Dictionary of Geomorphology

Dr. Emrullah GÜNEY
Dr. Recep BOZYİĞİT
Dr. İhsan BULUT
Dr. Ali MEYDAN

PEGEM AKADEMİ

Dr. Emrullah Güney
Dr. Recep Bozyiğit
Dr. İhsan Bulut
Dr. Ali Meydan

Dictionary of Geomorphology

ISBN 978-605-318-652-6
DOI 10.14527/9786053186526

Kitap içeriğinin tüm sorumluluğu yazarlarına aittir.

© 2016, Pegem Akademi
Bu kitabın basım, yayım ve satış hakları
Pegem Akademi Yay. Eğt. Dan. Hizm. Tic. Ltd. Şti.ye aittir.
Anılan kuruluşun izni alınmadan kitabın tümü ya da bölümleri,
kapak tasarımı; mekanik, elektronik, fotokopi, manyetik, kayıt
ya da başka yöntemlerle çoğaltılamaz, basılamaz, dağıtılamaz.
Bu kitap T.C. Kültür Bakanlığı bandrolü ile satılmaktadır.
Okuyucularımızın bandrolü olmayan kitaplar hakkında
yayınevimize bilgi vermesini ve bandrolsüz yayınları
satın almamasını diliyoruz.

1. Baskı: Ekim 2016, Ankara

Yayın-Proje: Seher Reyhani
Dizgi-Grafik Tasarım: Didem Kestek
Kapak Tasarımı: Pegem Akademi

Sonçağ Yayıncılık Matbaacılık Reklam San Tic. Ltd. Şti.
İstanbul Cad. İstanbul Çarşısı 48/48 İskitler - Ankara
(0312 341 36 67)
(0535 292 34 31)

Yayıncı Sertifika No: 14749
Matbaa Sertifika No: 25931

İletişim

Karanfil 2 Sokak No: 45 Kızılay / ANKARA
Yayınevi: 0312 430 67 50 - 430 67 51
Yayınevi Belgeç: 0312 435 44 60
Dağıtım: 0312 434 54 24 - 434 54 08
Dağıtım Belgeç: 0312 431 37 38
Hazırlık Kursları: 0312 419 05 60
İnternet: www.pegem.net
E-ileti: pegem@pegem.net

Prof. Dr. Emrullah GÜNEY

1947 yılında Göre'de (Nevşehir) doğdu. İlkokulu Göre'de, Ortaokul ve Liseyi Nevşehir'de tamamladı. 1964 yılında girdiği DTCF Fiziki Coğrafya ve Jeoloji Kürsüsünü 1968 yılında bitirdi. Fen Fakültesinde Genel Jeoloji sertifikasını; Ziraat Fakültesinde Toprak sertifikasını aldı. 1969 yılı içinde 6 ay teorik ve 6 ay pratik olmak üzere MTA Enstitüsü Genel Direktörlüğü'nün açtığı Yüksek Prospeksiyon kursunu izleyerek prospektör-obzerver ünvanıyla l971'e kadar çalıştı. 1971-1978 arasında Nevşehir, Ürgüp, Zara (Sıvas), Kadışehri (Yozgat) gibi kentlerde ortaöğretim öğretmeni olarak Milli Eğitim Bakanlığında görev yaptı. 5 Haziran 1978'de Fırat Üniversitesi'nde coğrafya asistanı oldu. 1980-1984 yılları arasında İstanbul Üniversitesi Coğrafya Enstitüsü öğretim üyesi Prof. Dr. Metin Tuncel'in denetiminde "Nevşehir Yöresinde Doğa Açısından Turizm" adlı doktora tezini hazırladı. 1 Ekim 1985'de Diyarbakır Dicle Üniversitesi Eğitim Fakültesinde Yardımcı Doçent olarak göreve başladı. 27 Ekim 1995'de Doçent unvanını aldı. Hazırladığı bazı dosyalar Dicle Üniversitesi tarafından kitaplaştırılmıştır. Ayrıca Almanya'da 2 ve Hollanda'da 1 kitabı Türk işçilerinin çocukları için ders kitabı olarak yayınlanmıştır. Mart 2014'te emekli oldu.

