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Air Ionization at Rock Surfaces and Pre-Earthquake Signals

Pre-earthquake signals have been widely reported, including perturbations in the ionosphere. These precursory signals, though highly diverse, may be caused by just one underlying physical process: activation of highly mobile electronic charge carriers in rocks that are subjected to ever increasing levels of stress. The charge carriers are defect electrons associated with O^- in a matrix of O^{2-}. Known as positive holes or pholes $h^\bullet$, they flow out of the stressed rock into the unstressed rock volume, traveling meters in the laboratory, probably kilometers in the field. At the rock-air interface they cause: (i) positive surface potential, (ii) field-ionization of air molecules, (iii) corona discharges. The rate of formation of airborne ions can exceed 10^9 cm^{-2} sec^{-1}. Massive air ionization prior to major earthquakes increases the electrical conductivity in the air column and may cause ionospheric perturbations, earthquake lights, and unusual animal behavior as well as infrared emission.

Biography: Unfortunately we do not have a biography for **Dr. Dahlgren**, so you'll need to attend the meeting to get these details! We do know that he is working with **Dr. Friedemann T. Freund**, who was planning on giving the presentation until conflicts developed. Dr. Freund is with NASA Ames Research Center, Earth Science Division at Moffett Field. Dr. Freund is also an Adjunct Professor, Department of Physics, San Jose State University, San Jose, and Principal Investigator at the Carl Sagan Center, SETI Institute, Mountain View, CA. Dr. Freund came to NASA Ames in 1985 after a 20-year career as professor in Germany at the universities of Göttingen and Cologne. His field of interest started with defects in crystals. This led him to questions related to the origin of Life and, as a spin-off, to the physics of pre-earthquake signals.