

# The Variation of Nuclear Decay Rates by Solar Influence: Part Duex

Professor Ephraim Fischbach

Tasneem Mohsinally

Dan O'Keefe

Michael Czerny

Sean Fancher



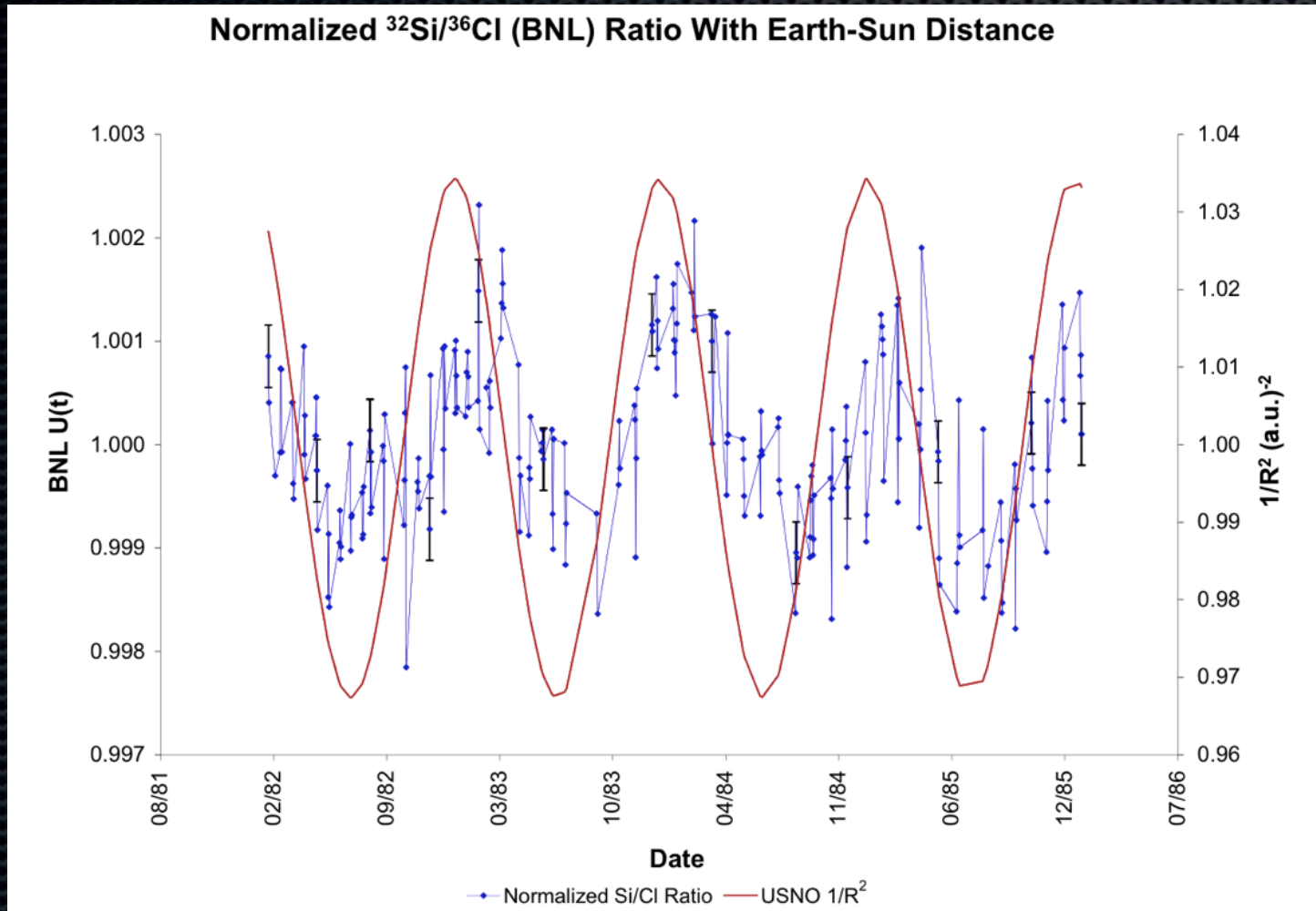
# Our Mission:

Should we choose to accept it

- To develop a computer program that will monitor decay rates and provide information on solar activity
- To be able to predict potentially harmful solar flares and other dangerous solar events
- To better our understanding of which particular situations cause decay rates to vary



