CHARACTER AND DISTRIBUTION OF ECHO-TYPES IN THE NORTHEASTERN IONIAN SEA IN RELATION TO BOTTOM PHYSIOGRAPHY.

by C. PERISSORATIS * and S. ROSSI **

* Institute of Geology and Mineral Exploration, Athens, Greece
** Istituto per la Geologia Marina CNR, Bologna, Italy

Examination of the 3.5 kHz seismic profiles collected by the R/v BANNOCK, during two cruises (1975 and 1982) at the North-Eastern Ionian Sea (Western Hellenic Margin), confirmed the variable morphology and the resulting divergent sedimentation patterns of this area. Furthermore, a correlation was established between the various echo-types and the patterns of sedimentation occurring in correspondence of the physiographic elements in the study area.

The following morphologic elements, shown in Figure 1, were recognized.

The Continental Shelf has a well defined shelf-break occurring at depth ranging from 180 m (off Peloponnesus) to 320 m (off Kerkira).

The Continental Slope is cut by numerous canyons, channels and valleys.

The Kerkira-Kephallinia Valley, lying between the Continental Slope and the Apulian Swell, constitutes a major pathway of sediment movement and transport. The Apulian Swell represents a low-gradient feature which is a prolongation of the Apulian Platform. The islands of Kephallinia and Zakynthos have escarpments that lie East and South of the Apulian Swell and are approximately 8 km in width with an average slope of about 15%. The Kephallinia-Zakynthos Furrow is an elongated depression that lies parallel to the escarpments. Finally, the Hellenic Arc and Trench in this area consists of a number of depressions and highs of variable direction and shape.

According to the reflectivity characteristics of the sea bottom and the sub-bottom reflectors, the various echo-types were grouped into seven major ones that display the distribution shown in Figure 2, as follows:

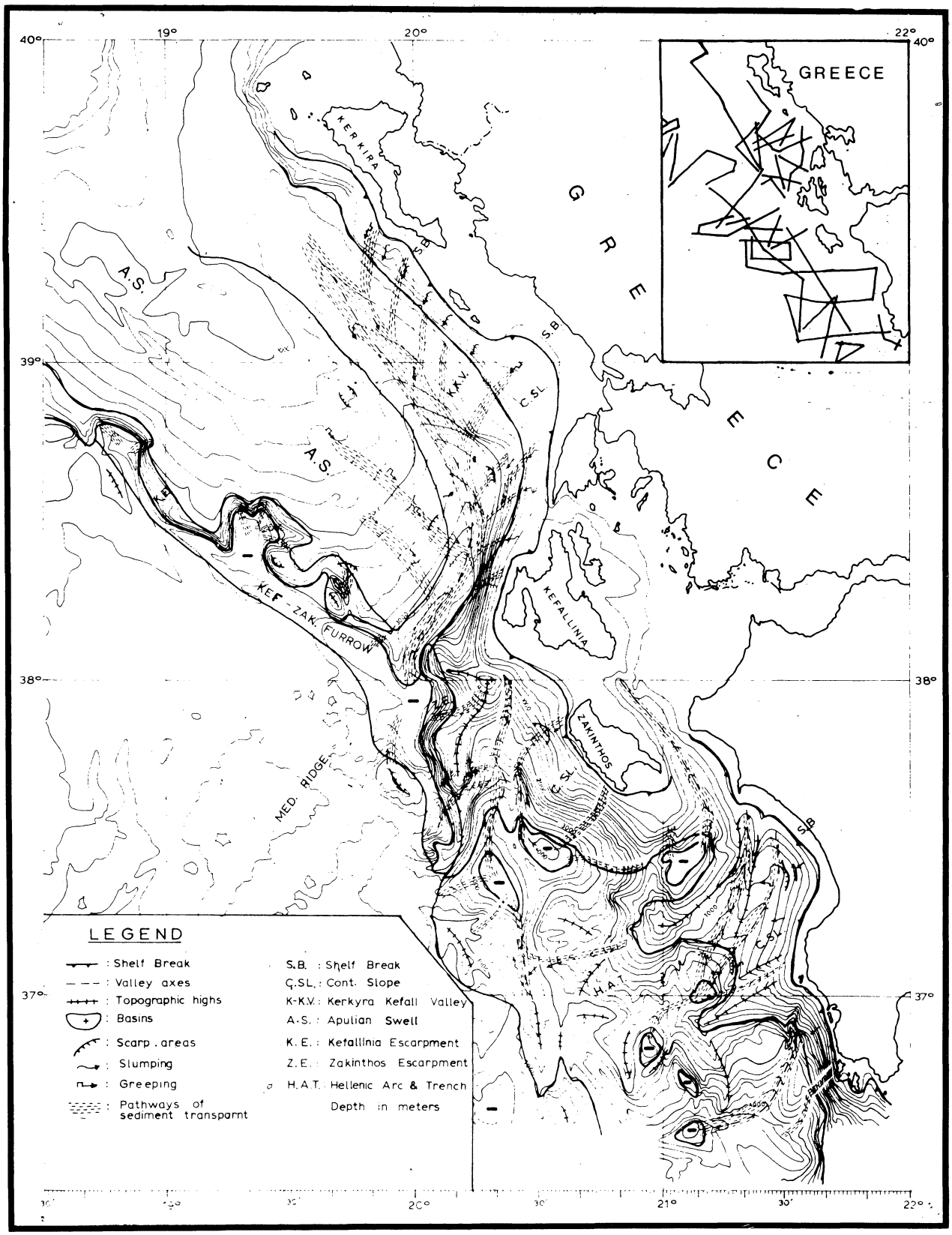
GREECE
KERKIRA
A.S.
S.B.
K.K.V.
C.S.L.
KEF - ZAK. (FURROW)
MED. RIDGE
KEFALLINIA
ZAKINTHOS
Z.E.
H.A.T.
LEGEND
: Shelf Break
: Valley axes
: Topographic highs
: Basins
: Scarp . areas
: Slumping
: Greeping
: Pathways of sediment transparnt
S.B. : Shelf Break
C.S.L. : Cont. Slope
K-K.V. : Kerkyra Kefall Valley
A.S. : Apulian Swell
K.E. : Kefallinia Escarpment
Z.E. : Zakinthos Escarpment
H.A.T. : Hellenic Arc & Trench
Depth in meters

