Geology - Structural Geology; Studies from University of Texas Austin Add New Findings in the Area of Structural Geology (Mineral Precipitation As a Mechanism of Fault Core Growth)

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2021 JAN 1 (NewsRx) -- By a News Reporter-Staff News Editor at Science Letter -- A new study on Geology - Structural Geology is now available. According to news reporting originating in Austin, Texas, by NewsRx journalists, research stated, "Faults vary in structural style, from simple planes to complex systems composed of fault cores and damage zones. Increased fault complexity results from the interaction of mechanical and chemical processes, including fracture growth, shear, and linkage, and mineral dissolution and precipitation."

Financial supporters for this research include GDL Foundation, Geothermal Resources Council, AAPG Foundation, Jackson School of Geosciences at University of Texas at Austin, Fracture Research and Application Consortium (FRAC), **Bureau of Economic Geology**.

The news reporters obtained a quote from the research from the University of Texas Austin, "Although water-rock interaction is traditionally associated with fault rock weakening and shear localization, we investigate processes of fault core widening by water-rock interactions that resulted in quartz precipitation. We combine field and petrographic observations with prior mechanical characterization to assess the impact of alteration and cementation on fault architecture at the Dixie Comstock epithermal gold deposit, Nevada, USA. Mineralized portions of the fault contain strong, thick, silicified fault cores and wide, weak damage zones, with evidence for widening of the core through entrainment of damage zone material and repeated cycles of embrittlement, dilation, and cementation. We present a model of fault zone evolution in which the hydrothermal regimes favoring either alterationweakening or precipitation-strengthening result in distinct fault zone architecture and mechanical and flow properties of fault systems. Alteration-weakening favors localization of the fault into thinner, clay-rich, low permeability fault cores."

According to the news reporters, the research concluded: "Precipitation-strengthening promotes thick, strong, and low permeability fault cores, with mineralization-embrittlement enhancing transient permeability following coseismic failure."

This research has been peer-reviewed.

For more information on this research see: Mineral Precipitation As a Mechanism of Fault Core Growth. Journal of Structural Geology, 2020;140. Journal of Structural Geology can be contacted at: Pergamon-Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, England. (Elsevier - www.elsevier.com; Journal of Structural Geology - www.journals.elsevier.com/journal-of-structural-geology/)

Our news correspondents report that additional information may be obtained by contacting Owen A. Callahan, University of Texas Austin, Jackson School of Geosciences, Bur Econ Geol, 10100 Burnet Rd, Bld 130, E0630, Austin, TX 78758, United States. Additional authors for this research include Peter Eichhubl and Nicholas C. Davatzes.

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