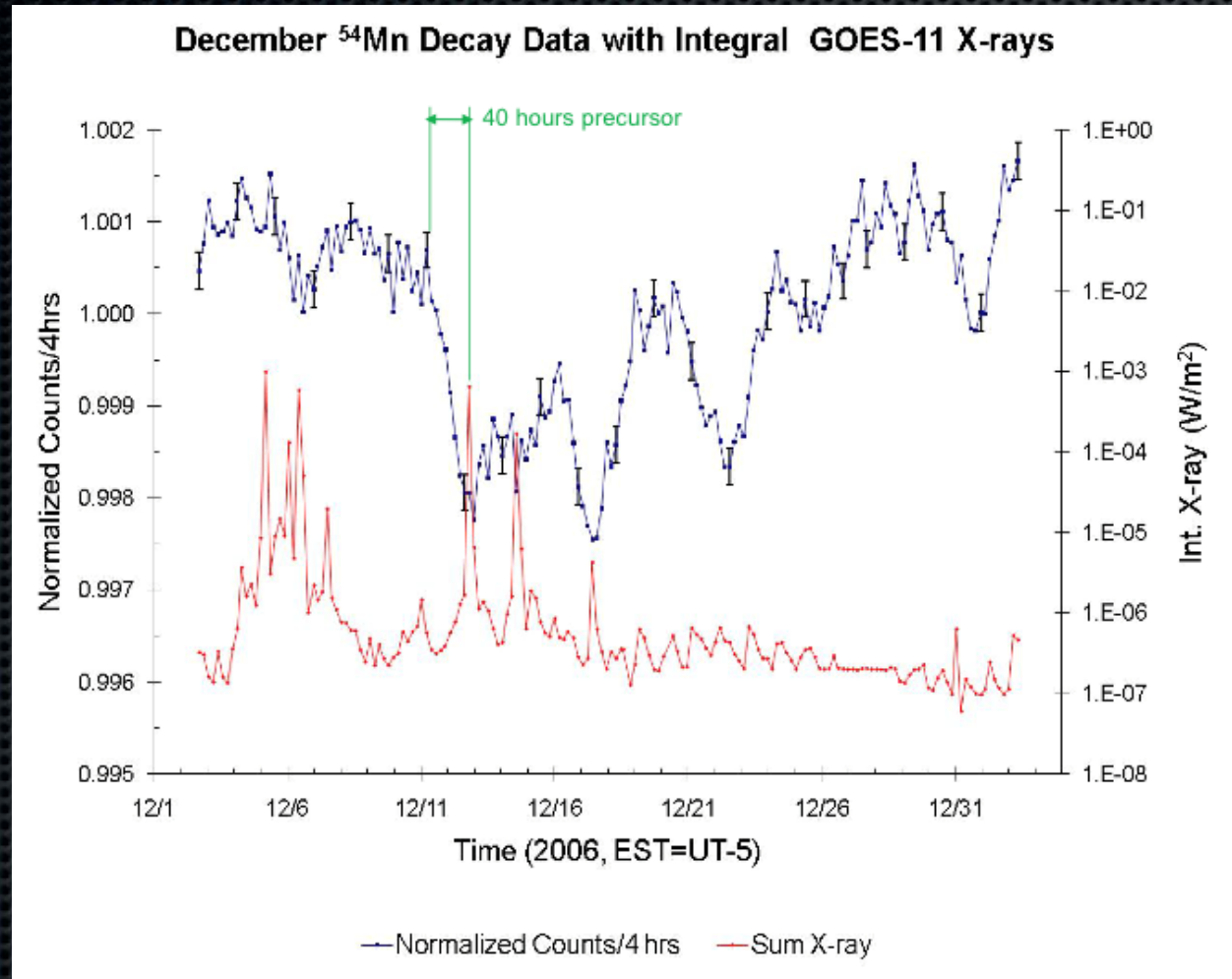
# The Basis



- Perfect normalization should produce a horizontal line.