Figure 1

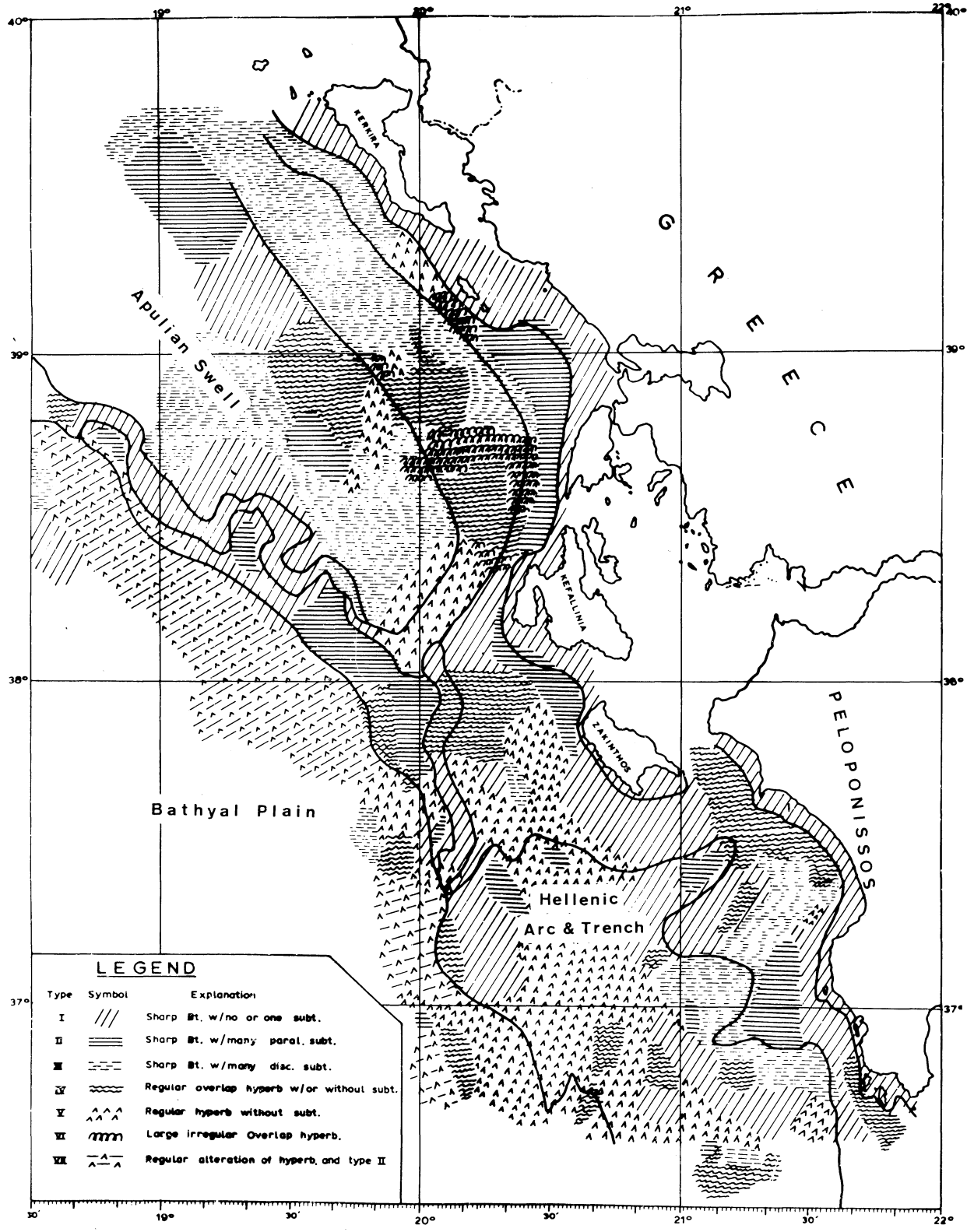
40°
19°
20°
21°
22°
39°
38°
37°
KERKIRA
Apulian Swell
G R E E C E
KEFALLINIA
ZAKINTHOS
PELOPONISSOS
Bathyal Plain
Hellenic
Arc & Trench
LEGEND
Type
Symbol
Explanation
I
Sharp Bt. w/no or one subt.
II
Sharp Bt. w/many paral. subt.
III
Sharp Bt. w/many disc. subt.
IV
Regular overlap hyperb w/or without subt.
V
Regular hyperb without subt.
VI
Large irregular Overlap hyperb.
VII
Regular alteration of hyperb. and type II
30'

