

China Seismic Experiment Site: scientific challenges

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Earthquake science studies earthquakes on the Earth. Laboratory experiments are of no doubt very useful. But to confirm or falsify a hypothesis, field experiments are necessary. As a matter of fact, the history of the ‘heat flux paradox’ and the ‘stress drop paradox’ clearly shows the importance of the combination of laboratory and in-situ experiments. Field experiments have been proposed for decades in earthquake science. But in the view of physics, such ‘experiments’ have the limitation of the precision of the measurement, as well as the lack of controllable processes. Since recent years, innovative technologies have been reshaping the horizon of seismological, geodetic, and geological studies. Emerging possibilities of semi-controlled processes of earthquake preparation (such as fluid injection which induces earthquakes), repeatable continuous measurements (such as non-explosive source imaging and the application of waveform cross-correlation techniques), and high performance computation for modeling the geodynamic processes of earthquakes have made the field experiments ‘more like’ the experiments in physics. Since 2018 the China Seismic Experiment Site has been launched. Discussion on the scientific challenges plays an important role in the planning and operation of the Experiment Site. In this presentation, based on the discussion in the Committee for Science and Technology of the China Earthquake Administration (CEA) and the exchange with international colleagues, we figure out the main scientific problems associated with the Experiment Site.