



Collaboratory for the Study of Earthquake Predictability (CSEP)

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Earthquake prediction is one of the most difficult problems in physical science and, owing to its societal implications, one of the most controversial. Despite a lack of success, there has been a resurgence of research on earthquake predictability motivated by better data on past events, new knowledge of the physics of earthquake ruptures, and a more comprehensive understanding of how active faults systems actually work. However, the study of earthquake predictability has been impeded by the lack of an adequate experimental infrastructure—the capability to conduct scientific prediction experiments under controlled conditions and evaluate them using accepted criteria specified in advance. To remedy this deficiency, SCEC is working with its international partners to develop a virtual, distributed laboratory with a cyberinfrastructure adequate to support a global program of predictability research. This Collaboratory for the Study of Earthquake Predictability (CSEP) will extend the testing activities of the SCEC/USGS RELM project. It will support rigorous procedures for registering prediction experiments on regional and global scales, community-endorsed standards for assessing probability-based and alarm-based predictions, access to authorized data sets and monitoring products from designated natural laboratories, and software to allow researchers to participate in prediction experiments and update their procedures as results become available. CSEP will encourage research on earthquake predictability by supporting an environment for scientific prediction experiments that allows the predictive skill of proposed algorithms to be rigorously compared with standardized reference methods and data sets. It will thereby reduce the controversies surrounding earthquake prediction, and it will allow the results of prediction experiments to be communicated to the public in an appropriate research context.