

**Simulating seismicity in a fault network model:
the effect of interaction on event statistics**

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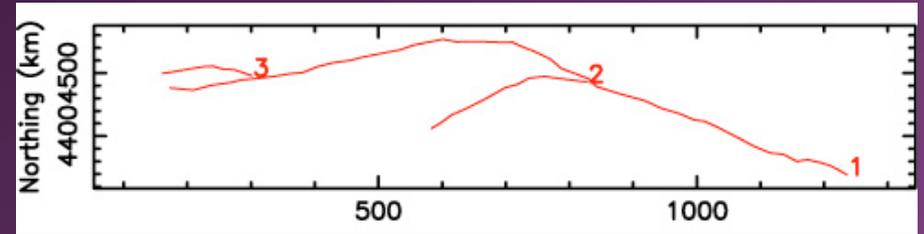
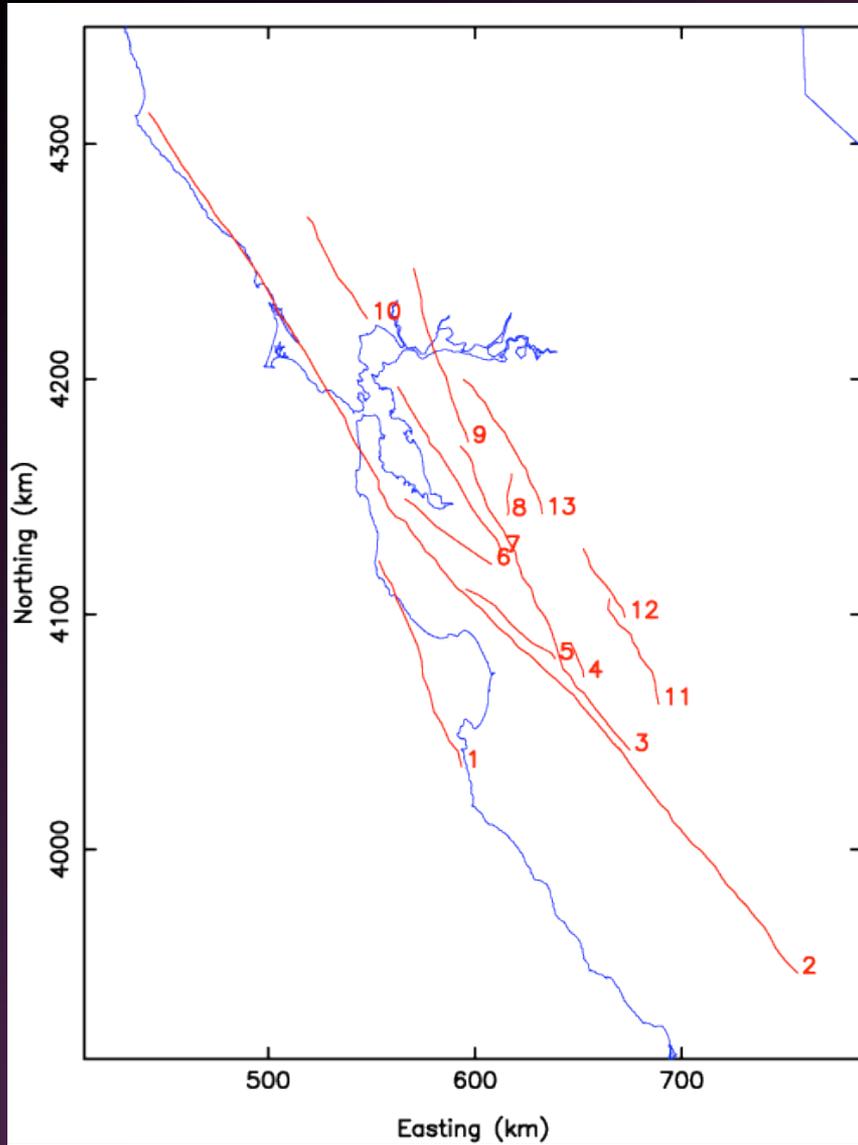
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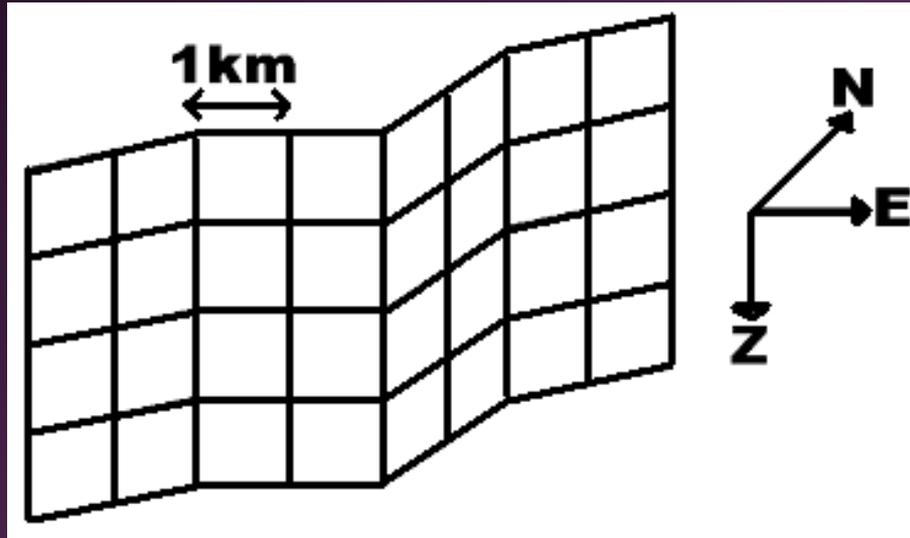
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Fault networks

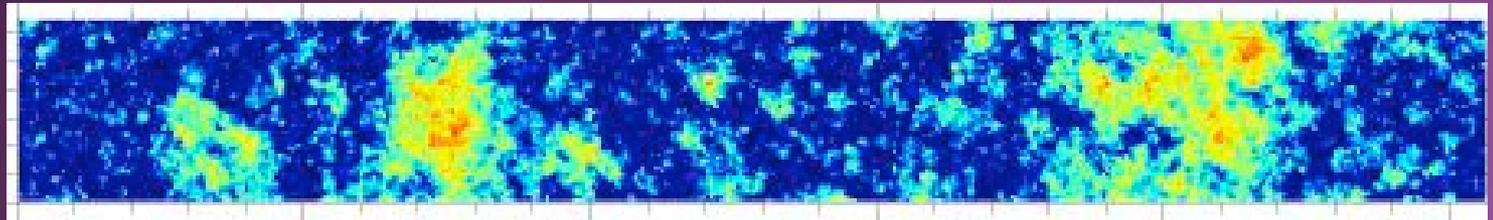


Seismicity simulation model

- Contains a user-defined network of 3D faults



- Cells assigned heterogeneous (usually fractal) distribution of strength



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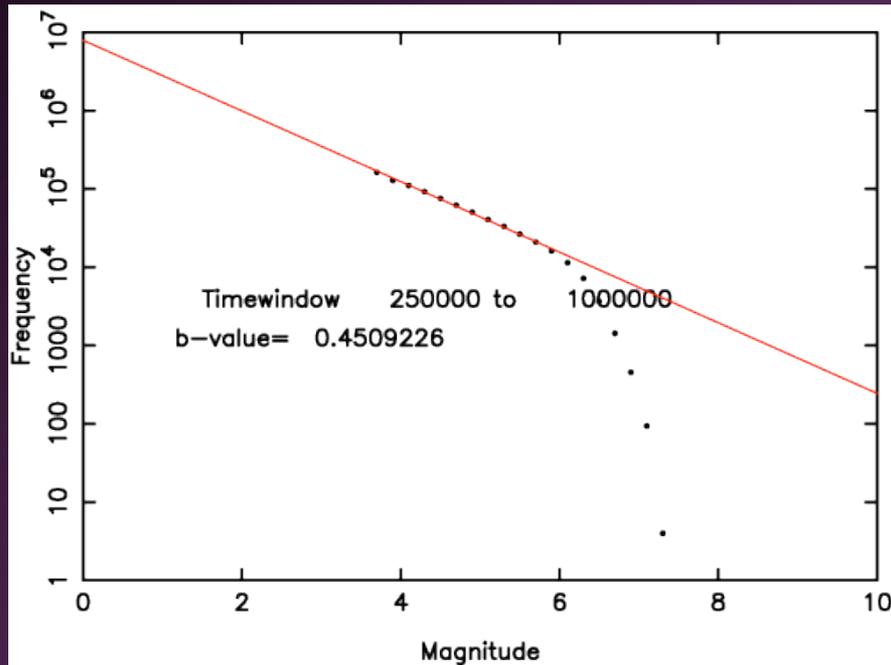
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- Fault interaction can be “turned off” to investigate its effects

B-values

- Both models produce power-law magnitude frequency distributions
- B-value lower than actually observed due to lack of small faults

