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The role of the reference seismicity rate in a rate-and-state model

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We investigate the role of the reference seismicity rate in making earthquake forecasts through a rate-and-state model. It is commonly accepted by the seismological community that the reference seismicity has a relevant role in all kind of forecasting models (both physically and evidence based). In general, its wrong estimation can easily lead to biased forecasting. Here, we analyze how different assesements of this variable in the rate-and-state model can influence seismicity rates forecast and the other involved physical variables. In particular, we study the case of a: 1) constant reference seismicity; 2) spatially variable one, estimated smoothing the past, not declustered seismicity; 3) background seismicity estimated through an Epidemic Type Aftershock Sequence (ETAS) model. We focus our attention on to the 1992 Landers earthquake and the 1997 Kagoshima couplet because of the high quality data available.