
		ED102	capri																	
		EA102	red monochrome st. III																	
		ED103	red monochrome st. II-II																	
		EA105	red monochrome																	
		EA107	impasto																	
		EDq101	apennine																	
		EDq102	impasto																	
		EBq101	s.i. protogeometric																	
		EAq102	s.i. protogeometric																	
		EAq103	piumata																	
		EAq104	piumata																	
		EDq103	piumata																	
		EDq104	s.i. protogeometric																	
		EDq105	s.i. protogeometric																	
		EDq106	s.i. protogeometric																	
Phase	Facies	9	5	21	59	11	12	6	5	19	20	21	3	1	2	2	1	2	1	1
Bronze Age	Ausonian 2																			
	Ausonian 1																			
	Milazzese																			
	Capo Graziano																			
Chalcolithic	Piano Quartara					1														
	Spatarella, Pianoconte																			
Neolithic	Diana							15	23	3	1									
	Serra d'Alto							1	1											
	Tricromica							2	2											
	Stentinello	1																		

The fabrics correspond to significant taxonomic units or 'types' representing technological compositions that identify the petrographic signatures of individual production centres or workshops. In this perspective the fabrics represent compositional formulae (specific paste recipes deriving from a consistent productive practice) and can be conceptually considered on the same level as the morphological types defined by quantitative approaches (for example Clarke 1970).

3.2 Petrographic results

The analysis has identified 33 fabrics (tab. III, IV): six major fabrics stand out for number of samples (fig. 7) whilst the remaining 27 fabrics are represented by a maximum of 5 samples each, and of these 13 are identified by a single example. A full description of the fabrics is in Levi-Cannavò-Brunelli 2019.

Local fabrics

The local fabrics represent 57% of the samples investigated (218 specimens) and contain sands deriving by the natural dismantling of the extrusive series attested in Lipari: lava and pyroclastic products belong to calcalkaline (CA), high potassium calcalkaline (HKCA), shoshonitic (SHO) and, more rarely, potassic (KS) affinities (Barberi *et al.* 1973; Francalanci *et al.* 2007; Peccerillo 2005 and references therein). The major rock types are rhyolite, andesite/basaltic andesite, trachyandesite/basaltic trachyandesite, basalt/picrobasalt and dacite. The compositional variation of these products can be compared to the sands derived by the natural dismantling of the volcanic sequences. In a recent work, Morrone *et alii* (2016) characterized the clastic composition of sands produced in 13 distinct hydrographic basins of the island. While a direct use of beach sands is highly unlikely, their compositional range clearly

Imported vessels															
I102	I108	S103	S104	G112	MS103	MS102	I101	IM101	EBq102	G117	M101	chemical analyses	EAqm101	IM103	S107
impasto	impasto	impasto	impasto	impasto	painted	painted	s.i. protogeometric	apennine, s.i. protogeometric	painted	painted	impasto	Aegean	nuragic	nuragic	nuragic
							4	6			1	X	2	1	1
								1				X			
								6				X			
								1							
									2						
								4	1	1	1				
						2		3							
						14	1	1							
					1	31		6							
5	1	3	1	1				4							

Table 4 - Fabrics diachronic distribution and wares: white = local products; grey: imported vessels.

Distribuzione diacronica e classi ceramiche degli impasti: bianco = prodotti locali; grigio: vasellame importato.

overlaps the (better selected) compositional distribution of the pottery.

Due to the absence of mature depositional basins the precise location from where the clay was obtained in Lipari during the pre and protohistoric phases is unclear. A source above the Tyrrhenian eustatic terraces on the western seaboard identifies one possible point of origin; the clay in the coastal plain below the Acropolis (Area A) represents another possible location. The local kaolin clays of the island can be ruled out, although it was used in the Classical period for the production of fine wares, as exemplified by the “Pittore di Lipari” in the 3rd cent BC (Barone *et al.* 2017).

The local products can be classified in two main groups:

- **Effusive andesitic:** the four fabrics are predominantly associated with Neolithic and Chalcolithic pottery. Of major importance are

fabrics EA102 (andesite-hornblende andesite) and fabric EA105 (vitreous andesite) for Diana red monochrome stage III pottery; fabric EA104 (plagioclase-andesite-green pyroxene) is represented at Castellaro Vecchio; fabric EA107 (grog-plagioclase-pyroxene) in a single Diana grey sherd.

