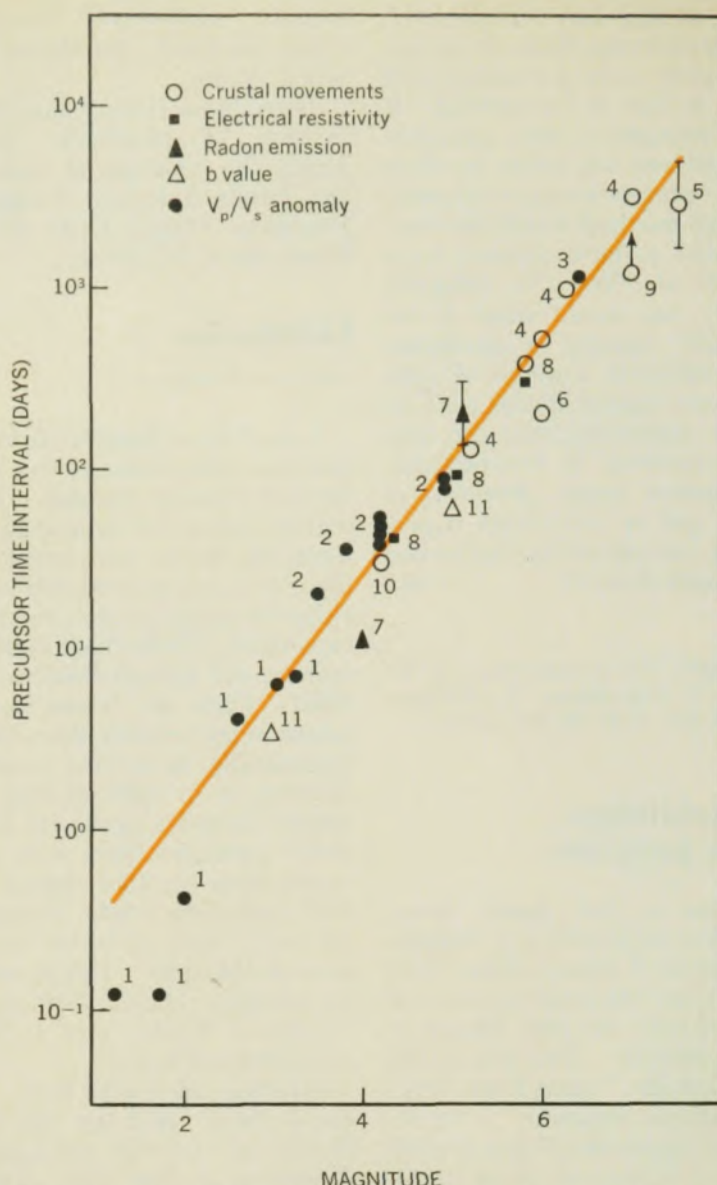




Duration time of precursory phenomena as a function of earthquake magnitude. The b value is a parameter that measures size distribution of earthquakes. Earthquake locations are: 1. Blue Mountain Lake, N.Y., 2. Garm, USSR, 3. San Fernando, Calif., 4. Kitamino, Kitaizu and Omi, Japan, 5. Niigata, Japan, 6. Odai-gahara, Japan, 7. Tashkent, USSR, 8. Garm, USSR, 9. Alma Ata, USSR, 10. Danville, Calif., 11. Fairbanks, Alaska. Plot from Christopher H. Scholz, Lynn R. Sykes and Yash P. Aggarwal.

to be going down. But in 1969, Japanese observers found that the peninsulas had risen a couple of centimeters; this uplift continued until at least 1971, when it began to tail off, Scholz told us. This reversal in direction of vertical movement was thought to be a precursor by Japanese seismologists who then started an intensive national earthquake-prediction program for the south Kanto province. The effort is directed by Tsuneji Rikitaki at the Earthquake Research Institute in Tokyo.

Scholz and Sykes feel that the 1969 uplift looks very much like what one would expect from dilatancy, resembling an earlier Japanese earthquake in Niigata. If dilatancy has occurred, it has been going on for at least four years. Using the Lamont time scale, this would imply that an earthquake of at least magnitude 7 would occur and that it would happen in the next few years. If it is delayed further, it would be of

even greater severity. But, Scholz cautions, they have not yet proven that dilatancy has occurred—the only indication is the crustal uplift and this can be explained by other causes. Further investigations will be required to establish if in fact dilatancy is actually occurring.

Because the Tokyo area has not been struck by any small earthquake since 1969, Scholz told us, the velocity ratio could not be determined from measuring the arrival times from seismograms. Another way to measure the velocity ratio is by setting off an asymmetric explosion, Sykes explained. Setting off an explosion in air or water does not produce much shear, unlike an earthquake. But if one can set off an asymmetrical source or put it at a boundary such as at the bottom of the ocean, there is a better chance of producing shear waves. At present, the Japanese workers are only timing compressional

waves, which now appear, on the basis of the Cal Tech results, to be all that is needed. Next month a US-Japan conference on earthquake prediction will discuss, among other things, the need for further observations. —GBL

References

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Infrared telescope takes to the air

A new infrared astronomy instrument is scheduled to begin test runs this summer as NASA scientists go aloft with a 36-in Cassegrain telescope mounted in a Lockheed C-141. Based at the NASA Ames Research Center in Moffett Field, California, the C-141 has been modified so that the telescope can operate either through an open port or through an optical window and it can fly at altitudes of up to 13.7 km for up to 3.5 hours.

The telescope will be used in a wide variety of infrared studies. Among these is the analysis of the composition and radiation balance of planetary atmospheres and the study of cool gas clouds in the galaxy. The gas clouds radiate little energy in visible wavelengths, but often show high radiation in the infrared range; some may be in the process of forming stars. The telescope will also lend itself to studies of the extragalactic sources of infrared radiation including those galaxies that radiate primarily in the infrared and to studies of circumstellar dust clouds that radiate at a few micrometers.

The telescope itself was built by Fecker Systems Division of Owens-Illinois, Inc. and is mounted on a 16-in diameter spherical air bearing that, together with gyroscopes, inertially stabilize the telescope. When operating through the open port, pressure bulkheads around the telescope will separate the researchers from the high-altitude environment and a tertiary mirror on the telescope reflects the infrared light through the bulkheads to instruments. "Chopping," or rapidly oscillating the secondary mirror so that the telescope looks alternately at an object and the adjacent sky, will be used to increase the sensitivity of the telescope.

The airborne telescope is expected to be fully operational early in 1974, and formal proposals for research using the NASA instrument can be submitted. Information can be obtained from Robert M. Cameron, Mail Stop 211-12, NASA Ames Research Center, Moffett Field, California 94035. □