emrullahguney@gmail.com

Yrd. Doç. Dr. Recep BOZYİĞİT

1965 yılında Seydikemer'de doğdu. İlk ve ortaöğretimini Fethiye'de tamamladı. Yükseköğretim hayatına Hacettepe Üniversitesi, Maden Fakültesinde başladı. Daha sonra Selçuk Üniversitesi, Eğitim Fakültesi, Coğrafya Eğitimi Anabilim Dalını bitirerek öğretmen oldu. Kısa bir süre öğretmenlik yaptıktan sonra 1990 yılında Selçuk Üniversitesi'ne araştırma görevlisi olarak atandı. 1991 yılında "Eşençay (Kocaçay) Deltası'nın Jeomorfolojisi ve Coğrafik Özellikleri" yüksek lisans, 1997 yılında "Eşen Çayı Havzası'nın Jeomorfoloji" konulu doktora çalışmalarını yaptı. Yazarın bu güne kadar yayınlanmış çok sayıda makale, kitap ve bildiri çalışmaları bulunmaktadır. Halen Necmettin Erbakan Üniversitesi, Ahmet Keleşoğlu Eğitim Fakültesi, Coğrafya Eğitimi Anabilim Dalı'nda öğretim üyesi olarak çalışmaktadır. Evli ve iki çocuk babasıdır.

rbozyigit@konya.edu.tr

Prof. Dr. İhsan BULUT

1961'de Sorgun'da doğdu. İlk ve orta öğrenimini Sorgun'da tamamladı. 1985'de Atatürk Üniversitesi Edebiyat Fakültesi Coğrafya Bölümünü bitiren Bulut, aynı yıl Eylülde açılan araştırma görevliliği sınavını kazanarak, 1986'da aynı bölümde göreve başladı. 1988'de "Kars Kümbetli Köyü: Yol boyu Köylerine Bir Örnek" konulu yüksek lisans tezini, 1992'de ise "Beşeri ve İktisadi Coğrafya Acısından Bir Araştırma Erbaa Ovası ve Çevresi" konulu doktora çalışmalarını tamamlamıştır. Prof. Dr. Bulut, 23 Ocak 1993'te Atatürk Üniversitesi Kazım Karabekir Eğitim Fakültesi Sosyal Bilimler Eğitimi Bölümü Coğrafya Eğitimi Anabilim Dalı'na Yardımcı Doçent olarak atanmıştır. 1998 tarihinde Doçent unvanını almış bölüm başkanlığını (6 yıl) ve Türkiye Coğrafyası ile Beşeri Coğrafya Anabilim Dalı başkanlıkları görevlerini de yürütmüştür. Görev yaptığı süre içerisinde Beşeri ve Ekonomik Coğrafya konularında lisans, yüksek lisans ve doktora danışmanlıkları ile ilgili alanlardaki dersleri yürüten Bulut'un 6'sı kitap, 25'i yurtiçi ve yurtdışı sempozyum bildirisi olmak üzere 100'e yakın çalışması bulunmaktadır. 15 Temmuz 2004 tarihinde de profesörlüğe yükseltilmiştir. Edebiyat Fakültesi fakülte ve yönetim kurulu üyeliği görevlerini uzun yıllar sürdüren Bulut, 31.12.2014 tarihinde Akdeniz Üniversitesi Edebiyat Fakültesi Coğrafya Bölümü'ne kurucu bölüm başkanı olarak atanmış ve halen Akdeniz Üniversitesi Edebiyat Fakültesi Coğrafya Bölümü başkanlığı görevini sürdürmektedir.