- **Effusive daci-rhyolitic:** three fabrics. Fabric ED101 (volcanic glass-pumice) exemplifies the most important, attested in more than 150 examples, in all phases of the chronological sequence and in all the sites investigated. Significantly it forms also the potting admixture discovered in a Capo Graziano bowl in Acropolis (sample ACRd12 from hut delta 12, Levi *et al.* 2019b: fig. 13). Fabric ED103 (rhyolite) is associated with Diana red monochrome stage I-II pottery, and fabric ED102 (pumice-vitreous rhyolite) distinguishes two unpainted Capri-Tricromica samples.

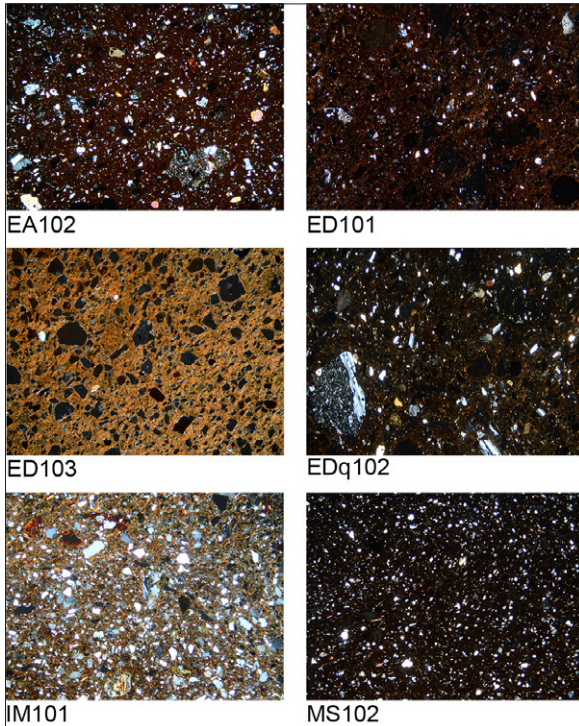


Fig. 7 - Microscope images of Lipari's main fabrics; horizontal dimension 5.5 mm, XPL. Local fabrics: EA102, ED101, ED103; local fabrics with imported clay: EDq102; imported fabrics: IM101, MS102.

Immagini al microscopio dei principali impasti di Lipari; dimensioni orizzontali 5,5 mm, XPL. Impasti locali: EA102, ED101, ED103; impasti locali con argilla importata: EDq102; impasti importati: IM101, MS102.

Local Fabrics with imported clays

These fabrics account for 16% of the sample investigated with 60 specimens characterized by a mixed composition where the effusive coarse fraction is typical of Lipari's products but there is a minority of different fine detrital components in the matrix (mainly quartz and mica) which association is uncommon to island's clastic distribution. This peculiar association was already recognized and interpreted by Williams (1991) as the result of a production based on Lipari charging imported sedimentary clays with local volcanic-derived tempers. Clays are possibly extracted from the beds of the north Sicilian coast, which still presently supply the raw material for the famous pottery produced at Santo Stefano di Camastra and for the industry of bricks and tiles at Spadafora-Villafranca. The importing of foreign clay is first attested in Middle Bronze Age 3 (Apennine ware). The local products with imported clay can be classified in three main groups:

- **Effusive basaltic + quartz groundmass:** Fabric EBq101 (basalt with quartz groundmass), associated with S.I. Protogeometric pottery.
- **Effusive andesitic + quartz groundmass:** Fabrics EAq101 to 104. These fabrics are equated with painted Ausonian pottery and possibly a Castellaro Vecchio *Impasto* sample: fabric EAq102 (andesite in sandy quartz groundmass) is associated with S.I. Protogeometric pottery; fabric EAq103 (coarse andesite and pyroxene in quartz groundmass) and fabric EAq104 (fine andesite in silty quartz groundmass) for Piumata ware. Fabric EAq101 (pyroxene andesite in quartz-muscovite groundmass) is possibly associated with an *Impasto* Serra d'Alto sample.
- **Effusive dacic-rhyolitic + quartz groundmass:** Fabrics EDq101 to 106 fabrics; the most abundant is the important Ausonian fabric EDq102 (glass shard in quartz groundmass); other fabrics include S.I. Protogeometric EDq104 (dark pumice in quartz groundmass), EDq105 (obsidian ankaramite in quartz groundmass), EDq106 (obsidian in quartz groundmass) and Piumata EDq103 (pumice in quartz groundmass); EDq101 (volcanic glass in quartz groundmass) is a Milazzese fabric associated with Apennine ware. The ankaramitic terms reported in group EDq105 are not present in the Lipari Island but possibly retrieved from the nearby La Sommata basalts in the Vulcano Island (De Astis *et al.* 1997, Gioncada *et al.* 1998, Lanzo *et al.* 2016). This site being almost in continuity with the Lipari Island -less than 1 km south of Lipari- can be considered as local. These peculiar ultra-calcic lavas are also attested in the Stromboli Island (Gioncada *et al.* 1998, Lanzo *et al.* 2016). An extra Aeolian provenance of these terms cannot be however ruled out (e.g. Etna, Kamentesky *et al.* 2007).

