

Preface

Distant earthquakes are well known to induce a wide range of responses in surface water and groundwater. These responses are often viewed as mere curiosities as their occurrence is limited in space and time. The frequent emphasis on earthquake precursors in studies of these phenomena also tends to push the study of ‘earthquake hydrology’ away from the mainstream of geoscience. The observed phenomena, however, probe the interaction between hydrogeological processes and mechanical deformation in the shallow crust. Hence they provide insight into the interaction among water cycle, tectonics, and properties of the crust. As such, the study of earthquake hydrology also has the potential to provide a more quantitative and in-depth understanding of the nature of earthquake precursors and evaluate whether they are in fact precursors.

The title of this book reflects the nature of the connections we address: we focus on how earthquakes affect hydrology. Water also influences earthquakes as it affects the strength of faults and the rheology of rocks. Our emphasis here, however, is not on the hydrology of earthquakes, but on understanding the hydrological phenomena induced or modified by earthquakes. The boundary between the ‘hydrology of earthquakes’ and the ‘earthquake-induced hydrological phenomena’, however, can sometimes be blurred. For example, triggered earthquakes are sometimes explained by a re-distribution of pore pressure following the triggering earthquake. Hence, triggered seismicity may be an example of an earthquake-induced hydrological phenomenon. The study of the latter, therefore, can be important towards a better understanding of the mechanics of at least some earthquakes.

There are many students, postdocs and colleagues we wish to thank for collaborating on research projects related to the topics reviewed in this book, or participating in stimulating discussions in the class we taught called ‘Earthquake hydrology’. In particular, we wish to thank Emily Brodsky, Yeeping Chia, Douglas Dreger, Shemin Ge, Fu-qiong Huang, Tom Holzer, Chris Huber, Joel Rowland, Martin Saar, Yaolin Shi, Chung-Ho Wang, Kelin Wang, Pei-ling Wang and Alex Wong for enlightening exchanges. Hunter Philson helped with figures and the index. We

also thank the National Science Foundation, the Miller Institute for Basic Research in Science, and NASA for supporting the research and synthesis in this volume.

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<http://www.springer.com/978-3-642-00809-2>

Earthquakes and Water

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2009, X, 225 p., Hardcover

ISBN: 978-3-642-00809-2