1. INTRODUCTION[1]

Shipboard Scientific Party[2]

The Tyrrhenian Sea is the small triangular sea surrounded by peninsular Italy, Sicily, Sardinia, and Corsica (Fig. 1). Drilling objectives for Leg 107 of the Ocean Drilling Program considered the Tyrrhenian Sea from three different perspectives: (1) as a landlocked back-arc basin, (2) as a young passive margin, and (3) as a stratigraphic type locality.

In common with other back-arc basins, the Tyrrhenian Sea exhibits a Benioff zone (Gasparini et al., 1982), a calc-alkaline volcanic belt (Barberi et al., 1974; Selli et al., 1977), thinned crust on the margins (Panza et al., 1980), tholeiitic (mid-ocean ridge basalt) volcanism (Barberi et al., 1978; Dietrich et al., 1978) high heat flow (Della Vedova et al., 1984; Hutchinson et al., 1985), and high-amplitude magnetic anomalies (Bolis et al., 1981) (see "The Tyrrhenian Sea Before Leg 107" chapter, this volume.)

The Tyrrhenian Sea contains two small deep basins: the Vavilov Basin and the Marsili Basin (southeasternmost), both floored with thin crust (Steinmetz et al., 1983; Recq et al., 1984; Duschenes et al., 1986). It had been suggested that the two basins differ in age (Moussat, 1983); thus, the Tyrrhenian Sea offered a field area in which to test the hypothesis of expansion of a back-arc basin through seaward migration of the arc and subduction zone (Boccaletti, et al., 1976; Moussat et al., 1985; Malinverno and Ryan, 1986). Furthermore, because the Tyrrhenian is bounded to the northeast and southeast by orogenic belts (see "A Review of Circum-Tyrrhenian Regional Geology" chapter, this volume), interactions between extension and collision could be explored and the basin could be regarded as a model for landlocked back-arc basin evolution.

In common with other passive margins, the western Tyrrhenian Sea is floored by continental crust which has been stretched and thinned by listric faulting (Fabbri et al., 1981; Malinverno et al., 1981; Rehault et al., 1985). A principal goal of drilling on the Tyrrhenian margin was to determine the timing and rate of extension and subsidence during the stretching phase as well as during the stage of oceanic crust emplacement. These questions are more easily addressed in the Tyrrhenian than elsewhere because the passive margin here adjoins a young oceanic basin and has a relatively low sedimentation rate; the pre-rift, syn-rift, and post-rift sediment sections are thus easily accessible to drilling.

Another goal of Leg 107 was to obtain a near-continuous Pliocene-Pleistocene sequence of pelagic sediments. Such a stratigraphic sequence would serve as a deep-sea type section within which biostratigraphy, magnetostratigraphy, tephrochronology, and stable isotope stratigraphies could be correlated. Such a comparative study is essential because the Pliocene-Pleistocene stages were originally defined in land sections around the Tyrrhenian Sea; yet stratigraphic correlations between Mediterranean and open-ocean records remain somewhat ambiguous.

To meet these objectives, the *JOIDES Resolution* drilled a north-northwest to south-southeast transect of seven sites across the passive margin and two deep oceanic-type basins (Fig. 2). More than 3500 m of sediments and hard rocks were drilled in a total of 11 holes. The cruise comprised 45 operational days and 5 days of transit, between 30 December 1985 and 18 February 1986, beginning in Malaga, Spain, and ending in Marseilles, France.