Imported Fabrics

These fabrics account for 27% of the sample investigated, with 106 specimens represented, and identify pottery that has been imported from extra Aeolian sources, mainland Italy, Sicily and Sardinia:

- **Effusive basaltic, quartz groundmass:** Fabric EBq102 (basalt and grog in quartz

groundmass) representing a painted Pianoconte vessel.

- **Effusive andesitic, quartz and mica groundmass:** Fabric EAqm101 (andesite in quartz-mica groundmass) typifying two Nuragic samples imported from Sardinia.
- **Intrusive:** Fabrics I102 (granite) and I108 (grog, quartz and granite) for Early Neolithic samples; Fabric I101 (granite) mostly for S.I. Protogeometric samples imported from mainland Italy.
- **Intrusive + Metamorphic:** Fabric IM101 (granite and schist) associated with S.I. Protogeometric pottery imported from mainland Italy; Fabric IM103 (quartz, schist and granite) representing Nuragic pottery imported from Sardinia.
- **Metamorphic:** Fabric M101 (quartz schist and muscovite schist) represented in a painted Pianoconte and in an Impasto Ausonian 2 vessels.
- **Metamorphic + Sedimentary:** Fabric MS102 (quartz in micaceous groundmass) is characteristic of the Neolithic and Chalcolithic phases and include painted pottery of Capri (Tricromica) and Serra d'Alto wares; a single Capri sample belongs to fabric MS103 (siltstone in micaceous groundmass). Origin is likely in mainland Italy.
- **Sedimentary:** Fabric S103 (quartz and feldspar with organic detritus) and Fabric S104 (fossiliferous grog) for Neolithic samples from Castellaro Vecchio imported from Sicily; S107 (grog in fossiliferous groundmass) characterizes a Nuragic pot from the Acropolis imported from Sardinia.
- **Generic with grog:** Fabric G112 (grog, quartz and feldspar) represent a Castellaro Vecchio sample; Fabric G117 (grog) is a Chalcolithic composition which resembles the grog rich fabrics in peninsular Italy.

Among the imported pottery we will also consider the Aegean pottery imported to the Archipelago during the Bronze Age identified with chemical analyses and mainly produced in the Peloponnese (Jones *et al.* 2014).

4. CONCLUSIONS

4.1. Discussion

The production of pottery in Lipari was an achievement of exceptional importance during the pre and protohistoric periods and cannot be fully understood without recourse to the changing environmental and cultural background which molded the pre and protohistoric communities that inhabited the island over a period of approximately 5.000 years. The sheer scale of manufacture and the continuity in its production, based in a very small island with relatively limited natural resources, is a subject that requires to be reviewed from a number of contributory angles.

The environmental constraints imposed by volcanic activity and the awareness of occupation, territorial continuity and demographic control within a restricted insular environment

Lipari is a very small island in a most unstable volcanic environment and offering few natural resources to sustain its population, yet it was able to support a vibrant, productive and successful pottery making industry.

While agriculture and fishing were the main props that sustained the rural economy and maritime exchange likewise played its supporting role, pottery making must also have contributed significantly to the cultural identity and to the stability of the island's economic base. The contribution of fishing to the pre and protohistoric economy can only be imagined because of the limitations in the archaeological record but the evidence for a more stable agricultural economy can be obtained from the small number of permanent prehistoric village sites that have been excavated in Lipari. The geological and geomorphological evidence indicates that only a small number of areas could have supported a more stable agricultural regime. Archaeology shows that the majority of the 7 identified inhabited areas were constantly being reoccupied over the millennia since no new areas could be developed because of the limitations imposed by the terrain. It is likely that at certain times in the historic record agriculture would have been a marginal activity barely able to support the island's population. The depopulation of the island's hinterland during the Bronze Age bears witness to the uncertainty caused by environmental problems and by external unrest leading to the expansion

of settlement in the harbor area in the lee of the defensive bastion of the Acropolis.

