**Ay/Ge 117 Bayesian Statistics and Data Analysis**

**1st Project Check-In**

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**Update:**

The dataset of this project is acquired from Northern California Earthquake Catalog. This is a double-difference earthquake catalog which provides more accurate location information (useful for evaluating spatial dependence of the parameters I am interested in) about the earthquakes in northern California. I have had this complete dataset from 1984–present covering the 250-km long San Andreas Fault from Cholame in the south toward Loma Prieta in the north. This dataset contains 72173 earthquakes and will allow me to look at spatial variations of earthquake occurrence information (b-value in Gutenberg-Richter law). I have checked previous papers of applying this similar approach in using maximum likelihood estimators (MLE) to evaluate the spatial variations of the parameters in this project. I will further be moving on to apply the MLE method to my dataset.

**Reference for methods and dataset:**

Aki, K. (1965). Maximum Likelihood estimate of b in the formula logN = a – bM and its confidence limits, Bull. Earthquake Res. Inst. 43,237 -239.

Frohlich, C., & Davis, S. D. (1993). Teleseismic b values; or, much ado about 1.0. Journal of Geophysical Research: Solid Earth, 98(B1), 631-644.

Lombardi (2003). The Maximum Likelihood Estimator of b-Value for Mainshocks. Bulletin of the Seismological Society of America 2003; 93 (5): 2082–2088. doi: https://doi.org/10.1785/0120020163

Waldhauser, F. and D.P. Schaff, Large-scale relocation of two decades of Northern California seismicity using cross-correlation and double-difference methods, J. Geophys. Res.,113, B08311, doi:10.1029/2007JB005479, 2008.

Waldhauser, F., Near-real-time double-difference event location using long-term seismic archives, with application to Northern California, Bull. Seism. Soc. Am., 99, 2736-2848, doi:10.1785/0120080294, 2009.