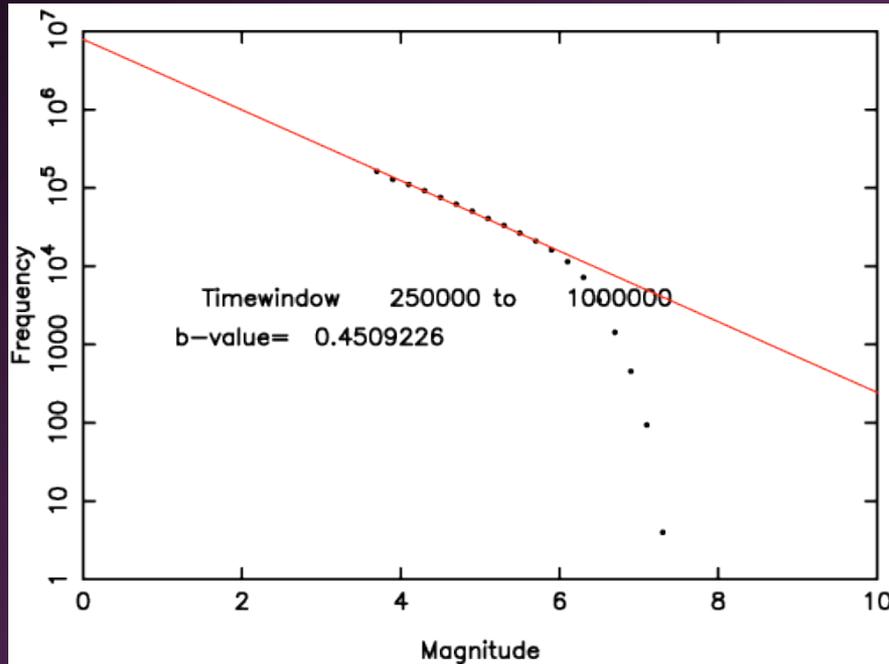
SFBA



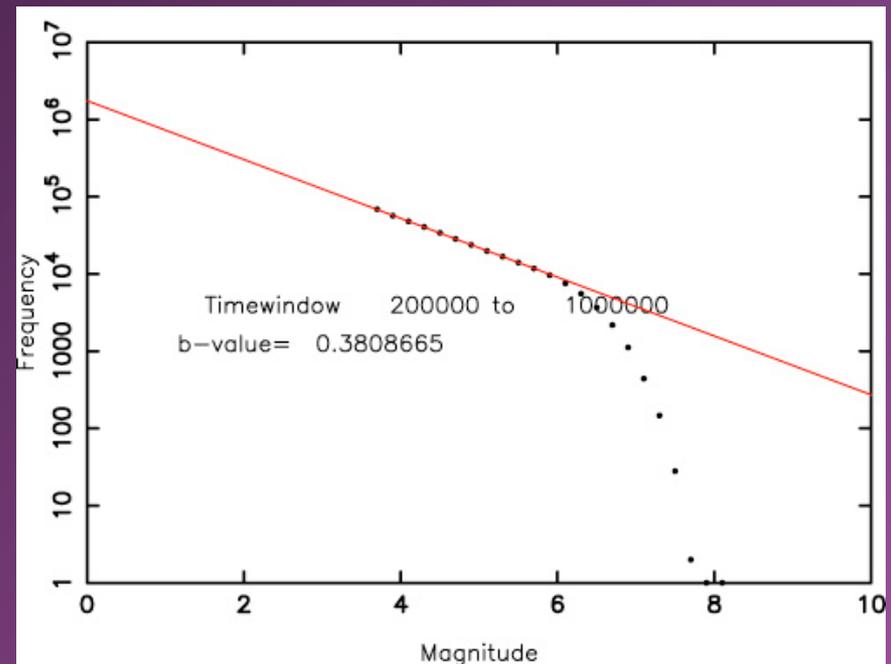
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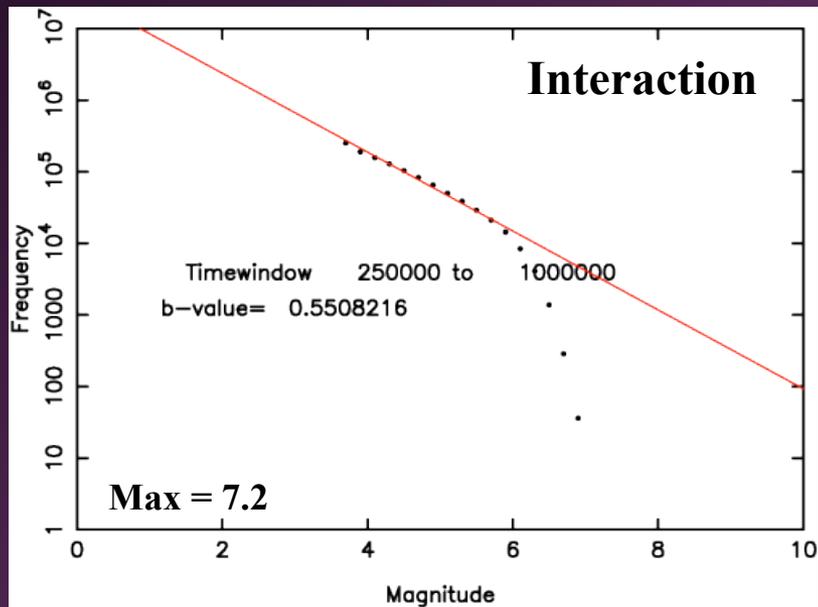
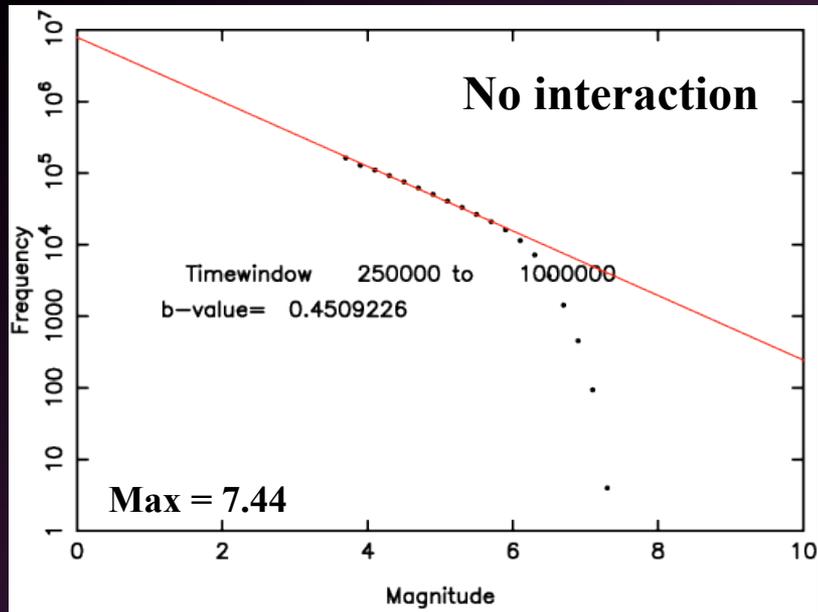
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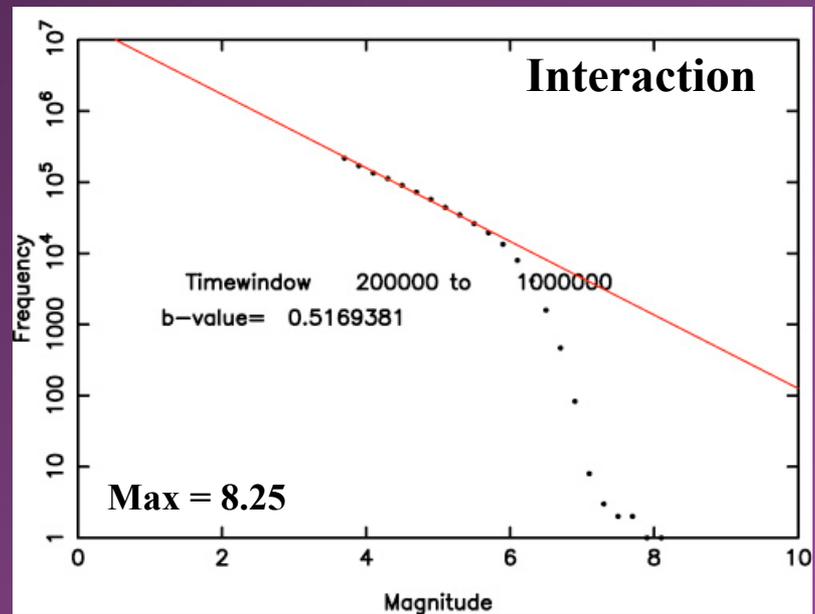
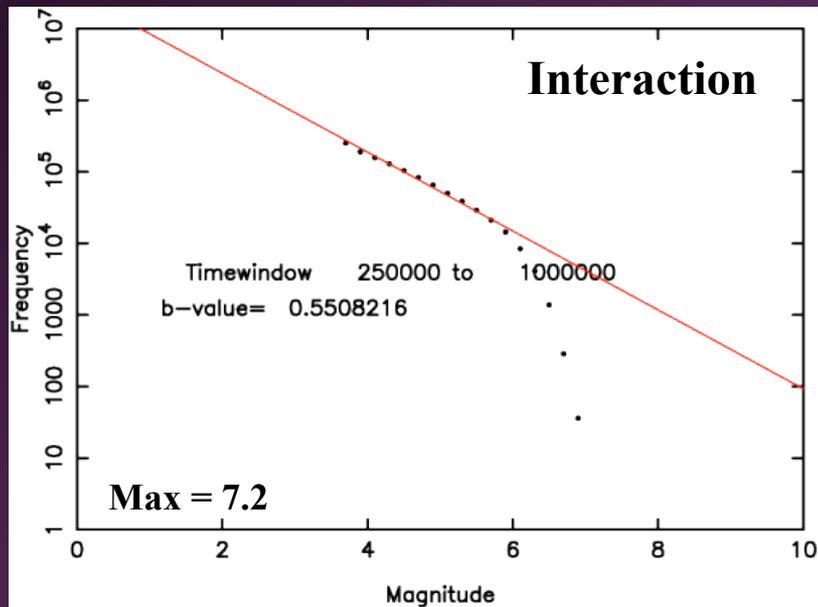
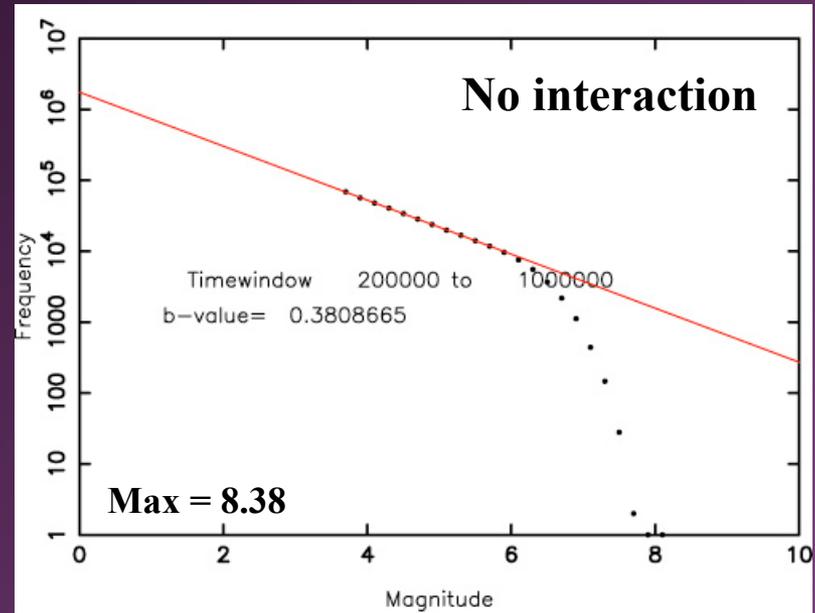
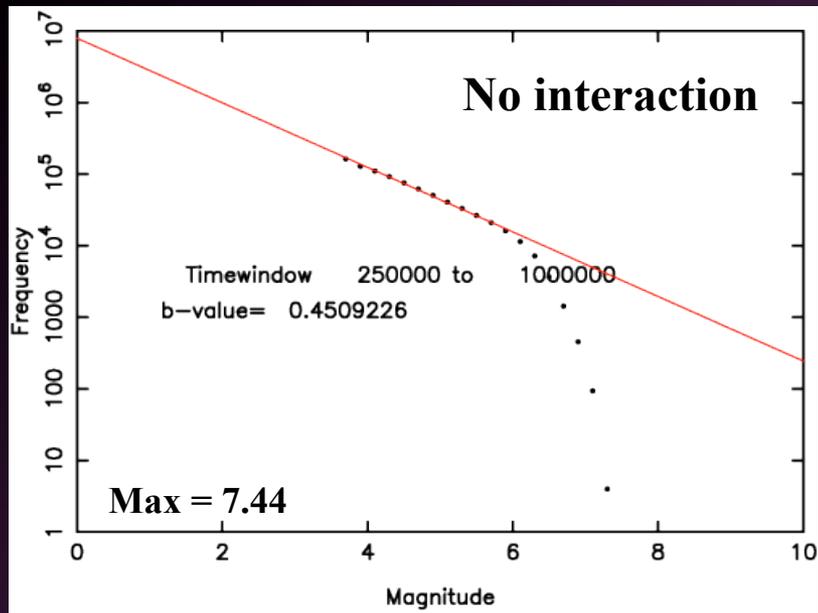
NAF