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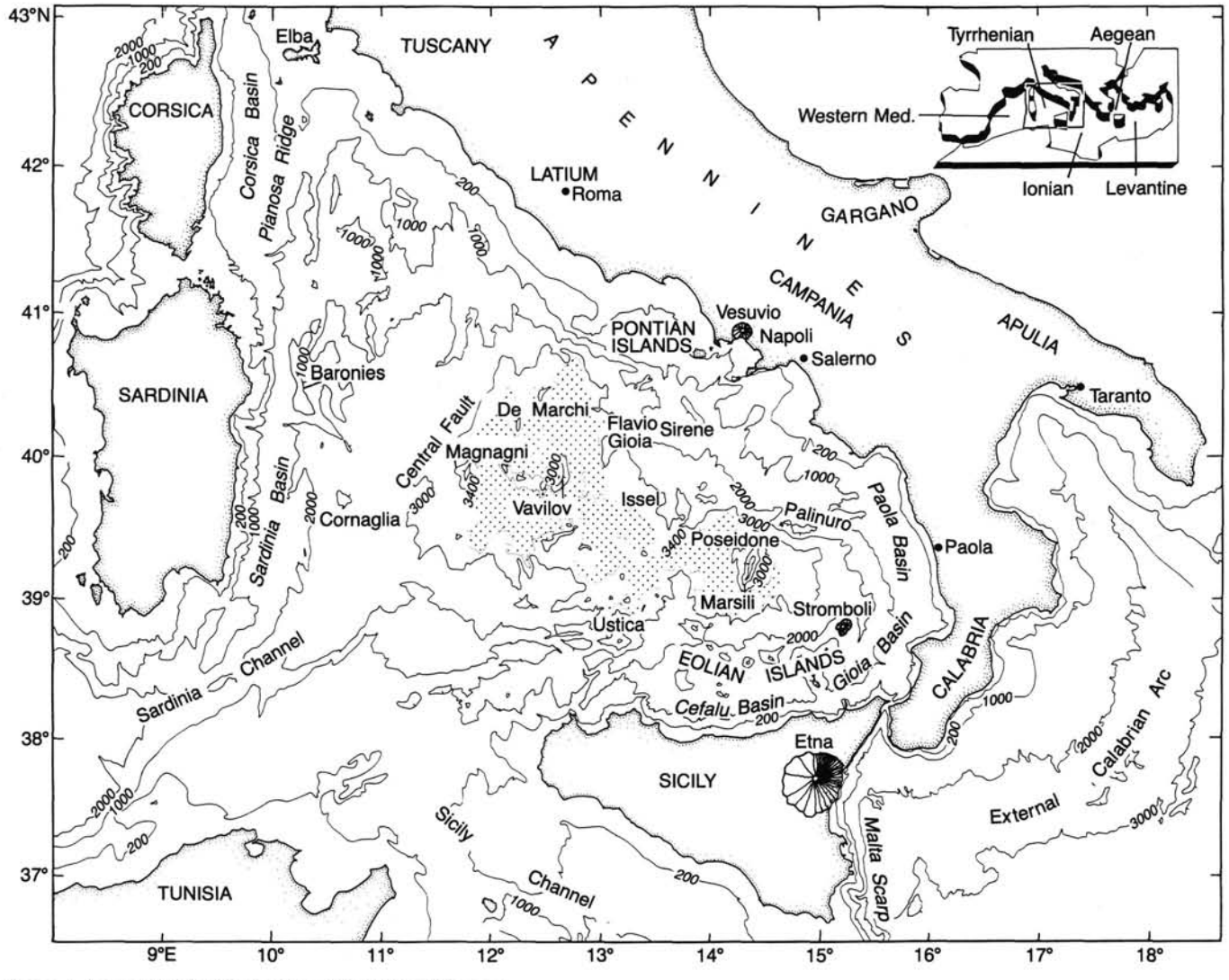

Figure 1. Map of the Tyrrhenian Sea and surrounding areas.

