



The chronology of faults, veins, stylolites and joints in carbonate rocks

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The development of faults, veins, stylolites and joints can be linked spatially and temporally, and determination of the chronology of these structures is vital in correctly interpreting their geometries and mechanics. For example, veins and joints can act as precursors to faults, with stylolites accommodating contractional strains in the wall-rocks. Veins are commonly clustered around faults, with joints more evenly-distributed in the rock mass, indicating mineralisation associated with faulting and a post-mineralisation phase of extensional fracturing. It is common for the chemistry of filling minerals to change as fracturing proceeds. For example, initial veins are commonly filled by locally-derived minerals, with the minerals changing to higher-temperature phases and eventually hydrocarbons as some of the fractures grow and develop into faults. Mineralisation and pressure solution are ended by hydrocarbon emplacement, and this can be identified by variations in stylolite amplitudes within a fold.