ihsanbulut@hotmail.com

Doç. Dr. Ali MEYDAN

1974 yılında İçel'in Tarsus ilçesinde doğan Dr. Ali Meydan, 1993 yılında kazandığı Selçuk Üniversitesi Eğitim Fakültesi'nden 1997 yılında mezun olup, İstanbul Ümraniye Ahmet Yavuz İlköğretim Okulu'na sınıf öğretmeni olarak atandı. 1998 yılında Selçuk Üniversitesi Eğitim Fakültesi'ne Araştırma görevlisi olarak alınan Meydan, 2001 yılında yüksek lisans programından mezun olmuştur. 2001 yılında Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Coğrafya Öğretmenliği'nde doktoraya başlayan Meydan, 2005 yılında "Sosyal Bilgiler Dersi Coğrafya Ünitelerinin İşlenişinde Öğrenmeyi Öğrenme Stratejilerinin Öğrencilerin Başarı ve Tutumlarına Etkisi" konulu doktora tezi ile mezun olmuştur. Çeşitli bilimsel dergilerde makalesi, ulusal ve uluslararası sempozyum ve kongrelerde yayını bulunan Meydan, Nevşehir Hacı Bektaş Veli Üniversitesi Eğitim Fakültesi Sosyal Bilgiler Eğitimi Ana Bilim Dalı'nda Doç. Dr. olarak görevine devam etmektedir.

alimeydan01@gmail.com

REFACE

Geomorpology Geomorpology (Physical Geology) is the study of the Earth the materials of which it is made, the structure of those materials, and the processes acting upon them.

It includes the study of organisms that have inhabited our planet.

An important part of geology is the study of how Earth's materials, structures, processes and organisms have changed over time.

We hope; this small dictionary will be useful for geography, engineering and achitecture students.

aa: A lava flow with a rough surface. Hawaiian word used to describe a lava flow whose surface is broken into rough angular fragments.

Ablation: All processes by which snow and ice are lost from a glacier, floating ice, or snow cover; or the amount which is melted. These processes include melting, evaporation, (*sublimation*), wind erosion, and calving. Synonym: *wastage*.

Ablation area: In the lower part of a glacier, called the ablation area or zone of wastage, more snow is lost in summer than accumulates in winter so there is net loss of glacial ice. Glacial ice flows downward from the accumulation area to the ablation area and continuously replenishes it.

Abrasion: The wearing away of a rock by rubbing, e.g. by small particles of rock. As the rocks and smaller grains collide, their sharp edges and corners wear away. The mechanical wearing and grinding of rock surfaces by friction and impact is called abrasion. Abrasion produces rocks with a characteristic smooth, rounded appearance.

Absorbtion: The taking in of water and dissolved minerals and nutrients across cell membranes. Contrast with ingestion.

Abyssal: Deep ocean ant its floor; at more than 2000 m depth.

Abyssal plain: A level area of the flor of the deep ocean. Sea bed below about 4 000 meres. It is used as a general term to describe the bed of the ocean that lies deeper than the continental shelves but shallower than the deep-sea trenches.

Abyssal hills: Relatively small hills that rises from the floor of the deep ocean to heights of about 1000 m.

Ablation: The loss of ice from a glacier due to melting, evaporation, or calving. The region of a glacier where there is a net loss of ice is known as the ablation area.

Accelerated erosion: An increased rate of erosion caused by humans.

Accessory mineral: A mineral that occurs in a rock in minute quantities, and does not affect the way the rock is named or classified.

Accidental: Pyroclastic rocks that are formed from fragments of non-volcanic rocks or from volcanic rocks not related to the erupting volcano.

Accumulation: The build-up or increase of one or more constituents in the soil at a given position as a result of translocation. The build-up may be a residue due to the translocation of material out of the horizon or may be due to an addition of material. Usually refers to soluble substances and clay particles.

Accumulation area: The part of a glacier where snowfall exceeds losses by melting, evaporation, and calving.

Acid: In petrology an acid igneous rock is one that has 10 per cent or more free quartz; granite and rhyolite are examples. The use of the word "*acid*" in this way has its origin in an earlier view of silicates as compounds of silica (SiO_2) with oxides of metals. Silica was then thought of as playing the part of an acid.

Acid volcanics: Light coloured volcanic rocks containing more than 66 per cent silica, free quartz and a minimum of dark coloured minerals. Moved by the wind.

Acidic rock: A type of igneous rock (*e.g. granite*) that consists predominantly of light-coloured minerals and more than 66% free or combind silica.

Acid rock is an igneous rock that contains more than 60 per cent silica and free quartz.

Active cave: A cave which has a stream flowing in it. Cf. Live cave.

A cave is a deep natural hollow place a underground, usually with an opening to the surface.

