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rabies. An infectious disease of the central nervous system in mammals, caused by a lyssavirus. Usually transferred by the bite of an infected animal, such as dogs, skunks, racoons, or rarely bats.

Characterized by choking, convulsions, inability to swallow, etc. Different genetic strains are now recognized and can be identified by tests. Transfer of rabies from bats via aerosols to caged animals in a cave has been demonstrated, but has not been proven in humans^[23].

radial flow. 1. Radial flow into or out of a well under ideal circular boundary conditions^[16]. 2. The flow of ground water in all directions in response to recharge entering the subsurface at or near the top of a ground-water plateau. This conditions occurs most often through point recharge entering the subsurface via sinkholes in karst terranes.

radioactive tracer. A tracer used in hydrological direction and velocity determinations^[16]. The two most common types are tritium and deuterium.

radioactivity log. A log measuring radioactivity in a borehole^[16].

radioisotope. An unstable isotope of an element that decays or disintegrates spontaneously, emitting radiation^[22].

radionuclide. A radioisotope^[22].

radionuclide retardation. The process or processes that cause the time required for a given-radionuclide to move between two locations to be greater than the

ground-water travel time, because of physical and chemical interactions between the radionuclide and the geohydrologic unit through which the radionuclide travels^[22].

radius of influence. The radial distance from the center of a well bore to the point where there is no lowering of the water table or potentiometric surface (the edge of its cone of depression)^[6].

raft. A thin sheet of crystalline calcite supported by surface tension on a cave pool or lake. The calcite is precipitated mainly in response to evaporation of the pool water and rafts are therefore found mainly in caves in arid regions or caves with powerful through draughts.

rain. Liquid precipitation of atmospheric water in the form of droplets^[16].

rainfall excess. That portion of rain fall that contributes directly to runoff^[16].

rainfall intensity. The volume or depth of rainfall per unit time^[16].

rain gage. An instrument used to measure the height of rainfall^[16].

rain gage network. An areal distribution of rain gages^[16].

rain intensity. The intensity of rain fall expressed in depth per time (in/hr)^[16].

randpolje. An enclosed plain at the edge of a karst area receiving surface water from the nonkarstic area. The water drains out through underground passages in the karst area. The plain is thus completely

enclosed by higher ground. Compare blind valley; karst margin plain^[10].

rappel. The art of descending a rope using some sort of friction between the rope and the rappeller to control the rate of descent^[13]. Synonym: abseil. See also abseil; carabiner.

rappel rack. A long U-shaped steel bar that holds several brake bars and is used for rappelling^[13]. See also rappel.

rappel spool. One of the devices used to create friction between a rappeller and the rope that consists of a spool on which the rope can be wrapped around several times^[13]. See also rappel.

rapid. A stream section with a notably higher flow velocity than in adjoining parts^[16].

rapid flow. Open channel flow with a Froude number greater than unity^[16]. See also Froude Number.

rate of draft. The rate at which water is required for use (demand)^[16].

rate of infiltration. The maximum rate at which soil can absorb water^[16].

rating curve. The graphic relationship of stage to discharge^[16].

rational formula. An equation relating runoff intensity and area to a runoff coefficient^[16].

ravine. A small erosional depression^[16]. See chasm.

raw sewage. Untreated sewage.

raw water. Untreated water^[16].

reaction path modeling. A simulation approach to studying the chemical evolution of a (natural) system^[22].

rebelay. The reanchoring of a rope, usually to avoid rub points or split long pitches.

redirection. Syn. deviation

rebound. An upward movement of soil as a consequence of a decrease in effective stress. In fine-grained soils, rebound is usually much less than the amount of compaction since compaction is mostly irreversible^[21].

receiver. That part of a remote measuring system that receives incoming data or impulses^[16].

receiving surface. A surface receiving precipitation or radiation^[16].

recessional moraine. A moraine deposited by a retreating glacier^[16].

recession curve. The falling limb of a hydrograph curve^[16].

recession flow. The flow that occurs after rainfall has ended^[16].

recession segment. That part of a hydrograph that represents the withdrawal of water from storage^[16].

recharge. 1. The process of addition of water to the saturated zone^[22]. 2. The artificial replenishment of a depleted

aquifer by injection or infiltration of water from the surface^[16].

