

PELAGIC SEDIMENTATION IN THE SOUTHERN CALABRIAN RIDGE AND WESTERN  
MEDITERRANEAN RIDGE, EASTERN MEDITERRANEAN

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Cores from plateaus, lying some 150-200 m above basin floors in areas of strong vertical relief visited during the "Cobblestone Project", consist entirely of pelagic sediments, with marls representing the dominant lithology, sapropels and tephra minor lithologies. All the plateau cores were calibrated biostratigraphically, and correlated by means of isochronous lithologies, such as sapropels (Cita et al., 1977) and tephra layers (Keller et al., 1978) with Core RC9-181 from the Mediterranean Ridge south of Crete (Vergnaud-Grazzini et al., 1977; Cita and Ryan, 1978). Core 29 from the western Mediterranean Ridge (Cobblestone Area 3) and Core 45 from the southern Calabrian Ridge (Cobblestone Area 4) were selected as type-sections and investigated quantitatively in terms of grain-size, carbonate content, and quantitative micropaleontology. Also studied with the same procedures was Core 6, selected as reference section for Area 4 (see Figure 1).

Faunal curves based on percentage abundance of selected species of planktonic foraminifers correlate precisely in the three cores, which extend back in time down to approximately 185000 y for Area 4, to 430000 y for Area 3.

The highest temperature in surficial waters, as expressed by the composition of the foraminiferal faunas is recorded in all three type- and reference sections at the base of an interval correlative to isotopic stage 5e (about 125000 y BP) and to zonal boundary X/W of Ericson and Wollin (1968) within sapropel S-5.

