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Squeezing electric currents out of rocks

Bobby W.S. Lau (1), Akihiro Takeuchi (2,3), Friedemann T. Freund (1,3)

(1) San Jose State University, Department of Physics, San Jose, CA 95192-0106, USA, blau@science.sjsu.edu, (2) Niigata University, Department of Chemistry, Niigata 950-2181, Japan, (3) NASA Ames Research Center, Code SGE, Moffett Field, CA 94035-1000, USA.

When we squeeze one end of a 1.2 m long slab of granite (or other igneous rocks such as anorthosite or gabbro), we observe a voltage building up instantly between the stressed and unstressed rock plus two electric currents. One current flows from the stressed rock directly to ground. The other current flows through the unstressed portion of the rock, out the far end, and to ground. The two currents are of equal magnitude but of opposite sign. They are tightly coupled and tend to fluctuate. The current from the stressed rock flowing directly to ground is carried by electrons. The current capable of flowing though the unstressed rock is carried by defect electrons in the oxygen anion sublattice, also known as positive holes or p-holes for short. In fact the stressed rocks act like a battery. Extrapolating our laboratory data to geophysically relevant dimensions suggests that each cubic kilometer of stressed rock can generate currents on the order of 1000-100,000 amps flowing for days or even weeks and months. We have a fairly good understanding of the nature of these currents, what the dormant precursors are that exist in the rocks and become activated by stress. Importantly, the currents are not piezoelectric nor are they caused by any other process discussed in the literature so far. Such stress-activated currents in Earth's crust may hold the key to decipher a wide range of electric, magnetic and electromagnetic signals that have long been reported in connection with impending earthquake activity.