

The Effects of Geomorphologic Changes on the Ancient Western Anatolian Coastal Civilizations since Last Glacial Age Ahmet Murat ALYAZ(1), Mehmet BEZDAN(2), Günay ÇİFÇİ(1), Mustafa ERGUN(1)

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INTRODUCTION	Whe
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The Aegean is the sea that is surrounded between the coasts of mainland Greece, the coasts of western	500 peri were fou
Turkey and Crete. The current geomorphological condition of the Aegean is the result of three main parameters:	Praying
the tectonism, the volcanic activity and the eustatism (i.e. the rise and fall of the sea level). The history of the	Mother
Aegean begins about 35 million years ago, when, during Oligocene, land emerged from the sea for the first	
The eustatic moves, i.e. the rise and fall of the sea level, due to the alternation of the glacial and interglacial nericed events of the land eve	Figure 1. T
periods, were causing expansion or reduction of the land areas and change of the land connections between them. Finally, during the Holocene, with the end of the last glacial period, the sea level rises and the Aegean	
region gradually acquires its current geography. The Eastern Aegean islands are cut off from Asia Minor and the	40°4'30"N
Cyclades islands are permanently isolated from one another.	40 4 00 N
There are two distinct types of continental shelves surrounding the Aegean Sea: (i) narrow (1-10 km) and (ii)	
broad (25-95 km) shelves. The shelf break in narrow shelves is primarily controlled by major bounding faults	
and generally occurs between 130 and 150 m with very steep slopes (up to 1:20) leading into deep basins. In	
most regions between the islands there is no clear shelf-break and the morphology of the sea-floor exhibits linear shore-parallel troughs. The broad shelves occur predominantly along the eastern and northern Aegean	
Sea. Except for the outlet of the Dardanelles, all are found seaward of major present-day deltas. The shelf-break	
in broad shelves occurs between 95 and 120 m water depth and denotes the topset to foreset transitions of	
deltas prograded during the end of last glacial period, immediately prior to Holocene transgression.	
Büyük Menderes, Küçük Menderes, Gediz, Bakırçay and Karamenderes are the important delta plains and	
they have significant effects on geomorphologic changes during the geological period in western Aegean	
Shoreline.On these deltas there are ancient towns such as: from south to nortks, Mileteus, Ephesus, Smirna,	39°59'0"N
Pergamon and Troia. In addition to, several major rivers discharge into the Aegean Sea, such as Meriç, Nestos, Strimon, Axios and Pinios discharge in the north and Karamenderes (Scamander), Bakırçay (Kaikos), Gediz	00 00 U N
(Hermos), Büyük Menderes (Maiandros) and Küçük Menderes (Kaystros) in the east.	
It should be noted that a rising sea level would occasionally inundate an area of low gradient such as the	
Aegean Sea, creating massively extensive new marshlands and new environments which could support	
adapting coastal and aquatic life styles. Populations certainly moved and adapted in response to such change	
of climate and sea level and there is a need for significant further research to track these movements. In order to	
understand where people could live and hunt or forage in these at different dates and different stages of the glacial-deglacial cycles, we need to analyze the details of sea level change and ice cap limits through time.	
Therefore the people of Luwi must have lived in the areas of valleys and lowlands during the ice-age	
(because sea-level was at least 120-130 m lower then the present day even much lower for the Sea of Marmara,	
Black Sea and Caspian Sea). With the rise of sea-level all these must have migrated to uplands naturally. During	
the ice-age all the eastern Aegean islands were connected to the mainland Anatolia. All the towns of these	20°52'20"N
islands face towards to the mainland Anatolia. With these thoughts the people of these lowlands must have the	39°53'30"N
same culture and basic language (i.e Luwi). Therefore Luwi people must be from this region not being migrated	
from Europe because during and just the end of the ice-age the northern areas were covered with intensive ice	
therefore they could not be habitable by human beings.	



