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3.3-O9. Using ISC Data to Build a Prior of Seismicity for NET-VISA.

Previous work on NET-VISA (Network Processing Vertically Integrated Seismic Analysis) has shown that a Bayesian approach to global seismic monitoring can be very effective. Such an approach builds on probabilistic generative models of seismicity, signal propagation, noise, and detector performance. Crucial to NET-VISA's performance are empirically calibrated measures of the uncertainty associated with each of these models. Together, the models and their associated uncertainties allow NET-VISA to propose bulletins that are consistent with known geophysics and combine evidence (or the lack of evidence) appropriately from all sources. In this work we focus on improving NET-VISA's Bayesian prior for global seismicity, i.e., the probability of occurrence per unit time of an event with a given location, depth, magnitude, and source type (natural vs. man-made). To do so we draw on the extensive ISC catalog of known natural seismic events. The new prior leads to significantly more accurate predictions of event locations. Using ISC's database of known explosions, we also evaluate the extent to which an event's predicted location provides an indication of its source type.

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