During the pre and protohistoric phases the pottery production in Central Mediterranean was presumably organized at domestic and/or workshop levels (Rice 1984; Van der Leeuw 1984; Levi 2010; Levi and Muntoni 2014). It is therefore envisaged that at Lipari pottery production would have been a domestic task with each community fulfilling its own requirement, and that centralized production was not undertaken until the very latter stages of the Bronze Age when a more specialized range of wares were manufactured. The process of centralization must be viewed against the general decline in, and the denudation of, the rural population in the island during the later stages of the Bronze Age.

The role of tradition and innovation in the production of native pottery with reference to technological expertise and awareness of stylistic influences

In the different archaeological phases, such as adaptation or reaction to environmental or cultural transformations, Lipari's potters have been -from time to time- conservatives, reformers, innovators or revolutionaries.

If tradition is defined as establishing a practice or creating an institution, then the marker of that tradition in Lipari is exemplified by Fabric ED101 which makes its first appearance during the initial prehistoric occupation and it was to remain throughout the entire cultural development. This tradition is based on very poor native clay deposits but capable of producing a creative repertoire of serviceable vessels to meet the varied requirements of the population in table ware, cooking service, storage containers and funerary receptacles.

It will however be necessary to balance the constraints, or even the continuity, of this technological tradition against the invigorating forces of innovation that sought to expand and enriched the native base: seven other fabrics can be identified using local constituents and eleven utilizing imported clays in combination with local fillers.

Nevertheless, fabric ED101 is overtaken in importance only in the Diana (red monochrome) and Ausonian 2 cultural phases, suggesting that in all other stages the native conservative tradition prevails as dominant. From the beginning of

the Chalcolithic (Spatarella) to the end of Middle Bronze Age 2 (Capo Graziano), a period of approximately two millennia, there are no new fabrics that enhance the potting tradition. Continuity is broken with the introduction of a foreign clay from which a proliferation of fabrics is developed starting from Middle BA 3 (Milazzese) (fig. 8) showing a great sophistication in the selection of specific raw materials. The practice of mixing local volcanic sand with Sicilian Pleistocene clays continues in classical phases, for example at the Portinenti amphorae workshop, dated to the 1-2 cent AD (Di Bella *et al.* 2019).

Innovation may also be viewed by the style and typology of the wares that define each stage (Procelli *et al.* 1999). All changes in the stylistic repertoire have been explained by the arrival of new people into the Archipelago (for instance Bernabò Brea 1985a). For instance, in each Bronze Age phase specific formal and decorative characteristics can be identified with their own meaning in terms of the local development of the wares (Bernabò Brea and Cavalier 1980: 653-719; Peroni 1989: 260-261, 355-360; Bietti Sestieri 1997: 479-485; Bettelli-Borgna-Levi 2018: 226-228).

It is worth noting that phases in which Aeolian potters introduced new compositional recipes correspond to periods of strong discontinuity in pottery shapes and decorations, elements which are usually linked to the consumers' taste: during Late Neolithic for the red monochrome Diana, during the Late Bronze Age for the Ausonian *Impasto* and specialized painted wares.

The openness of Lipari to external exchange

Lipari and the Aeolian Islands in general cannot be viewed in isolation without recourse to the influences within the wider Mediterranean world. Together with the obsidian, the production of pottery also contributed to the exchange mechanism that brought the Archipelago into contact with extraneous areas thus enriching what might have developed into an insular inward-looking society.