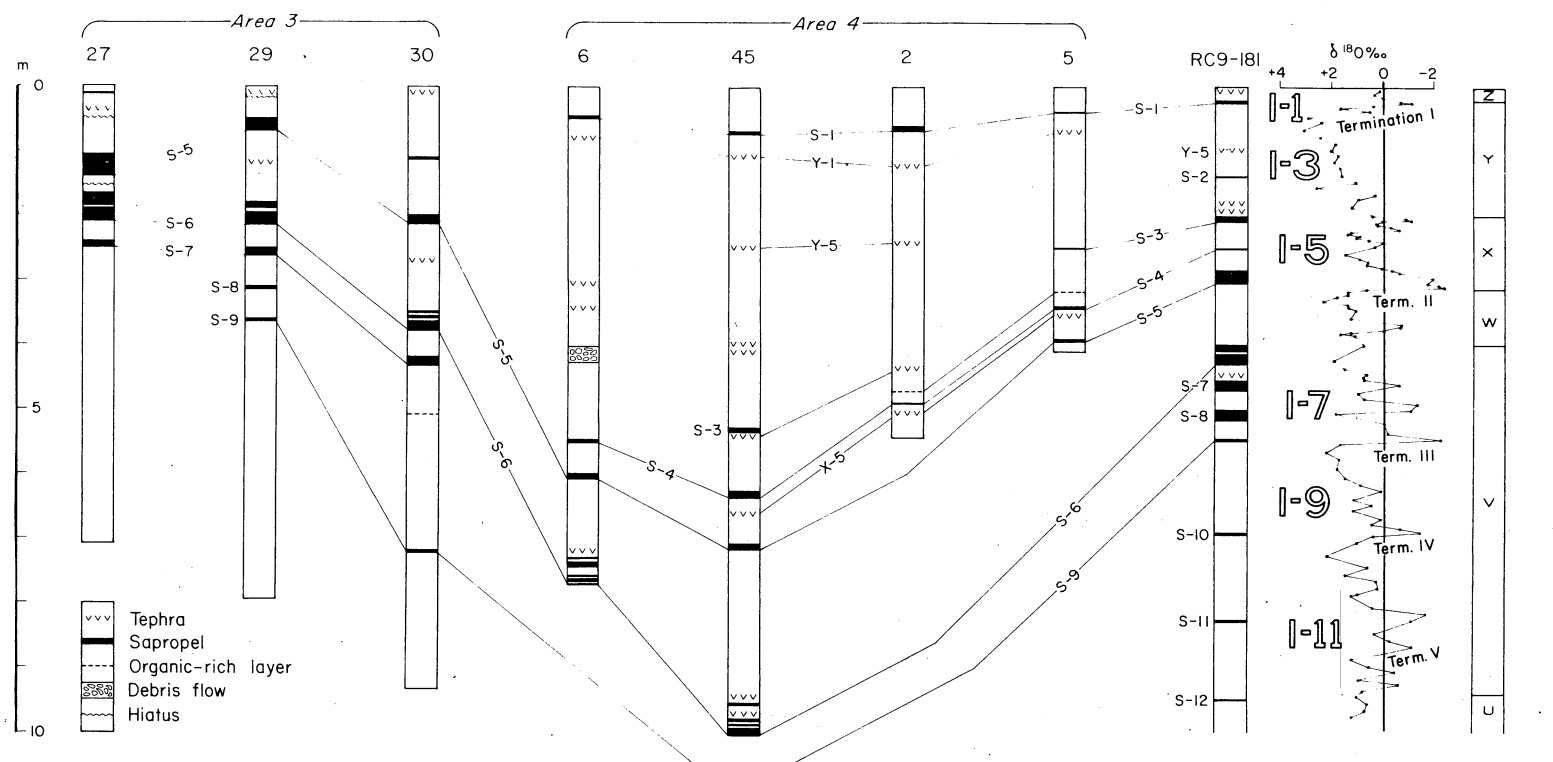


Fig. 1 - Correlation of the plateau cores of Cobblestone Area 3, of Area 4 and of core RC9-181 by means of isochronous lithologies (sapropels and tephras). The lithologic correlation is consistent with the biostratigraphic calibration by means of calcareous nannofossils. The right column shows the isotopic changes recorded in *Globigerinoides ruber* in core RC9-181 (Vergnaud-Grazzini et al., 1977), the reference section for the Eastern Mediterranean. Also shown are the isotopic stages and the climatic zones (after Ericson and Wollin, 1968). Sapropel identification after Cita et al. (1977). Tephra identification after Keller et al. (1978).

Carbonate curves record faithfully the paleoclimatic fluctuations, with carbonate peaks correlative with warm conditions, carbonate lows correlative with cold conditions. This is true only for that part of the record which is older than approximately 250000 y BP. In the later part of the record the interaction of stagnant episodes and of frequent ash falls obscures the signal.

Clay mineralogy indicates basically uniform conditions in the two areas, with one exception: smectite is more abundant in the Calabrian Ridge, which is closer to its source area (Sicily, Sicily Channel). Carbonates include calcite, and also magnesian calcite and some dolomite.

Sapropels, sedimentary expression of stagnation (Cita et al., 1977; Kidd et al., 1978), represent up to 25 % of the sedimentary column in an interval encompassing stages 5 through 7: average content of organic carbon in sapropels analyzed is 3.1 %, versus 0.29 % in normal pelagic sediments. Organic matter is essentially of marine origin.

Sapropel S-6 and S-8 are consistently accompanied by a foraminiferal fauna indicative of low salinity surficial waters, and cool temperature. This observation supports the assumption that at least two different mechanisms can lead to density stratification, one of which is related to salinity differences (sapropel S-6 and S-8), the other one is temperature-controlled, with sapropels occurring in coincidence with the warmest peaks of the climatic faunal curve (as exemplified by S-1, S-5, S-7).

Average sedimentation rate is 3.2 cm/1000 y for Core 29; 5.5 cm/1000 y for Core 45. Sedimentation rates calculated for basin cores from the same area are five to ten times higher. Sedimentation rates of sapropels and tephras are independent from regional sedimentation rates. Winnowing results in reduced sedimentation rates in Area 3, and in unusually high percentages of the coarser sediment fraction, with extended hiatuses at the top of the cores. Hiatuses in plateau cores correlate with debris flows in base-of-slope cores, both occurring during times of enhanced bottom circulation and submarine erosion related to low stands of sea-level in cold periods.

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