CONTINENT - OCEAN COLLISION AND THE ACTIVE DEFORMATION OF THE WESTERN HELLENIDES

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An onshore-offshore seismic survey performed in 1994 across three transects, from the deep Ionian sea to the western Hellenides, revealed that the crust and lithosphere offshore western Greece is of oceanic origin. The sediments have a thickness of 8 to 10 km while the crust below them is only 5 to 6 km thick, and the lithosphere does not exceed 25 km thickness. The deformation below the Hellenides is very intense and compressional processes have uplifted limestones of high velocity and density above softer sediments and Mesozoic anhydrites. Thickness of the post-Miocene sedimentation is very unevenly distributed over the entire area and strongly depends on the intensity of the horizontal deformation. Compression has forced the sedimentary sequences to glide over each other causing horizontal shortening of 40 to 50 km in places. The compressional processes are not developing in a uniform manner along the compressional axis and show strong lateral variations. The Mesozoic sediments have been strongly deformed and hydrocarbons associated with the early development of the Mesozoic basins must have migrated to higher levels of the sedimentary sequence. This process is responsible for oil and gas accumulation at economic depths within the Ionian Zone, and should be expected particularly under flysch covered areas where the flysch is acting as a cap-rock to oil and gas traps.

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COMPARATIVE GEOMORPHOLOGICAL OBSERVATIONS IN THE KALAMAS DELTA IN WESTERN GREECE AND THE SPERKHIOS DELTA IN EASTERN GREECE

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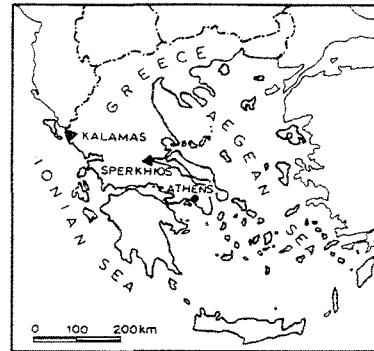
Fig.1. Location of the deltas of the Kalamas and Sperchios rivers in Greece.

The evolution of the deltas of Greece is depended on the areal extent, lithologic composition, slope, orientation, climatic conditions and vegetation cover of their drainage systems which evolve on a young and highly irregular relief owed to recent and intense tectonic activity of the Hellenic region. Their seasonal bedload variations are directly depended upon the unpredictable Mediterranean climate. The receiving basins and sea conditions are other important factors affecting delta growth. This study focuses on two significantly different deltaic environments of Greece, the Kalamas river which empties into the Ionian sea in the West and the Sperkhios river which empties into the semi-enclosed Maliakos gulf in the east (Fig.1). The Kalamas river has formed a cuspate type delta when it debouches from the Pindus mountain range (Fig.2). Its 1826 km² drainage basin has given rise to a 78 km² delta joining a number of former limestone islands to the mainland. The river has changed its course many times filling up the intermediate basins between the islands. Human interference in the form of a low dam at the apex of the delta and an artificial channel with a second mouth have been determinative in the evolution of the delta in recent decades. The sea has covered large parts of the inactive old delta thus destroying cultivated lands and irrigation works. The drainage basin (1780 km²) of the Sperkhios river is located in an East-West trending, elongated, assymetric and active tectonic depression (Fig.3). The river flows East and empties into the relatively calm, shallow, less than 27 metres deep, Maliakos gulf. It has formed a digitate type delta having silted up an area of 104 km² during the last 2500 years. It is characterized by frequent channel changes, the last one having occured about a century ago in the area of Thermopylae. Until recently, the Sperkhios had not been affected by human interference. Today, a dam is being constructed on its major tributary, the Vistritsa.
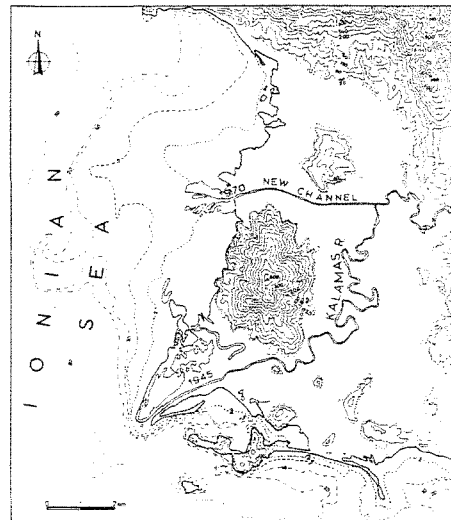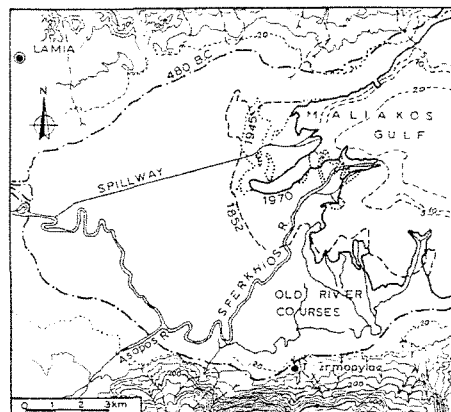

Fig.2 The delta of the river Kalamas.

Fig.3 Deltaic growth of the Sperkhios river from 480 B.C. till 1970.