The presence of imported vessels especially in coastal and island sites emphasizes the role of the sea as the major and most efficient route way of connectivity between distant lands, that in the central Mediterranean become more effective in the latter half of the of second millennium BCE as sailing ships appears (van Dommelen and Knapp

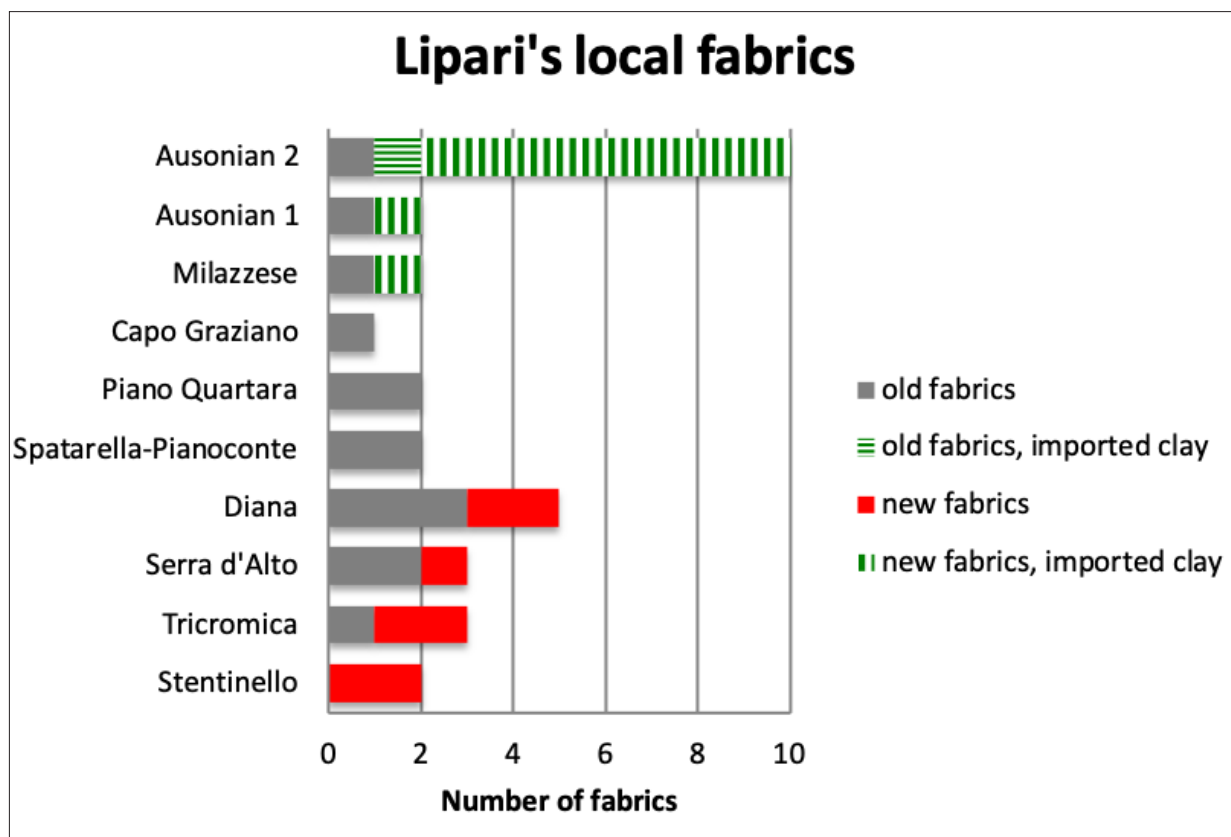


Fig. 8 - Diachronic distributions of old and new local fabrics at Lipari.

Distribuzioni diacroniche di impasti locali vecchi e nuovi a Lipari.

2010; Broodbank 2013; Dawson 2014; Knapp and van Dommelen 2015). Analysis has demonstrated that numerous vessels had been brought to Lipari from areas outside the Archipelago: mainland Italy, Sicily, Sardinia and the Aegean (fig. 9).

The activities of the sea farers of the Aeolian Archipelago may also be documented in the circulation of the pottery produced in Lipari. The shipwreck of Pignataro di Fuori, dated to the beginning of the Bronze Age, and discovered on the eastern coast in close proximity to the Acropolis is the symbol of this maritime trade: its cargo included a standardized set of vessels manufactured from the classic native fabric Fabric ED101. Although its destination, whether to another Aeolian Island or beyond, cannot be established, inter-island exchange accounts for Lipari's Fabric ED101 pottery to have been found in many locations: Salina (Early Neolithic), Stromboli (Chalcolithic, Early and Middle BA 1-2), Filicudi, Messina, Vivara (Early and Middle BA 1-2), Salina (Early and Middle BA) and Panarea (Middle BA 3) (Cazzella-Levi-Williams 1997; Levi 2000; Levi-Cannavò-Brunelli 2019).

