 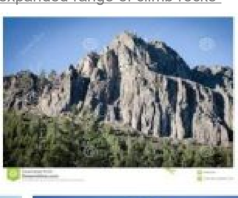   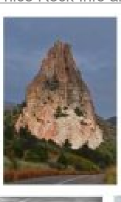 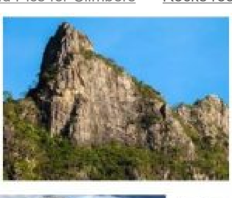 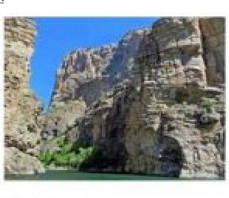

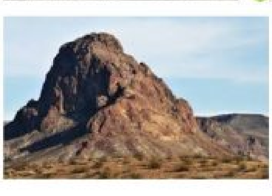  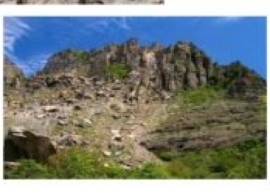 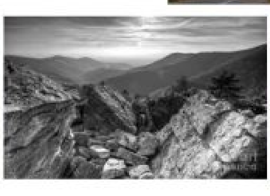  

All Types of Rock and Some Geology for Climbers

- – The Rocks for Rock Climbing – 43 Suitable Rock Types

von Dipl.-Geol. Harald Rost, Windischeschenbach, April 2017 *)

Climbers

There really is a wide variety of climbers:

– indoor, outdoor,
– in nature and in urban environments,
– on artifical or natural grounds,
– on rocks, trees and even on buildings, antennas, spans,
– using plastic or natural holds – sometimes it even seems they use none,
- with and without rope – and even some climbers using steel cables.

Oh my God! Seems to be complicated somehow. I do not want that! I wanna deal with simple facts, clear and easy to understand. Such matters as rocks ! No variety! We climb on them and that's it!

I suppose that is the attitude of most climbers?

(In case it's yours, too, stop here and go to the climbing gym or your favorite crag and stay there forever, if you like it)

Fig. 1: (Source: Wikipedia-Commons)

Climbers and Rocks

OK, let's forget climbing indoor and on trees and let's just have a look at the last letter of „***BASE***-Climbing“ (Buildings, antennas, span, **earth**) (– just joking, skydivers) „Earth“ here clearly means rock. That's easy. Isn't it!? – Un-/Fortunately I am a geologist and thus I tell you it isn't, but in case you are interested, I will try to give you a rough idea about it right here

What do we climb on? What rock types? And how many?

Fig. 2

Mostly you might become aware of that matter when you just consider whether chalk or climbing in wet conditions might damage rock holds and why different rock types dry more quickly after rain. You possibly think about why bolts might break out of rocks, rock fall might happen, sometimes even a complete crag can collapse or the economical interests of a quarry do not really fit to your hobby climbing.

So how many rock types do you already know and how many do you think exist?

Try searching Google and – up to now – you will not be very successful with finding out what climbers being somehow interested in geology and rocks possibly would appreciate to know.

7 Rocks – The Very Basic Range

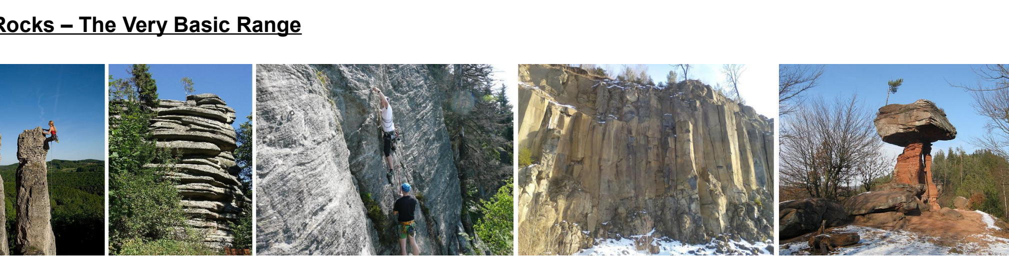

Fig. 3: Remarkable differing structures of limestone/dolomite (Röthelfels/Franconian Switzerland), granite (Rudolfstein/Fichtel Mountains), gneiss (Kaitersberg, Bavarian Forest), basalt (Gr. Teichelberg, Steinwald), sandstone (Teufelstisch/Palatinate)

Naturally you will read something about the very basic range of rocks most climbers usually climb on. Limestone/dolomite, granite, gneiss, basalt, sandstone are commonly known after all. Possibly you are an experienced climber already having climbed all of them or even some more!?

