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# Coseismic paleomagnetic signal in fault pseudotachylytes?

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The 59 Ma-old fault-related pseudotachylytes of the Peninsular Ranges of California have been investigated from the microstructural and magnetic point of view. These veins have a 30-fold increase in magnetic susceptibility compared to their tonalitic host-rock. The increase results from the breakdown of mafic silicates during frictional melting and subsequent formation of abundant fine grained magnetite grains. Upon rapid cooling of the pseudotachylyte melt in the Earth's magnetic field the rocks acquire a strong thermoremanent magnetization. In addition to this dominant process some samples exhibit a "lightning-induced" remanent magnetization acquired during seismic slip in the presence of a high magnetic field. This unusual remanence component is anomalous in direction and tends to be at high angle to the pseudotachylyte vein plane. We propose that the coseismic lightning-induced magnetization is caused by electrical currents possibly similar to those responsible for earthquake lightnings.