

### **A Little About Me**

I will be a sophomore at MIT in the fall

When I was in first grade I told everyone I was going to go to MIT and study earthquakes!

I'm from Kansas...never felt one but keep hoping ;-)

#### **Outside of class I:**

volunteer at the Paul Revere House

**Am on MIT's Panhellenic Council** 

**Enter Iron Chef Competitions** 

**Debate Foreign Policy with Anyone Who Will Listen to Me** 

## Treatment of Foreshocks

 Are we comparing apples to apples or apples to oranges?

Are foreshocks mainshocks with larger-thannormal aftershocks?

Or are they different from mainshocks?

Useful to treat them as separate type of event

## Agnew-Jones in Theory



#### (Zero Dimensional Model)

P(C)=Probability of a characteristic earthquake

P(B)=Probability of a background earthquake

P(F)=Probability of foreshock

 $P(C \mid F \mid U \mid B) = P(F)/P(F) + P(B)$ 

## Agnew Jones in Application

#### Inputs:

P(C) = Probability of the characteristic

mainshock at a given time.

P(B) = Probability of a background

earthquake

P(FIC) = Probability of a foreshock, given a characteristic mainshock

#### Compute:

P(CIF∪B) = Probability of a characteristic mainshock given an event that may be either a foreshock or background event.

$$P(C \mid F \cup B) = \frac{P(F)}{P(F) + P(B)}$$

$$P(F) = P(F \mid C)P(C)$$

$$P(C \mid F \cup B) = \frac{P(F \mid C)P(C)}{P(F \mid C)P(C) + P(B)}$$



## The Problems



Mainshock-Centric Calculation

Different Faults= Different Background Rates!

Different Mainshock Probabilities!

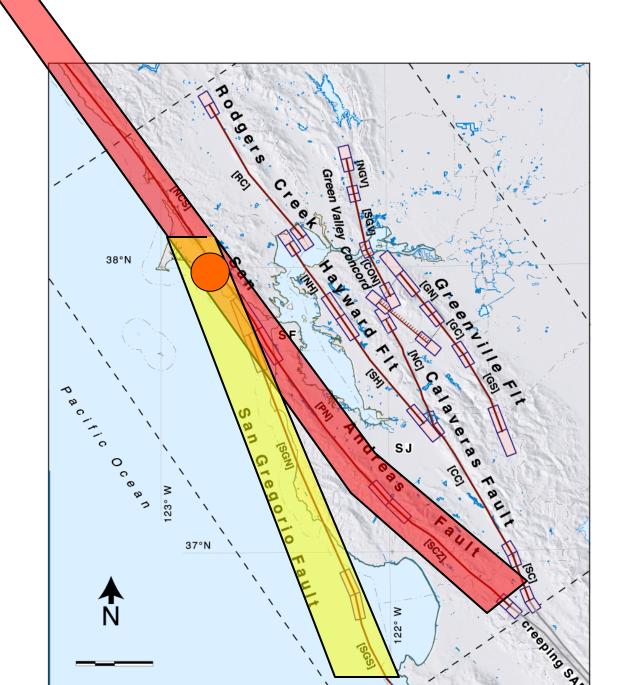
Not always know what mainshock most likely