Figure 2

Type I : Sharp bottom return with no or one subbottom reflections. It probably indicates presence of coarse-grained or indurated sedimentary layers and occours at the Continental Shelf, at part of the Continental Slope, and at the escarpments.

Type II : Sharp bottom return with numerous parallel continuous subbottom reflections. It shows continuous undisrupted sedimentation, sometimes by distal turbidites, and it occours in all small basins of the Hellenic Arc and Trench, at the upper part of the Continental Slope and at Kephallinia-Zakynthos Furrow.

Type III : Sharp bottom return with intermittent, parallel or not, subbottom reflections. It indicates a greater role in the sediment deposition by turbidites and small scale mass moving processes. It is present at the flanks of the Apulian Swell, the Northern part of the Kerkira - Kephallinia Valley and the lower part of the Continental Slope.

Type IV : Regular overlapped hyperboles sometimes with conformable subbottom reflections. It indicate increased mobility of the sediments and deposition by processes such as sliding, olistolith moving, etc. It is present at the Kerkira-Kephallinia Valley, the lower part of the Continental Slope and, occasionally, at the Hellenic Arc and Trench.

Type V : Regular separate hyperboles with no subbottom reflections. It probably shows deposition by creeping, mass flows, etc., and it is present at the lower part of the Valley, at parts of the Hellenic Arc and Trench, at the Continental Slope and East of the Furrow.

Type VI : Large hyperboles with varying vertex elevation. This is the result of anomalous bottom morphology that occours mainly at the sides of the Kerkira-Kephallinia Valley.

Type VII : Hyperboles with sediment ponding of the Type II. Apparently this is the result of a particular morphology consisting of a succession of small hills and depressions, that occours East of the Kephallinia-Zakynthos Furrow, where the Mediterranean Ridge begins.

Although, as indicated above, the mass movement processes play the most important role in the sedimentation pattern of this area, no large scale scarp areas and mass flows could be outlined as shown in Figure 1. This is attributed to the great morphological diversity of the sea floor so that sediments in nearby areas have different degrees of mobility. On the other hand the sediment masses, during their transportation, bypassing the topographic highs, are distributed irregularly in the numerous valleys and basins of the area.