# The Testable Effects



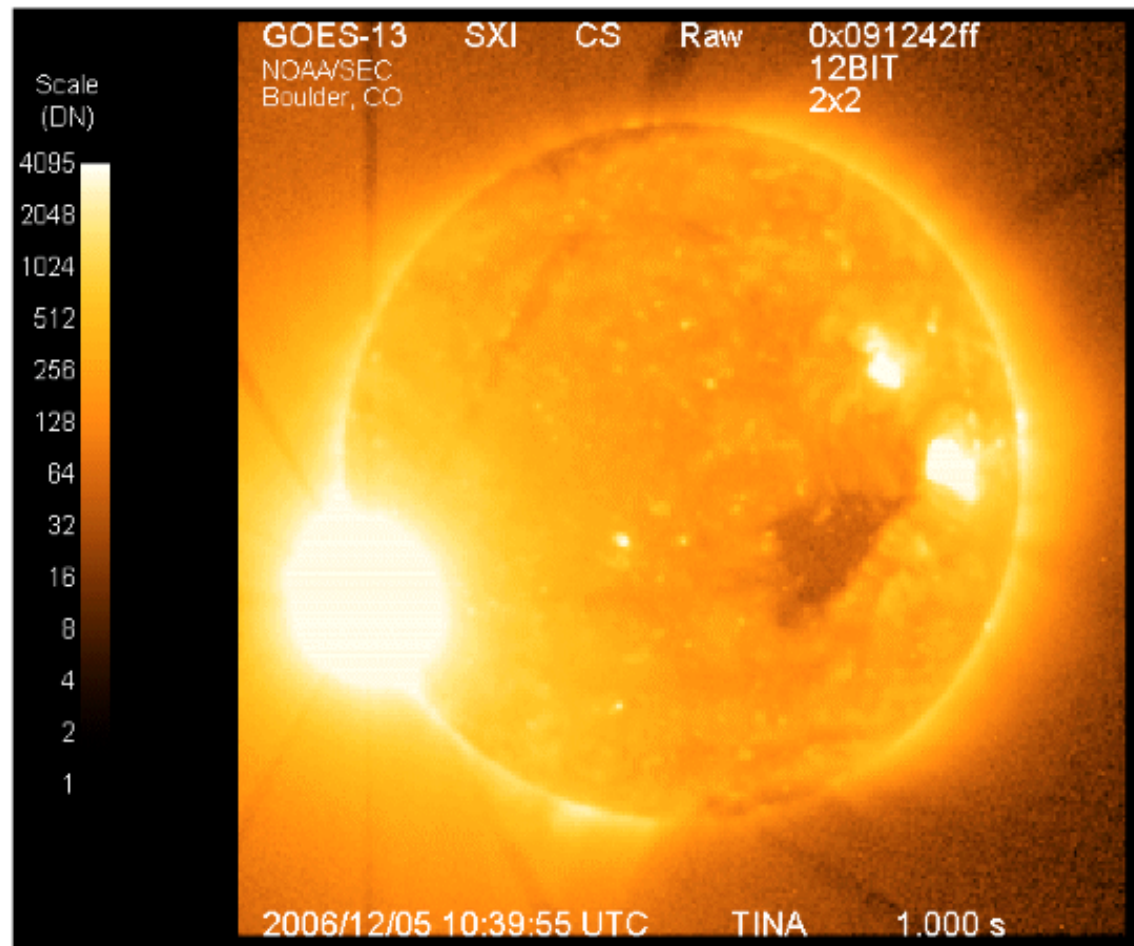
- Possible correlation with solar activity may give predictive power.