Active volcano: A volcano that is erupting. Also, a volcano that is not presently erupting, but that has erupted within historical time and is considered likely to do so in the future.

Volcano is a mountain with a large opening (crater) at the top (and often others on the sides) through which melting rock (lava), steam, gases etc., escape from time to time with explosive force from inside the earth: An active volcano may explode at any time.

Actualism: The principle that the same processes and natural laws that operated in the past are those we can actually observe or infer from observations as operating at present. Under present usage, *uniformitarianism* has the same meaning as actualism for most geologists.

Adsorption: The attachment of a particle, ion or molecule to a surface. Calcium is adsorbed onto the surface of clay or humus.

Adularia: A low-temperature from of $KAlSi_30_8$ found in veins.

Aeolian deposits: Wind-deposited sediments, such as sand dunes. The erosion, transport, and deposition of material by wind, and work best when vegetation cover is sparse, or absent.

Aggradation: The wearing down of the rocks to a lower level. The process by which a stream's gradient steepens due to increased deposition of sediment. The build-up of sedi-

ments at the headwaters of a lake or reservoir or at a point where streamflow slows to the point that it will drop par tor all of ts sediment load.

Aggregates: Discrete clusters of particles formed naturally or artificially and including such particles as crumbs, granules, clods, faecal pellets, fragments of faecal pellets and concretions.

Aggregation: The process by which particle coalesce to form aggregates.

Albite: Plagioclase feldspar.

Alkali feldspars: Feldspars containing sodium silicate, $NaAlSi_30_8$ (*soda feldspar*) or potassium silicate, $KAl\ Si_30_8$ (*potash feldspar*), or the two together. The group includes orthclase, adularia, sanidine, and microcline.

Alkali soil: Soil containing such a great quantity of sodium salts precipitated by evaporating ground water that it is generally unfit for plant growth.

Alkaline rock: A rock containing more than average amounts of potassium-and sodium- bearing minerals.

Alpine glaciers: Mountainous regions are generally colder and wetter than adjacent lowlands. Near the mountain summits, winter snowfall is high and summers are short and cool. These conditions create alpine glaciers. They exist on every continent – in the Arctic and Antarctic, in temperate regions, and in the tropics. Glaciers cover the summits of Mount Kenya in Africa and Mount Cayambe in South America even though bath peaks are near the equator. Some alpine glaciers in high latitudes flow great distances from the peaks onto adjacent lowlands. For example, the Kahiltna Glacier flows down the southwest side of Denali (*Mount McKinley*) in Alaska. It is about 65 kilometers long, 12 kilometers wide at its widest point, and about 700 meters thick. Most alpine glaciers are smaller; a few are larger.

Alluvial deposits: Detrital material which is transported by a river and deposited-usually temporarily – at points along the floodplain of a river. Commonly composed of sands and gravels.

Alluvial - being, concerning, or made of soil put down by rivers, lakes, floods, etc.

Alluvial fan: A fan-shaped depositof alluvium formed at the place where a swiftly stream enters a plain or open valley. Here its speed is checked and it deposits much of its load. A stream can slow down suddenly and deposit much of its sediment in two types of environments. If a stream flows from a step mountain front onto a flat plain, its velocity decreases abruply. Here it deposits particles of all sizes, from cobbles to fine silt, in a fan-shaped landform called an alluvial fan.

Alluvial fan is a cone-shaped pile of alluvium deposited where the gradient of a stream becomes less (*e.g. at the base of a step slope*) . Alluvial fans are common in dry regions.

Alluvial plain: A flat area built up of alluvium.

Alluvial valley: River or stream valley flanked by floodplains that are frequently inundated by seasonal floods and underlain by alluvium.

Valley is the land between 2 lines of hills or mountains, often with a river running through it. The land through which a stated river or great river system flows.

Alluvium: Mud, sand, gravel, and other materials moved by streams and deposited by them.

Alpine glacier: Any glacier in a mountain range which is dominantly confined by the surrounding topography. It usually originates in a cirque and may flow down into a valley previously carved by a stream. Synonym: *mountain glacier.*

Alteration: Any physical or chemical change in a mineral or rock subsequent to original formation; usually results in the formation of new mineral sor in textural changes in the rock.