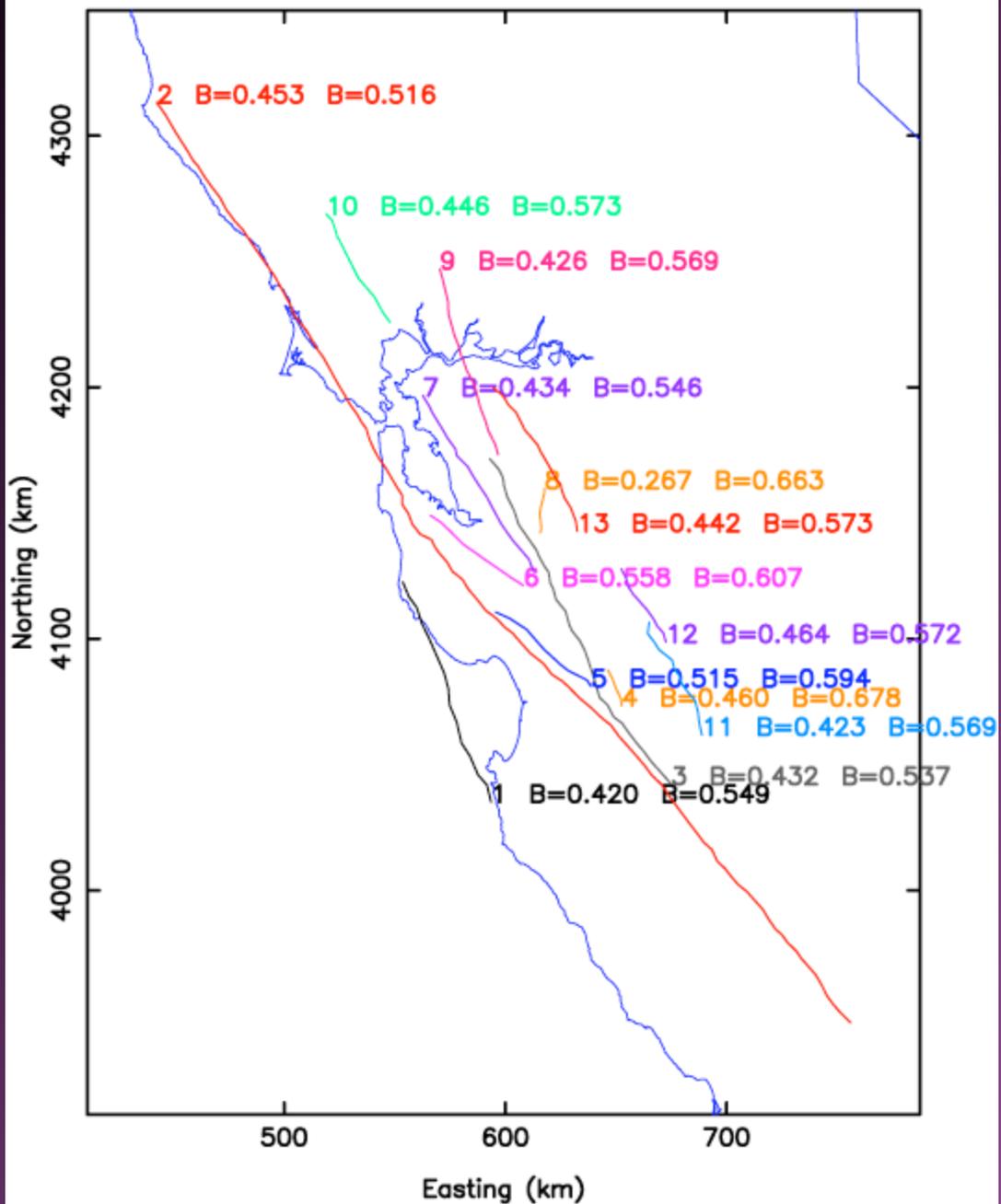
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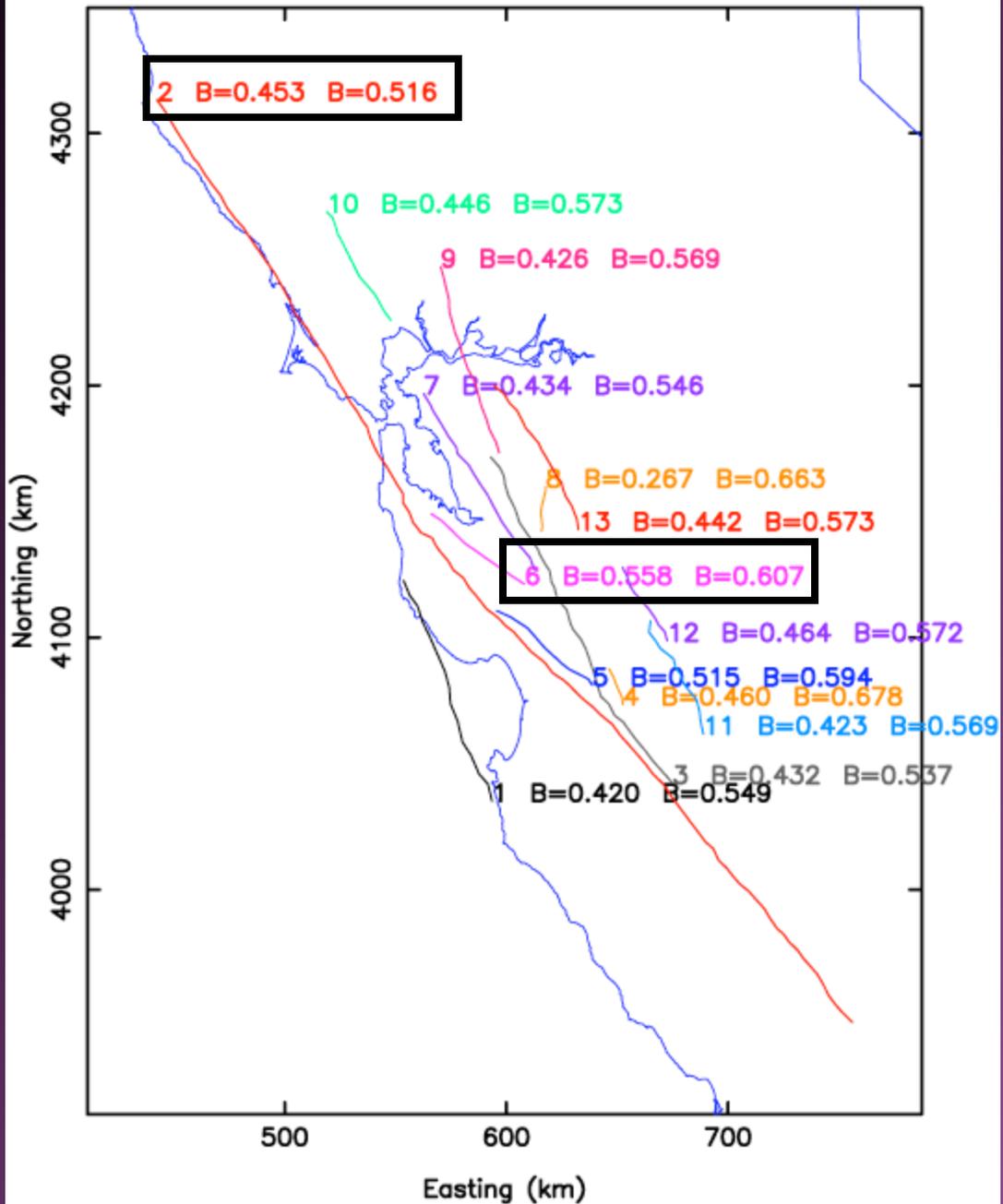
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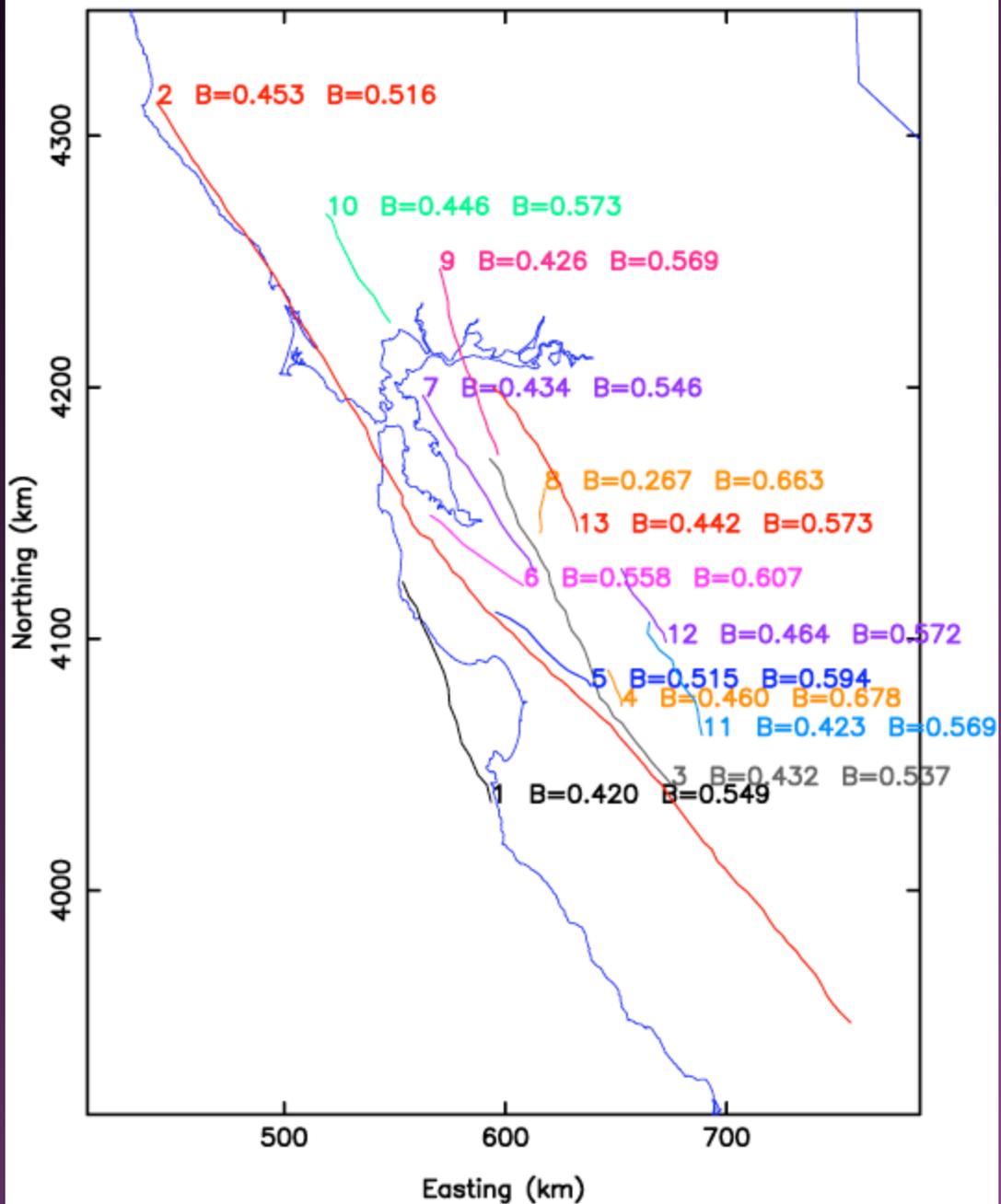
Map of San Francisco Bay Region