# Where's the First Flare?

5 Dec 2006: X-9 class flare

- Here we see the flare pointing away from Earth



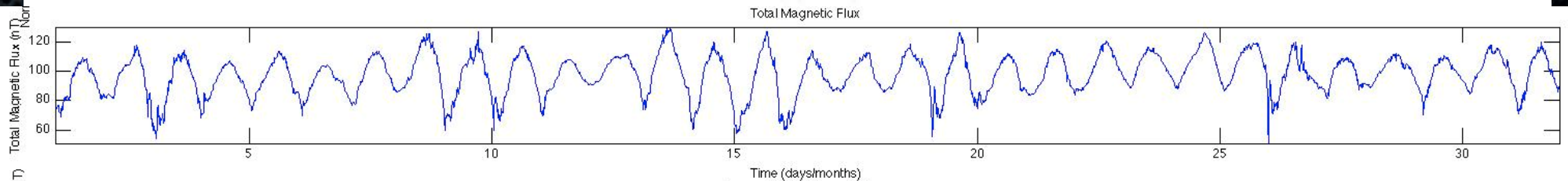
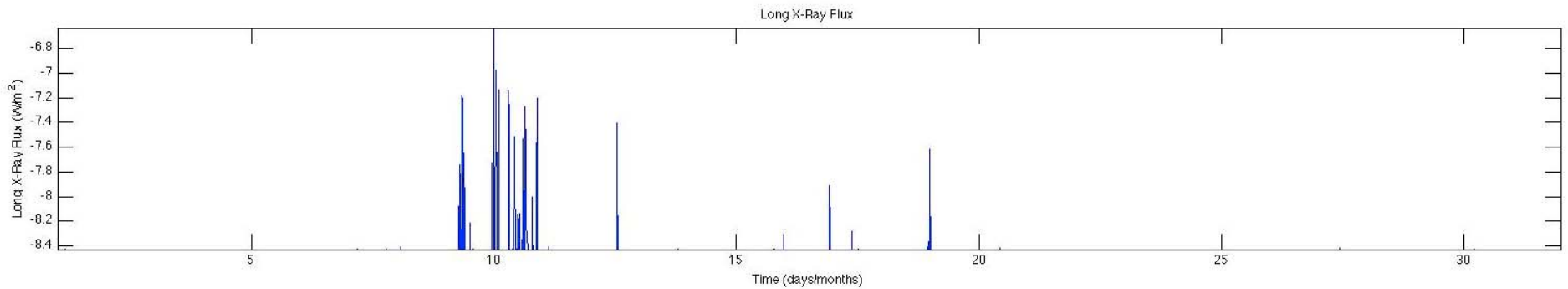
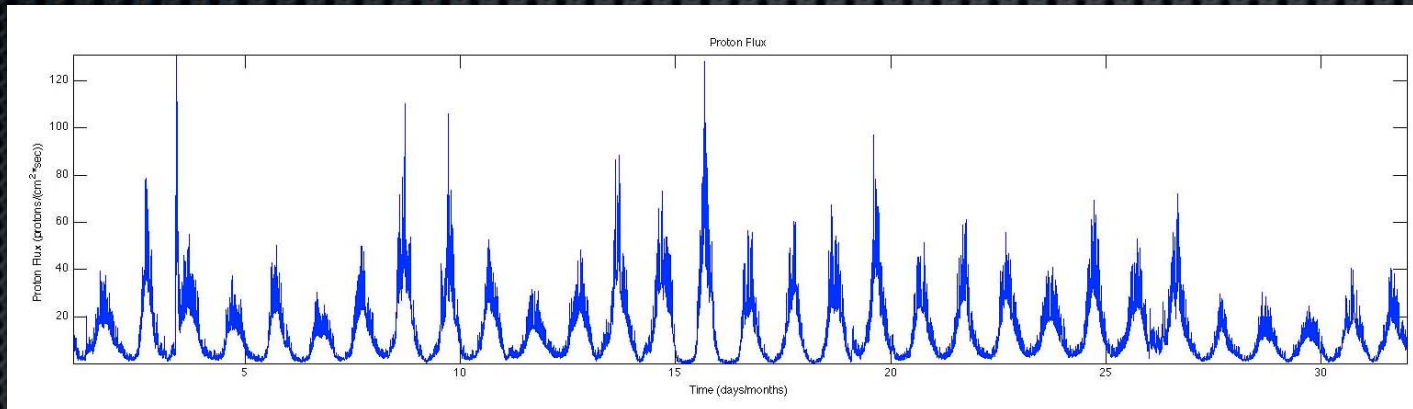


# Through the Wormhole: How does the Universe Work?

QuickTime™ and a  
Cinepak decompressor  
are needed to see this picture.