Amendment (soil): A material that is added to soil to improve chemical or physical charateristics or as a means of treating a waste material.

Anaclinal: The term anaclinal is applied to an antecedent streams flowing on a surface which has been slowly tilted in a direction opposite to the flow of the stream. If sufficiently vigorous, such a stream maintains its course. Davis cites the lower Raritan of New Jersey as an anaclinal stream.

Angle: Edge along which the faces of a crystal meet. Sometimes called the interfacial angle.

Annular drainage pattern: Some of the streams which drain a maturely dissected dome follow circular paths around the dome in conformance with the outcrops of the weaker belts. These are subsequet streams. They have both obsequent and resequent tributaries. An annular drainage pattern is simply a variation or special form of the trellis pattern. The annular plans of the streams around the Black Hills and of the Weald of England clearly reflect the rock structure of these two eroded domes.

Antecedent: An antecedent stream is one which has maintained its course across an uplift which it antedates. This naturally presumes a very slow uplift. The Gren River where it cuts across the Uinta Mountains through the Canyon of Ladore has often been cited as an antecedent stream. This is now considered doubtful as there is evidence that the Gren River was blocked to form a lake whose outlet was superimposed at the point

where the canyon now exists. A beter example is the Sevier River across the Sevier Range in tah. Otherwise it is impossible to account fort his gorge cutting entirely across a block mountain.

Antecedent valley is a stream valley that existed before uplift, faulting, or folding occured and which has maintained itself during and after these events.

Anticline: An arched fold in which the rock layers usually dip away from the axis of the fold.

In structural geology, an anticline is a fold that is convex up and has its oldest beds at its core. On a geologic map, anticlines are usually recognized by a sequence of rock layers that are progressively older toward the center of the fold because core of the fold is preferentially eroded to a deeper stratigraphic level relative to the topographically lower flanks. The strata dip away from the center, or crest, of the fold.

Aphanitic: A rock texture in which the crystals are too small to be seen the eye without using a lens.

Aquifer: A layer of porous rock that can hold and transmit water. A formation, a group of formations, or part of a formation that contains sufficient baturated permeable material to yield significant quantities of water to wells and springs.

Aragonite: A less common crystalline form of calcium carbonate than calcite, denser and orthorhombic

Arch: Sea arch. Bridge of rock left above an opening eroded in a headland by waves. A mass of rock in the shape of an arch. Arches are commonly formed by coastal erosion of stratified rocks where harder beds rest on weaker bds.

Arete: A sharp ridge that separates adjacent glacially carved valleys. Arete is a sharp-edged ridge formed by glacial erosion, commonly between two cirques.

Aride: A term applied to a region or climate in which precipitation is toolow to support crop production.

Arroyo: A watercourse which is normally dry but may temporarily contain running water after heavy rain. The term is used mainly of the desert regions of North America and South America.

Aseismic ridge: A submarine ridge with which no earthquakes are associated.

Ash: Small rock fragments formed by volcanic explosions. Fine particles of pulverized rock blown from an explosion vent Measuring less than 1-10 inch in diameter, ash may be either solid or molten when first erupted. By far the most common variety is vitric ash (*glassy particles formed by gas bubbles bursting through liquid magma*).

Ash is fine particles of pulverized rock blown from an explosion vent.

Ashfall (Airfall): Volcanic ash that has fallen through the air from an eruption cloud. A deposit so formed is usually well sorted and layered.

Ash flow: A turbulent mixture of gas and rock fragments, most of which are ash-sized particles, ejected violently from a crater or fissure. The mass of pyroclastics is normally of very high temperature and moves rapidly down the slopes or even along a level surface.

Astenosphere: The layer of the mantle immediately below the rigid lithdsphere. It is sufficiently non-rigid to flow slowly in a solid state and plays a key part in the movement of the tectonic plates.

Atol: A ring of coral rock round a central lagoon.

Autochthonous: A term applied to shelves on which older shelf sediments are primarily being reworked by modern shelf processes.

Avalanche: A mass of snow and ice which slides down a mountain slope, often accompanied by large quantities of rock.

Aquifer: A body of rock that contains significant quantitities of water that can be tapped by wells or springs.

