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Shear coupled grain boundary migration as a deformation mechanism in minerals.

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A grain boundary can move under stress by a mechanism called shear coupled grain boundary migration (SC GBM) and contribute to strain. SC GBM is considered to be a general property of all grain boundaries over a wide range of misorientation angles, although higher deformation temperatures favour grain boundary sliding. Apart from a structured boundary interface, SC also requires a critical shear stress. We examine evidence for SC GBM in ice. An extensive literature study showed that SC GBM of high angle boundaries does occur in ice bicrystals that were probably deformed under conditions close to those found in nature. We conclude that SC GBM is likely to be an important deformation mechanism for geological materials, where extensive GBM occurs and also in nano sized materials, such as fault gauges.