# The Sunny Side of Research Life



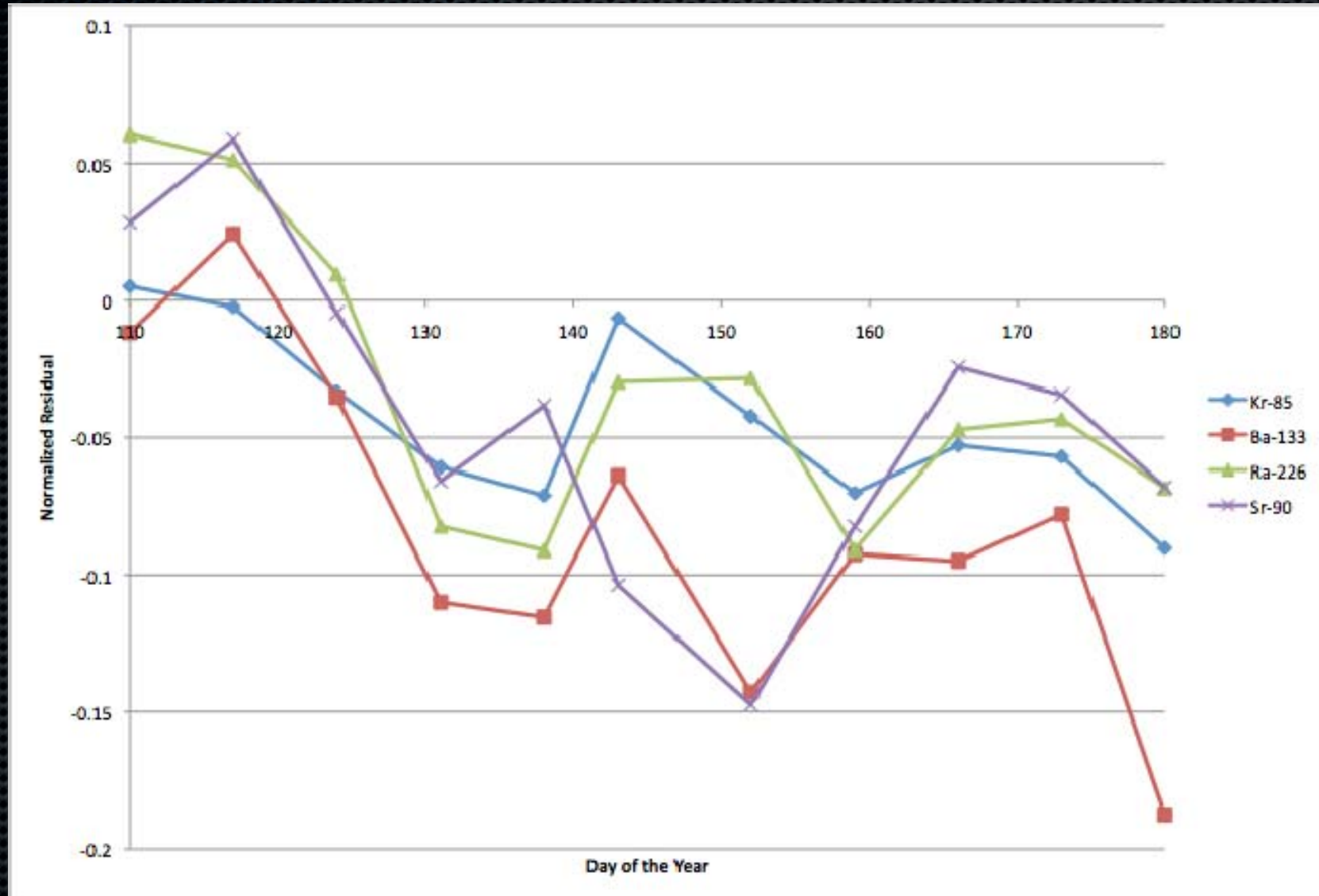


# A Look into the Past

- May 23, 1990: Researchers at Physikalisch-Technische Bundesanstalt (PTB) perform their weekly data collection on the decay rate of various isotopes as part of a 5 year study.
- May 24, 1990: The sun explodes in a massive solar proton event. This is accompanied by an X12 class solar flare, making it one of the largest solar events in recorded history.