Avalanche: A large mass of material or mixtures of material fallin or sliding or sliding rapidly under the force of gravity. Avalanches often are classified by their content, such as snow, ice, soil, or rock avalanches. A mixture of these materials is a debris avalanches.

Backplain: Parts of a river floodplain furthest from the channel.

Backslope: The hillslope profile position that forms the steepest and generally linear, middle portion of the slope.

Badlands: An area in a very dry climate which is cut by large numbers of deep gullies and is almost bare of vegetation, owing to erosion by the occasional heavy rain. The name was originally applied to the Bad Lands of South Dakota, in the United States, which were so called because they were so rugged and inhospitable to man.

Badlands is a type of arid terrain where softer sedimentary rocks and clay-rich soils have been extensively eroded by wind and water. It can resemble malpais, a terrain of volcanic rocks. Canyons, ravines, gullies, hoodoos and other such geological forms are common in badlands.

Badload: Sedimentary material subject to transport by flowing water (e.g.*currents*) which is moved by Rolling, pushing, and saltation. The size of particles moved is proporional to the strength of water movement.

Bajada: A broad, gently sloping, depositional surface frmed at the base of a mountain range in a dry region by the coalescing of individual alluvial fans.

Bank: A raised portion of the sea bed. The shallow waters above the bank are often rich fishing grounds.

Bar: A generic term for any of various elongate offshore ridges, banks, or mounds of sand, gravel, or other unconsolidated material submerged or built up by the action of waves or currents.

Barchan: A crescent-shaped dune with the horns of the crescent pointing downwind.

Barchanes show both transverse and longitudinal characteristics. They ocur neither where the sheet of wind has the complete mastery over the snd, nor where the drifting sand is too heavy fort he carrying power of the wind. They dot the desert plain where the sheet of wind has, fort he most part, the mastery of the sand, but where it drops its burden at certain points. The horns, or cusps, of the barchanes point to leeward, fort he lowest parts of the dune travel fastest. A barchane exposed to winds from all quarters

gradually changes to a sationary dune.

Barchan dune: When the dune migrates, the edges move faster because there is less sand to transport. The resulting barchan dune is crescent-shaped, with the tips of the crescents pointing downwind. Barchan dunes are not connected to one another, but instead migrate across the landscape independently. In a rocky desert, only a small portion of the surface is covered by barchan dunes; the remainder is mostly rock or desert pavement.

Bare karst: Karst with much exposed bedrock.

Barriere island: A long island of sediment paralel to a coastline. It is normally higher than a barrier bar.

Barrier beach: A bar essentially paralel to the shore, which has been built up so that its crest rises above the normal high water level. Also called barrier island and offshore barrier.

Barrier island: A long island of sediment paralel to a coastline. It is normally higher than a barrier bar.

Barrier spit: Similar to barrier island, only connected to the mainland.

Basalt: A fine grained igneous rock forming lava flows or minor intrusions. It is composed of plagioclase, augite and magnetite; olivine may be present.

Basalt is a type of dark greenish-black igneous rock.

Base flow: The dependable flow in a river, which results primarily from groundwater sources.

Basement rock: General term to describe older rocks beneath a sedimentary basin.

Basic: In petrology a basic igneous rock is one that contains no quartz and has feldspars with more calcium than sodium; basalt and gabro are exemples. Basic rocks contain 45 or 55 per cent silica.

Basic rock: An igneous rock (e.g. *gabbro*) with low silica content and a high percentage of pyroxene, hornblende, and labradorite.

Basin: A domelike, similarly shaped syncline is called a basin. Domes and basins can be small structures a few kilometers in diameter or less, but commonly are much larger. Large domes and basins result from regional warping of the entire ontinental crust.

Batholith: A huge, very large body of igneous intrusion, 100 km or more across, which originates deep underground. The Earth's great batholiths are known to science only if exposed on the surface by weathering.

Batholith is a massive discordant pluton with a surface area greater than 100 square kilometers, typically having a depth of about 30 kilometers. Batholiths are generally found in elongated mountain ranges after the country rock above tem has eroded.

Bay: A recess or inlet in the shore of a sea or lake between two capes or headlands, not as large as a gulf but larger than a cove.

