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Origin and Occurrence of Crude Oils in Molasse Basin (Southern Germany)

In the Molasse basin of southern Germany, a distinct differentiation of four regionally connected groups of oils can be inferred from the results of the $\delta\lambda C_{13}$ values and chemical analyses of the organic fractions. The differences between primary and secondary processes which caused isotope fractionation effects, and the principal correlations of chemical and isotopic data have geologic relevance. Probable models of the origin and occurrence of crude oils in the Molasse basin have been derived from geologic observations and geochemical results.

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Flow of Bottom Water Out of Weddell Sea, Antarctica—700,000 Years to Present

Bottom water produced at the Antarctic continental margin (loosely defined here as Antarctic bottom water, AABW) is thought to exert an important influence on calcium carbonate dissolution and terrigenous sedimentation in basins of the world ocean. Indeed it has been suggested that variation in AABW production and flow causes significant seafloor scouring in the Southern Hemisphere ocean basins. Today, most AABW flowing into the world ocean originates in the Weddell Sea. Piston cores from this vital region taken in the path of proposed present-day bottom-water flow, have been subjected to micropaleontologic, geochemical, and size analyses and their Th^{230} and paleomagnetic stratigraphy determined. These data have been used to reconstruct the history of AABW production and flow in the Weddell Sea during the past 700,000 years.

Variations in standard deviation ranging from 1.473 to 2.339, with sediments laminated and nonlaminated respectively, indicate fluctuations in apparent bottom-water-flow velocity and possibly, in turn, production in the west-central Weddell Sea. These fluctuations between peak and low velocities have occurred over periods of more than 100,000 years. Periods of peak-flow velocity also correspond to times when the calcite compensation depth (CCD) was elevated. Only in the past 300,000 years has the level of the CCD fallen below 4,000 m. Not yet fully understood is what seems to be a more rapid and chaotic periodicity in flow in the northwestern Weddell Sea and an apparent correlation between fluctuations and ice-rafted detritus (IRD). It does, however, seem apparent that during the past 700, 000 years bottom-water flow in the Weddell Sea has not been strong enough to cause scouring.

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Eugene Island Block 330 Field, Offshore Louisiana

The Eugene Island Block 330 field is currently the largest oil-producing field on the Federal outer continental shelf of the United States. The field, located about 150 mi (240 km) southwest of New Orleans, Louisiana, was discovered by the Pennzoil 1 OCS G-2115 well in March 1971, following leasing on December 15, 1970. The field includes Blocks 313, 314, 315, 330, 331, 332, 337, and 338, Eugene Island area, South Addition, offshore Louisiana.

The field is an anticlinal structure on the downthrown side of a large northwest-trending growth fault. Production is from more than 20 Pliocene-Pleistocene delta-front sandstone reservoirs ranging from *Lenticulina* to *Trimosina* "A" zones and located at depths of 4,300 to 12,000 ft (1,290 to 3,600 m). Reservoir sandstone thickness ranges from 20 to 90 ft (6 to 27 m). The reservoir energy results from a combination water-drive and gas-expansion system. Recoverable reserves are estimated to be greater than 225 million bbl of liquid hydrocarbons and 750 Bcf of gas.

Considerable subsurface data provided by 220 exploration and development wells and several seismic grids form the basis for our interpretation of the geology, geophysics, and petrophysics of the Block 330 field and its producing zones.

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Sedimentation Processes and Hydrocarbon Potential of Continental Rise off North America

The continental rise, within the 200-mi (320 km) economic zone, represents both the largest accumulation of terrigenous sediment on this planet and perhaps the largest unexploited hydrocarbon repository.

Several models have been presented for the origin of the rise; in the 1950s and 1960s, R. Dietz, M. Kay, C. Drake, M. Ewing, and others suggested a model of pyroclastics and turbidity-current deposition which produced a thick accumulation (eugeosyncline) of alternating coarse- and fine-grained sediment.

This view of continental-rise sedimentation was proposed prior to the discovery that deep thermohaline circulation could play a significant geologic role at abyssal depths. This latter concept was first hypothesized by the writer, who presented a model for along-slope fine-sediment dispersal driven by thermohaline circulation. This view held that turbidity currents inject sediment into contour-following, near-bottom currents; only fine-grained material is wafted parallel with contours, whereas the coarser turbidite material largely bypasses the continental rise and is deposited on the abyssal plains. This concept is supported by the results of Leg 11 of the DSDP.

The present sedimentary environment of the lower continental rise (3.5 to 5 km deep) in the western North Atlantic is now known to be dominated by vigorous near-bottom, contour-following currents (i.e., "contour currents"). Dense water originating in the Labrador, Norwegian, and Irminger Seas flows south and west through various fracture zones until it reaches the North American continental margin, where it is constrained to flow against the massive sedimentary apron of the continental rise.

The obvious implication of the contour-current concept for petroleum interest is that there would be little or no deposition on the continental rise of sediments