recharge, allogenic. Recharge derived from runoff of neighboring or overlying non-karst rocks that drains into a karst aquifer. Diffuse allogenic recharge is used to describe the slow percolation of recharge when runoff into direct input points is reduced in magnitude while concentrated allogenic recharge is used to describe the concentrated recharge that occurs by runoff into large fractures, sinkholes, and sinking streams.

recharge area. An area in which water reaches the zone of saturation by surface infiltration^[22]. See also intake area.

recharge, autogenic. Recharge derived from precipitation directly onto the karst landscape. Diffuse autogenic recharge is used to describe the slow percolation of recharge through a myriad of small openings while concentrated autogenic recharge is used to describe the concentrated recharge that occurs by flow into large fractures, sinkholes, and sinking streams.

recharge capacity. The ability of the soils and underlying materials to allow precipitation and runoff to infiltrate and reach the phreatic zone^[22].

recharge line. A series of recharge wells arranged in linear fashion to approximate a line source^[16].

recharge pit. A large diameter well or shaft for recharge under gravity^[16].

recharge water. Water used for replenishment of a depleted aquifer^[16].

recharge well, absorbing well, diffusion well, inverted well. A well that is used to recharge water back into an aquifer. Commonly used when aquifer depletion, saltwater intrusion, and contaminant migration are problems.

recipient. A vessel receiving liquids in volume measurements^[16].

reclamation. To reclaim land after abusive effects such as strip mining.

recorder. An instrument designed to continuously or intermittently record measurements^[16].

recovery. The water-level rise in a well occurring upon the cessation of discharge from that well or an observation well.

recovery method. A pumping test analysis method in which both drawdown and recovery of head after cessation of pumping are observed and plotted for the same observation well^[16].

recrystallization. A new formation of crystals from solid rock material^[16].

reculée. See pocket valley.

redirection. See deviation.

redox. A chemical reaction in which an atom or molecule loses electrons to another atom or molecule. Also known as oxidation-reduction. Oxidation is the loss of electrons; reduction is the gain of electrons^[6].

redox potential (Eh.) Oxidation-reduction potential^[16].

reef. A dissected ridge of rocks totally or partially submerged in sea water; often of organic origin^[16].

regelation. The melting of ice under pressure and subsequent freezing^[16].

rigging. The process of establishing the belays for SRT or laddering^[25]. See also single rope technique.

region of dispersed water. The diffuse interface between freshwater and sea water caused by mixing in a coastal aquifer^[16]. See also transition zone.

regolith. A general term for the layer of fragmental and unconsolidated rock material that nearly everywhere forms the surface of the land and overlies or covers the bedrock^[6].

regosol. Dry sandy soil^[16].

regression line. A curve fitted to all mean values of one variable^[16].

rejuvenation. A process that interrupts an active erosional or development cycle and initiates a new cycle. Rejuvenation is most commonly achieved in the karst and speleogenesis context by erosional base-level changes caused by relative uplift (or sea-level fall) or by local water-table changes caused by downcutting of surface valleys intercepting deeper drainage lines^[9].

relapsing fever. One type of *Borreliosis*, caused by various species of *Borrelia*

spirochaetes carried by several species of tick. Related to Lyme disease, but less chronic and milder. An occupational disease of some cavers in Texas who come in contact with the soft tick *Ornithodoros turicatae*, which carries *Borrelia turicatae* and may live in cave entrances^[23].

relative humidity of atmosphere. The ratio of absolute humidity to the maximum possible saturation at given conditions^[16].

relative permeability. See permeability, relative.

relict cave. Abandoned, inactive cave segment, left when the water that formed it is diverted elsewhere, normally due to rejuvenation, continuing cave development and increasing karstic maturity. Relict unmodified phreatic passage segments are abandoned in the vadose zone, where they may remain dry, retaining a typical phreatic morphology, or be invaded and modified to a keyhole profile by new streams. Ages of relict caves vary greatly and due to lack of stream-flow breakdown and speleothem deposition may become the dominant processes. Relict caves are commonly referred to incorrectly as fossil caves^[9].

relict karst. A karst area that exists within the contemporary system, but has been removed from the situation in which they developed, usually as a result of base-level changes.