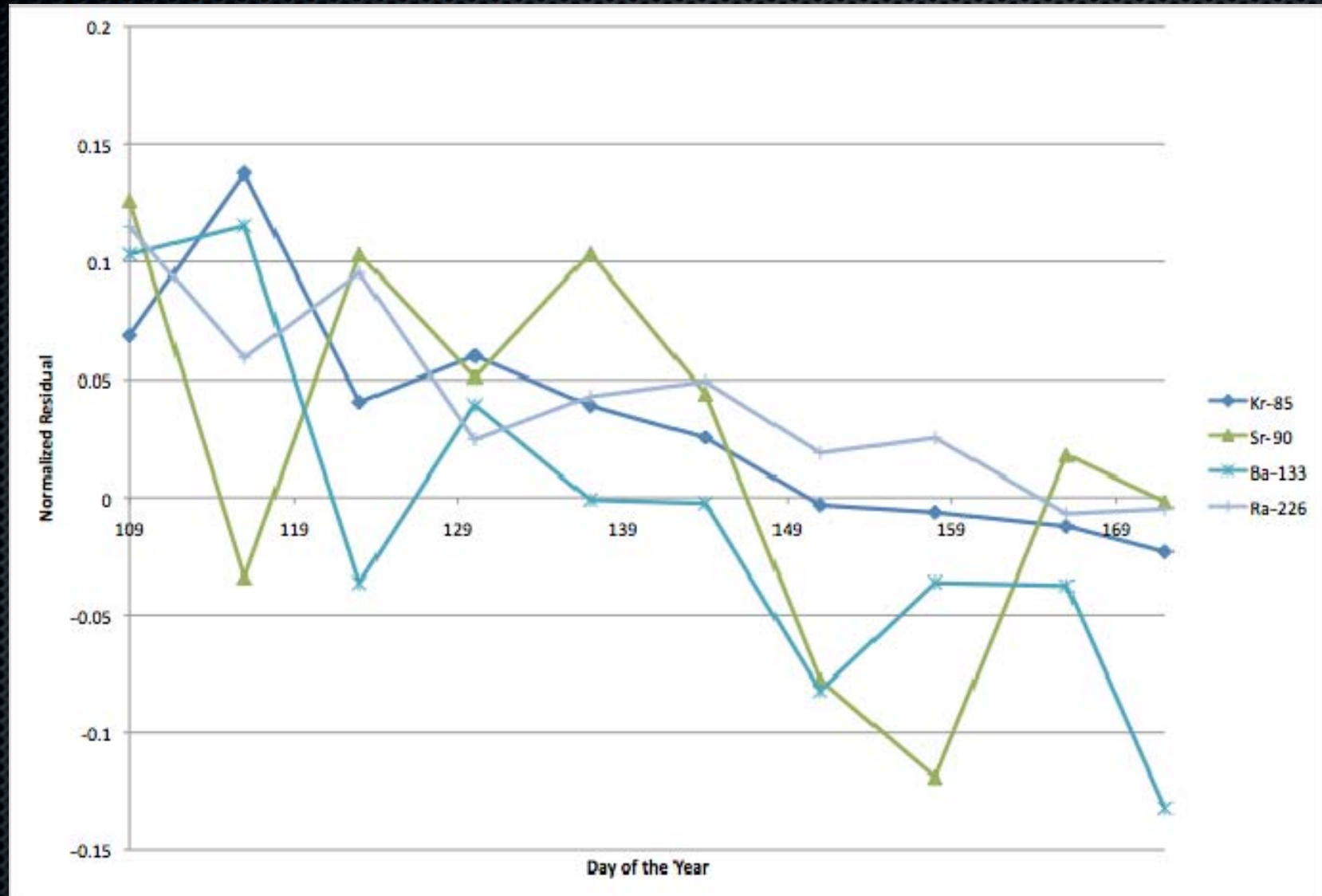


# What they saw:





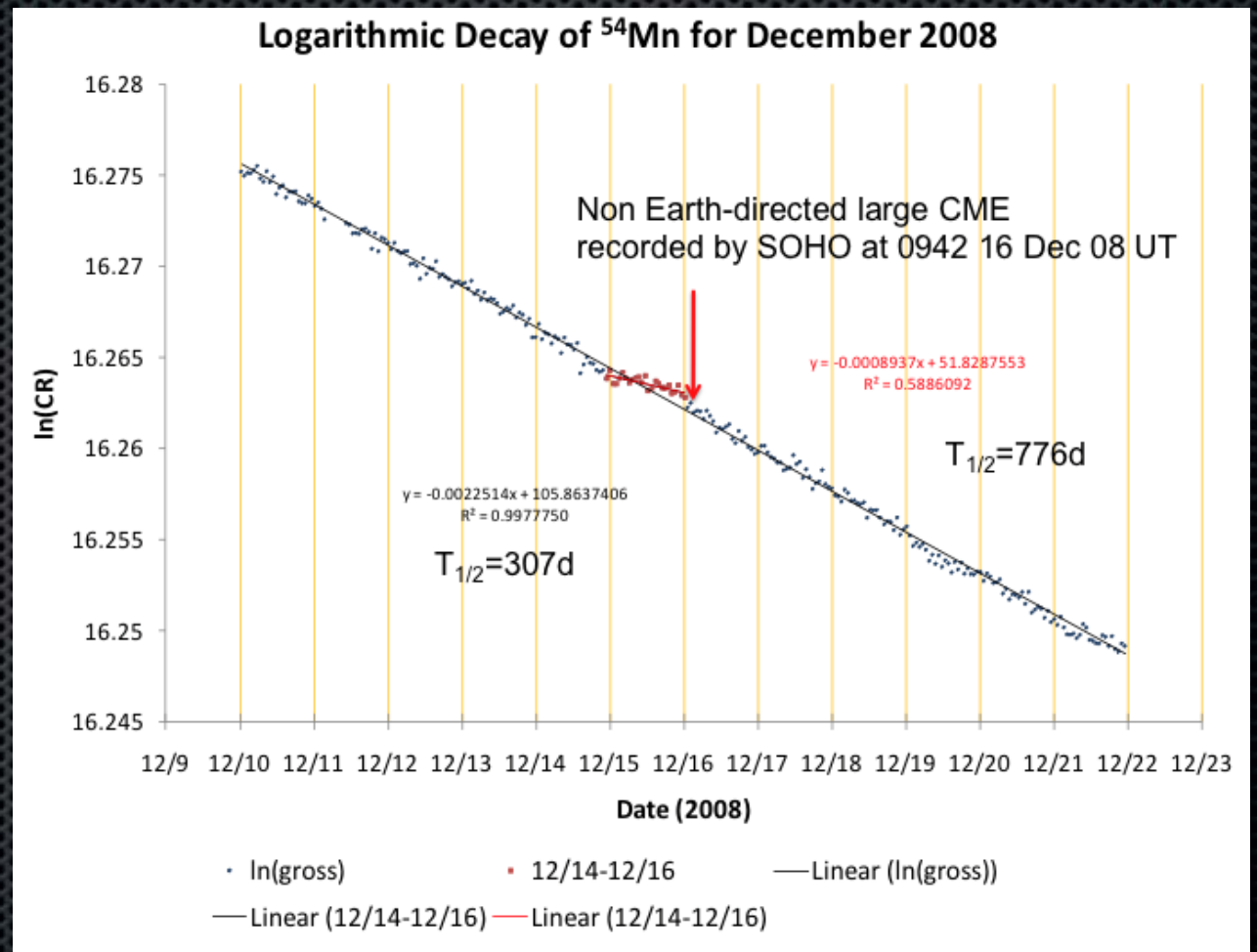
# What they saw next year:





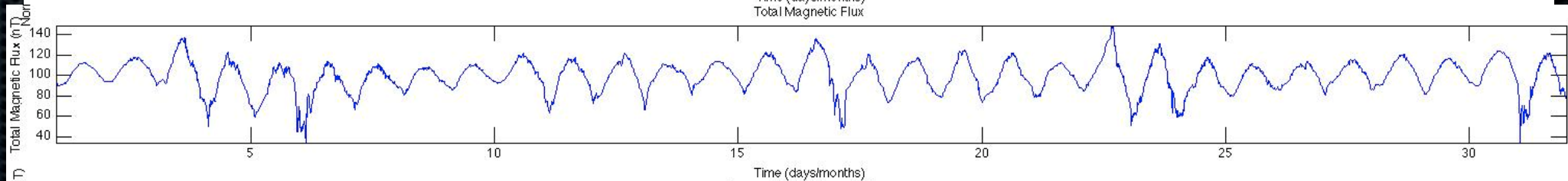
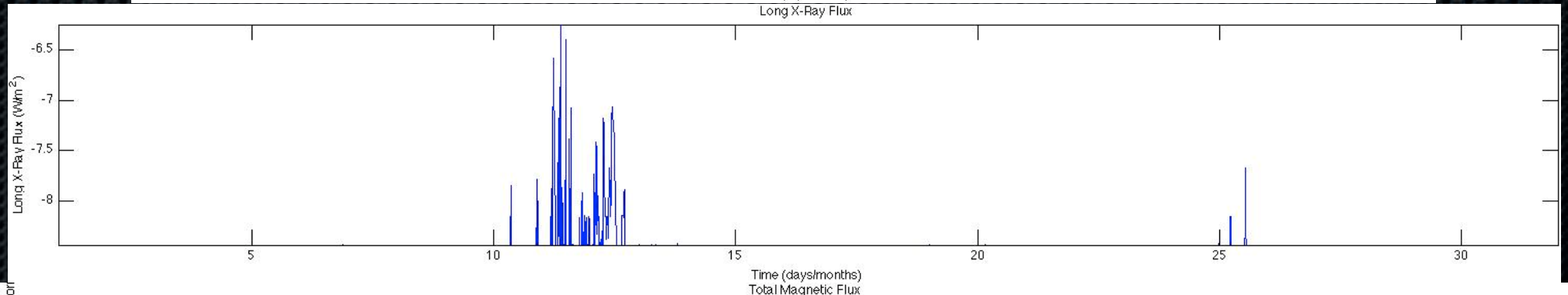
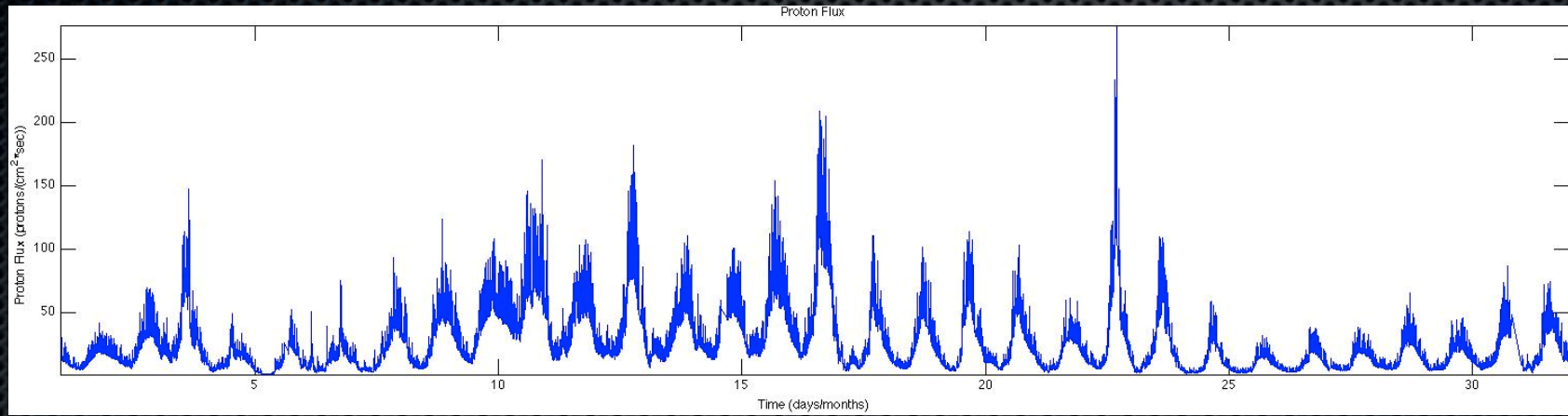
# I Sense a Disturbance in the Decay Line...

