

# *Globigerina pachyderma* and *Globigerinoides ruber* : paleoclimatic indicators in submarine cores in the Adriatic Sea

by

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Fives cores collected by *Laboratorio di Geologia Marina* of CNR in Bologna during 1967 and 1968 in the south Adriatic are the subject of this study. The cores designated as : R 1, R 9, IN 29, IN 5 and IN 10 were recovered at various depths ranging from 379 m to 1,214 m (Fig. 1). The aim of this paper is to extend the paleoclimatic knowledge in this area [D'ONOFRIO 1959, CITA & D'ONOFRIO 1965].

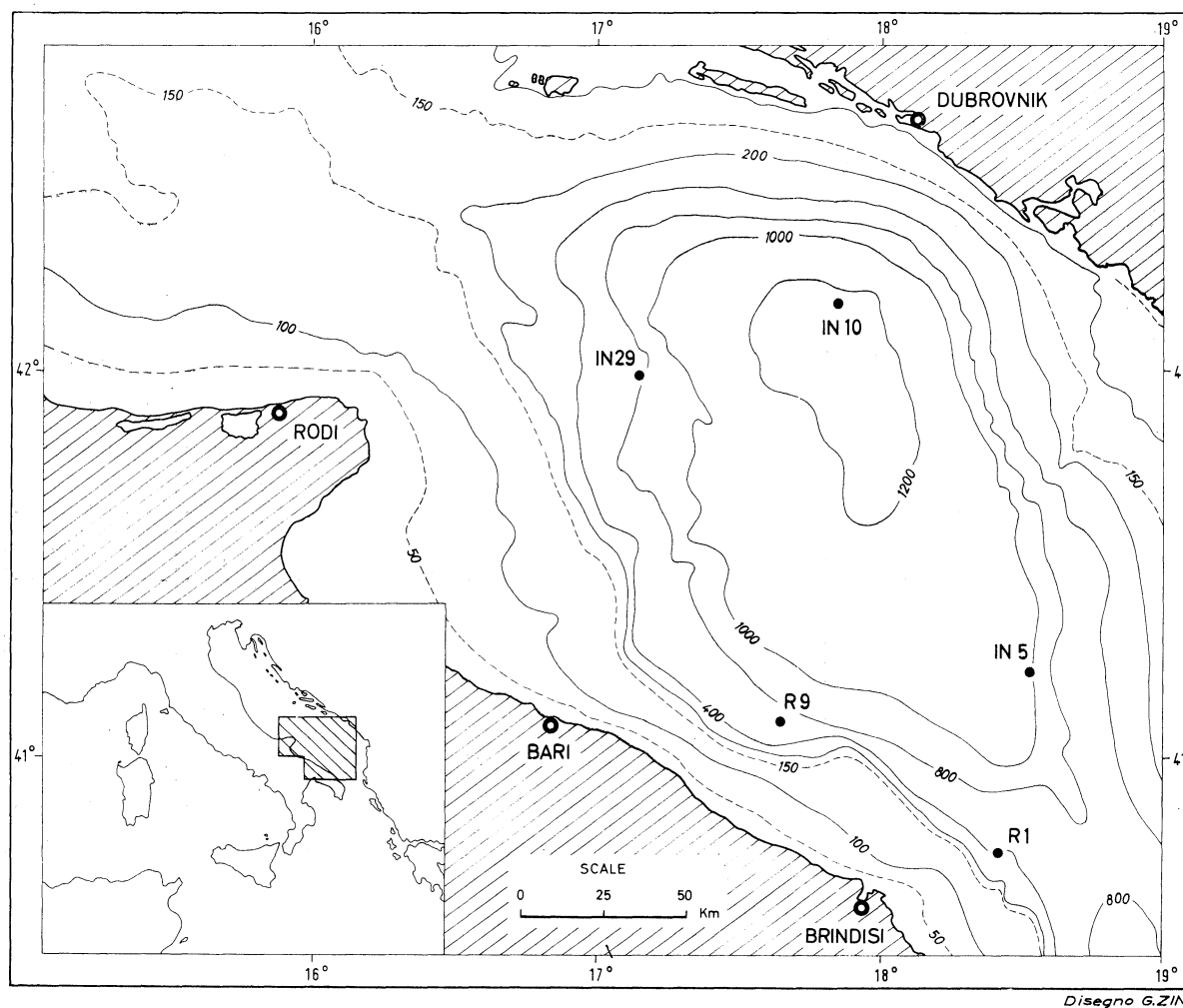


FIG. 1. — Locations of the cores investigated.

*Rapp. Comm. int. Mer Médit.*, 21, 11, pp. 905-908, 3 fig. (1973).