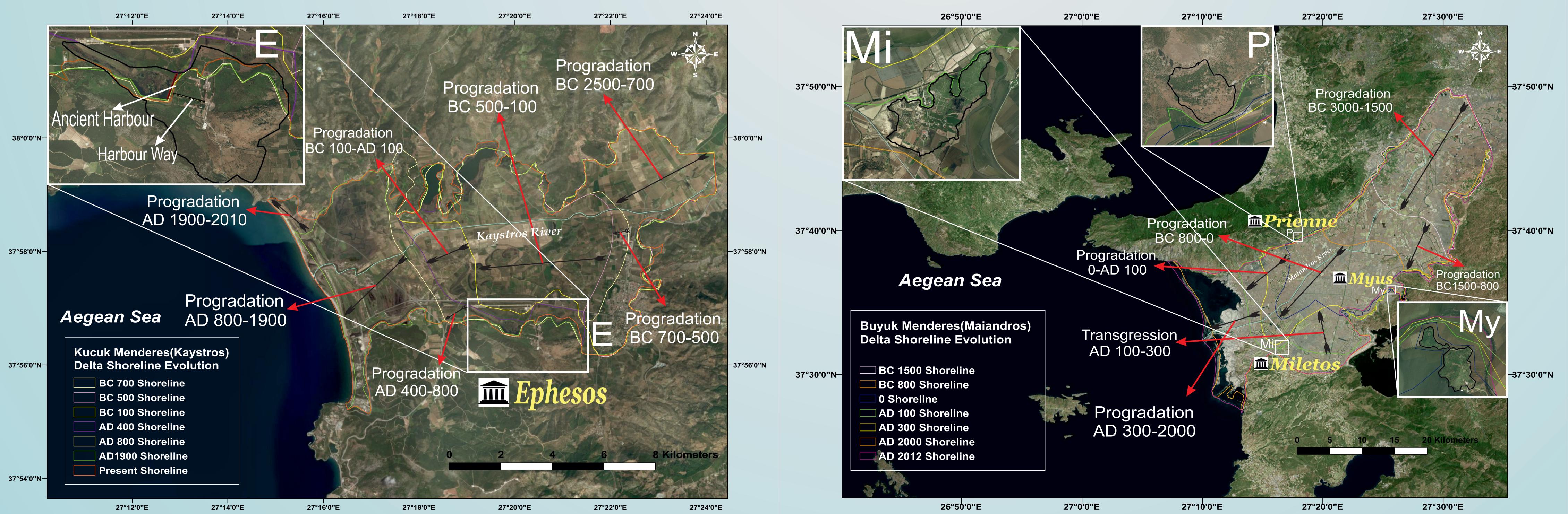
Figure 4. Aegean Graben Structure



Figure 5. Ancient Settlements of Aegean, that have been investigated in Aegean Region