The long path to revolution and connectivity

In order to summarize the parameter here considered, we propose a general evaluation of the dynamics underlying cultural development quantifying the number of new and imported fabrics that appear in each phase (fig. 10). One can speculate that the potters of Lipari can be defined as conservative during the Chalcolithic (Spatarella, Pianoconte, Piano Quartara) and Early-Middle Bronze Age 1-2 (Capo Graziano), as reformers during both the Middle Bronze Age 3 (Milazzese) and the Recent Bronze Age (Ausonian 1), as innovators during the Neolithic (Stentinello, Tricromica, Serra d'Alto and Diana) and finally, as revolutionaries during the Final Bronze Age (Ausonian 2). Connectivity was stronger at the beginning and at the end of the occupation (Stentinello and Ausonian 2) and lower during the Late Neolithic (Diana) and from Early to Recent Bronze Age (Capo Graziano, Milazzese, Ausonian 1).

4.2. A long durée perspective

The correlation of typological and stylistic innovations with the technological traditions and the

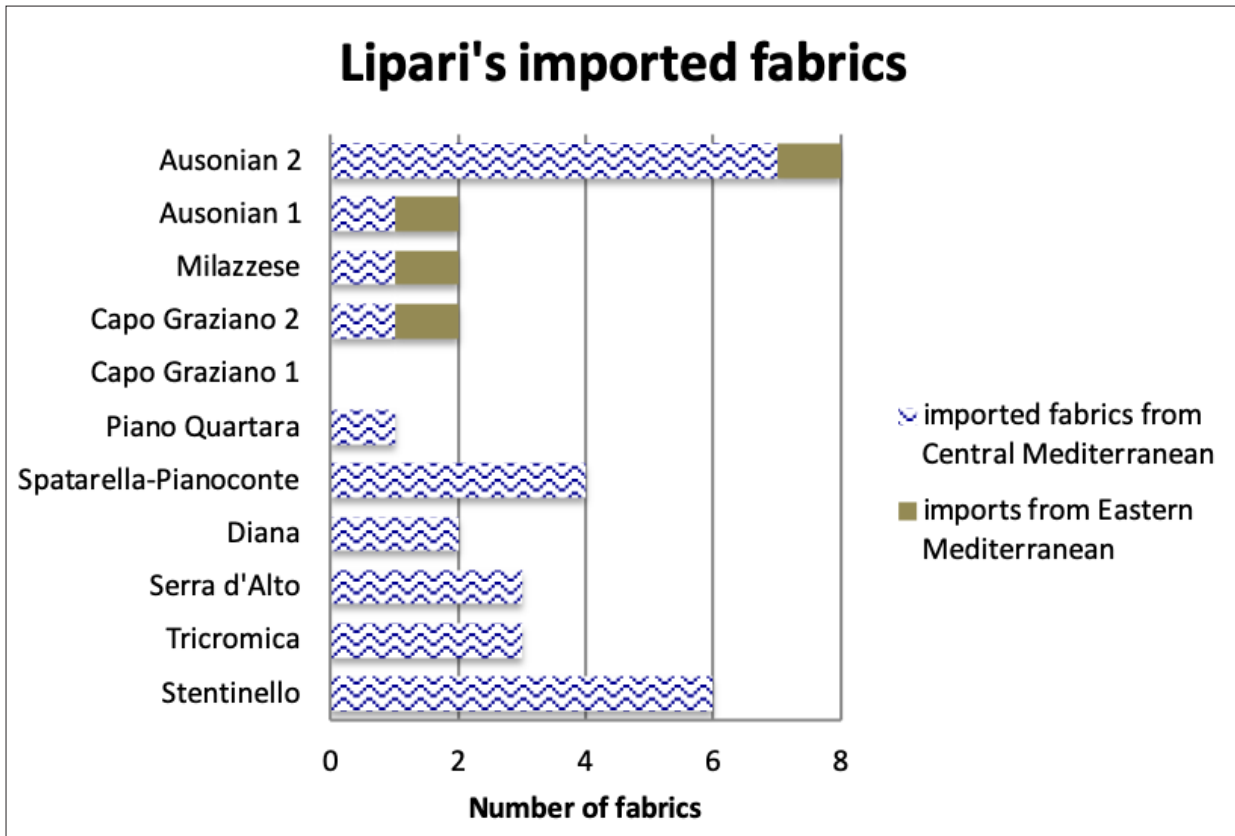


Fig. 9 - Diachronic distributions of fabric imported fabrics at Lipari (for Eastern Mediterranean a single “Peloponneso” Fabric is here considered but other origins were likely present, see Jones *et al.* 2014).