Figure 2 shows the length, depth and location of the cores and also the distribution frequency of the following species : *Globigerina bulloides* d'Orbigny, *G. eggeri* Rhumbler, *G. pachyderma* (Ehrenberg), *G. quinqueloba* Natland, *Globigerinoides gomitulus* (Seguenza), *G. ruber* (d'Orbigny), *Globorotalia inflata* (Brady), *G. scitula* (Brady), *G. truncatulinoides* (d'Orbigny), *Hastigerina aequilateralis* (Brady), *Globigerinita glutinata* (Egger).

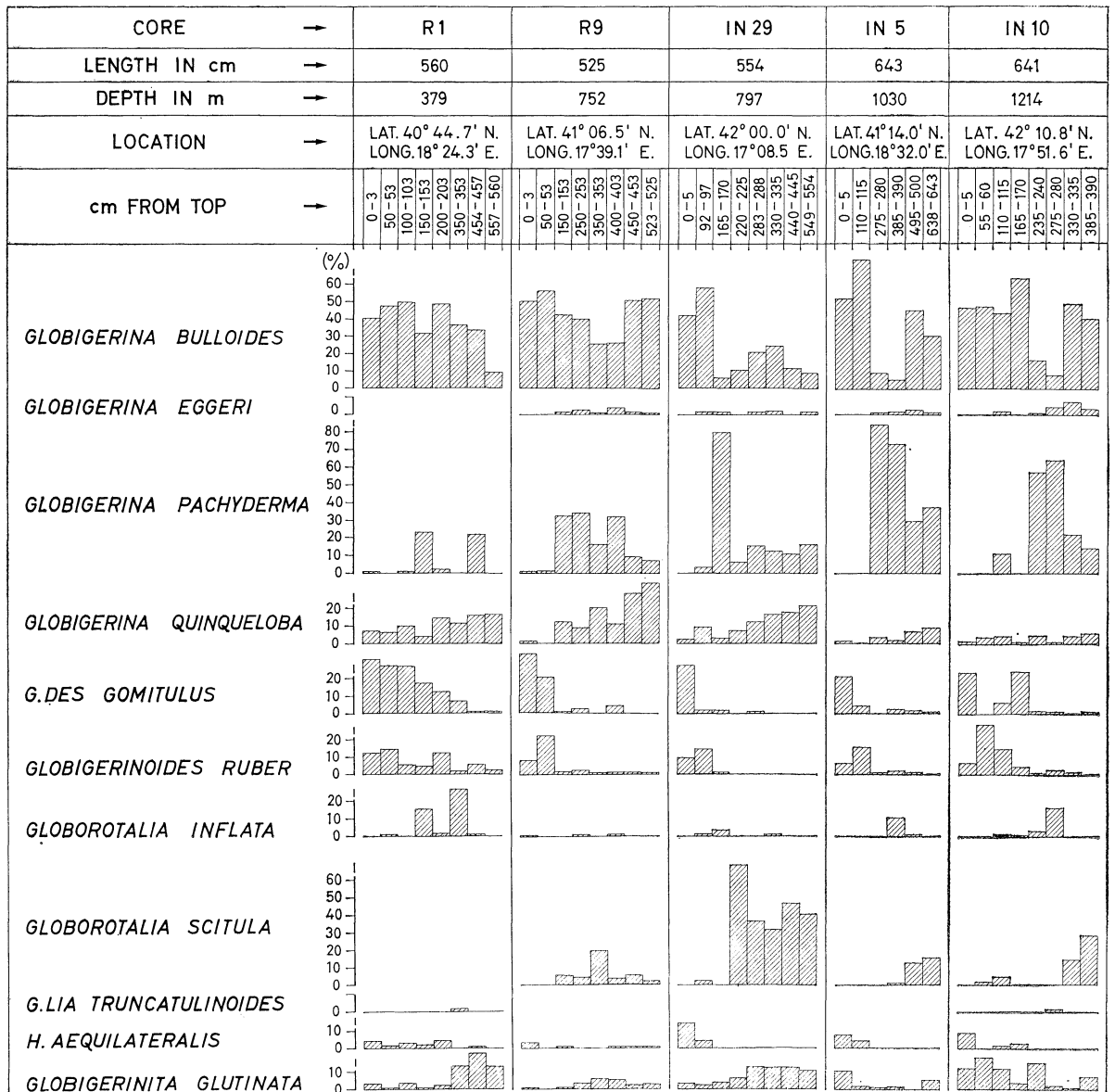


FIG. 2. — Data on the frequency of the most indicative species in the cores investigated.

The percentage of relative frequency of two planktonic species considered by all investigators as paleo-environment indicators i.e. *Globigerina pachyderma* (« cold » indicator) and *Globigerinoides ruber* (« warm » indicator) is shown in Fig. 3.