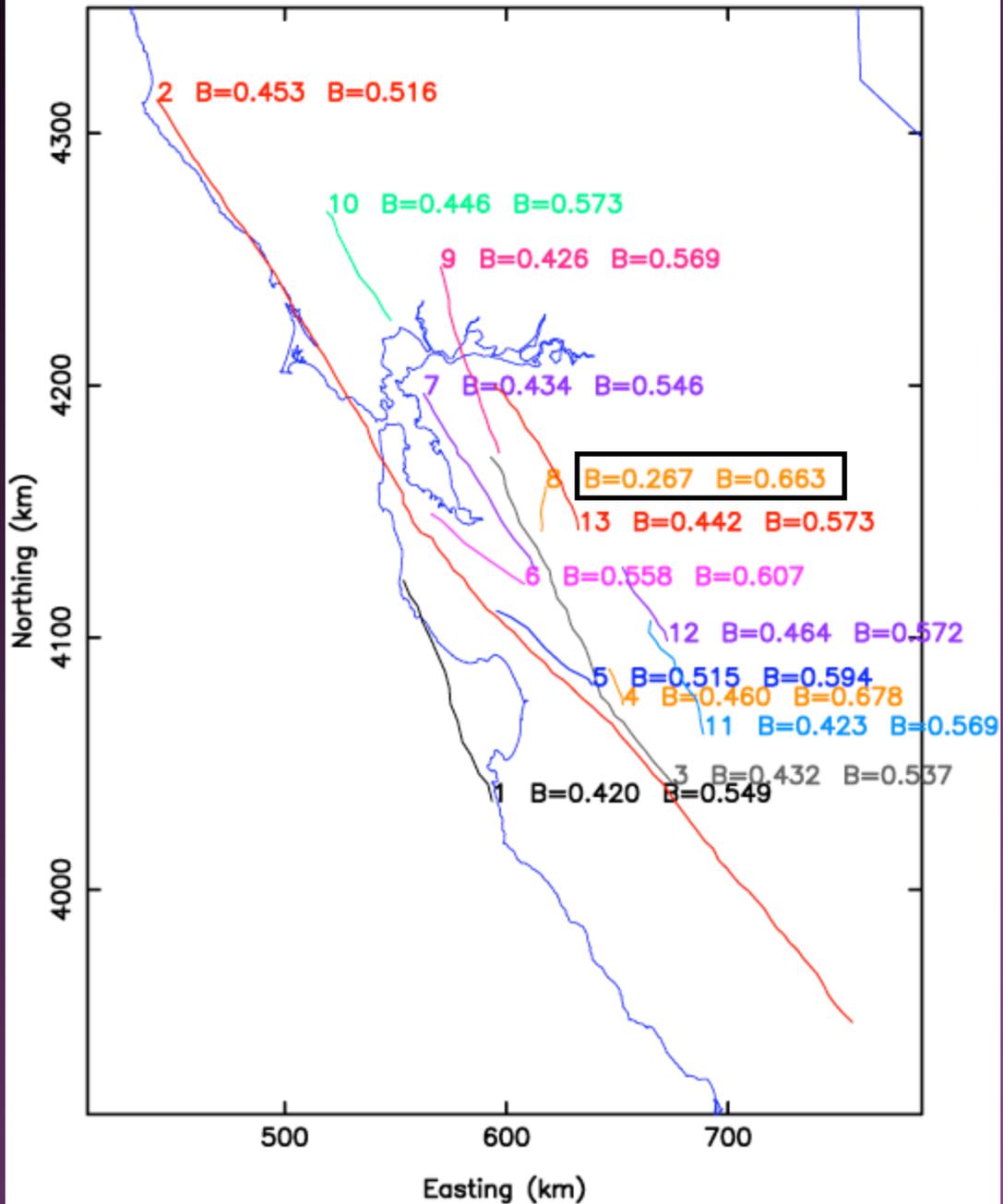
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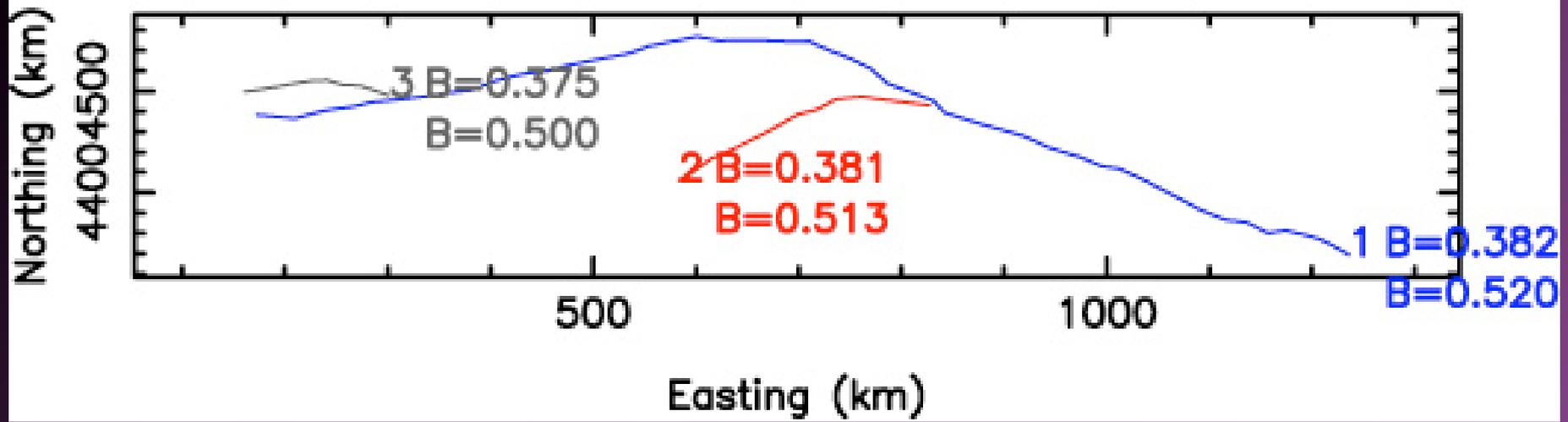
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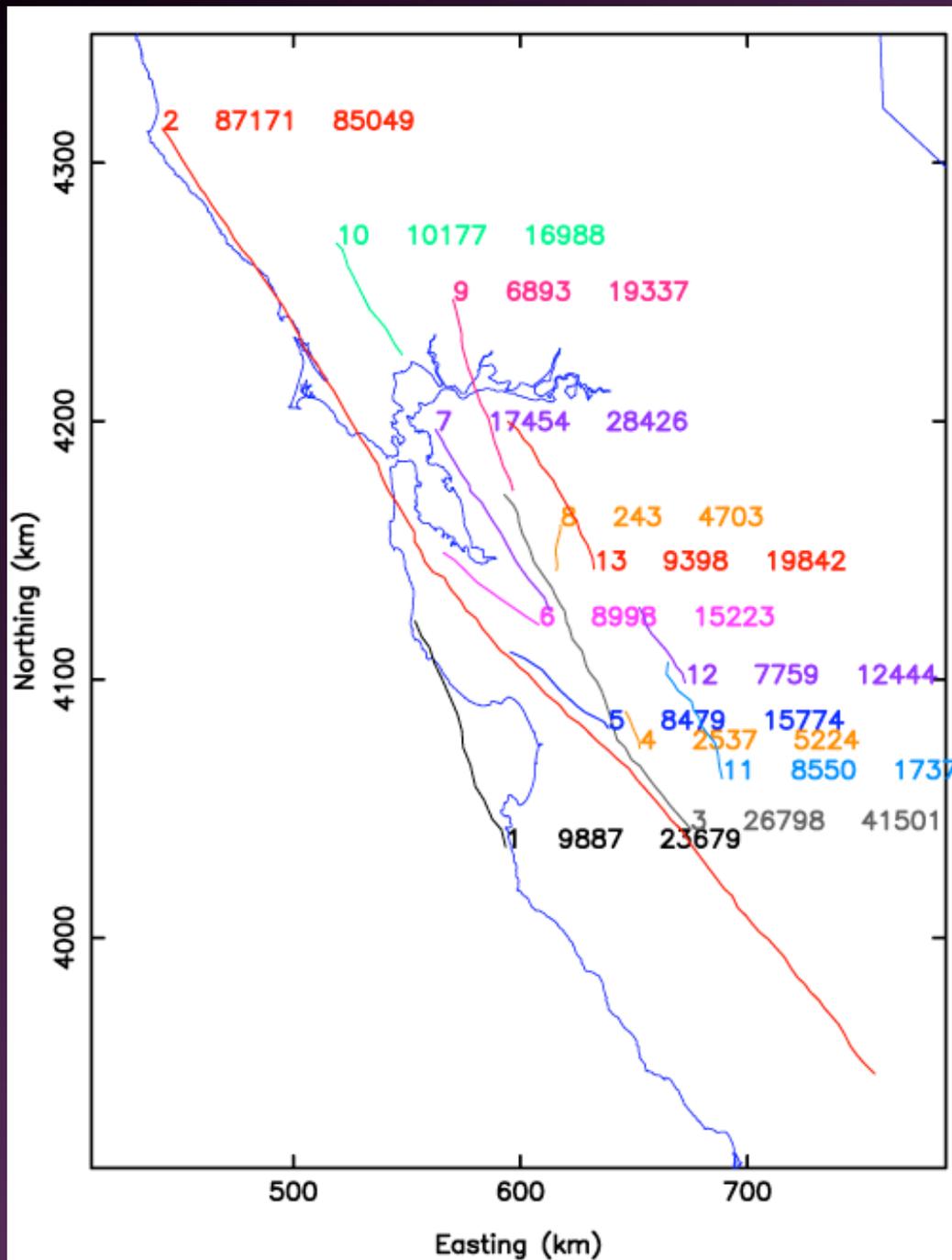


