مربوط به

درس شناسایی های ژئوتکنیکی زمین

علی فاخر

آشنایی با اصطلاحات در خصوص زمان و دوران های زمین شناسی که در مطالعات دفتری برخورد می شوند.

اگر به این اصطلاحات برخورد کردید لازم است توصیف کوتاهی از آن را مطالعه کنید.

not to any scale

Eon ابر دوران	Era دوران	Period دوره	Series/ Epoch دور	Major Events	شروع (میلیون سال قبل)
Phane-rozoic	Cenozoic دوران سوم وچهارم سنوزوییک نوزیستی	Neogene نئوژن	Holocene هولوسن (معاصر)	پایان یخچال های اخیر و شروع تمدن	0.011430 (114هزار)
			Pleistocene پلیستوسن	توسعه و سپس انقراض پستانداران بزرگ. Evolution of anatomically modern humans.	1.8 (میلیون سال قبل)
			Pliocene پلیوسن	Intensification of present ice age; cool and dry climate. Australopithecines, many of the existing genera of mammals, and recent mollusks appear. *Homo habilis* appears.	5.3 (میلیون سال قبل)

			Miocene میوسن	Moderate climate; Orogeny in northern hemisphere. Modern mammal and bird families became recognizable. Horses and mastodons diverse. Grasses become ubiquitous. First apes appear.	23 (میلیون سال قبل)
		Paleogene پالئوژن	Oligocene	Warm climate; Rapid evolution and diversification of fauna, especially mammals. Major evolution and dispersal of modern types of flowering plants	34 (میلیون سال قبل)
			Eocene	Archaic mammals (e.g. Creodonts, Condylarths, Uintatheres, etc) flourish and continue to develop during the epoch. Appearance of several "modern" mammal families. Primitive whales diversify. First grasses. Reglaciation of Antarctica; current ice age begins.	56 (میلیون سال قبل)
			Paleocene	Climate tropical. Modern plants appear; Mammals diversify into a number of primitive lineages following the extinction of the dinosaurs. First large mammals (up to bear or small hippo size).	65 (میلیون سال قبل)
	Mesozoic دوران دوم مزوزوئیک میان زیستی	Cretaceous کرتاسه	Upper/Late	Flowering plants proliferate, along with new types of insects. More modern teleost fish begin to appear. Ammonites, belemnites, rudist bivalves, echinoids and sponges all common. Many new types of dinosaurs (e.g. Tyrannosaurs, Titanosaurs, duck bills, and horned dinosaurs) evolve on land, as	100 (میلیون سال قبل)
			Lower/Early		145 (میلیون سال قبل)

				do modern crocodilians; and mosasaurs and modern sharks appear. Primitive birds gradually replace pterosaurs. Monotremes, marsupials and placental mammals appear. Break up of Gondwana.	
		Jurassic ژوراسیک	Upper/Late	Gymnosperms (especially conifers, Bennettitales and cycads) and ferns common. Many types of dinosaurs, such as sauropods, carnosaurs, and stegosaurs. Mammals common but small. First birds and lizards. Ichthyosaurs and plesiosaurs diverse. Bivalves, Ammonites and belemnites abundant. Sea urchins very common, along with crinoids, starfish, sponges, and terebratulid and rhynchonellid brachiopods. Breakup of Pangea into Gondwana and Laurasia.	161 (میلیون سال قبل)
			Middle		175 (میلیون سال قبل)
			Lower/Early		200 (میلیون سال قبل)
		Triassic تریاسه	Upper/Late	Archosaurs dominant on land as dinosaurs, in the oceans as Ichthyosaurs and nothosaurs, and in the air as pterosaurs. cynodonts become smaller and more mammal-like, while first mammals and crocodilia appear. *Dicrodium* flora common on land. Many large aquatic temnospondyl amphibians. Ceratitic ammonoids extremely common. Modern corals and teleost fish appear, as do many modern insect clades.	228 (میلیون سال قبل)
			Middle		245 (میلیون سال قبل)
			Lower/Early		251 (میلیون سال قبل)
	Paleozoic	Permian	Lopingian	Landmasses unite into supercontinent Pangea, creating the Appalachians.	260 (میلیون سال قبل)

	دوران اول	پرمین	Guadalupian	End of Permo-Carboniferous glaciation. Synapsid reptiles (pelycosaurs and therapsids) become plentiful, while parareptiles and temnospondyl amphibians remain common. In the mid-Permian, coal-age flora are replaced by cone-bearing gymnosperms (the first true seed plants) and by the first true mosses. Beetles and flies evolve. Marine life flourishes in warm shallow reefs; productid and spiriferid brachiopods, bivalves, forams, and ammonoids all abundant. Permian-Triassic extinction event occurs 251 mya: 95 percent of life on Earth becomes extinct, including all trilobites, graptolites, and blastoids.	270 (میلیون سال قبل)
			Cisuralian		300 (میلیون سال قبل)
		Carboniferous (Pennsylvanian)	Upper/Late	Winged insects radiate suddenly; some (esp. Protodonata and Palaeodictyoptera) are quite large. Amphibians common and diverse. First reptiles and coal forests (scale trees, ferns, club trees, giant horsetails, *Cordaites*, etc.). Highest-ever oxygen levels. Goniatites, brachiopods, bryozoa, bivalves, and corals plentiful in the seas. Testate forams proliferate.	306.5 (میلیون سال قبل)
			Middle		312 (میلیون سال قبل)
			Lower/Early		318 (میلیون سال قبل)
		Carboniferous	Upper/Late	Large primitive trees, first land vertebrates, and amphibious sea-scorpions live amid coal-forming coastal swamps. Lobe-finned rhizodonts are big fresh-water predators. In the oceans, early sharks are common and quite diverse; echinoderms (esp. crinoids and blastoids) abundant. Corals, bryozoa, goniatites	326 (میلیون سال قبل)
			Middle		345 (میلیون سال قبل)
			Lower/Early		359

