Structures of metamorphic rocks pdf

Gneis Marble Slate and slate cleavage GNEISS 401.-.1 Contorted gneiss, ottawa River Bank, Canada. 401.-.2 Boulder Curved Gneis, Amherst, Maly. 401.-.3 Precambrie Gney granite cutting. A man on granite; The contact cuts the gneiss directly under the foreground of the soil section. Kingston, Ontario. All hills and valleys here are shown pre-ordovician, opened by the removal of the earlier Paleozoic limestone. Slide 481.B.3 and 4 are at water level below the dead tree. MARBLE 407.-.1 Marble flow effects produced by metamorphism. Georgian Bay, near Honey Harbor, Ontario. SLATE AND SLATEY CLEAVAGE 409.-.1 anticlinel crease. Falling axis and splitting to the west; The beds thicken on top; Castlemaine, Victoria. 409.-.2 The splitting of the slate and its attitude to bedding aircraft; 3.2 km south of Walland, Tennessee. 409.-.3 Hill showing cleavage in granite. North side of the Deep Spring Valley. Inyo County, California. 409.-.4 The western end of the ridge, give a closer view of the granite. Same locality as the previous slide. 409.-.5 Chart of Net Reduction, after Van Hisi. 409.-.6 Chart showing the development of fracture cleavage, after Van Hisi. 409.-.7 Block showing the development of fracture cleavage, after Van Hisi. A rock that has been subjected to heat and pressure Metamorphic redirects here. For other purposes, see Metamorphic (disambigation). This article needs additional quotes to verify. Please help improve this article by adding quotes to reliable sources. Non-sources of materials can be challenged and removed. Find the sources: Metamorphic Rock - News Newspaper Book Scientist JSTOR (January 2012) (Learn how and when to remove this template message) quartzite, a type of metamorphic rock metamorphic rock deformed during the varicane oragogy. Val de Cardes, Ljerida, Spain Metamorphic rocks arise as a result of the transformation of existing types of rocks, in a process called metamorphism, which means a change in shape. The original stone (protolite) is exposed to heat (temperatures, more than 150-200 degrees Celsius) and pressure (100 megapascals (1000 bar) or more), causing profound physical or chemical changes. Protolite can be a sedimentary, intemic or existing metamorphic stone. Metamorphic rocks make up a large part of the Earth's crust and make up 12% of the earth's surface. They are classified by texture and chemical and mineral build (metamorphic facies). They can be images just deep below the Earth's surface, exposed to high temperatures and high pressure of rock layers above it. They can be formed from tectonic processes, such as continental collisions, which cause horizontal pressure, friction and distortion. They also form when the rock is heated hot molten rock called magma from uneven earth. Study of metamorphic rocks (currently exhibited on the Earth's surface after and ascent) provides information on the temperatures and pressures that occur at great depths in the earth's crust. Examples of metamorphic rocks are gneis, slate, marble, shiff and quartzite. Metamorphic minerals Metamorphic minerals are minerals that are formed only at high temperatures and pressures associated with the process of metamorphism. These minerals, known as index minerals, include silimanite, chianite, starolite, andalusite and some pomegranates. Other minerals, such as olivine, pyroxen, amphibol, mixes, feldspar and quartz, can be found in metamorphic rocks, but are not necessarily the result of a process of metamorphism. These minerals are formed during the crystallization of vigne rocks. They are stable at high temperatures and pressures and can remain chemically unchanged during the metamorphic process. However, all minerals are stable only within certain limits, and the presence of certain minerals in metamorphic rocks indicates approximate temperatures and pressure at which they were formed. Changing the size of a rock particle in the process of metamorphism is called recrystalization. For example, small calcite crystals in sedimentary limestone and chalk are changed to larger crystals in metamorphic stone marble; in the metamorphosed sandstone, the recrystallization of the original quartz sand grains results in a very compact quartzite, also known as metaquartzite, in which often larger quartz crystals are intertwined. Both high temperatures and pressure contribute to redistruturization. High temperatures allow atoms and ions in solid crystals to migrate, thereby reorganizing the crystals, while high pressure causes the crystal solution inside the rock at the point of contact. Folio Folded folios in a metamorphic rock from near Geirangerfjord, Norway Home article: Foliation (geology) Layers in metamorphic rocks called folio (derived from the Latin word folio that means leaves), and this occurs when a rock shrinks along a single axis during redistallization. This causes braided or elongated crystals of minerals, such as mica and chlorite, to rotate in such a way that their long axis are perpendicular to the reduction. This results in striped, or foliated rock, with bands showing the colors of the minerals that formed them. Textures are divided