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## Non-ergodic FAS Ground-Motion Model for France

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In this study, we use an ergodic ground motion model (GMM) of California of Bayless and Abrahamson (2019) as a backbone and incorporate the varying-coefficient model (VCM) to develop a new French non-ergodic GMM based on the French RESIF data set (1996-2016). Most of the magnitudes of this database are small ( $M_w = 2.0 - 5.2$ ), so we adopt the Fourier amplitude spectral GMM rather than the spectral acceleration model, which allows the use of small magnitude data to constrain path and site effects without the complication of the scaling being affected by differences in the response spectral shape. For the VCM, the coefficients of GMPE can vary by geographical location and they are estimated using Gaussian process regression. That is, there is a separate set of coefficients for each source and site coordinate, including both the mean coefficients and the epistemic uncertainty in the coefficients. Moreover, the epistemic uncertainty associated with the predicted ground motions also varies spatially: it is small in locations where there are many events or stations and it is large in sparse data regions. Finally, we modify the anelastic attenuation term of a GMM by the cell-specific approach of Kuehn et al. (2019) to allow for azimuth-dependent attenuation for each source which reduces the standard deviation of residuals at long distances. The results show that combining the above two methods (VCM & cell-specific) to lead an aleatory standard deviation of residuals for the GMM that is reduced by ~ 47%, which can have huge implications for seismic-hazard calculations.