Distribuzioni diacroniche di impasti importati a Lipari (per il Mediterraneo orientale è conteggiato un solo impasto “Peloponneso” ma verosimilmente erano presenti altre provenienze, vedi Jones et al. 2014).

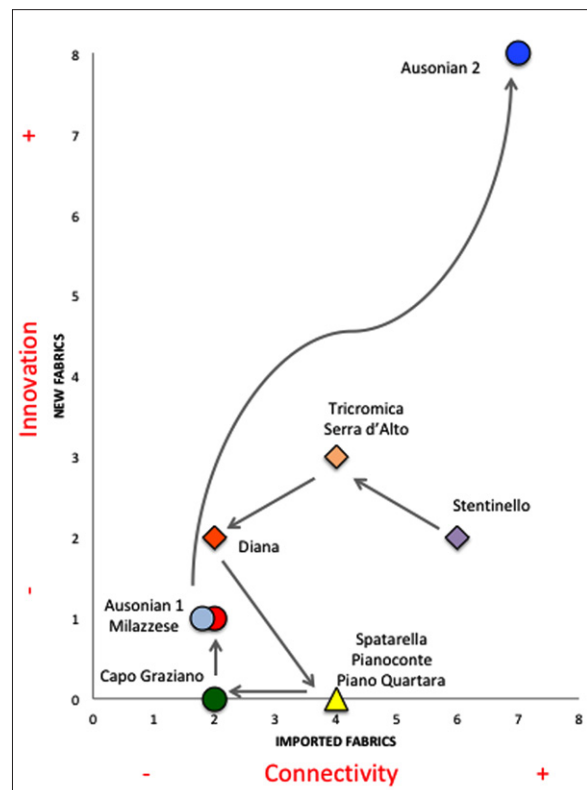


Fig. 10 - Innovation (new fabrics), connectivity (imported fabrics) at Lipari in the various phases, from Stentinello to Ausonian 2 (for the chronological sequence see table 1).

Innovazione (nuovi impasti), connettività (impasti importati) a Lipari nelle diverse fasi, da Stentinello all'Ausonio 2 (per la sequenza cronologica vedi tab. 1).

circulation patterns is here summarized in a long *durée* perspective of historical reconstruction.

Early and Middle Neolithic (Stentinello, Tricromica, Serra d'Alto)

The first phases of the occupation are characterized by a progressive increasing population; pottery production was based on a domestic/domestic workshop social organization and characterized by the stabilization of Fabric ED101. High numbers of imported vessels are recorded in the earliest stages: Early Neolithic *Impasto* pottery of the Stentinello phase indicates connections with peninsular Italy and similar associations may be assumed for the Middle Neolithic Tricromica and Serra d'Alto highly refined painted pottery.

Late Neolithic (Diana)

The Late Neolithic corresponds to a phase of increasing population with a more extensive occupation. This phase coincides with the maximum exploitation and circulation of obsidian but in contrast has the least number of imported vessels. Whilst copper metallurgy was not part of the local material culture until the Chalcolithic and that the presence of copper in the late Neolithic of Lipari has been rejected by recent research (Martinelli *et al.* 2016) it is not inconceivable that an innovative wave of activity could have affected Lipari in much the same way as other Mediterranean areas were influenced by a parallel upsurge in creativity occasioned by the discovery of metallurgy.

The skill and versatility of the local potters is demonstrated by the use of specific and finer raw materials to produce a range of red monochrome burnished Diana wares, a specialized production probably linked to domestic workshop organization. This stage may be considered as an experimental phase exercising new techniques of firing pottery under more controlled oxidizing conditions to produce a monochrome red burnished ware with new fabrics (EA102, ED103).

Chalcolithic (Spatarella, Pianoconte, Piano Quartara)

The territorial and demographic crisis of the Chalcolithic possibly linked to volcanic activities and the decreased importance of the obsidian is marked also by the diminished creativity of the potters with the resume of the "classic" Fabric ED101. Imported pottery, mainly of painted

wares, indicate a degree of positive connectivity during the Pianoconte phase.

Early and Middle Bronze Age (Capo Graziano, Milazzese)

The Bronze Age introduces a new cultural cycle characterized by the repopulation of the island and new Mediterranean connections, but contrarily, potters at Lipari remain conservative in their production technology.