Beach: An accumulation of sand, shell debris, or larger particles along a shoreline. A beach face is the steeply sloping part of a beach below a berm. A deposit of non-cohesive material situated on the interface between dry land and the sea and actively "*worked*" by present-day hydrodynamics processes and sometimes by winds. The zone of unconsolidated material that extends landward from the low water linet o the place where there is marked change in material or physiographic form, or to the line of permanent vegetation. The seaward limit of a beach- unless otherwise specified – is the mean low water line. A beach includes foreshore and backshore. The zone of unconsolidated material that is moved by waves, wind and tidal currents, extending landward to the coastline.

Beach is a shore of an ocean, sea, or lake or the bank of a river covered by sand, smooth Stones, or larger pieces of rock. Seashore area, esp. One used for swimming and sunbathing. Shore.

Beach erosion: The carrying away of beach materials by wave action, tidal currents, littoral currents or wind.

Beach ridge: An arcuate ridge of sand that parallels or sub-parallels a coast. Beach ridges are formed by fluctuation in ater level that create the core of the ridge.

Bed: Distinct layer of sedimentary rock. It may be only milimetres thick of several metres. It represents the material laid down during a space of time when conditions were stable.

Bedrock: The solid rock at the surface of the Earth or at some depth beneath the soil and superficial deposits.

Bedrock-collapse sinkhole: Formed by the collapse of a bedrock roof into an underlying cave. Bedrock collapse in karst is rare, but it is principal origin of karst window.

Bedding: The arrangement of sedimentary rocks in approximately paralel layers (*strata, or "beds*") which correspond to the original sediments that formed the rock.

Bedding plane: Surface marking the break between two distinct pulses (*beds*) of sediment deposition.

Bedrock: Consolidated rock composed of cemented or lithified sediments (*such as shale, limestone*) or crystalline rck such as granite or slate. Underlies all surfical soil, sand, gravel, clay, etc.

Benthic: Organisms that live on the bottom of the ocean are called benthic organisms. They are not free-floating like pelagic organisms are.

Bergschrund: A deep crack formed at the back of a cirque glacier caued by the glacier moving away from the cirque wall.

A bergschrund is a crevasse that forms where the moving glacier ice separates from the stagnant ice above. It is often a serious obstacle for mountaineers, who sometimes abbreviate "bergschrund" to "schrund". In a corrie or cirque, the bergschrund is positioned at the rear, paralel to the back wall of the corrie. It is caused by the rotational movement of the glacier. In a longitudinal glacier, the bergschrund is at the top end of the glacier at a right angle to the flow of the glacier. It is caused by the downwards flow of the glacier.

Bifurcation: Location where a river separates in two or more reaches or branches (*the opposite of a confluence*).

Bituminous coal: A mediu-hard, highly carbonaceous black coal: also called "*soft coal*".

Bituminous rocks: Rocks that contain (*and sometimes smell of*) asphalt, tar, or petroleum.

Black earth: Dark coloured pedal clay soils usually found in valleys and often derived from basalt.

Blind valley: A valley that is closed abruptly at its lowe end by a cliff or slope facing up the valley. It may have a perennial or intermittent stream which sinks at its lower end or it may be a dry valley.

Block-faulted belts: Long, narrow, sometimes diamond-shaped, zones called block-faulted belts are marked by strong faulting. These belts ocur between pairs of mountain chains as Intermontane Plateaus or as "*rift valley*" belts that cross the great shields. These strongly faulted features exhibit the effects of various types of stres that ocur within the continent's crust. Continental rifts result from streching forces within the lithosphere. The major rift zonez are characterized by faulting and the upward movement of magma. Some rift zones may be true plate boundaries, as in the case of the African Rift, but often are not closely related to any of them.

Blockfield: An area of broken rocks, usually in a mountainous region.

Blockstream: Periglacial landform composed of a "river" of boulders on low angle slopes.

Blowhole: Extension of a sea cave that reaches the top of the cliff. Pressure built up in the cave by waves causes and air to spurt through this hole.

Blowout: A depression in the land surface caused by wind erosion.