Maybe you additionally know conglomerate by James Bond 007 (For Your Eyes Only) climbing in Meteora (see also Petzl RocTrip) and having some geological knowledge you even know that **quartz** can build up rocks all by itself.

Congratulations! However, that's still just the very basic range with about 7 or 8 different rock types!

Fig. 4: Conglomerate climed by 007 James Bond; Meteora

If that would be the complete range, I never would have considered to start climbing or studying geology

Rocks and Climbrocks

However, how many climbrocks do exist in the world? When I asked this question for the first time, I did not find any answer at all. No overall view! Especially most articles dealing with climbing just listed limestone, granite, gneiss, sandstone, but not much more. I was not satisfied. Fortunately I am an experienced geologist and even have been a petrologist during my time at the university. (Thanks and greetings worshipped Professor Nollau !) My Diploma thesis dealt with an area in South Tyrol where I was confronted with 45 different types of rock. Not all of them where suitable for climbing.

However, 45, that's nothing! There is a tremendous number of existing rock types and unfortunately much more names for all of them (more)! Nomenclature might be related to occurrence, genesis, geological age, minerals, size of grains, colour, technical use and much more.

Aggravating there are transitions and peciuliarities of rocks which result in diverging names. Additionally there sometimes are misleading trivial names, trade names and so on. There also are diverging meanings of English and German names. So, don't be ashamed, if you simply do not know them all

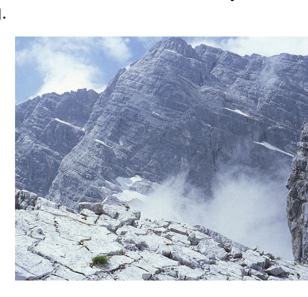

Fig. 5: Watzmann-East-Face; 'Dachsteinkalk'-limestone

I will try to simplify a little bit. Using the common genetic structuring I restrict my presentation to rock types which are in somehow broader use by climbers due to occurence, accessibility and characteristics or might be interesting thanks to other special reasons. One helpful criteria is the existence of sport climbing routes. Thus claystones, rock salt and gypsum for example are not included from the beginning although they might be climbed in individual cases or under special conditions.

Characteristics of Climbrocks

Rocks and their individual characteristics are essential for the forming of landscape. The landscape itself surely often influences your choice where to go for climbing. However which climbrock characteristics are essential for climbing techniques?

Is it possible to describe every type of rock you climb on by its individual climbing characteristics?

For sure it is. However, as more as you simplify for systematic reasons in order to get it somehow, it becomes harder and as soon as you only present the basic range of rock, those 7 up to 8 types mentioned at the beginning of this article, it's nearly impossible in a really senseful way. I know, it's done in a lot of presentations. Rocktypes are tried to be characterised and described for climbing in 4 sentences and one picture for each type. However, sorry, very often it's simply nice bullshit! Appearing good and somehow senseful and reliable – the more often you hear it, the better it seems to be – but after all, as it is commonly done, it doesn't make too much sense. Indeed, very quickly it becomes a discrimination of rock types and just creates and preserves prejudices! Please stop it!

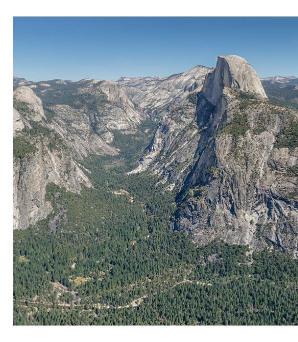

Fig. 6: Wikipedia; Half Dome, Yosemite Valley; Granodiorite

For climbing and climbing techniques not only the type of rock and its material is essential, but additional features, too, which partly even are independent of the rock itself. Texture and stuctures (history of sedimentation or intrusion and/or tectonics as well), exposition, weathering and individual site features (e.g. is the site manmade or natural) might be even more important.

Within quarries even the art of excavation influences rock and climbing. Possibly blasting which intentionally could be used for best smashing of rock already might have smashed wall faces so much that even very solid rock is completely unreliable and not suitable for climbing any longer.

