

Geomorphological and Sedimentological Setting of the Filiouris River Wave Dominated Delta

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Extended Abstract

The aim of the present research is to study the sedimentological record of fluvial and coastal landforms of the Filiouris River wave dominated delta plain, during Holocene. Filiouris River crosses the Rhodope plain and flows into Thracian sea (North Aegean), southwards the Komotini City, creating a deltaic plain. Concerning its geological setting, Filiouris is located at the Thracian basin which is one of the widest basins of North Aegean created on the Rhodope geotectonic Massif, Strandja and Sakarva Massifs (Mountrakis, 2010). The Neogene and Quaternary sediments, 1-2 km thick, cover the lower part of Filiouris River basin. Sampling took place on the west side of the Filiouris River plain, between the coastline and Mitrikos Lake. A total of 12 samples were collected and stored in plastic bags (Figure 1). The sampling positions were conducted by portable GPS device. The map was produced using ArcGIS software, the topographical map from Hellenic Military Geographical Service (H.M.G.S.) and the geological map from I.G.M.E. The sediment samples were analyzed in the Physical Geography Lab of Aristotle University of Thessaloniki. Each sample was dried at 90° C and weighted using a precision balance. Organic matter was removed from all the samples using H₂O₂ (10%) and then particle size analysis was performed. Eight samples were sieved for the fractions of particles -2.00 phi to 4.00 phi (Table 1) while four fine grained samples were analyzed by the use of the pipette method (Table 2)(Folk, 1974). Grain size statistical analysis was performed using GRADISTAT Version 8.0 (Blott, 2010) software and the triangular graphs according to Shepard (1954), Folk (1956) and Folk et al. (1970).

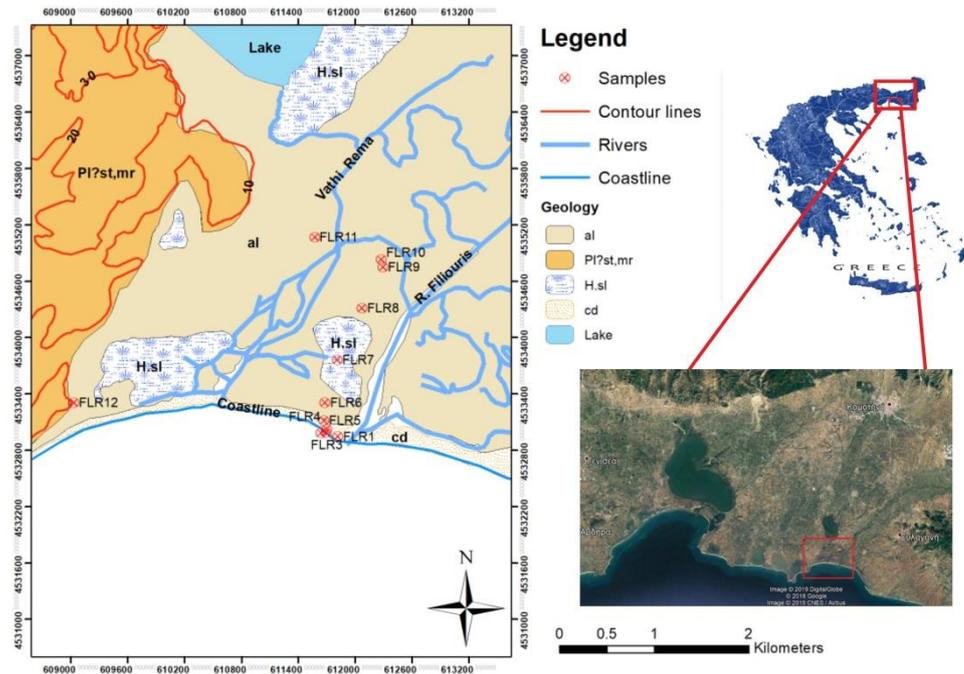


Figure 1. Geomorphological map based on IGME map Xilagani, 1:50,000, Datum: D_GGRS_1987, GRS_1980 and sampling locations.

Table 1. Summary of Grain size analysis results by sieving method.

Sample Name	M	σ	sk	k	Type
FLR1	1,251	0,615	-0,175	0,986	Medium Sand-Moderately Well Sorted
FLR2	0,981	0,547	0,120	1,155	Coarse Sand- Moderately Well Sorted
FLR3	1,255	0,685	0,027	0,949	Medium Sand-Moderately Well Sorted
FLR4	2,043	0,526	-0,035	1,053	Fine Sand-Moderately Well Sorted
FLR5	2,198	0,458	0,027	1,022	Fine Sand-Well Sorted
FLR6	1,311	0,701	-0,084	1,071	Medium Sand-Moderately Sorted
FLR8	1,910	0,517	0,154	1,135	Medium Sand-Moderately Well Sorted
FLR11	1,118	0,721	-0,005	1,180	Medium Sand-Moderately Sorted

Table 2. Summary of Grain size analysis results by pipette method.

Sample Name	Sand	Silt	Clay	Type
FLR7	77,8%	10,9%	11,3%	Muddy Sand
FLR9	74,4%	12,4%	13,2%	Muddy Sand
FLR10	7,2%	40,7%	52%	Mud
FLR 12	59,7%	28,1%	12,2%	Silty Sand

According to the grain size analysis (Table 1 & 2), samples FLR1, FLR2, FLR3 have been deposited in a current coastal depositional environment and they are supermature sediments. Sample FLR4 indicates a transition from coastal to mainly Aeolian depositional environment. Sample FLR5 has an aeolian origin and indicates the present day coastal dune formation. Sample FLR6 was collected further northwards. However, it has similar sedimentary characteristics with samples FLR1, FLR2 and FLR3 and it could be assumed as coastal. Sample FLR7 consists of silty clayey fine-grained sand (77.8%). The sample has been collected from a small temporary marsh of Filiouris Plain. The high content in fine-grained sand is probably indicative of a former dune environment. The high content of silt and clay has been apparently reinforced because of the current marshy environment. Sample FLR8 has similar sedimentological and macroscopic characteristics with FLR4. Sample FLR9 consists mainly of fine-grained sand (74.40%) with silt and clay, while sample FLR10 is mostly silty clay and indicative of a marshy environment. It is very likely that the origin of these two samples is highly related to the fluvial action of the Filiouris River in the vicinity of the old river channel before human intervention. Sampling position of FLR11 sample is the most remote in relation with the present day coastline. Despite the long distance from the coastline, its sedimentological characteristics and the presence of marine mollusks indicates coastal sediment. Finally, the sample FLR12 consists of silty sand and there is a correlation established not only by the presence of the adjacent marshy environment but also by the pre-existing river deposition.

From the sedimentological characteristics of the sampling locations, we can conclude that there is a succession of coastal and aeolian depositional environments from South to North. The former coastline was located on the area of sample's FLR11 location and was gradually shifted towards its current location (coastline). Regarding their positions, the sediments are very well sorted indicating a wave reworking process. Additionally, it indicates a step forward delta progradation. The coastline of Filiouris River is a wave dominated deltaic coast with a succession of coastal and aeolian landforms.

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