rates from core data into account, sediment fluxes with resulting deposition/erosion patterns are computed to reconstruct the history of the sediment fill between time slices.

FLOW OF CURRENTS IN THE CRETACEOUS TETHYS

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We have plotted the occurrences of a variety of marine organisms on new global plate tectonic and paleogeographic reconstructions for the Santonian. A major difference compared to earlier reconstructions is that we have completely closed the Norwegian-Greenland Sea, which rotates Asia counterclockwise relative to western Europe and Greenland. Using the paleomagnetic reference frame of Harrison and Lindh (1982), we obtain a zonal boundary for the northern margin of the Tethys at 30° N. Unless the Hadley Cells were greatly restricted in the Cretaceous, this would place the entire Tethys under the influence of the easterly Trade Winds.

Two biogeographically important species of *Inoceramus* are restricted to the northern margin of the Tethys. True bioherms are also restricted to the northern margin and diversity of their faunas increases toward the Caribbean. The greatest diversity of reef organisms should be downstream, so that the increasing diversity from E to W implies westward flow of the waters along the northern margin of the Tethys. Although phosphorites do not occur in the Santonian, they were deposited in north Africa along the southern margin of the Tethys during the Campanian and Maastrichtian.

The distribution of the organisms is consistent with generally northwesterly Ekman flow of Tethyan waters beneath easterly Trade Winds. Upwelling would have occurred along the southern Tethyan margin and downwelling along the northern margin. On both margins there would have been a net westward zonal flow. Within the Tethys, the meridional flow would have always been to the north. Restriction of reefs to the northern margin may reflect either the difficulty of distribution of larvae upstream, or different hydrographic conditions along the southern margin.

PANGAEAN CLIMATOLOGY AND OCEANOGRAPHY

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Geologic evidence indicates that Pangaea existed as a supercontinent from 270 Ma until 180 Ma. During its almost 100 million year existence it had a variety of climates. Its southern part, Gondwana, was glaciated from Late Mississippian until Middle Permian (330 Ma until 240 Ma). Polar ice disappeared and the continent reached a condition of extreme aridity during the Early Triassic (245Ma). At this time there is no clear record of the existence of an equatorial humid belt. During the later Triassic, the aridity of the continent decreased, and a "wet" episode occurred during the Late Triassic (Carnian, 225 Ma). The paleoceanographic record of Pangaea times is virtually unknown.

A variety of models have been used to simulate the climate of Pangaea. The interior of the continent was exceedingly arid. The seasonal temperature contrasts may have been 50°C. The temperature differences induced by

Milankovitch forcing were extreme. Strong monsoonal circulation was a characteristic of the atmosphere in Pangaean times.

A new General Circulation Model, GENESIS, has been used to simulate the climate of an Earth with realistic Triassic Pangaean geographies. The models indicate no ice cap on land and no permanent sea ice. The seasonal temperature variation is 50°C. The continent is very dry except for coastal areas and uplifts. Extreme seasonal monsoonal circulation produces strong westerly winds parallel to the entire coast of Gondwana and the east coast of Laurasia during June-August, inducing coastal upwelling. Permafrost occurs poleward of 50°. Topography strongly affects the monsoonal circulation causing major deviations of the winds suggested in earlier model runs with idealized geographies. Topography also plays a crucial role in concentrating rainfall in a few small areas.

LATE QUATERNARY STRATIGRAPHY IN THE FRAM STRAIT

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Stratigraphic analysis of sediments from the Fram Strait is mostly hindered by low abundances of foraminifera and other microfossils and by the occurrence of intervals totally barren of fossils. Therefore, most cores do not provide continuous records of oxygen isotope ratios, nor of any kind of species composition data.

Until now, only two Fram Strait cores with a continuous oxygen isotope record are published (Morris, 1988; Köhler and Spielhagen, 1990). Neither record shows the typical saw-tooth pattern known from lower latitudes and also found, e.g., in cores from the Norwegian-Greenland Sea. Due to the lack of this pattern, the interpretation of the oxygen isotope records is rather difficult. A higher time resolution than that provided by oxygen isotope stage boundaries seems more or less impossible.

Based on these two oxygen isotope records, a set of 14 sediment cores from two west-east transects across the Fram Strait was analyzed stratigraphically by correlating sedimentological, geochemical and micropaleontological data. All stage boundaries in the cores could be identified by this method. Age control for the correlation is partly given by high-resolution paleomagnetic analysis. A recently produced oxygen isotope curve for one of the cores confirmed the results of the correlation.

Sedimentation rates show a general increase from west to east, although highest rates were observed in the deepest parts of the Fram Strait. These areas, the Spitsbergen Fracture Zone, the Molloy Deep and the central rift valley of the Knipovich Ridge, clearly act as natural sediment traps with sedimentation rates >17 cm/kyr. Lowest sedimentation rates were found in the central southern Fram Strait (<2 cm/kyr). Intermediate rates were observed on the continental slope of Svalbard (3-7 cm/kyr). There is an apparent trend in almost all cores to higher sedimentation rates in glacial stages compared to interglacials.