into folio and non-foliated categories. Foliated rock is a product of differential stress that deforms rock in one plane, sometimes creating a plane of cleavage. For example, slate is a folio metamorphic rock originating from shale. The liaized breed does not have planar deformation models. Rocks that have been subjected to uniform pressure from all sides, or those that do not have minerals with distinctive growth habits, do not foliated. Where the rock has been subjected to differential stresses, stresses, salt, which develops, depends on the metamorphic class. For example, starting with mud stone, with the increase in temperature develops the following sequence: the slate is a very fine-grained, folic metamorphic breed characteristic of metamorphism of a very low grade, while the phylite is fine-grained and is located in areas of low-grade metamorphism, the schistite is medium and coarse-grained and is located in the areas of middle-class metamorphism, and Marble, as a rule, does not allow it to be used as a material. Another important mechanism of metamorphism is the chemical reactions that occur between minerals without melting them. In the process, atoms are exchanged between minerals, and thus new minerals are formed. There can be many complex high-temperature reactions, and each mineral build produced gives us an idea of the temperature and pressure during metamorphism. Metasomatism is a dramatic change in the mass chemical composition of a breed, which often occurs during metamorphism processes. This is due to the introduction of chemicals from other surrounding rocks. Water can quickly transport these chemicals over long distances. Because of the role that water plays, metamorphic rocks tend to contain many elements missing from the original rock, and the absence of some that were originally present. However, the introduction of new chemicals is not necessary for redistrification to occur. Types of Metamorphism Contact Metamorphism Contact Metamorphic Breed of Interlayer Calcite and Serpentine from Precambrian Canada. It was once thought to be a pseudo-fossil called Eoson canadense. Contact metamorphism is the name given to the changes that occur when magma is introduced into the surrounding rock (country rock). The changes that occur are greatest wherever magma comes into contact with the rock because the temperature is highest on this border and decreases with the distance from it. Around the delicious rock, which is formed from cooling magma, there is a metamorphoized zone called aureol of metamorphism. Aureols can show all degrees of metamorphism from the area of contact to the non-metamorphous (unchanged) breed of the country at some distance. The formation of important ore minerals can occur during metasomatism in or near the contact area. When rock contact is altered by a vignette invasion it very often becomes more indurated, and more crudely crystalline. Many altered rocks of this type were formerly called horned stones, and the term hornfels is often used by geologists to denote these small grainy, compact, non-folio products of contact metamorphism. The slate can become a dark argylaceic horn full of tiny plates Biotites; gauze or unclean limestone can change gray, yellow or greenish lime-silicate-roefel or silis marble, hard and split, with abundant ayugit, pomegranate, vollastonite and other minerals in which calcite is an important component. Diabaza or asesite can become diabass horns or anesthetic horns with the development of a new rogblend and biotite and partial recrystalization of the original feldspar. Devil or flint can become a small crystalline quartz stone; sandstones lose their clastic structure and are transformed into a mosaic of small close-fitting quartz grains in a metamorphic rock called quartzite. If the stone was originally striped or foliated (such as laminated sandstone or foliated calc-schist) this character cannot be destroyed, and striped hornfels product; Fossils may even have their shapes preserved, albeit completely recrystallized, and in many contact modified lava are still visible, although their contents are usually joined in new combinations to form minerals that were not originally present. Minute structures, however, disappear, often completely, if the thermal change is very deep. At the same time, small grains of quartz in shale are lost or mixed with the surrounding particles of clay, and the thin earth mass of lava is completely reconstructed. By recrystallization thus distinctive rocks of very particular styles are often produced. Thus, shale can pass into cordyrital rocks, or can show large crystals of andalusite (and hyastolite), staurolite, pomegranate, kianita and silimanite, all derived from the alumina content of the original slate. A significant amount of mica (both Muscovite and biotite) is often formed simultaneously, and the resulting product has a close resemblance to many types of shihta. Limestone, if they are clean, is often turned into roughly crystal balls; but if there was a mixture of clay or sand in the original rock, minerals such as pomegranate, epidot, idoxra, wollastonite will be present. Sandstone can turn