Map of San Francisco Bay Region



Map of North Anatolian Fault Region

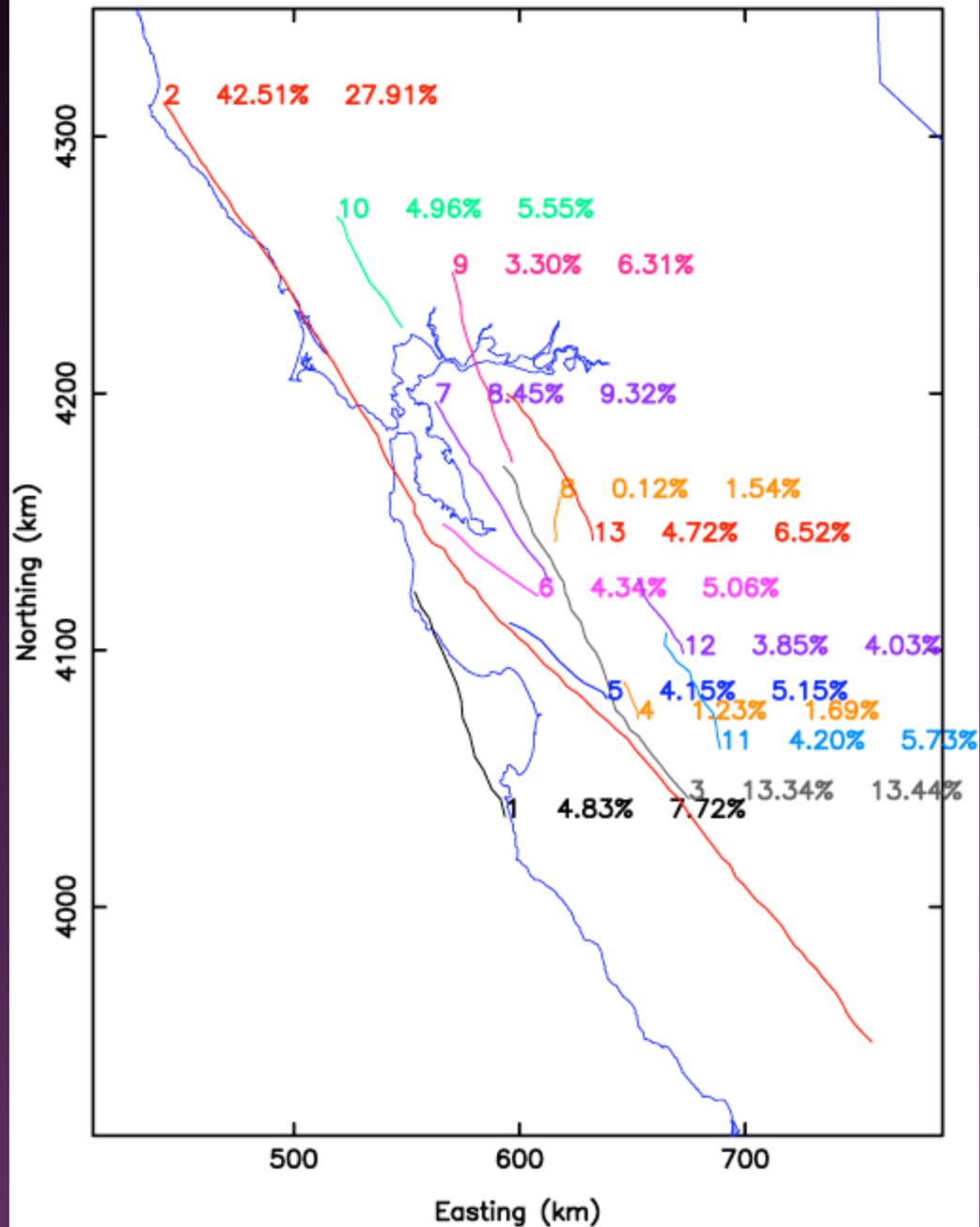


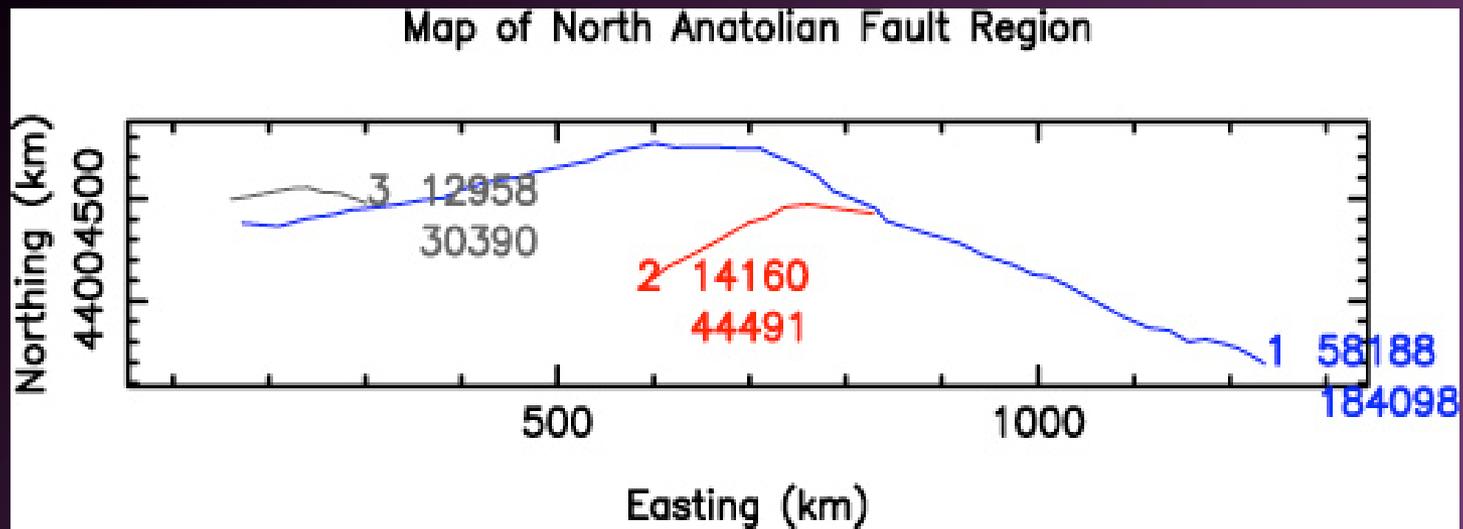


No interaction:
204,349 events

Interaction:
305,569 events

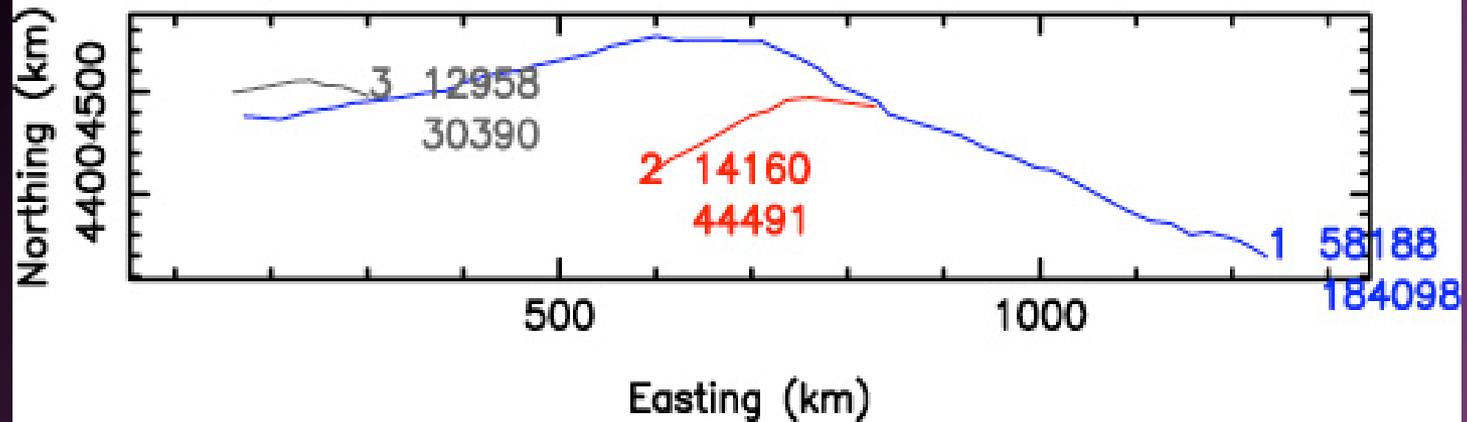
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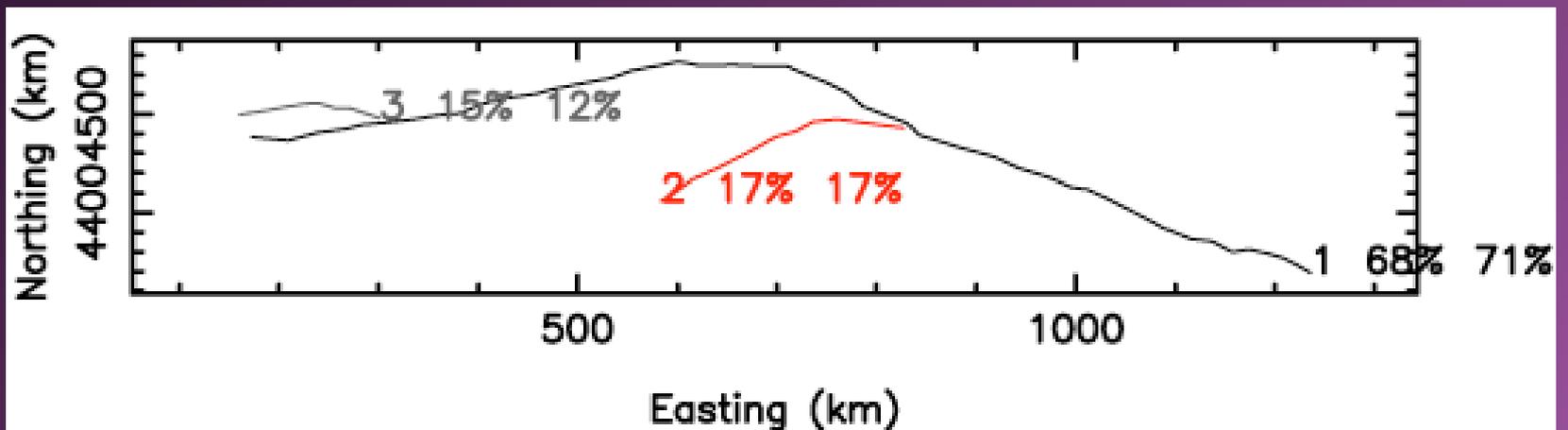