Bog: Waterlogged, spongy, poorly drained ground, consisting of mosses containing acidic, decaying vegetation such as spaghnum, sedges, and heats, that may develop into peat. A bog sometimes represents the final stage of the natural processes of eutrophication by which

lakes and other bodies of water are very slowly transformed into land areas.

Bomb: Fragments of molten or semi-moltenrock, 2 1-2 inches to many feet in diameter, which is blown out during an eruption. Because of their plastic condition, bombs are often modified in shape during their flight or upon impact.

Boss: An igneous intrusion that is roughly circular in horizontal cross-section.

Braided stream: A stream that becomes a maze of interconnected channels with excess sediment. River in which the main channel is braided with multiple paths that split and join frequently. Usually a gravel or sand bed stream.

A braided river is one of a number of channel types and has a channel that consists of a network of small channels separated by small and often temporary island called braid bar sor, in British usage, ait sor eyots. Braided streams ocur in rivers with high slope and-or large sediment load. Braided channels are also typical of environments that dramatically decrease channel depth, and consequently channel velocity, such as river deltas, alluvial fans and peneplains.

Breccia: Angular fragments of rock and-or fossils cemented together or with a matrix of finer sediment. Cf. *Bone breccia*.

Buoy: A float; especially a floating object moored to the bottom, to mark a channel, anchor, shoal rock etc. Some common types include: a nun or nut buoy is conical in shape; a can buoy is squat and cylindrical above water and conical below water ; a spar buoy is a vertical, slender spar anchored at one end ; a bell buoy, bearing a bell, runs mechanically or by the action of waves, usually Marks shoals or rocks ; a whistling buoy, similarly operated, Marks shoals or channel entrances; a dan buoy carries a pole with a flag or light on it.

Burning clouds: *Nuees ardente*. In some kinds of violent volcanic eruptions pyroclasts combine with large quantities of hot gases to form a fluid-like flow which is capable of moving very rapidly even over very low gradints. The great mobility of these pyroclastic flows is attributable to the volume of hot gas present and the heating of engulfed air which renders the solid material highly buoyant.

Butte: A narrow pinnacle of resistant rock with a flat top and very step sides.

A butte is a narrow hill of resistant rock with a flat top and very step sides. Most butte form by continued erosion of mesas. The term butte is also used in other parts of the country for any isolated hill.

Calcite: A common mineral form of calcium carbonate.

Calcareous: Containing calcium carbonate or calcite.

Calcification: Used by some to refer to the processes of calcium carbonate accumulation.

Calcite: Crystalline calcium carbonate, CaCO3. Crystalizes in the hexagonal system, the main types of crystals in soils being dog-tooth, prismatic, nodular, fibrous granular and compact.

Caldera: Caldera in the Spanish language means "*kettle*" or "*cauldron*"; in geological literature, it has come to be known as a volcanic collapse crater. With time, the upper parts of volcanic cones may be destroyed and enormous circular depressions with step iner walls and a flat flor are formed-in their place. Such depressions are called calderas. They may have different origins. With recent calderas and volcanic-tectonic depressions are associated large hydrothermal deposits (*Uzon, Bolshoi Semyachik, Pauzhetka in Kamchatka*, *Wyraney in New Zealand*) Highly rich deposits of copper, gold, silver, rare metals and uranium are confined to Paleocalderas.

Caldera is a vast depression at the top a vlcanic cone, formed when an eruption substantially empties the reservoir of magma beneath the cone's summit. Eventually the summit collapses inward, creating a caldera. A caldera may be more than 15 kilometers in diameter and more than 1000 meters deep.

Caliche: A layer or horizon cemented by the deposition of calcium carbonate. It usually occurs within the soil but may be at the surface due to erosion.

Calve: Of a glacier: to create icebergs by shedding ice blocks into a sea or lake.

Calving: Breaking off and floating away as icebergs of either a tidewater glacier or an ice shelf. Calving is a very efficient form of ablation, thus helps stabilize the extent of ice shets (like *Antarctica*) which might otherwise expand continuously from a positive mass budget.

Canyon: Gorge. A narrow step-sided gorge formed by a river cutting downward through the rocks in a dry region. Because the rainfall is low, erosion of the canyon sides is relatively slow, and so their steepness is maintained.