relief. Elevation differences in topography of a land surface^[16].

relief intensity. The average altitude difference between the highest point of a basin and the valley bottom^[16].

replenishment. The restoration of water in a depleted aquifer^[16].

resequent river. A river flowing according to a consequent drainage pattern but at a lower level than the original slope^[16].

reservoir. 1. A recipient for the collection of small amounts of liquid^[16]. 2. A surface water impoundment^[16].

reservoir evaporation. Evaporation from the free surface of impounded water bodies^[16].

reservoir lake. A lake obtained by the impoundment of water for storage purposes^[16].

residual clay. Clay or sandy clay remaining on a rock surface after removal of calcium carbonate by solution. Compare terra rossa^[10].

residual drawdown. The rise in water level in a well in response to cessation of pumping.

residual hill. See emergence.

residue. Solids remaining after evaporation^[16].

resurgence. 1. Re-emergence of karst ground water a part or all of whose waters are derived from surface inflow into ponors at higher levels^[20]. Point at which an underground stream reaches the surface and becomes a surface stream. In

European literature, the term is reserved for the re-emergence of a stream that has earlier sunk upstream; the term exsurgence is applied to a stream without known surface headwaters^[10]. Synonyms: (French.) *résurgence*; (German.) *Karstquelle*; (Greek.) *kephalari*; (Italian.) *risorgenza*; (Russian.) *vihod karstovih vod*; (Spanish.) *resurgencia*; (Turkish.) *suçikan*; (Yugoslavian.) *kr̃ki izvor (vrela), obrh*. See emergence. Compare exsurgence.

retardation factor. The ratio of the average linear velocity of ground water to the velocity of the retarded constituent at $C/C_o=0.5$ ^[22].

retention. 1. The detention of water on surface depressions or in subsurface void space. 2. the retention of water in pores against gravity^[16].

reverse fault. A fault where relative movement of the hanging wall has occurred in the upward direction^[16].

Reynolds number. A numerical quantity used as an index to characterize the type of flow in a hydraulic structure in which resistance to motion depends on the viscosity of the liquid in conjunction with the resisting force of inertia. It is the ratio of inertia forces to viscous forces, and is equal to the product of a characteristic velocity of the system (e.g. the mean, surface, or maximum velocity) and a characteristic linear dimension, such as diameter or depth, divided by the kinematic viscosity of the liquid; all expressed in consistent units in order that the combinations will be dimensionless. The number is chiefly applicable to closed systems of flow, such as pipes or

conduits where there is a free water surface, or to bodies fully immersed in the fluid so the free surface need not be considered^[1]. See also Chézy equation; Froude number; Manning equation.

rhodamine dye, sulpho rhodamine dye.

Orange dyes used in environmental tracing studies that fluoresce red when held under a black light. See also fluorescent dyes.

rice paddy. In a cave, a terraced rimstone pool^[10].

ridge. An elongated narrow elevation^[16].

rift. 1. A cave passage that is relatively high and narrow. Generally rifts are straight or nearly so, reflecting that they are commonly guided by, and developed along, vertical or sub-vertical fissures, joints and faults^[9]. 2. A long narrow high cave passage controlled by joints or faults^[10].

rift valley. A surface depression due to the formation of graben block faulting^[16].

rill. 1. Small solution groove on surface exposures of limestone; most common in arid or semiarid areas^[10]. 2. Small channel cut by flowing water in the floor, wall, or ceiling of a cave^[20]. 3. The smallest category of stream in any terrane^[20]. Synonyms: (French.) *traces de ruissellement*; (German.) *Rinne, Kerbe*; (Greek.) *riákion*; (Italian.) *solchi di ruscellamento*; (Spanish.) *arroyuelo*; (Turkish.) *küçük dere, oluk, ark*.

Rillenkarrren. (German.) Solution flutes that occur only in places where fresh

unspent precipitation is active and end where the water attains too high a content of lime or where water is added. Their length increases with slope, temperature, and rainfall; eventually reaching 1 m and more in the tropics, up to 50 cm, and as an exception, 100 cm in the Alps. Their width extends from 1 to 3 cm. They lie together in rows with no space between, with sharp intermediary ridges of no more than 1 cm in height. They increase at all freely exposed peaks and ridges where fresh rainwater alone is at work. The grooves gradually flatten out to a smooth surface. Their theory of origin is unknown^[3]. Synonyms: (German.) *Kannelierungen*; *solution flutes*; and *firstkarren*.