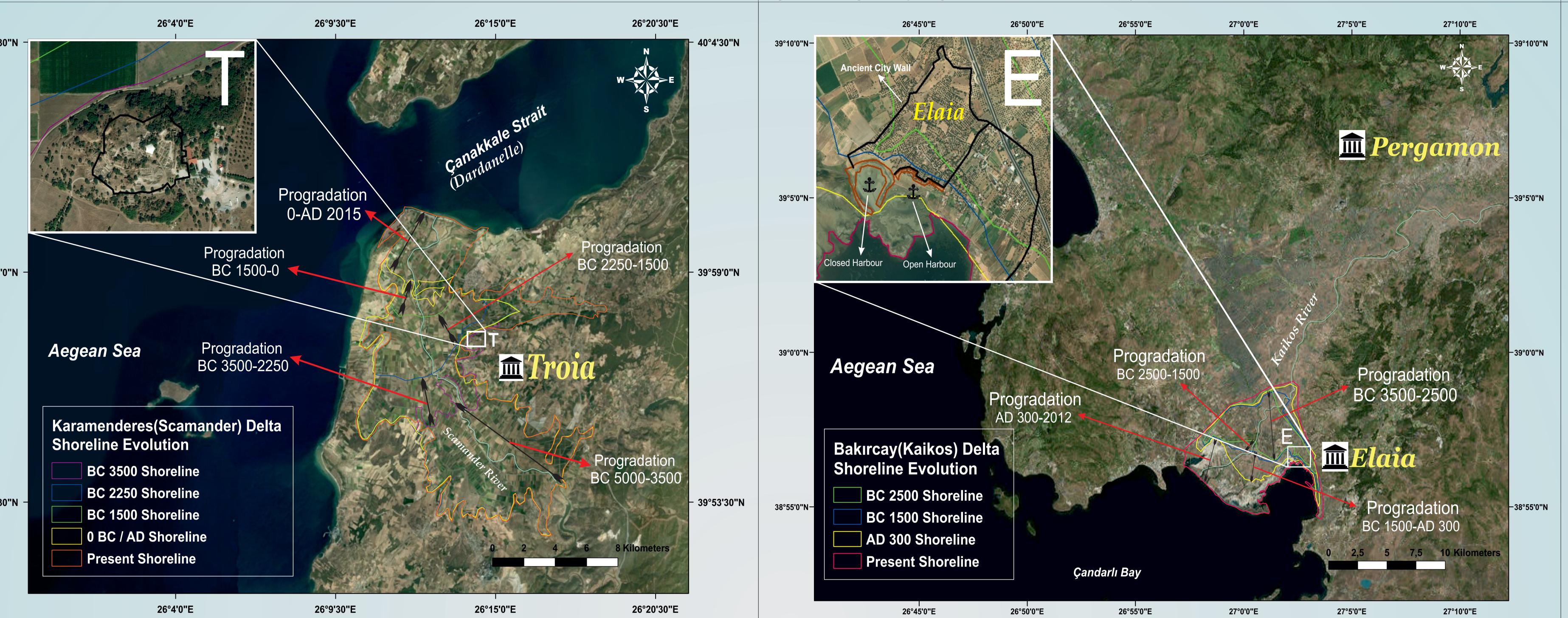
Stretching in a westeeast direction of about 80 km, the Küçük Menderes graben ends in the Aegean Sea approximately 70 km south of Izmir. It is surrounded by the Menderes Massif, a 300 km by 200 km mountain range with elevations up to 2000 m. Ephesos harbour, which is the significant trade center especially in Roman period, has exposed to alluvial deposits brought by Küçük Menderes (Kaystros; in Luwi language Running Stream) River. It has lost their importance due to ongoing the deltaic progradation. Now, it is far from the sea about 7 km. The name of Ephesus comes from the Luwi languge: Apa-Assa (Water City).

Figure 6. The geomorpholigical evolution of the Küçük Menderes Delta since 2500 BC



The extention of Gediz Graben started in the late Miocene and is characterized by numerous east-west trending This map shows the changes of shoreline and the progradation of the delta due to the alluvial deposits which has en sea-level rise slowed and stopped about 6000 BP in Karamenderes (Scamander) plain, alluvial aggradation and grabens that are bounded by active normal faults. The graben and the intervening horst control the west flowing progradation began to dominate coastal processes. Barrier-lagoons were not usual in the inner parts of the brought by the Bakırçay (Kaikos) River where it is located in Bakırçay Delta plain, in western Anatolian between BC 2500 drainage systems of western Anatolia. Izmir Bay, an active graben itself, is situated at the western end of the Gediz graben ressive embayments. This implies a river dominating deltaic progradation about 7000-5000 yr ago at the maximum and present. At the present day, Elaia Harbour that was a very important port during its period, stayed underwater by the ression of the sea into the river valleys. Troia city, geographically very convenient location, from BC 3000 up to AD rising of the waters due to the changes in sea level. During Hellenistic and Roman times, Elaia, the harbour city of ancient in which the Gediz river flows. The name of this river is Hermos in latin and Errmos in Greek. The derivation of this word is Pergamon, was an important place of trade and traffic at the western coast of Asia Minor. Elaia is a word of Helen, from Swa-Ma-Arda (Sacred Mother Goddess River) later it was turned to Smardos (rhen to Ermos in Greek). The Gediz ermanent settlements have been seen. After the excavations, 10 different urban strata and more than 50 buildings Graben plains had hosted many ancient civilizations during the ages. For example, Symrna, with the conclusions of ten meaning "olive grove". However, a name actually derived from the word "Ela" in the name of Elaia may have been ound here. Troia word means: (A)dr(a)-uwa- (a)da = Druwada (or Truwada) meaning a place having Adra(Husband) uninterrupted settlements dating from the 11th to the 4th century BC, has been a center of commercial and political introduced in the name of Helen, for example, "Passage, throat" from Luwi, just like "Ela-uwa". And Pargag in Luwi Language. Besides, Scamander(Karamenderes) word means; Ska(Peninsula)-Ma-Andra-Arda (Peninsul activity for 3 centuries beginning with the 7th century BC. In addition to, Phokaia is one of the 12 Ionian cities and is Goddess Husband's River) in Luwi Language. (u)ma=Pargama word means: High Place People in Luwi Language. located to the north of Ionia. The meaning of Smyrna (İzmir) word comes from: S(wa)-M(a)- ur(a)-(wa)na in Luwi Language. Also it means: Sacred Mother Goddess Country in English.

