



Estimating the completeness of volcanic eruption records using hidden Markov models

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Despite ongoing efforts worldwide to compile different databases for volcanic eruptions, eruption records are pervasively incomplete, a problem that is exacerbated when dealing with catalogs derived from geologic records. When using statistical models to analyze this type of records, missing data can strongly influence the parameter estimates, which are usually obtained by maximizing the log likelihood function, and hence affect the future hazard estimate. This work explores a hidden Markov model framework to handle missing data in volcanic eruption records. This framework will enable us to estimate the completeness level of the records, and offers a means of determining where in the record the missing observations are likely to be found. We apply this method to different volcanic eruption records with the aim to estimate the completeness of the records over time and to obtain more robust estimates of the future hazard.