Rillenstein. (German.) Microsolution grooves and pitting on rock surface^[10].

rimstone. 1. A wall-shaped deposit around springs and below cascades which impounds water in pools. Its formation is due to precipitation from saturated bicarbonate waters^[20]. 2. Calcareous deposits formed around the rims of overflowing basins, especially in caves^[10]. Synonyms: (French.) *gour*; (German.) *Sinterbecken*; (Greek.) *frágma, epiphliomatos*; (Italian.) *vasche d'incrostazione*; (Russian.) *natecnaja plotina*; (Spanish.) *dique travertínico*; (Turkish.) *sedde, kenartaş*. See constructive waterfall, rimstone barrage, rimstone pool.

rimstone barrage, rimstone barrier, rimstone dam. A wall-shaped deposit that impounds pools of water in caves, around springs, and in cascades of streams saturated with calcium bicarbonate^[10].

Synonym: (French.) *gour*. See also rimstone; rimstone pool.

rimstone pool. A pool sited on a cavern floor and enclosed by a rim of carbonate reprecipitated from the karst water in the pool at points locally favoring the release of carbon dioxide^[19]. See also rimstone; rimstone barrage.

Rinnenkarren. (German.) Solution grooves that form where runoff water is collected in streams. If the whole surface is moistened, the amount of water increases downwards with the result that the grooves are widened and deepened at the bottom. This distinguishes them from other similar forms. When the slope is slight they are coiled, but become straighter with increasing inclination. They are sometimes interpreted to be subcutaneous forms that develop below soil cover, but this is believed to be a rare occurrence. They are found in all climates. In arid zones, they exist as relics of the past when the climate was damper^[3].

ripple mark. A wavelike sculpture on water covered sand surfaces obtained by wave action^[16].

rise. (Jamaican.) Spring rising from fractures in limestone. Point at which an underground stream comes to the surface^[10].

rise pit. An artesian spring rising up through alluvium accumulated in an earlier surface valley phase and often fringed, except on the outlet side, by a minor levee deposited as the force of the

vertical discharge dissipates at the surface^[19].

riser. A pipe through which liquid rises in a well^[16].

riser pipe. A pipe through which water is raised in a production well^[16].

rising. 1. The resurgence of an underground watercourse, usually at the base margin of the calcareous massif, although in the instance of a blind valley the rising has eroded headwards for some distance. Each rising accounts for the collective discharge of several sinks and in this way has a relatively high discharge as the sole drainage outlet for a large area. If the water issues freely, the rising is said to be *free-flowing*, but if it issues under pressure, the terms artesian, forced, or *vauclosian spring* are used (after the type-example of the resurgence of the Sorgue river at Vaucluse in France)^[19]. 2. An issue of water from massive limestone which cannot be classed with certainty as either a resurgence or a spring^[20].
Synonyms: (French.) *émergence*; (German.) *Ausflußstelle*, *Karstquelle*; (Greek.) *kephalari*; (Italian.) *sorgente*; (Russian.) *vihod karstovih vod*; (Spanish.) *emergencia*; (Turkish.) *yüzeye yükseliş*; (Yugoslavian.) *krško vrelo*, *krški izvor*, *obr.* See also emergence; exurgence; resurgence.

rising segment. That part of a hydrograph curve that represents a rise in water level as a result of precipitation^[16].

river. A natural water course through which runoff reaches the sea^[16].

river bed. The channel of a river covered by water^[16].

river reach. A particular segment of a river^[16].

river swamp. A swamp in lowlands adjoining a river^[16].

river system. The system of a main river that includes all its branches and tributaries^[16].

river terrace. A level land terrace formed in a valley by fluvial erosion or aggradation^[16].

rivulet. A very small stream^[16].

rock. Consolidated mineral matter of igneous, sedimentary, or metamorphic origin^[16].

rock fall. See cave breakdown.

rock formation. A lithologically or structurally distinct part of the lithosphere^[16].

