

THE SOUTH CRETAN FAULT VALLEY SYSTEM: SHALLOW STRUCTURE AND DYNAMIC SEDIMENTATION

ANASTASAKIS,G.,and KELLING,G., HITCH,S.

Department of Geology, University of Keele,Staffs. ST5 5BG.

Abstract:The development and the complicated physiography of the South Cretan Fault Valley System(S.C.F.V.S.) are structurally controlled.Towards the North,Crete provides most of the sediment supply in the form of coarse clastics.Towards the south the system receives additional sediment input from the Ptolemy Mountains and the Gavdos Rise.However the tilting of the floor of the system leads to rapid mixing,so that sediments in the Messara basin are of intermediate type.

Resumé:Le developpement et la physiographie compliquée du Système de Fault Valley de la Crète du Sud(S.C.F.V.S.),ast contrôlé de façon structurée.Par le Nord,la zone est limitée par l'île de Crète,qui produit la majorite des sediments sous la forme de clastiques ayant relativement de gros grains.Par le sud,le Système reçoit des sediments additionnels par les montagnes de Ptolemée et la massif de Gavdos.Neamoins, l'inclinaison du sol du système conduit rapidement vers un melange de ces deux types de sediments, en convergant longitudinalement, et ainsi les sediments accumulés au bassin de Messara sont d' un type intermediaire.

\* \* \* \*

A complex system of submarine canyons, valleys and basins occurs off the south coast of Crete.A well defined depression commences from a line running from in between the small island of Crysi and Ierapetra town in SE. Crete, and widens to the west, leading through a complicated system of basinal areas, passages and canyons to a triangular shaped basin, roughly defined by the 2600m contour and termed the Messara basin.To the west, between the island of Gavdos and the town of Chora Sfakion on the SW. Cretan coast, there is a submarine elevation seperating the heads of two submarine fault valleys, the Paleochora and Sfakia Fault Valleys,leading respectively towards the west into the Gavdos Trench and towards the east into the Paximadia Basin.The Paximadia Basin is defined by the 1400m contour and is connected via

the Paximadia Channel to the Messara Basin.

Essentially the development and the complicated physiography of this E-W trending depositional system are structurally controlled. Towards the north the zone is bounded by the island of Crete, which provides most of the sediment supply in the form of coarse clastics. Small fans developed along the northern major fault line of the S.F.V.S. contain sediment fed directly from Crete and the narrow Cretan shelf through a series of small steep canyons, most of which trend perpendicular to the coast. However, the main E-W trending valley transects the mid and lower fan sectors and contains several "intravalley" basinal areas, converging towards the main Messara Basin. Thus much of the sediment of the suprafans is reworked and longitudinally transported into the deeper basins. In these deeper intrabasinal and main basinal areas the thickness of the Post-Messinian sediments generally exceeds 800m and in places it attains a thickness of more than 1500m.

Towards the south the S.C.F.V.S. receives additional sediment input from the Ptolemy Mountains and the Gavdos Rise. The amount of south derived sediments appears to be controlled primarily by tectonic activity (especially movement on the southern boundary faults of the S.C.F.V.S.) and is envisaged as being episodic rather than continuous. The original nature of this south derived material is less terrigenous than sediment with a Cretan provenance. However, the southwards tilting of the S.C.F.V.S. leads to rapid mixing of these two types of sediment as they are conveyed longitudinally, so that sediments accumulating in the Messara Basin are of intermediate composition.

Piston and gravity cores revealed the existence of a complete series of clastic sequences which are typical of such depositional systems. The most remarkable sequence is that of clean sand and gravel that grades upward into sand and finally sand and silt turbidite units. Coarse sand lenses are also present within the finer sand. The mud interbeds between the coarse grained units are either absent or poorly developed. Such sections are attributed to a channel-related sequence described from other regions of the Mediterranean.