The geomorpholigical evolution of the Karamenderes Delta since 3500 BC



This map shows the changes of shoreline and the progradation of the delta due to the alluvial deposits which has brought by the Büyük Menderes(Maiandros) River, located in the Büyük Menderes Graben between BC 1500 and present. Between AD 300 and AD 100, the transgression have occured depend on sea-level changes. And the shoreline had gone to the backwards until Myus almost 7.8 km in the southwestern of graben. Miletos, Prienne and Myus ancient settlements have been affected by sediments of the Büyük Menderes River. According to results of offshore surveys, the Büyü Menderes River formed four superimposed deltas, or a delta complex with four deltas in the Aegean Sea during the Last Pleistocene, the new or occurring just after the Last Glacial period. The Miletos word means MILANWANDA (M(a)-ila wanda in Luwi language). Mother Goddess praying passage place in English at the same time. The name of Prienne is: Pria (Castle)-Wana (Place).

Figure 2. The geomorpholigical evolution of the Bakırçay Delta since 2500 BC

Figure 7. The geomorpholigical evolution of the Büyük Menderes Delta since 3000 BC



Figure 3. The geomorpholigical evolution of the Gediz Delta since 6000 BC



GENERAL REMARKS

The current geomorphological condition of the Aegean is the result of three main parameters: the tectonism, the volcanic activity and the eustatism (i.e. the rise and fall of the sea level). The eustatic moves, i.e. the rise and fall of the sea level, due to the alternation of the glacial and interglacial periods, were causing expansion or reduction of the land areas and change of the land connections between them. The broad shelves occur predominantly along the eastern and northern Aegean Sea. Except for the outlet of the Dardanelles, all are found seaward of major present-day deltas. The shelf-break in broad shelves occurs between 95 and 120 m water depth and denotes the topset to foreset transitions of deltas prograded during the end of last glacial period, immediately prior to Holocene transgression. Büyük Menderes, Küçük Menderes, Gediz, Bakırçay and Karamenderes are the important delta plains and they have significant effects on geomorphologic changes during the geological period in western Aegean Shoreline. On these deltas there are ancient towns such as: from south to norths, Mileteus, Ephesus, Smirna, Pergamon and Troia. All the original names of all these rivers and cities are derived from the oldest Anatolian language of Luwi.

It should be noted that a rising sea level would occasionally inundate an area of low gradient such as the Aegean Sea, creating massively extensive new marshlands and new environments which could support adapting coastal and aquatic life styles. Populations certainly moved and adapted in response to such change of climate and sea level and there is a need for significant further research to track these movements.

Therefore the people of Luwi must have lived in the areas of valleys and lowlands during the ice-age (because sea-level was at least 120-130 m lower then the present day even much lower for the Sea of Marmara, Black Sea and Caspian Sea). With the rise of sea-level all these must have migrated to uplands naturally. During the ice-age all the eastern Aegean islands were connected to the mainland Anatolia. All the towns of these islands face towards to the mainland Anatolia. With these thoughts the people of these lowlands must have the same culture and basic language (i.e Luwi). Therefore the Luwi people must be from this region not being migrated from Europe because during and just the end of the ice-age the northern areas were covered with intensive ice therefore they could not be habitable by human beings.

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