rock-hill. See karren, rill.

rock milk. Less common synonym for moonmilk^[9]. See moonmilk.

rock pendant. See pendant.

rock pillar. A residual isolated mass of bedrock linking the roof or overhanging wall and floor of a cave, in contrast with a column, which is composed of dripstone or flowstone^[10]. See column; pillar.

rock pinnacle. A tall sharp projection of bedrock rising from the floor of a cave^[10].

rock shelter. 1. Shallow cave under an overhanging rock ledge. Many sea caves are rock shelters. Also found in limestone and other rock types where streams have undercut their banks at bends, or where there has been abrasion by blowing sand. Common in tropical areas at places where a secondarily hardened layer of limestone forms a ledge that projects over unindurated limestone^[10]. 2. A wide but shallow cavity in any rock; in carbonate rock often formed below a noncarbonate layer^[20]. Synonyms: (French.) *abri sous roche, balme, baume*; (German.) *Halbhöhle, weite aber flache Höhle*; (Greek.) *kataphyion*; (Italian.) *riparo sotto roccia, androne*; (Spanish.) *abrigo, balma*; (Turkish.) *kaya sığınāği*; (Yugoslavian.) *potkapina, okapina, polupećina, spodmol, zijalka*.

rock system. Rocks deposited during a given geological time period^[16].

rock terrace. A terrace formed by erosional action and denudation^[16].

rock texture. The geometrical aspects and arrangement of the component particles of a rock^[16].

rockhole. A shallow, small hole in rock outcrops, often rounded in form and holding water after rains. Well known on the Nullarbor Plain, Australia^[25].

rockpile. A heap of blocks in a cave, roughly conical or part-conical in shape^[25].

rockfall. The falling of bedrock from a cliff or steep slope^[16].

romanechite. A cave mineral — $\text{BaMn}_9\text{O}_{16}(\text{OH})_4$ ^[11].

roof crust. Flowstone deposited on ceilings of caves from thin films of water, which have crept over the rock from pore or crack sources^[10].

roof drainage. Precipitation runoff from roofs.

roof pocket. Blind upward extension into the ceiling of a cave passage, commonly enlarged by dissolution along a transverse fracture, and less extensive than an aven or chimney^[9].

roof slab. See ceiling slab.

room. A part of a cave system that is wider than a passage^[10]. Synonym: (British.) chamber.

root karren. These are small, relatively flat karren that are formed beneath compact soils where roots etch into the limestone^[3]. See also covered karren; wave karren.

root zone. The zone in a soil profile penetrated by plant roots^[16].

rope protector. A length of heavy fabric or plastic hose placed around a rope where it may rub against rock^[25].

rotating meter. A stream velocity meter that transforms stream momentum into angular momentum by vanes and rotor^[16].

roughness. An unevenness of surfaces giving rise to high flow resistances^[16].

roughness coefficient. A coefficient that describes roughness of a channel bed^[16].

round karren. See Rundkarren.

roundness. The degree to which a sand grain approaches spherical shape^[16].

roul, to. The action of predicting and directing of flood waves through a channel system^[16].

run dry, to. The cessation of flow from a well or spring^[16].

Rundkarren. (German.) 1. Karren forms with rounded edges; formed by soil water that cannot flow freely due to the tightness of soil pores and thus corrodes away all edges and points. The small karren forms disappear, grooves and grikes are widened and deepened. One or two centuries after being laid bare, the earlier rounded edge is only just recognizable so round karren and their remains provide evidence of an earlier soil covering^[3]. 2. Karren form comprising rounded channels, commonly 50–500mm deep and wide and separated by rounded ridges. Rundkarren are the characteristic dissolutional form created beneath superficial material such as sandy till, peat or other soil, or beneath a cover of plants or lichen^[9]. Synonym: round karren. See also Karren.

runoff. 1. The discharge of water through the surface streams of a drainage basin^[16]. 2. The sum of surface runoff and ground-water flow that reaches a stream^[16].

runoff coefficient. A dimensionless coefficient to estimate runoff as a certain percentage of storm rainfall^[16].

rupture. That stage in the development of a fracture where instability occurs. It is not recommended that the term rupture be used in rock mechanics as a synonym for fracture.

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