with multidirectional trough and planar cross-bedding, *Ophiomorpha* sp., rounded mud clasts, and mud blocks. The tidal channel cuts through tidal-flat deposits, is approximately 40 m wide and 11 m thick, and contains gently dipping accretion beds of fine to very fine sand, including small-scale cross-stratification, and upwardly decreasing sand bed thickness. The lithology and sedimentary structures of facies 3 strongly resemble classic tidal-flat deposits of the Wadden Sea.

The west pit exposes a regressive sequence of (1) tidal-inlet fill, (2) a poorly represented upper shoreface-beach-barrier flat facies, overlain by (3) bay-lagoon deposits. The inlet facies of fine to very fine sand includes large-scale, low-angle planar cross-beds, *Ophiomorpha* sp., bipolar, planar cross-beds, and has a scoured base. Some zones are highly burrowed. Facies 2 consists of trough and planar cross-bedded fine to very fine sand, with low-angle parallel bedding, root traces, and woody fragments near a hummocky upper surface. Facies 3 includes an ashy, burrowed lignite overlain by a massive, burrowed clayey siltstone containing plant debris. Facies 1 and 2, as well as the base of the lignite bed, are uranium bearing.

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Uranium in Volcanic Rocks: Progress

Calc-alkaline rocks of crustal(?) derivation analyzed 0 to 5 ppm uranium in magmatic phases, but hundreds of ppm in epigenetic end-products. Alkaline rocks of mantle(?) derivation analyzed 0 to 22 ppm in magmatic phases, 30 to 45 ppm in deuterically modified phases and hundreds of ppm in final epigenetic modifications. Incompatibility with rock-forming silicates relegates large ions including uranium to residual gas or fluid. Mantle volatiles released during magma generation or crystallization mineralize rocks according to relative chemical reactivity.

In rocks with <5 ppm U, U-Th were not detected by autoradiography or fluorescence. Uniform weak glow at 10 to 20 ppm U suggests uniform distribution at the eutectic. Selective distribution in more uraniferous rocks favors deuteric or pegmatitic biotite, zircon, complex silicates, and multiple oxides. U-Th uniformly distributed within grains are considered contemporaneous lattice substitutions. Some magmatic minerals in rocks with >60 ppm U show inclusions variably containing Th, REE, U, Ti, V, Ni, Cr, Cu, Pb, Zn, Ba, and Mn. Halogens, S, and P underscore the volatile role. Inclusion-laden asphaltite is common. Lattice inclusions may represent vapor trapped during crystallization. Those in cleavages, amygdules, or fractures appear epigenetic. Those lacking Th probably are of relatively low temperature.

Surface tension would inhibit liquid entry into tight textures and lattices, so volatile transport and ionic lattice diffusion are inferred. Inclusions account for most Th-U distribution patterns suggesting dominant epigenetic enrichment of volcanics by residual volatiles.

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Oncolites in Cretaceous Yucca Formation, Presidio County, Texas

Detailed stratigraphic work in the Yucca Formation, Presidio County, Texas, has revealed about 70 ft (21 m) of oncolite-bearing strata. The zone of oncolite occurrence is 180 ft (55 m) above the unconformity separating the Permian and Cretaceous rocks and 665 ft (203 m) below the initial occurrence of abundant *Orbitolina.* The zone varies both vertically and laterally from oncolite-supported conglomerate with micrite matrix to micrite with less than 10% oncolite content, to algal-encrusted, matrix-supported pebble conglomerate. Oncolites range from less than 0.5 in. (1.25 cm) to approximately 3 in. (7.5 cm) in diameter, and are commonly size sorted within the zone.

The oncolites are most commonly nucleated about a fragmental piece of oncolite material and are classified as type-SS. In the pebble conglomerate facies, algal encrustations occur on very well-rounded, spheroidal clasts of siltstone, micrite, and chert. Very rare encrustations are present on clasts appreciably larger or smaller than the pebble size. Rarely is the algal material nucleated about organic remains such as pelecypod, gastropod, or brachiopod shells.

The presence of this oncolite zone within an otherwise unfossiliferous section provides some control for interpreting depositional environments within the Yucca Formation. However, oncolites have been reported from several aquatic depositional environments both in the geologic record and as forming today. These environments include: lacustrine, fluvial; shallow, nearshore marine; and marginal marine brackish water systems. Local sedimentary features and broader stratigraphic relations effectively eliminate lacustrine and fluvial interpretation.

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Geology of Sierra Pena Blanca Region, Chihuahua, Mexico

The Sierra Pena Blanca is a fault-block mountain range, extending 100 km in a north-south direction, and being up to 15 km wide. Paleozoic eugeosynclinal sediments constitute the southernmost part, and rocks are progressively younger to the north. Cretaceous basinal and reef carbonate facies are present, and are succeeded northward by lower Tertiary conglomerates, ash-flow tuffs, and volcaniclastics, ranging in age from 44 to 35 m.y. The area is at the boundary of the Chihuahua trough on the east and the Aldama platform on the west. Internally, the range has a repetition of significant northwest-trending, down-to-the-northeast faults. The Tertiary units show some variation in thickness and facies throughout the area. They illustrate an outflow environment, and some units suggest a caldera source on the west or southwest.

Significant uranium deposits occur near the base of the ignimbrite pile. The largest volume of ore is stratigraphically controlled at the base of a welded ash-flow tuff, the Nopal Formation. The Margarita deposit and northern El Curvo zone are examples of this type. Additional mineralization occurs in fractures and faults, as at Nopal 1 and 3. Some mineralization is also present in the underlying Cretaceous carbonate rocks, as at Domatilla, and Sierra Gomez.

Data were collected from drill holes in the Margarita deposits. To define the geochemical indicators a principal factor analysis was performed on the data, which consists of 30 samples with 28 chemical elements. Factor analysis reduced this data set to 8 latent variables or factors. The factors can be interpreted from the association of variables which have the highest factor loadings.

An eight-factor solution to the analysis indicated that certain trace elements, as well as some important major elements, could be used as possible geochemical indicators for this type of deposit. The positive trace elements defined are: MnO, Hg, B, Y As, Mo, F, and Cu. The multiple correlation coefficient