

Interactive comment on “Stimulated infrared emission from rocks: assessing a stress indicator” by F. T. Freund et al.

Anonymous Referee #2

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The paper of Freund et al. “Stimulated infrared emission from rocks: assessing a stress indicator” presents the results of a very interesting laboratory experiment demonstrating the increase of IR emission of igneous rocks under mechanical loading. As laboratory experiment itself it is no doubts on the validity of the presented results and their physical mechanism, but the attempt to adapt these results to interpretation of the thermal IR anomalies observed by remotes sensing satellites before earthquakes seems to be tense. Regardless the authors claim that “in most cases the increase in radiative temperature seems not to correlate to meteorological ground data”, it is not so. Even in the papers cited by authors (Tronin 2000, 2002, 2004; Pulinets et al., 2006) there is direct claim on the correlation between the IR anomalies and near ground air temperature. We bring the text from abstract of the Tronin et al. (2004) paper: “Air tem-

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perature, surface temperature, retrieved from satellite data, and well observations on the Kamchatka peninsula, Far East, Russia were jointly analyzed. Air temperature indicates correlation with seismic activity. “Joint analysis indicates similarity both satellite and ground observations related to earthquakes.” The conclusion of the Pulinets et al. (2006) is even stronger than the Tronin’s ones, because it explains the observed IR anomalies together with air temperature ones by the common physical mechanism.

We can bring more references demonstrating the atmospheric and meteorological anomalies before earthquakes having the temporal, amplitude and spatial parameters similar to IR anomalies observed by the satellites. Mil’kis M. R., Meteorological Precursors of Earthquakes, *Izvestiya, Earth Physics*, 22, 195-204, 1986. Dunajevka M. A, Pulinets S. A. Atmospheric and thermal anomalies around the time of strong earthquakes in Mexico, *Atmosfera*, 18, 235-247, 2005

From experimental data presented in the cited papers, it is clear the satellite IR anomalies and observed meteorological anomalies are of the same origin. In this case the IR emission produced by p-holes recombination is several orders of magnitude lower and is absolutely insufficient to produce the air heating by 3-5 K within the area of several thousands square kilometers what is observed experimentally.

Another question which arises immediately - it is the ground surface characteristics. The results reported in the paper are obtained using the pure monomineralic sample. At the same time the satellite IR anomalies are observed for completely different surfaces which can consist of sand, clay, could be covered by grass, trees, snow, etc. Nevertheless, the IR anomalies are observed and have almost the same characteristics regardless on the properties of underlying surface. It means that their origin are in atmosphere, not in the ground surface.

We can conclude that the paper may be recommended for publication but with much more modest conclusions regarding the possibility of application of laboratory experiment results to the earthquake prediction and interpretation of the satellite IR anomalies.

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