carbon generation. These mechanisms operate at different depths and temperatures, but may, in some cases, operate together to produce hydrodynamic flow. The result of flow is development of secondary porosity by dissolution of grains or cement and by hydrocarbon migration. Oil and gas accumulate in local, low-potential volumes of reservoir rock in which the pressures can be either slightly or greatly in excess of normal hydrostatic pressures.

Deficient pressures in Rocky Mountain basins are caused by uplift, exposure, and recharge of aquifer systems by meteoric waters. Downdip hydrodynamic flow results in oil columns of unusual height in which the oil trapped by flow greatly exceeds that which can be trapped by capillary-pressure barriers alone. These basins may have locally excess pressures due to clay transformation, or hydrocarbon generation, or locally deficient pressures due to gas blockage in fine-grained rocks.

The principles of flow are well established but not widely applied, and there is a need for better documentation of causes for abnormal pressures and the effects of flow. Knowledge of fluid-pressure regime can often be determined from relatively few points of subsurface control for a better understanding of fluid-migration history. Such knowledge is essential to oil and gas exploration in both poorly tested and mature basins.

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The Age of the Eocene/Oligocene Boundary is ...

In the construction of geologic time scales and the related exercise of discussing the chronology of chronostratigraphic units and boundaries, it is important to clearly distinguish between radiochronologic, biochronologic, magnetochronologic, and magnetobiochronologic input to their formulation. Failure to do so has, in some places, led to the confusion which surrounds the discussion and uncritical acceptance of some of the variant scales now being used. A brief critical examination will be made of several of the currently used Cenozoic chronologies and their bearing on the age of the Eocene/Oligocene boundary.

Current age estimates of the Eocene/Oligocene boundary range from about 32 to 38 Ma based on the assessment of various (predominantly glauconitic) radiometric dates, poleontological control of varying reliability, and quality and paleomagnetic chronologies employing different calibrations. High temperature radiometrically dated polarity stratigraphy in the middle Eocene (polarity chron 20-21 interval) and the latest Eocene-early Oligocene (chron 15/16-12 interval) in North American continental sections with mammalian faunas provide the framework for much needed calibration points in the mid-Cenozoic and for a revised Cenozoic time scale. This also provides constraints on age estimates of the magnetobiostratigraphically determined Eocene/Oligocene boundary in deep sea and continental marine sections. The Eocene/Oligocene boundary (biostratigraphically linked with the LAD's of the *Globorotalia cerroazulensis-cocoaensis* group, *Hantkenina* and *Globigerapsis*, and the rosette-shaped discoasters, *i.al. Discoaster barbadiensis* and *d. saipanensis*), is situated within the reversed interval between marine magnetic anomalies 15 and 13 with younger and older boundary estimated age values of 37.24 and 35.87 Ma, respectively. Our best estimate of the age of the Eocene/Oligocene boundary (subject to minor changes as a result of further magnetobiostratigraphic studies) is 36.6 Ma.

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Paleozoic Lithofacies in Southwestern Sinai and Their Depositional Environments.

Major breaks in sedimentation, accompanied by well-developed paleosols, have been successfully used to subdivide the 600 m (1,968 ft) of Paleozoic sandstone and shale sequence of southwestern Sinai, Egypt, into five smaller facies association units (i.e., formations). The lowest unit (the Araba Formation) is dominated by 1 to 10 m (3 to 32 ft) thick coarsening-up sequences of parallel-bedded, varicolored, fine-grained arkosic sandstone and muddy sandstone with abundant *Skolithos* burrows and in places *Cruziana* traces. This is the deposit of a low-energy prograding sandy coastal plain complex that grades upward into a thin, fining-up channel-overbank deposits with poorly developed paleosols. The overlying Naqus Formation scours deep into the Araba, and is characterized by lenticular, coarse to medium-grained, cross-bedded quartz sandstone with only a few clayey intervals. Well-rounded vein quartz and quartzite pebbles are scattered in the lower half, but form lenses in upper half. Cross-beds are common. The Naqus is interpreted as alluvial fan-braided stream deposits. A 15 to 20 m (49 to 66 ft) thick, conspicuous dark brown, ferruginous shale, ochre-yellow dolomitic sandstone and fossiliferous gray siltstone sequence, persistent all along the Qabeliat valley, overlies the Naqus and represents lagoonal deposits laterally equivalent to the shallow marine shale-dolomite sequence of the Um Bogma Formation farther north. The upper few meters of this unit developed into a paleosol. Basal fluvial channel sands of the succeeding Ataqa Formation cut into the Um Bogma paleosol, and grade upward into the fossiliferous green-red marine shales and subordinate sandstones in shoaling-upward sequences. Laterally, these shallow marine beds grade into coastal swamp deposits of carbonaceous shale and coal. Excellent paleosols developed at the top of the Ataqa Formation which in turn is deeply channeled by a thick succession of fining-upward, lenticular fluvial channel-sand-overbank paleosol facies of the Budra Formation. Southward in the Qabeliat valley, a parallel-bedded sequence of thick green shales and thin brown sandstones, both nonfossiliferous, intervenes in the middle of the Budra Formation and represents ephemeral lake deposits related to the fluvial system. Although the repetition of facies associations in the Paleozoic sequence of southwestern Sinai points to the repetition of events, each lithofacies shows characters of its own sufficient to assign it to a specific environment. Marked asymmetry in the facies sequences suggests spasmodic character of the events.

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Fan-Delta Deposition in Lower Cotton Valley Group Sandstones of Northeast Texas

Fan deltas have been defined as progradation of alluvial fans into a standing body of water from a proximal highland area. Sedimentary environments associated with fan delta complexes have been described in detail in Holocene examples. The subaerial fan is composed of braided channels, gravelly beaches, flood plains, and marshes. The subaqueous fan includes tidal lagoons, channel-fill complexes, marginal islands, breaker bars, and is also characterized by steep slopes and submarine channels where mass-gravity processes may dominate.

Few fan delta complexes have been recognized in the subsurface. The Cotton Valley Taylor "B" Sandstone is interpreted as the distal part of a prograding fan delta based on the vertical sequence in cores from Kildare field, Cass County, Texas. Three