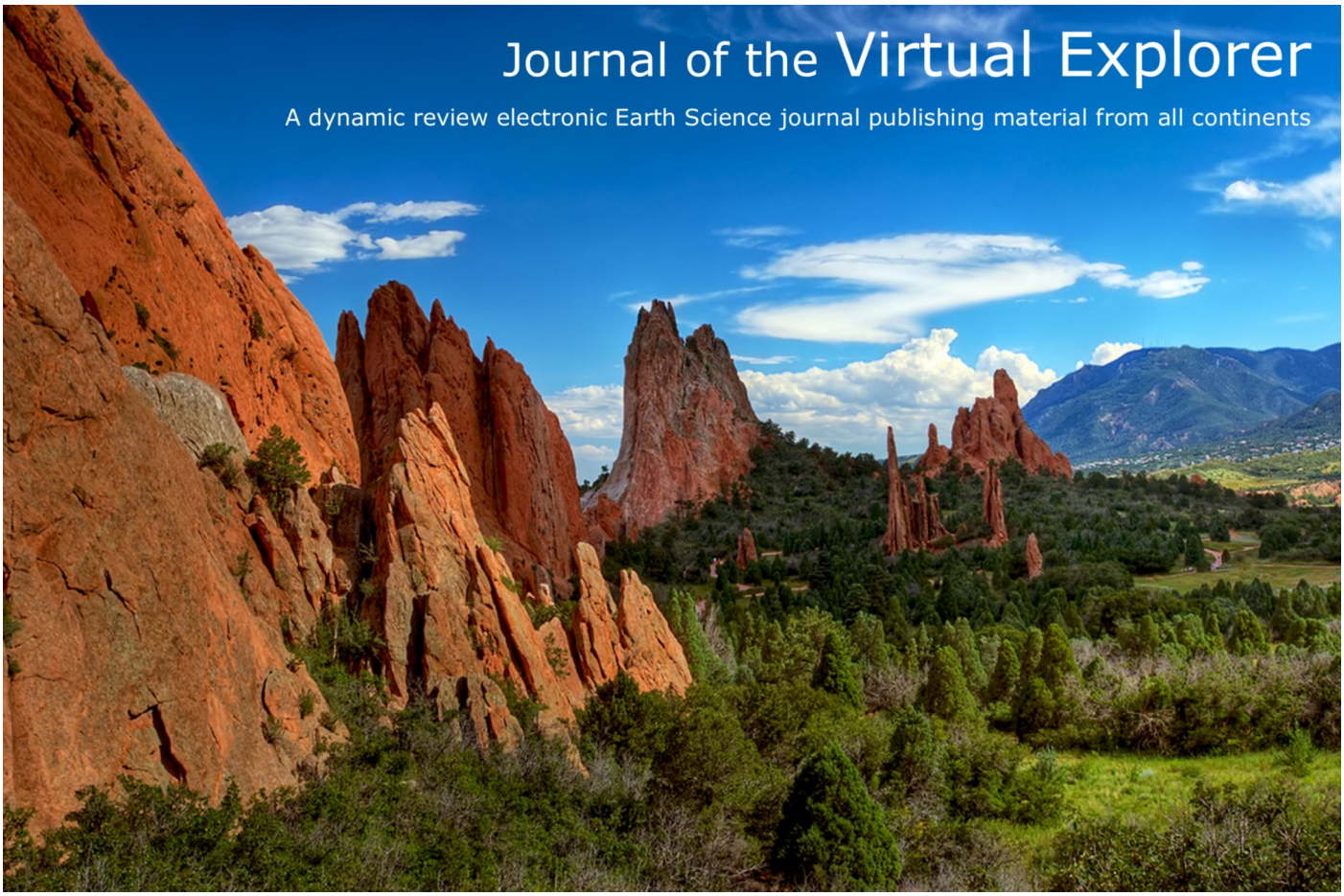

The formation of veins and their microstructures

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The formation of veins and their microstructures

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Abstract: An overview is presented of the various vein types, their microstructures and the processes that lead to vein formation. Vein types and their structures are divided into three categories:

1. macroscopic morphology (e.g. sigmoidal vein),
2. microscopic morphology (e.g. fibrous, blocky, etc.),
3. growth morphology (e.g. syntaxial, antitaxial, etc.).

The formation of veins involves two steps: (a) transport of vein forming material (nutrients) to a vein and (b) precipitation of the vein forming mineral(s). Main modes of transport are diffusional transport, advective or Darcian fluid flow and mobile hydrofractures. Causes for precipitation range from local supersaturation in, for instance, pressure shadows, which is mostly associated with diffusional transport to, often large, supersaturation in externally derived fluids. Variations in fluid pressure between hydrostatic and lithostatic can also cause precipitation of vein material.

In general, fibrous textures form due to diffusional transport to low pressure sites, such as pressure shadows. Fibrous textures can form without brittle fracturing. Elongate blocky and stretched crystal textures form in case of repeated fracturing and sealing (crack-seal mechanism). Nutrient transport can be by diffusion or by advective fluid flow. Rapid fluid flow, especially in mobile hydrofractures, can bring fluids quickly from their source region to the sites of vein formation, allowing large supersaturation and precipitation of massive amounts of vein material. Resulting veins are often blocky, although elongate blocky / stretched crystal textures can also be found if repeated crack-sealing occurs.

The volume and its media content (including movies, interactive animations and figures) should be viewed in its original format.

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