Sandstone can be fine-grained and coarse-grained, same as granites, but additionally the last can even occur with porphyritic structure (e.g. Falkenberger Granite). Sandstone can be more rigid as granite. Limestone can be more rough than sandstone. Sandstone might have more holes in surface than dolomite … Moreover, all of that might not even have a great effect on climbing because rock anyway is polished by water or ice – or animals like … e.g. climbers – or climbing uses younger tectonic structures as e.g. fissures.

Nothing in life is simple, especially the simple things!

You do not have to look at the broader range of granitoids and their differences. Sometimes there are no ‚typical‘ granites within one single pluton. Moreover not even one individual granite site and climbing crag really is homogeneous! You may get an impression by the picture above and by having a look at some more within this awesome work at El Capitan where it is from: Geological Mapping Project (It's really worth clicking through!!). – Now, did you really imagine something like this only having heard and read that granite typically is rough, there often are fissures and rounded structures are predominant!?

Let me tell you: It's just the same with nearly all rock types! It simply cannot be described within 4 sentences or even less and one pic each! In case something is being postulated as ‚typical‘ it should be hard to find exceptions!

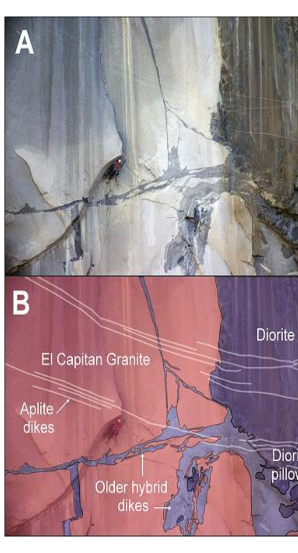

Fig. 7: El Capitan, Yosemite Valley.; Granodiorit, Granit, Tonalit; PUTNAM, R., GLAZNER, A. & LAW, B.: Geological Mapping Project EL Capitan, SE-Face

A rock, in which case does it fit for climbing purposes?

That's a little bit easier to explain:

For this in general a rock has to have a minimal thickness and areal occurrence. (E.g. a dike, possibly consisting of special rock type, may be quickly crossed over but only therefore is no climbrock itself.) A minimum of strength and durability against weathering and surface disintegration, regarding the specific climate, ensures reliability of holds and trustworthyness of bolds and anchors. Evaporite rocks, e.g. rock salt and gypsum, as well as claystones are not suited and only are climbable temporily or under special circumstances. You will hardly find sportclimbing routes in those rocks, especially with standardly installed safety devices.

However, there are exceptions everywhere: despite not fitting the general requirements of reliability, ‚chalk‘, which is a very special limestone, is used as a climbrock using drytooling equipment (read and see more).

14 – The „expanded range of climb rocks“

That's a little bit easier to explain:

Using these criterias for climbrocks and trying to sum up wherever possible still results in about **14 types of rock**. Twice as many as the basic range we started with at the beginning of the article.

- sedimentary: sandstones, conglomerates, carbonates, chert
- metamorphic: gneiss, marble, quartzite, some „greenstones“
- plutonic: some „granitoids“
- volcanic: phonolite, rhyolite, „basalts“, „some other volcanites“
- hydrothermal and metasomatic: quartz

However, the thuringian slate (Spiegelwand), which I would like to climb on for years, isn't included yet. Thus, I possibly should proceed a little bit more detailed.

Up to now I also haven't talked about tufa, chalk, calcareous sinter (all three just special limestones) and other things rock climbers may enjoy, but make a simple typification obviously impossible.

However, this doesn't cause me headache! I am absolutely glad about the fact that there still is a difference between studying geology and not

So, following simply and still simplified the results of my work

Fig. 8: Slate of Spiegelwand, Saalfeld, Thuringia

43 – An Overall View on All Climbrocks

According to this table there are 43 climbrocks. (No problem to count just in another way!) Simply click on the table (or here) to open a separate PDF-window where links will work. The table supplies some point-like info and the links lead to additional external information. My article is not based on Wikipedia info, however most of the linked Wiki-articles about rock and geology are really fine with me. Additionally you may search by links to the Thecrag databasis for climbing areas and routes where you can experience the individual climbrocks in real life.

In order to keep systematics somehow correct and to present the info in context some rocks are included, which are no climbrocks in the above defined meaning.