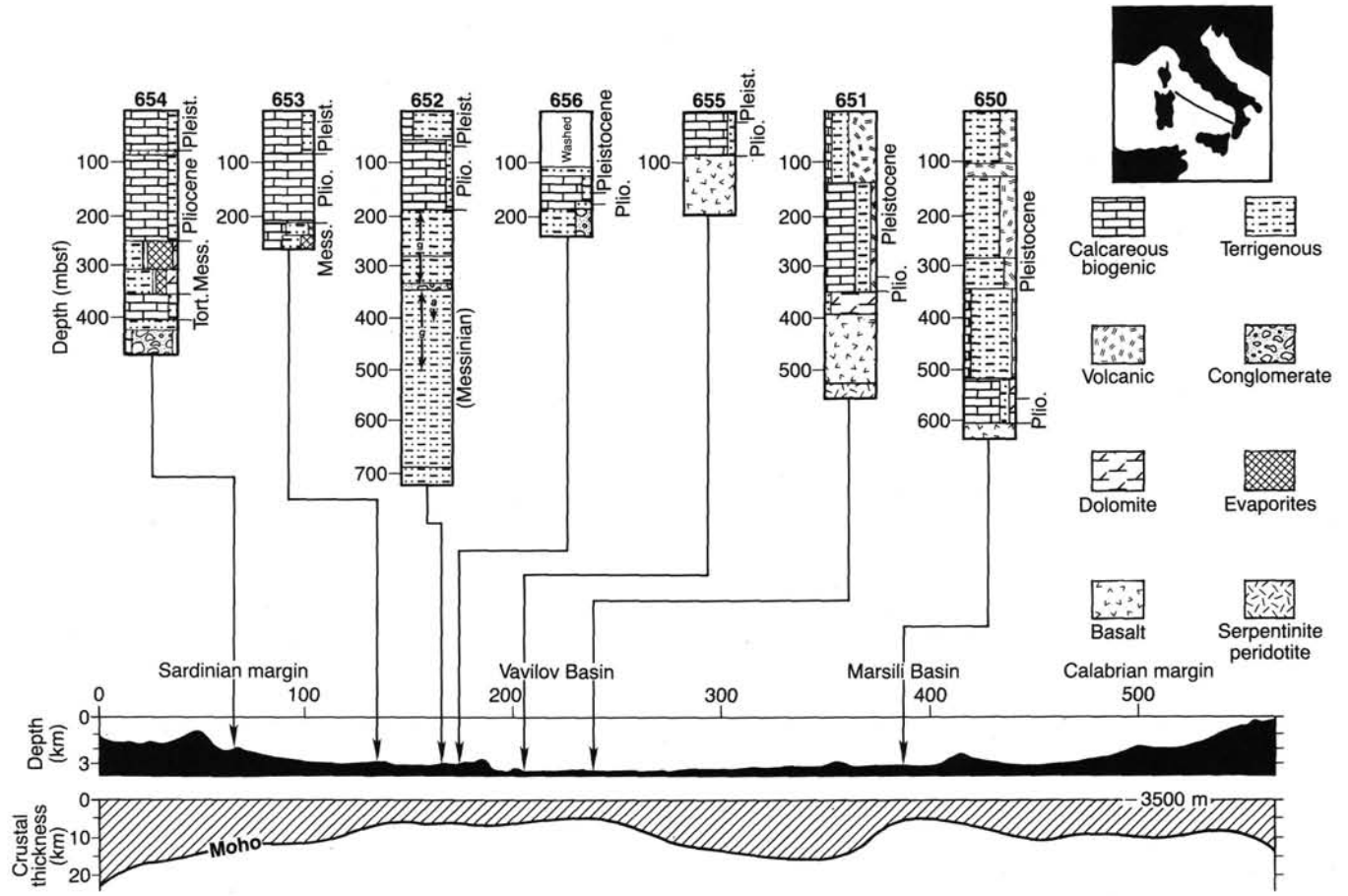

Figure 2. Bathymetric and crustal section across the Tyrrhenian Sea (see location in inset; crustal thickness data after Steinmetz et al., 1983). Simplified stratigraphic columns of Leg 107 drill sites are projected along the transect. a = occurrence of anhydrite; g = occurrence of gypsum.