Testing physics and statics based hybrid ETAS models

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ETAS model:

$$\lambda(r,t) = \mu + \sum_{t_i<t} g_i$$

where,

$$g_i = \frac{Ke^{\alpha(m_i-M_0)}}{\{t-t_i\}^{1+\omega} e^{\frac{t-t_i}{\tau}} \{(r-r_i)^2 + de^{\gamma(m_i-M_0)}\}^{1+\rho}}$$

[Nandan et al. (2019)]

Models tested for different spatial kernels:

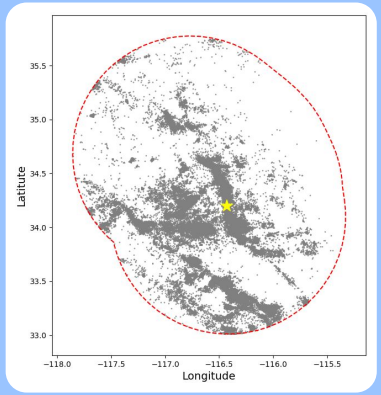
1. Power law decay kernel (**Radial**),
   $\{(x-x_i)^2+(y-y_i)^2+de^{\gamma(mi-M0)}\}^{(-1-\varrho)}$

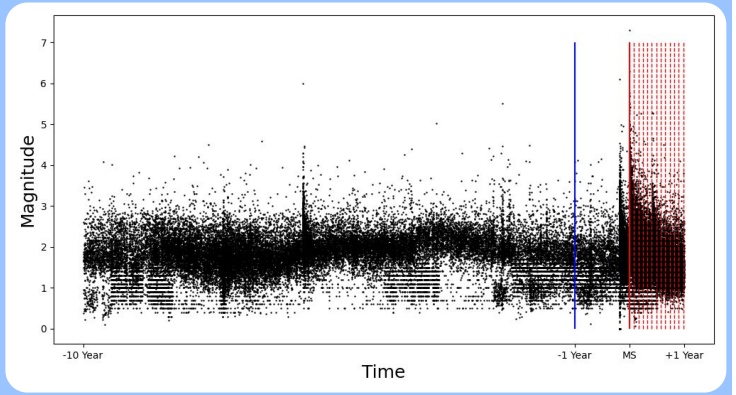
2. Probability kernel using stress data,

$$P_i = \frac{S_i H(S_i)}{\sum_{i=1}^{N} S_i H(S_i)}$$

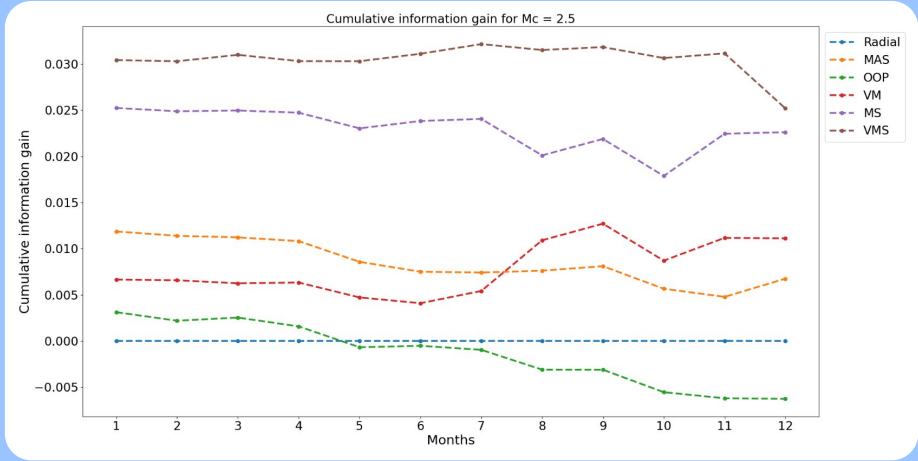
   2a. ΔCFS on master fault orientation (**MAS**)
   2b. ΔCFS on optimally oriented planes (**OOP**)
   2c. ΔCFS assuming fault variability (**VM**)
   2d. Maximum Shear (**MS**)
   2e. von-Mises stress (**VMS**)

Testing region and events (M=7.2 1992 Lander earthquake):





Information gain



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