The methods of study adopted in this investigation are those already discussed and commonly followed by all authors interested in ecologic studies [PARKER 1948, PHLEGER 1955, 1960, TODD 1958, etc.].

Figure 3 shows that the distribution frequency in percentage of *Globigerinoides ruber* in the upper part of each core is matched with the lack or with a very small amount of *Globigerina pachyderma*. More precisely, in the cores R 1 and R 9 the high frequency percentage of *Globigerinoides ruber* is at 50 cm from the top, in core IN 29 at 92 cm, in IN 5 at 110 cm and in core IN 10 at 55 cm from the top. On the other hand, in the core R 1 *Globigerina pachyderma* reaches two high frequency points at 150 cm and at 557 cm from the top. In the other cores, the almost total absence of this species in the upper part is evident, while the highest frequency point is located at different depths : 150-250 cm for core R 9, 165 cm for core IN 29, 275 cm for IN 5 and IN 10. Going down towards the base of the cores no other significant variations occur. In core IN 10 below 440 cm to 641 cm the Foraminifera content is very poor and often represented by dystrophic specimens; therefore it is impossible to calculate the frequencies of the species.

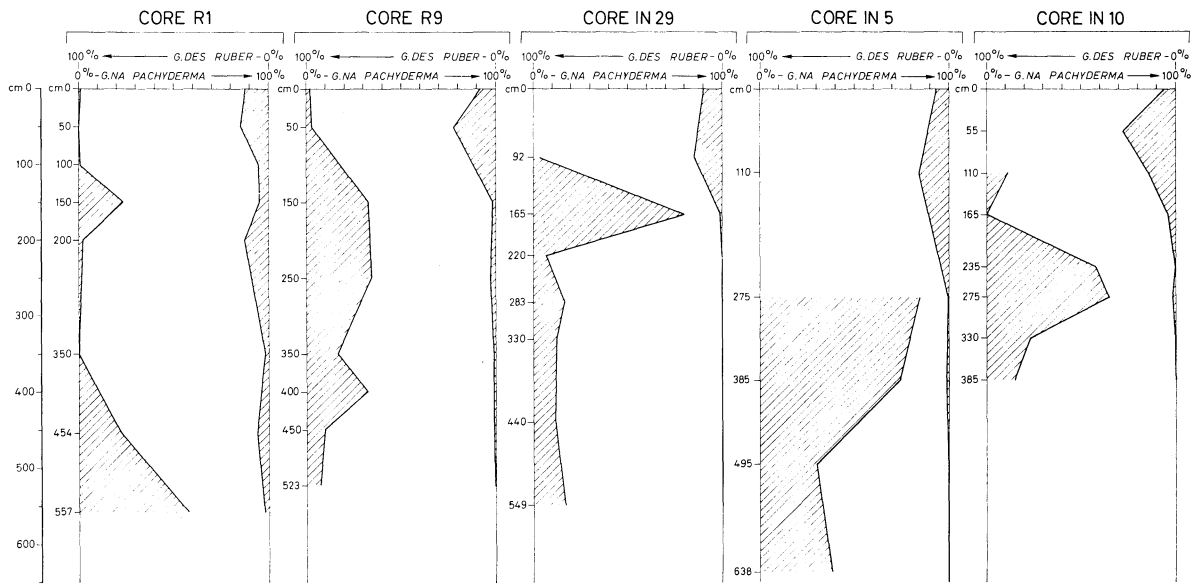


FIG. 3. — Frequency curves of two planktonic species in the cores investigated : *Globigerina pachyderma* on the left, *Globigerinoides ruber* on the right.

Even though the samples have been collected in the cores within a wide (up to 1 m) vertical range the frequency curves of *Globigerina pachyderma* and *Globigerinoides ruber* in each core show certain similarity. The results of this investigation clearly indicate fluctuations in the temperature of the surface water layers of the Adriatic during the Recent Quaternary. Undoubtedly, the first frequency maximum of *Globigerina pachyderma* observed at different depths in these cores (between 150 and 275 cm) indicates a cooler climate than today. Two alternative explanations of this cooling can now be put toward :

- a. If the area investigated in the south Adriatic is an area of very low sedimentation rate, then this climatic fluctuation could correspond to the last Glacial Period (Würm III);
- b. If, on the contrary, the rate of sedimentation in this area is high, the decreasing of the water temperature represents a post-Würm climatic fluctuation.

Unfortunately the data on sedimentation rate in the area studied is not available. Thus, in my opinion, geophysical data on sediment thicknesses backed by the absolute dating would assist in eliminating one of the two possible solutions.

**References**

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