

b26 Plankton as temperature indicators < geographic range, coiling >

Many planktonic foraminifera are temperature sensitive. Warm water adapted *Globorotalia menardii* during times of Pleistocene glacials is only found in cores taken near the equator. However, their latitudinal range extends to higher latitudes during interglacials.

Globorotalia truncatulinoides in their living planktonic populations show an increase in the frequency of left-handed coiling individuals (that is, sinistral coiling in the evolute spiral view of their trochospiral test) as water gets colder at higher latitudes. So their tests accumulated in bottom sediments record the temperature of the surface waters where they lived. David B. Ericson, who was the first to notice this, detailed a statistical method in 1954 for its study in deepsea core samples.¹ In 1968, Don L. Eicher found correlations between glacial stages and *G. truncatulinoides*' coilings in South Atlantic deepsea core samples.² The planktonic Pleistocene *Neogloboquadrina pachyderma* (**Figure b26.1**) species predominantly right (dextral) coil in water above 8-10°C and left (sinistral) coil in colder water.³ □

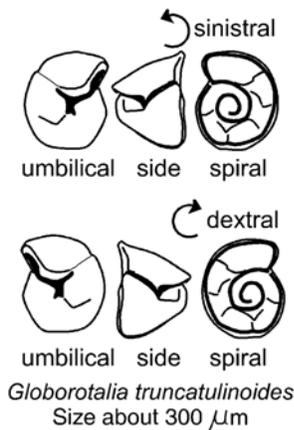
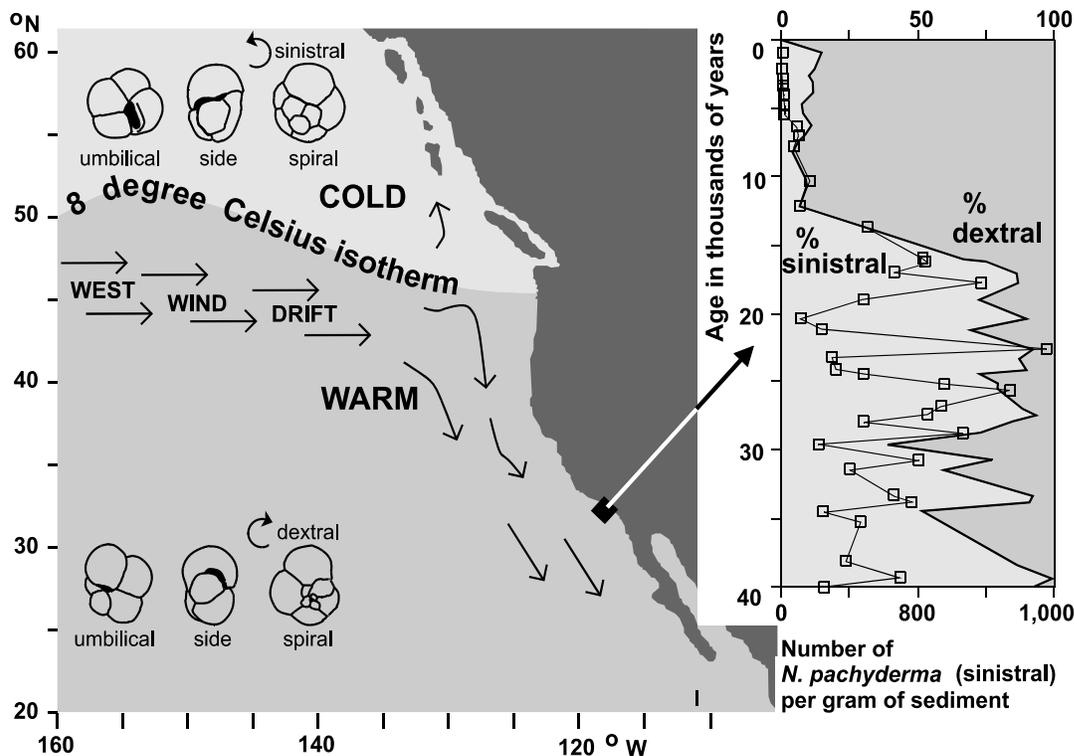


Figure b26.1⁴ Left (sinistral) coiling is seen in the evolute spiral or dorsal view (the other way-up view is umbilical or ventral) of *Neogloboquadrina pachyderma* that proliferate today in surface sea waters cooler than 8°C and right (dextral) coiling is seen in the spiral view of *N. pachyderma* in warmer waters. The inset shows sediment core sampling results at a site (the Tanner Basin) just off the coast of southern California.



The transition from the last glacial to the Holocene is recorded by the abrupt change in the percentage of left (sinistral) coiling *N. pachyderma* which indicates that the 8 °C isotherm was much further south to those with right (dextral) coiling. A markedly fluctuating climate is revealed for the time before the end of the Ice Age.