into coarse quartzites consisting of large pure quartz grains. These more intense stage changes are not so often seen in vignette rocks because their minerals, being formed at high temperatures, are not so easily converted or recrystallized. In some cases, the stones merge and in a dark glass product the smallest crystals of spinel, sillimanite and cordierite can separate. The slates sometimes, thus, change basalt dams, and feldspathic gerbils can be completely vitrified. Similar changes can be caused in shale by burning coal seams or even a conventional furnace. There is also a tendency to metasomatism between vigneous magma and sedimentary rocks in the country, as a result of which chemicals in each of them are exchanged or injected into the other. Granites can absorb slate or pieces of basalt. In this case, hybrid hybrid there is a scarn that has no characteristics of normal vignettes or sedimentary rocks. Sometimes invading granite magma permeates the rocks around, filling their joints and bedding planes, etc., with the threads of quartz and feldspar. It's very exceptional, but the cases are known and it can happen on a large scale. Regional Mississippi Marble Metamorphism at Great Cottonwood Canyon, Wasatch Mountains, California. Dynamic metamorphism Regional metamorphism, also known as dynamic metamorphism, is a name given to changes in large masses of rock over a wide area. Rocks can be metamorphoses simply by being at great depths below the Earth's surface, exposed to high temperatures and high pressure caused by the huge weight of the layers of rock above. Most of the lower continental cortex is metamorphic, with the exception of recent vigneal intrusions. Horizontal tectonic movements, such as continental collisions, create horned belts and cause high temperatures, pressure and deformation in rocks along these belts. If metamorphose rocks are later raised and eroded, they can occur in long belts or other large areas on the surface. The process of metamorphism may have destroyed the original features that could reveal the previous history of the rock. The redististization of the rock will destroy the textures and fossils present in sedimentary rocks. Metasomatism will change the original composition. Regional metamorphism tends to make the breed more indoculate and at the same time give it a folio, schistous or gneissic texture consisting of the planar location of minerals, so that platy or prismatic minerals such as ad cea and Rogbland have their longest axis parallel to each other. For this reason, many of these rocks are easily split in one direction along the mica zones (shis). In gneissa, minerals are also usually divided into strips; thus, there are seams of quartz and mica in mica shiff, very thin, but consisting mainly of one mineral. Along the mineral layers, consisting of soft or fissile minerals, the rocks will be broken down most easily, and freshly cut samples are likely to collide or be covered with this mineral; For example, a piece of mica schist looked at on the face can be assumed to consist solely of shiny mica scales. On the edge of the samples, however, the white folios of granular quartz will be visible. In gneisses these alternating folios are sometimes thicker and less regular than in schists, but most importantly less micaceous; they can be lenticular, dying out quickly. Gneiss also tends to contain more feldspar than splits, and are tighter and less split. Curvature or destruction of salt is by no means uncommon; the split faces are wavy or shrivelled. and gneissik (two main types of lyoation) are formed pressure on the elevated temperature, and to the interstitial movement, or the internal stream of the arrangement of mineral particles while they crystallize in that directional pressure field. Rocks that were originally sedimentary and rocks that were undoubtedly fascinated can be metamorphosed into splits and gneisses. If initially such a composition they can be very difficult to distinguish from each other if the metamorphism was great. The quartz-porphyria, for example, and the fine feldspathetic sandstone, can be metamorphoses into gray or pink mica-sist. The metamorphic textures of rock Five main metamorphic textures with typical rock types are slate (includes slate and phylite; the folia is called slaty cleavage), schistose (includes shistych; salt is called schistositis), gneissosis (gneiss; foliage is called gneissosity), granoblastic (includes granolite, some marbles and quartzite), and hornfelsic (includes horns and scarns). See also the Blueschist List of Rock Types List of Rock Textures Metavolcanic Rock Migmatite Neomorphism Subductorism zone metamorphism Links - Dictionary.com record. Received on January 14, 2014. Bruce Wilkinson; Brandon J. McElroy; Steven E. Kesler; Peters, Shanan E.; Rothman, Edward D. (2008). Global geological maps are tectonic speedometers - the speed of riding on rocks from the frequencies of the area era. Bulletin of the Geological Society of America. 121 (5–6): 760–79. doi:10.1130/B26457.1. Vikander R. and Munro J. Basics of Geology. Cengage learning. 174-77. 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