Lipari was among the first recipient of Aegean and Mycenaean wares dated LH I-III (Bettelli *et al.* 2016; Bettelli-Borgna-Levi 2018; Martinelli-Levi-Bettelli *in press*) and Cypriot pithoi are attested at Portella in Salina (Levi-Cannavò-Brunelli 2019).

The Middle Bronze Age 1-2 (Capo Graziano) phase marks the most complete occupation of the archipelago with six of the islands inhabited. The pottery has formal typological traits which are specific to the Aeolian Islands and may be ascribed as synonymous of cultural identity. Production centers are also attested at Filicudi, Stromboli and Salina, identified by a different series of effusive compositions which are confirmed by in-situ mineral chemical microanalyses (Brunelli *et al.* 2013; Levi-Cannavò-Brunelli 2019) that reflect the general magnetic characteristics of each island (Peccerillo 2017 and references therein). The plurality of the production centers may also be observed in the different decorative styles (Levi *et al.* 2014b).

The succeeding Middle Bronze Age 3 (Milazzese) is considered a phase of innovations in several aspects of material culture (including architecture) and it is particularly evident in the range of pottery forms and decorative motifs. The new style appears to be heavily influenced from Sicily and southern Calabria although is characterized by some local indigenous characteristics. The typical peninsular Apennine pottery is both imported and locally made with imported clay. This ware is more abundant in Panarea and Salina than in Lipari and the spatial distribution analysis inside the villages demonstrated that specific 'foreign' wares are concentrated in some huts suggesting some form of social hierarchy (Martinelli 2012).

Recent and Late Bronze Age (Ausonian)

During the Recent and Final Late Bronze Age only the Acropolis of Lipari is inhabited in the whole Archipelago. An increase in population centered on the Acropolis must be counterbal-

anced by the political and social unrest of the period. Whilst the typical ED101 production continues, the native pottery industry is dominated by the use of imported clays which in Ausonian 1 accounts for a single fabric but in the succeeding Ausonian 2 develops a series of new fabrics. With the expanded range of fabrics new ceramic forms are devised and more advanced technological innovations applied, particularly with the introduction of the wheel. New techniques also presuppose fundamental changes in social organization that suggest a more centralized organization in the production of pottery. The phase sees an increase in imported wares with, for the first time, the presence of Nuragic pottery from Sardinia.

The Recent Bronze Age (Ausonian 1) is, again, a period of abrupt changes in pottery style: the local repertoire is completely oriented towards peninsular Italy, with shapes and decorations heavily influenced by the Subapennine facies. It has been suggested that the islands were occupied by people from a peninsular Italian provenance as a possible reaction to the previous Sicilian “political” influence (Bernabò Brea and Cavalier 1980). It is in the Ausonian I phase that the new EDq102 fabric is introduced which ultimately supersedes the original Fabric ED101 to become the most important domestic pottery production composition.

In the Final Bronze Age (Ausonian 2) the continuity in the production of the *Impasto* pottery repertoire is maintained utilizing both EDq102 and ED101 fabrics, however, the archaeological excavations in the Acropolis suggested an abrupt break between the two phases manifested in the destruction of the Ausonian 1 village and the evidence of a massive conflagration which is generally interpreted as amounting to a second wave of “invasion” from the peninsular region (Bernabò Brea and Cavalier 1980: 710-719). The discontinuity is reflected in the introduction of a new series of fabrics all utilizing imported clay for their production but containing local volcanic fillers. Included in this category are the Painted S.I. Protogeometric and Piumata wares (typical products of Peninsular Italy and Sicily) which suggest the existence of separate production networks from that of the traditional *Impasto* ware, possibly intimately associated with the wider geographical compass for the two wares.

The Greek historian Diodorus Siculus (V 9.4), when referring at the moment of the Greek foundation of Lipara (580/576 BCE), described the local

community reduced to 500 people, so the Greek people were welcomed amicably and persuaded by the natives to settle. On the contrary, according to the geographer Pausanias (X-11, 4), at that time the islands called Aeolus were not inhabited. The archaeological record indicates that after the Ausonian village on the Acropolis was devastated the island has been left virtually uninhabited. Life was brought back to the island when it was colonized by Cnidian and Rhodian immigrants, opening a new cycle after the 5.000 years odyssey of its pre and protohistoric cultural history.

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