

## HELICOSPHAERA CARTERI: A FURTHER NOTE ON ITS STRATIGRAPHICAL OCCURRENCE

Eric de Kaenel\* & Giuliana Villa\*\*

\*DPR, Matile 51, CH-2000 Neuchâtel, Switzerland Dipt. di Scienze della Terra, \*\*Università di Parma, Viale delle Scienze 78, 43100 Parma, Italy

This note constitutes a reply to the recent publication in the *JNR* of a paper on *Helicosphaera carteri* by Kığo Vathi (Vathi, 1998). In this paper, the author extended the range of *H. carteri* down into the Early Oligocene. In order to clarify this occurrence, we (de Kaenel and Villa) are referring to our 1996 publication.

We would like to clarify the presence in Oligocene sediments of nannofossils almost similar to *H. carteri*. This may help to avoid future mistakes in nannofossil biostratigraphy. We have illustrated in our paper an helicolith identical to the forms illustrated by Vathi. Contrary to Vathi, we did not consider these helicoliths as being *H. carteri*. Because we noted some different morphological features (*i.e.* the outline of the flange, the features of the proximal plate), and because its range is discontinuous with reference to the uppermost Oligocene-Lower Miocene forms, we decided to use a different taxonomic label: *Helicosphaera aff. H. carteri*. In the future, it may be better to raise this form to the rank of another species or of an intraspecific taxon.

### Systematic descriptions

#### *Helicosphaera carteri* (Wallich, 1877) Kamptner, 1954

**Description:** Small- to medium-sized *Helicosphaera* with an asymmetrical outline. The proximal plate has two very small central openings aligned with the principal suture of the helicolith. The blanket covered most of the distal surface. The flange is continuously rounded, without abrupt diminution of the length of the distal elements, and the termination of the flange is along the upper part of the side of the helicolith. The elements of the wing (widest part of the flange) may vary greatly in size.

**Holotype:** Coccusphere from the Recent, Indian Ocean (Wallich, 1877, Pl. 17, fig. 4).

**Size:** Coccusphere of Wallich (1877): about 1/830 of an inch (= 30 µm). Recent specimens (*H. carteri* var. *carteri*): 4-12 µm. Miocene specimens: 6-15 µm (size depends mostly on the development of the flange).

**Occurrence:** Upper NP25-Recent. Correlation with the eustatic sea-level chart of Haq *et al.* (1987): the first occurrence (FO) of *H. carteri* coincides with the base of the transgressive period of the TB 1.3 sequence (de Kaenel & Villa, 1996). Aubry & Villa (1997) reported the FO of *H. carteri* in the Lemme-Carrosio section (GSSP for the Palaeogene/Neogene System Boundary), some 29m above the Oligocene/Miocene boundary, in Nannofossil Zone NN2 (latest Chron C6Bn. 1n at 22.6Ma). This position is correlated with the end of the transgressive period TB 1.4.

De Kaenel & Villa (1996) reported the FO of *H. carteri* at Hole 900A, some 35m below the NP25/NN1 boundary, and in Zone NP25 (earliest Chron C7n.2n at 25.10 Ma). This

event is recorded a few metres below the level of the last consistent occurrence (LCO) of *Sphenolithus ciperensis*, the age of which is estimated at 24.69Ma. The LCO *S. ciperensis* event of de Kaenel & Villa (1996) is equivalent to the last occurrence (LO) of *S. ciperensis* of Aubry & Villa (1997), which is dated at 24.7Ma.

*Helicosphaera paleocarteri* (Theodoridis, 1984) has its FO in middle NN1 at Hole 900A. This form differs from *H. carteri* by its proximal plate: the two small openings are not aligned with the principal suture of the helicolith.

#### *Helicosphaera aff. H. carteri* (Wallich, 1877) Kamptner, 1954

de Kaenel & Villa, 1996, p. 125, pl. 8, figs 21-24; pl. 10, figs 14, 15

**Size:** 8-10 µm.

**Occurrence:** Base NP23-NP24 (Leg 149, Hole 900A); base NP23-upper NP23 (Leg 149, Hole 897C); lowermost NP25 (Leg 149, Hole 899B, single occurrence, possibly re-worked).

**Remarks:** (from de Kaenel & Villa, p. 125) „This medium-sized *Helicosphaera* has two distinct openings aligned with the longer axis of the shield. The flange is rounded and terminates by a small inner crescent-shaped expansion along the side of the shield. The bar is in optical continuity with the rim and separates two openings. This helicolith measures between 8 to 10 µm and has a short range restricted to Oligocene Zone NP23 to the early part of Zone NP24. In cross-polarized light, *Helicosphaera aff. H. carteri* exhibits the same intense birefringence as *H. carteri* and is distinguished from the latter by its smaller size, the larger openings and the abrupt termination of the flange.“

As also observed by Vathi in land section from Albania, we did not observe *Helicosphaera aff. H. carteri* in the lower and middle interval of Zone NP25 and we concluded that *H. carteri* is quite unlikely to represent a re-entry of the same species.

The FO of *Helicosphaera aff. H. carteri* is used as a secondary Oligocene event in de Kaenel & Villa (1996, p. 91). Its FO is observed between the LO of *Reticulofenestra umbilicus* and the LO of *Lanternithus minutus*.

### References

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