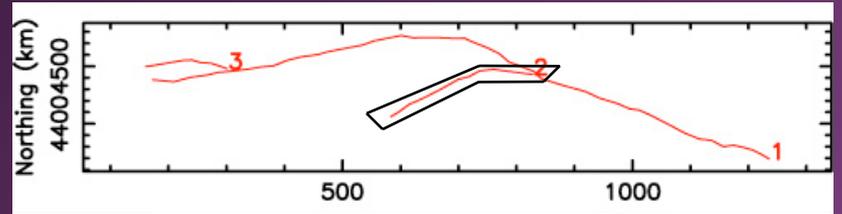
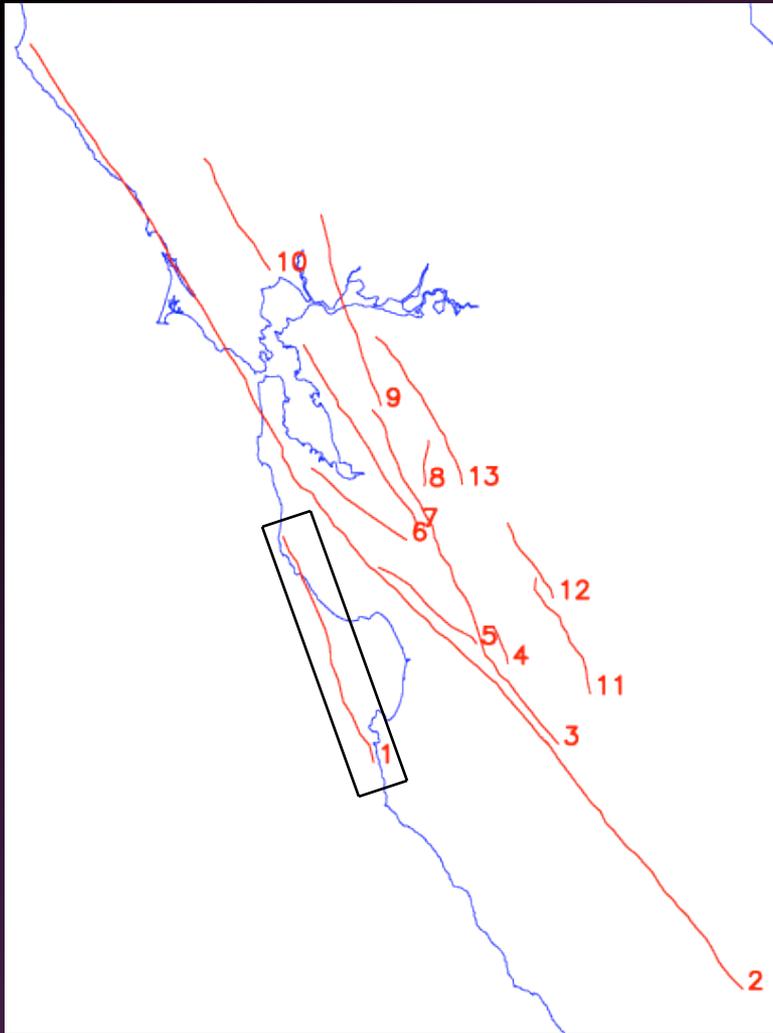
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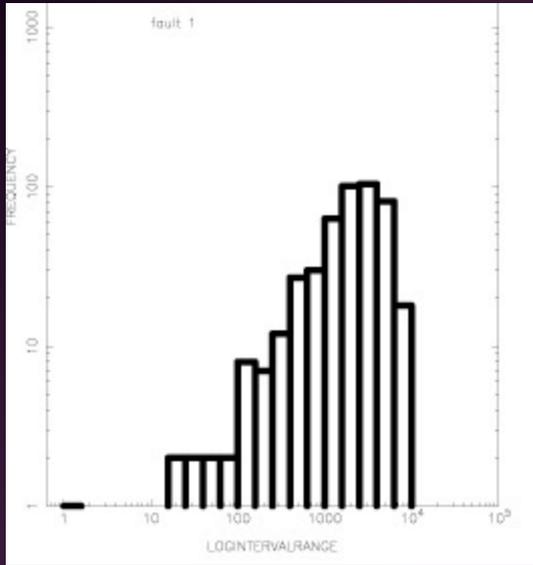
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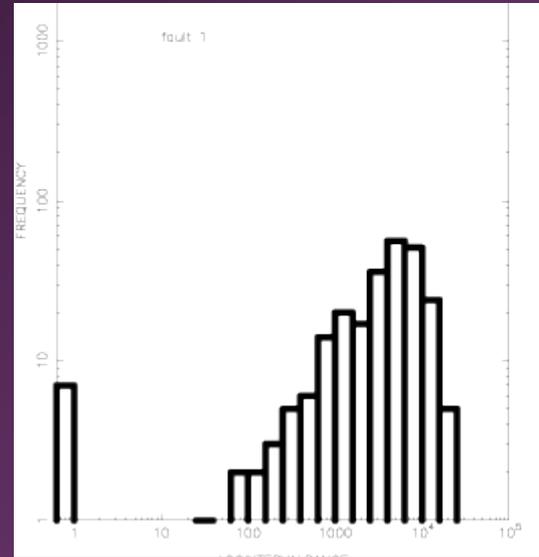


Recurrence times of events on fault 1 (SFBA)

No interaction



Interaction



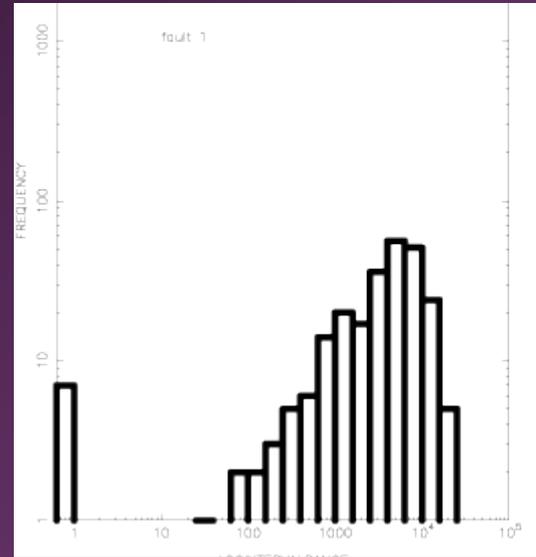
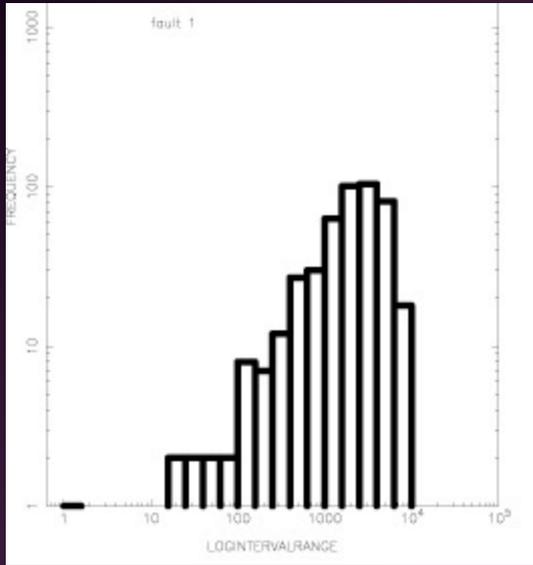
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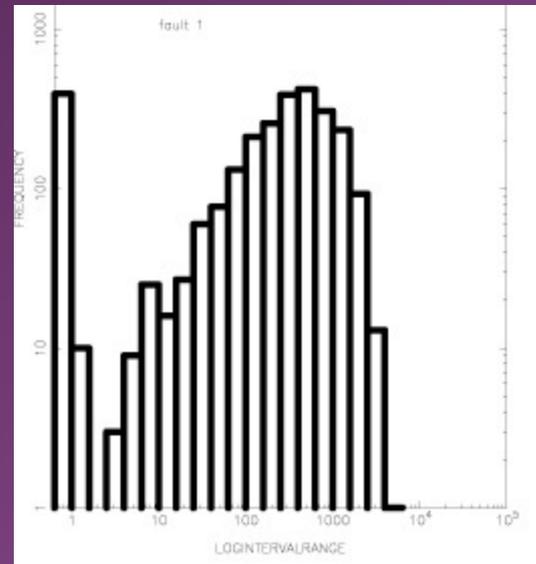
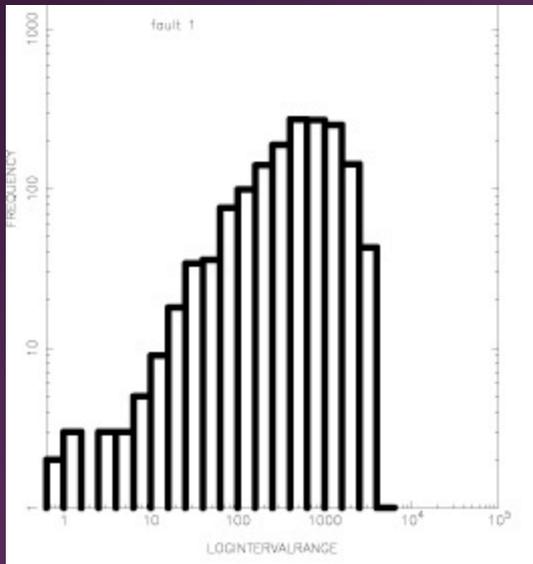
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$M \geq 5.5$

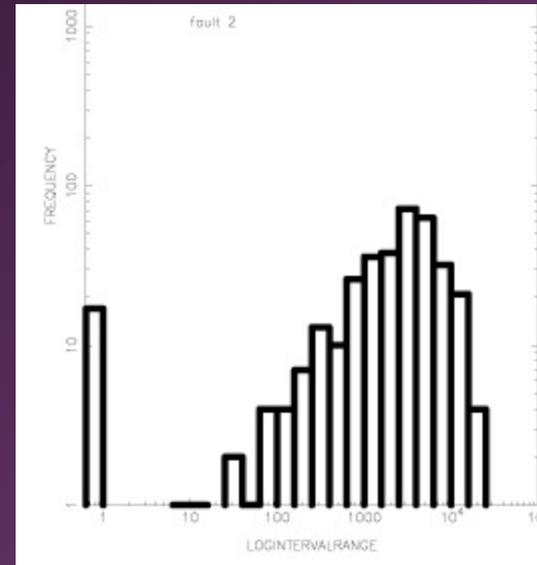
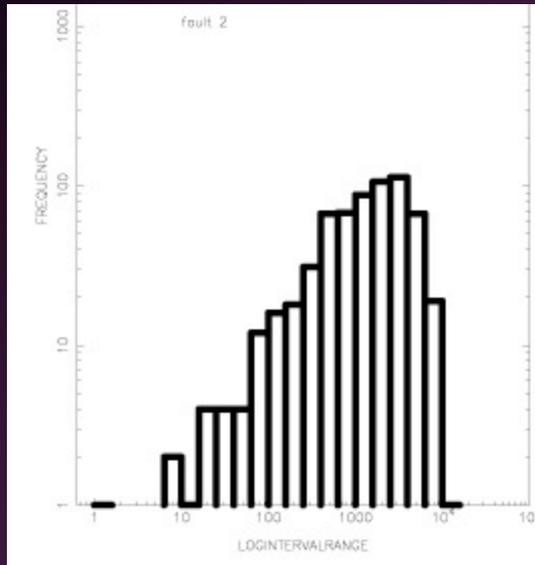


Recurrence times of events on fault 2 (NAF)