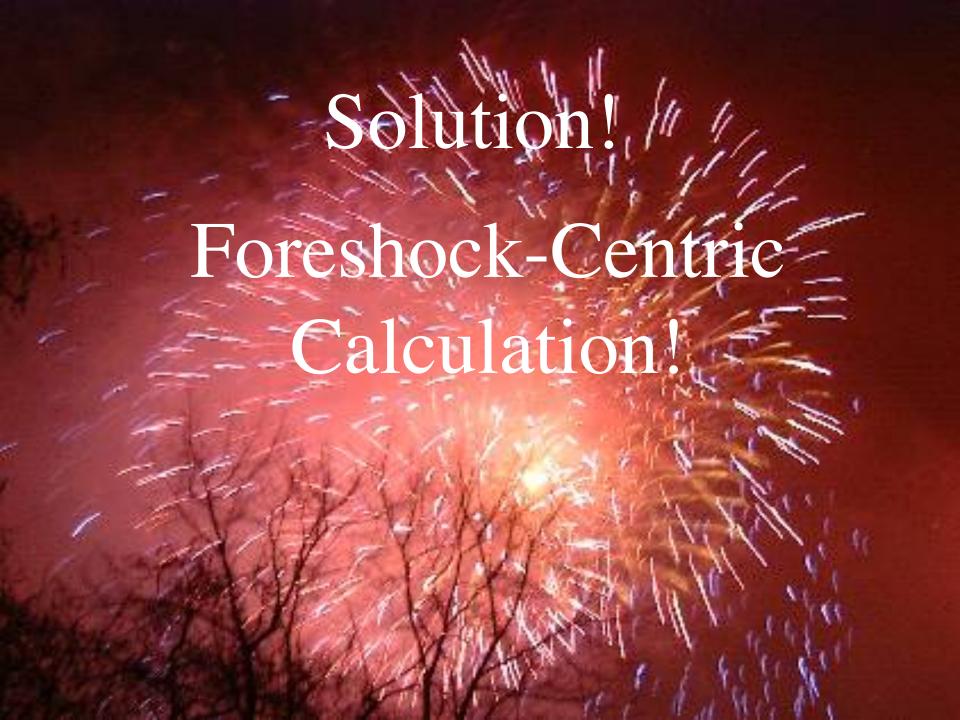
#### Which Mainshock?

#### Different faults have

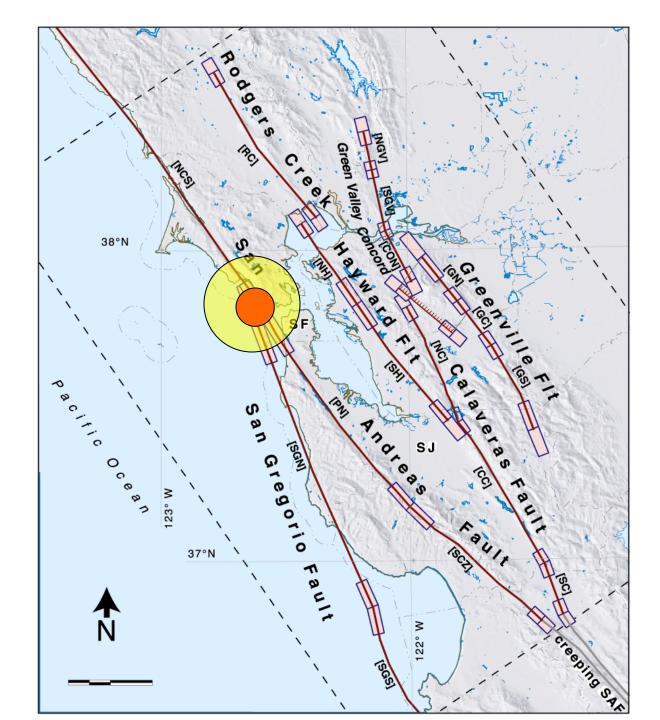
- Different background rates
- Different mainshock probabilities
- Different resulting probabilities.

Problem: Mainshock Centric Calculation!





More limited than just occurring near the mainshock rupture.



# Foreshock-Centric Calculations: A How-To

Integrate Background Event Probability around Foreshock Hypocenter

**Integrate Mainshock Nucleation probability** 

**Use Some Standard Observations/Laws** 

## **Current Status**

**Program: Completed!!!!** 

**Historical Test of Accuracy: In Progress** 

# San Francisco Chronicle

124th Year No. 147

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#### Gorbachev Proposes

Increased Odds for Next 5 Days

# New Earthquake May Be Likely Soon

Sacramento

There is "a slightly increased likelihood" of a strong earthquake in the Santa Cruz area within the next day or two in the wake of Monday's temblor. of Emergency

after Monday's tembler, Elleworth said

By today, any increase in the likelihood of another quake there will be small, he said

Elisworth said that even the porquel was there and

**Emergency Services**, said yesterday that he did not recall the state ever issuing such a warning, which he said "came pretty close to . . . a prediction.

However be said ...