Ice is completely ignored as water by definition is not a rock even when frozen. Not even in Polar region you will find any permanent climbing routes, especially none with really long lasting bolts and anchors. However in permafrost regions water ice may change general unsuitable rocks and even loose rock to climbable aggregates by the additional binding of the ice.

I cannot guarantee for the correctness of all results when using the links to the Thecrag databasis. The examples are right. All the rest depends on accuracy of the collaborative work as it is typical for the Thecrag idea.

(May 2023: Refering systematics, nomenclature and some „problems“ see 'problems')

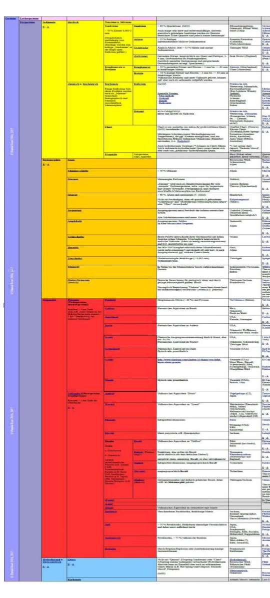

Fig. 9: All Climbrocks with links to Wikipedia-articles and to Thecrag-areas/-routes for additional information (PDF able to work with)

P.S.: Via Ferratas

There are way less of Via ferratas than climbing routes, however a first search by me (results up to now not verified!) seemes to indicate that you might enjoy quite a view different rock types by using Via ferratas (see green hightlighted climbrocks in picture).

Fig. 10: Climbing rocks you may exoerience climbing Via Ferratas (green) (Zoom)

Simply try and feel it!

In case this article has invited you to learn more about rocks and on occasion to climb different rocks: Good luck and Glückauf !

Have a close look and you will realize that everything is changing as soon as local rock changes: landscape, vegetation, wine, people, climbing …

As said: Simply try and feel it!
(Mit freundlicher Genehmigung der … - na, ihr hörts es eh. Sonst siehe Link)

Some nice Rock Info and Pics for Climbers

MEYER, J. & SCHEIBER, T. (2011): Achtung Stein! Teil 1.- Bergundsteigen, 2011/2; 70-83

MEYER, J. & SCHEIBER, T. (2011): Achtung Stein, Teil 2.- Bergundsteigen, 2011/3; 72-81

MEYER, J. & SCHEIBER, T. (2011): Achtung Stein! Teil 3.- Bergundsteigen, 2012/2: 56-67

LAW, B. (2012): El Capitan. Geologic Mapping Project. - Super Topo Climbers' Forum: Topic Author's original post; Apr 26, 2012

HOWARD, B. C. (2013): Yosemite's Iconic El Capitan Mapped in High-Res 3-D.- National Geographic

NELSON, P. (2014): Geology for Climbers, Part I: Igneous is Bliss.- Rockclimbing.com, 2014-11-01

NELSON, P. (2014): Geology for Climbers, Part II: In a Sedimental Mood.- Rockclimbing.com, 2014-11-12

NELSON, P. (2014): Geology for Climbers, Part III: Metamorphic Rocks.- Rockclimbing.com, 2014-12-06

BURR, A. (2015): Flash: The Many Different Types of Rocks. Learn more about the rocks you climb.- Climbing, July 2015 (Online May 2, 2016).

GREEN, S. (2017): 3 Types of Rocks for Climbing: Granite, Sandstone & Limestone. - ThoughCo. Updated Feb 2017

Neues „Projekt“: **ROST, H. (2019):** Felsen-Geologie-Klettern: Eine Vorstellung von Klettergesteinen.

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*): Windischeschenbach, Bavarian town most famous as of Zoigl-beer, as of one of the deepest drilled holes (9101 m) and the hightest derrick on firm ground (83 m) in the world. Beginning 1987 to 1995 the German Continental Deep Drilling Project (German abbreviation: KTB), a geoscientific drilling project, took place here. The preserved derrick is one of the points of interests of the GEO-Zentrum and the Geopark Bayern-Böhmen.

Within a distance of about 100 km you can climb (sport climbing) at least on 7 different rocks and additionally quite a few varieties of granites – in the midth of the town granite climbing is possible at Burgfelsen Neuhaus just in the valley of river Waldnaab.

German version: “Klettergesteine“ - Klettern für geologisch Interessierte

Veröffentlichung bei Thecrag: https://www.thecrag.com/de/artikel/rocktypes

Pic really just presented as of the breccia-like sausage at the right