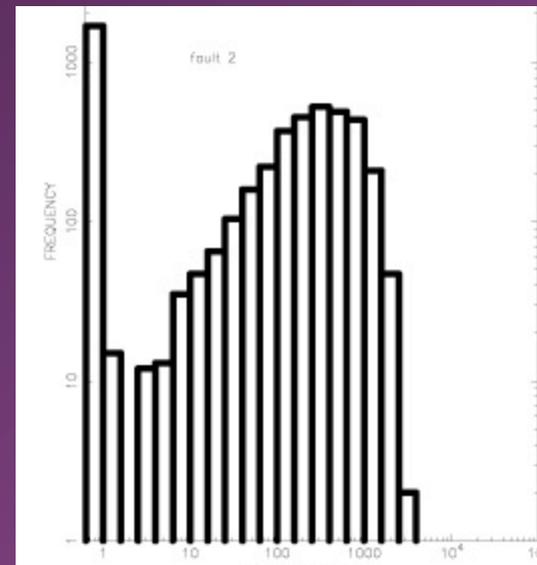
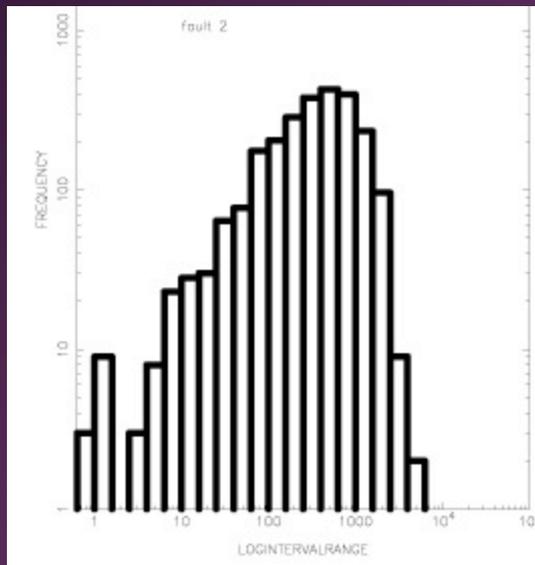
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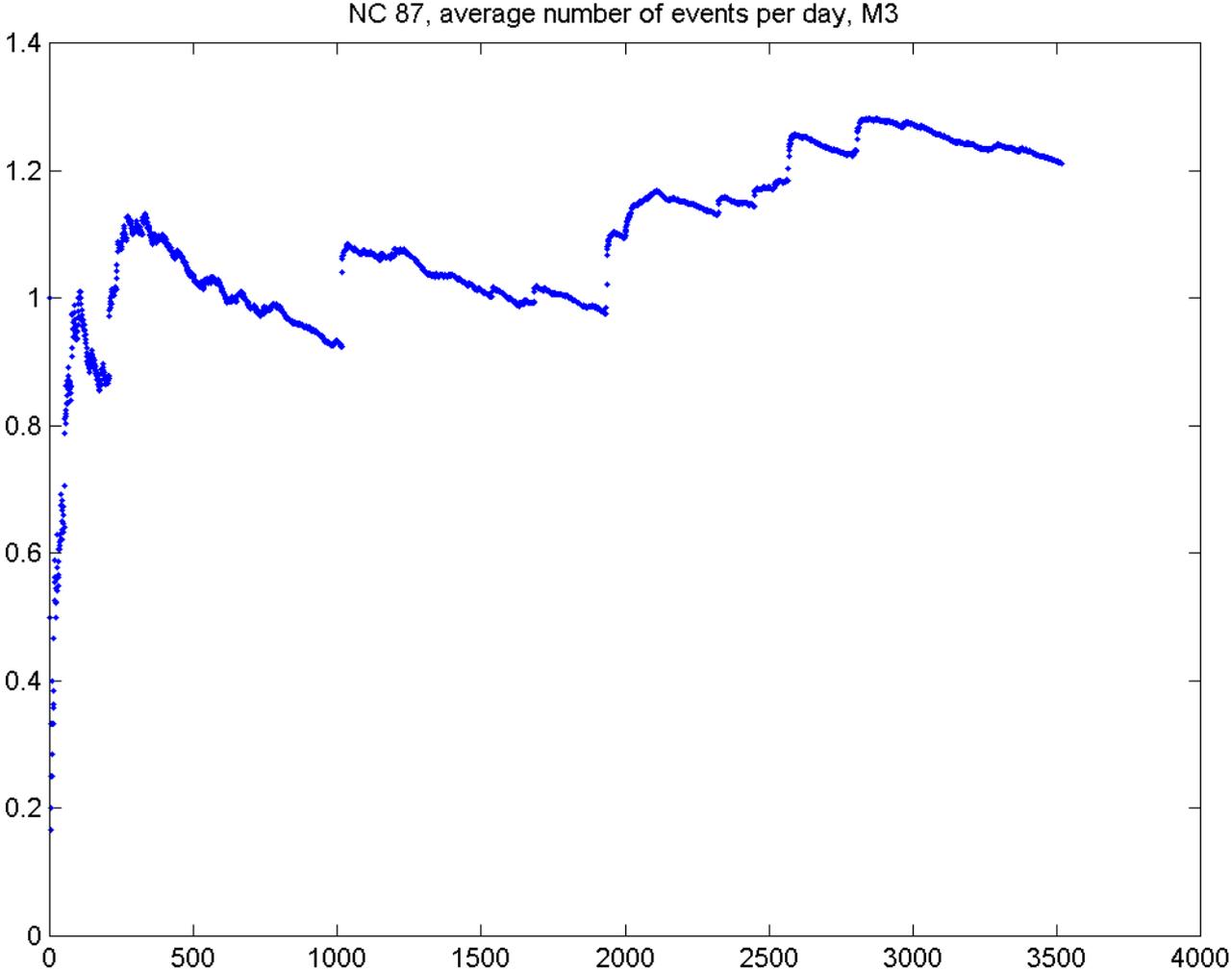
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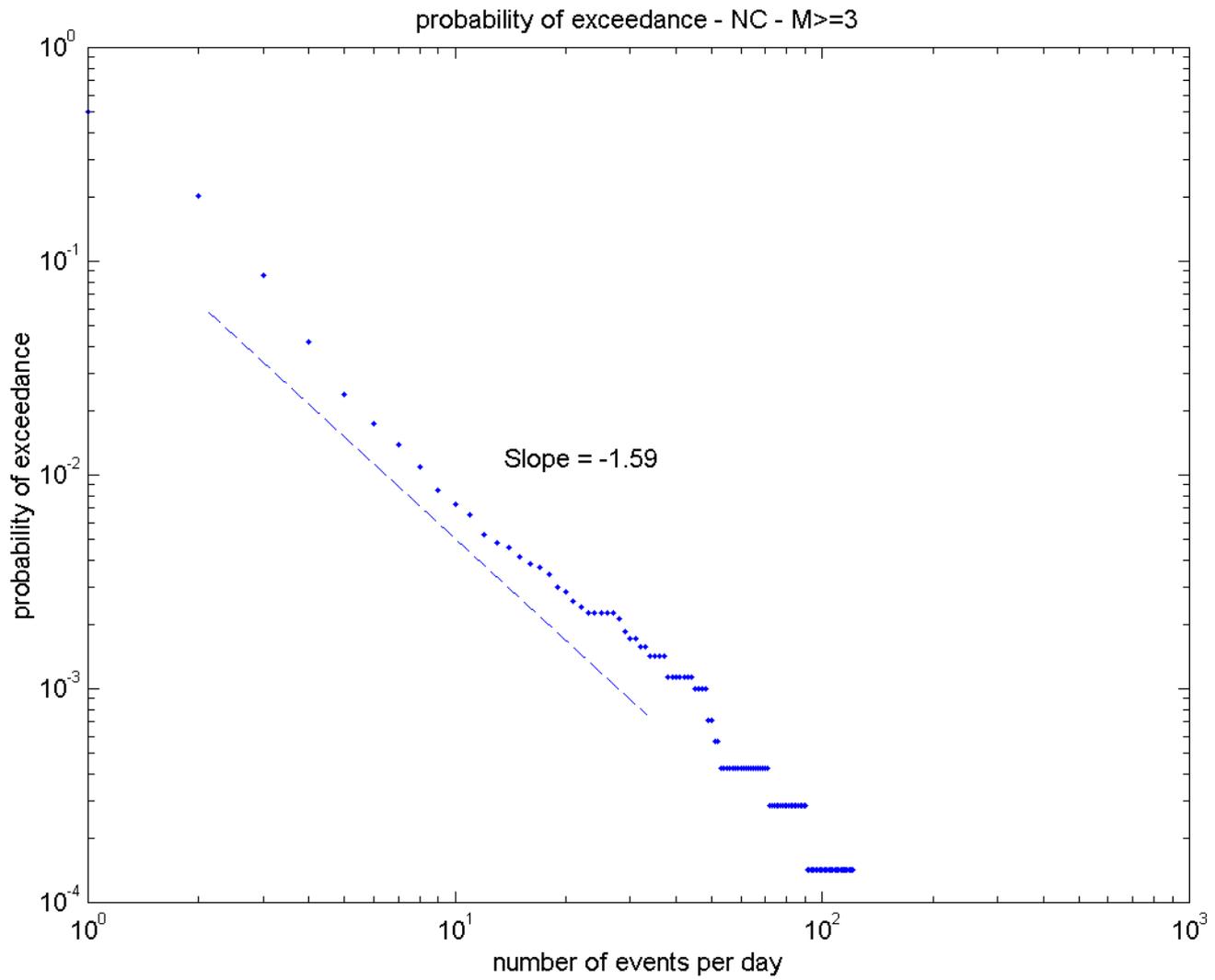


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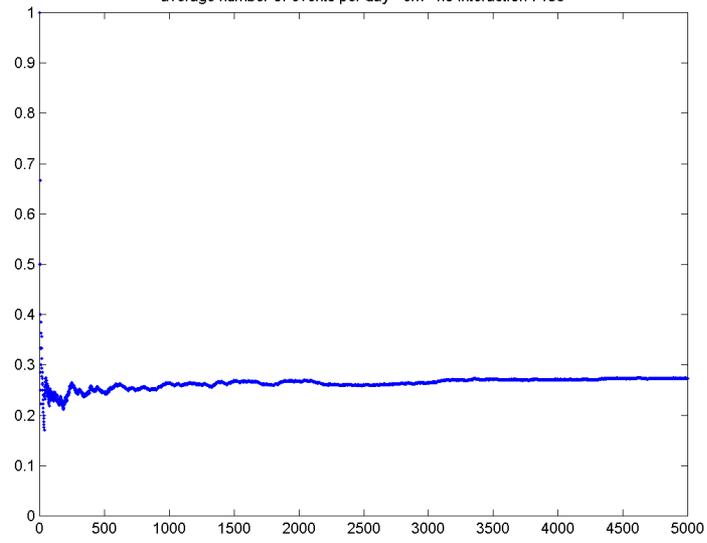