				and brachiopods (Productida, Spiriferida, etc.) very common. But trilobites and nautiloids decline. Glaciation in East Gondwana.	(میلیون سال قبل)
		Devonian	Upper/Late	First clubmosses, horsetails and ferns appear, as do the first seed-bearing plants (progymnosperms), first trees (the tree-fern *Archaeopteris*), and first (wingless) insects. Strophomenid and atrypid brachiopods, rugose and tabulate corals, and crinoids are all abundant in the oceans. Goniatite ammonoids are plentiful, while squid-like coleoids arise. Trilobites and armoured agnaths decline, while jawed fishes (placoderms, lobe-finned and ray-finned fish, and early sharks) rule the seas. First amphibians still aquatic. "Old Red Continent" of Euramerica.	385 (میلیون سال قبل)
			Middle		397 (میلیون سال قبل)
			Lower/Early		416 (میلیون سال قبل)
		Silurian	Pridoli	First vascular plants (the whisk ferns and their relatives), first millipedes and arthropleurids on land. First jawed fishes, as well as many armoured jawless fish, populate the seas. Sea-scorpions reach large size. Tabulate and rugose corals, brachiopods (*Pentamerida*, Rhynchonellida, etc.), and crinoids all abundant. Trilobites and mollusks diverse; graptolites not as varied.	418 (میلیون سال قبل)
			Upper/Late (Ludlow)		422 (میلیون سال قبل)
			Wenlock		428 (میلیون سال قبل)
			Lower/Early (Llandovery)		444 (میلیون سال قبل)
		Ordovician دوره	Upper/Late	Invertebrates diversify into many new types (e.g., long straight-shelled	460 (میلیون سال قبل)

		اردویسین	Middle	cephalopods). Early corals, articulate brachiopods (*Orthida*, *Strophomenida*, etc.), bivalves, nautiloids, trilobites, ostracods, bryozoa, many types of echinoderms (crinoids, cystoids, starfish, etc.), branched graptolites, and other taxa all common. Conodonts (early planktonic vertebrates) appear. First green plants and fungi on land. Ice age at end of period.	472 (میلیون سال قبل)
			Lower/Early		488 (میلیون سال قبل)
		Cambrian کامبرین	Upper/Late (Furongian)	Major diversification of life in the Cambrian Explosion. Many fossils; most modern animal phyla appear. First chordates appear, along with a number of extinct, problematic phyla. Reef-building Archaeocyatha abundant; then vanish. Trilobites, priapulid worms, sponges, inarticulate brachiopods (unhinged lampshells), and many other animals numerous. Anomalocarids are giant predators, while many Ediacaran fauna die out. Prokaryotes, protists (e.g., forams), fungi and algae continue to present day. Gondwana emerges.	501 (میلیون سال قبل)
			Middle		513 (میلیون سال قبل)
			Lower/Early		542 (میلیون سال قبل)
Proter-ozoic	Neo-proterozoic	Ediacaran	Good fossils of multi-celled animals. Ediacaran fauna (or Vendobionta) flourish worldwide in seas. Trace fossils of worm-like *Trichophycus*, etc. First sponges and trilobitomorphs. Enigmatic forms include oval-shaped *Dickinsonia*, frond-shaped *Charniodiscus*, and many soft-jellied creatures.		630 (میلیون سال قبل)
		Cryogenian	Possible "snowball Earth" period. Fossils still rare. Rodinia landmass begins to break up.		850 (میلیون سال قبل)
		Tonian	Rodinia supercontinent persists. Trace fossils of simple multi-celled eukaryotes.		1000 (میلیون سال قبل)

			First radiation of dinoflagellate-like acritarchs.	
	Meso-proterozoic	Stenian	Narrow highly metamorphic belts due to orogeny as supercontinent Rodinia is formed.	1200 (میلیون سال قبل)
		Ectasian	Platform covers continue to expand. Green algae colonies in the seas.	1400 (میلیون سال قبل)
		Calymmian	Platform covers expand.	1600 (میلیون سال قبل)
	Paleo-proterozoic	Statherian	First complex single-celled life: protists with nuclei. Columbia is the primordial supercontinent.	1800 (میلیون سال قبل)
		Orosirian	The atmosphere became oxygenic. Vredefort and Sudbury Basin asteroid impacts. Much orogeny.	2050
		Rhyacian	Bushveld Formation occurs. Huronian glaciation.	2300
		Siderian	Oxygen Catastrophe: banded iron formations result.	2500
Archean	Neoarchean	Stabilization of most modern cratons; possible mantle overturn event.		2800 (میلیون سال قبل)
	Mesoarchean	First stromatolites (probably colonial cyanobacteria). Oldest macrofossils.		3200
	Paleoarchean	First known oxygen-producing bacteria. Oldest definitive microfossils.		3600
	Eoarchean	Simple single-celled life (probably bacteria and perhaps archaea). Oldest probable microfossils.		3800 (میلیون سال قبل)
Hadean	Lower Imbrian			c.3850
	Nectarian			c.3920
	Basin Groups	Oldest known rock (4100 mya).		c.4150
	Cryptic	Formation of earth (4570 mya). Oldest known mineral, zircon (4400 mya).		c.4570