Seismic rates – Northern California

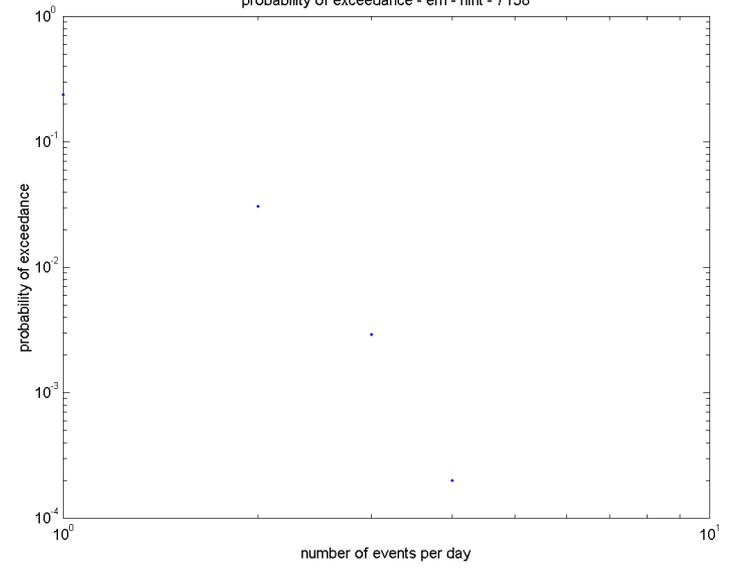




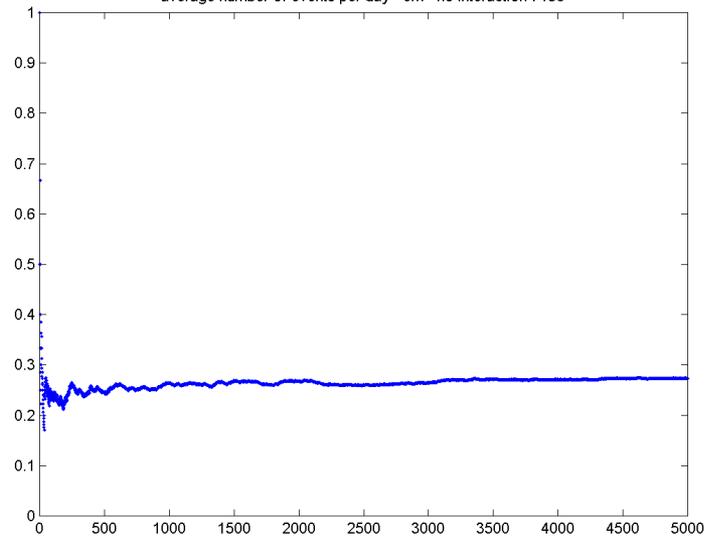
average number of events per day - em - no interaction 7158



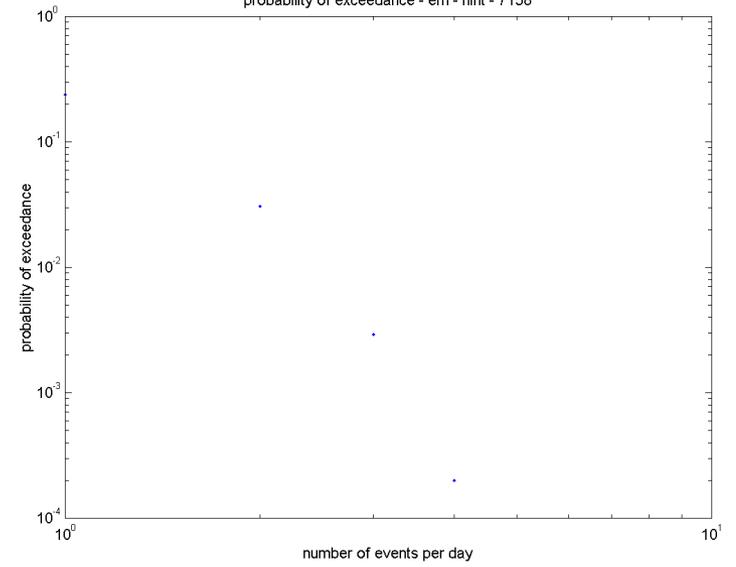
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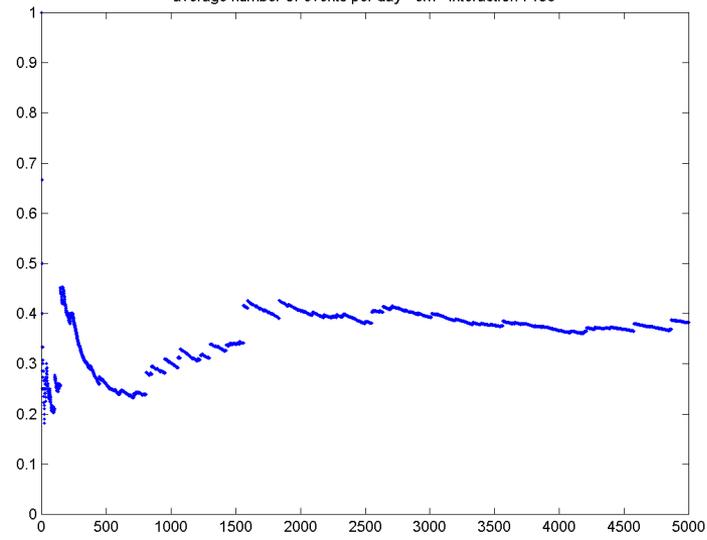
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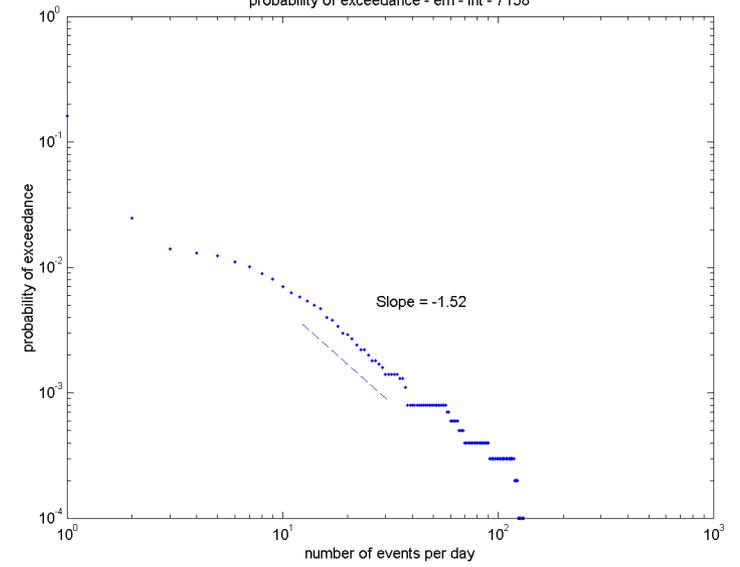
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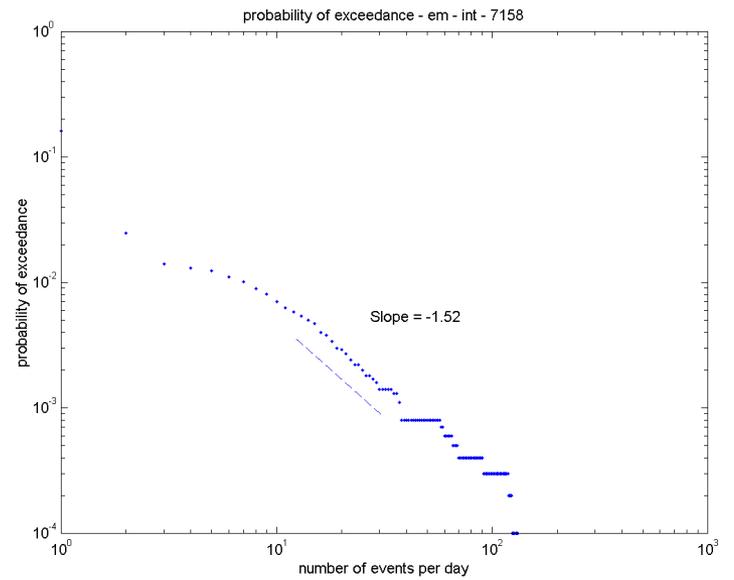
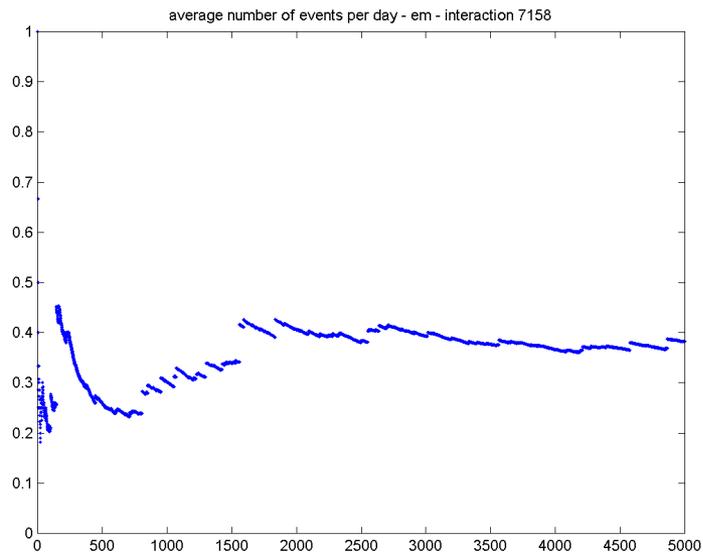
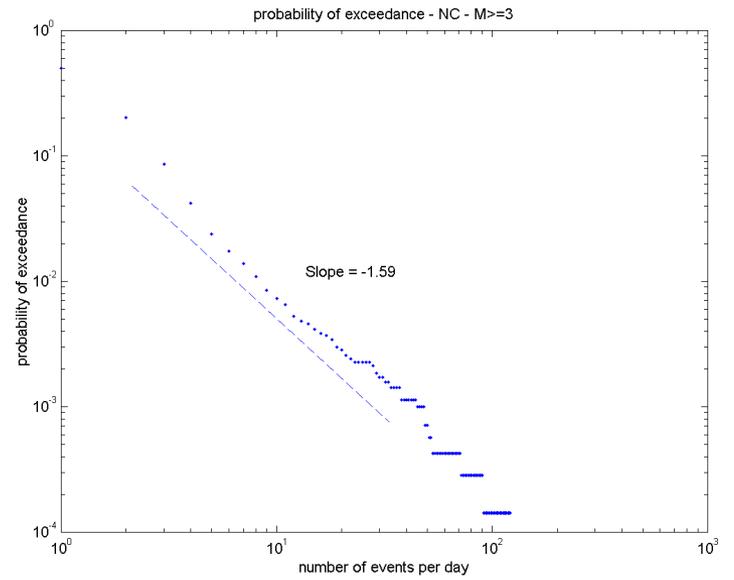
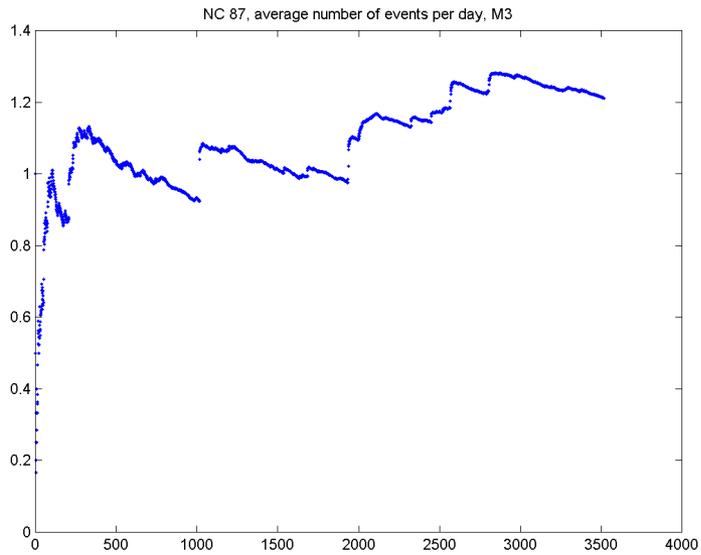


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- Only models with interaction produce seismic rate patterns consistent with those observed in natural fault systems.