- This slight deviation from the standard line is seen to be a precursor to a Coronal Mass Ejection on the far side of the Sun.





# December's Second Appearance





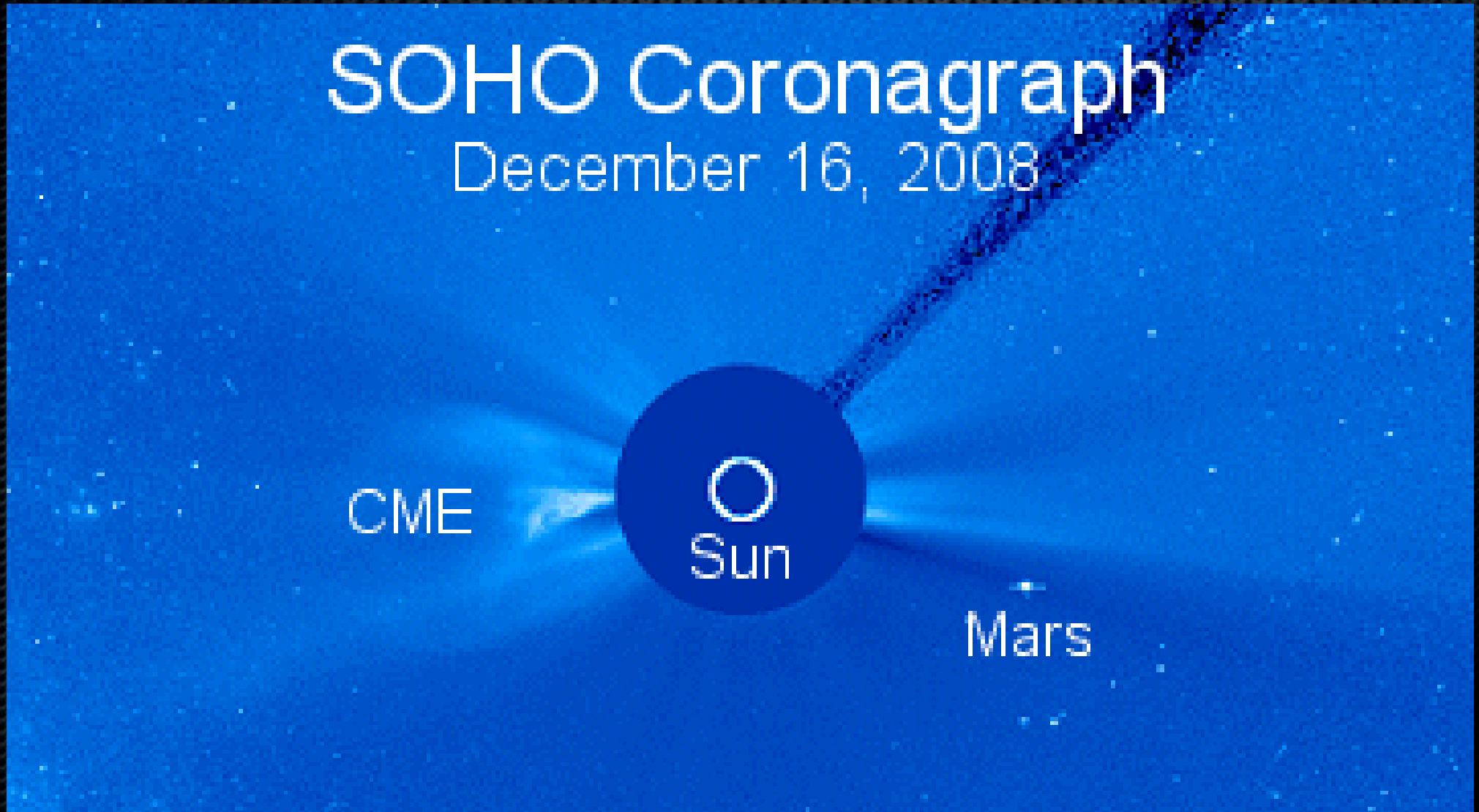
# Earth Dodges Another Solar Fireball!!

SOHO Coronagraph  
December 16, 2008

CME

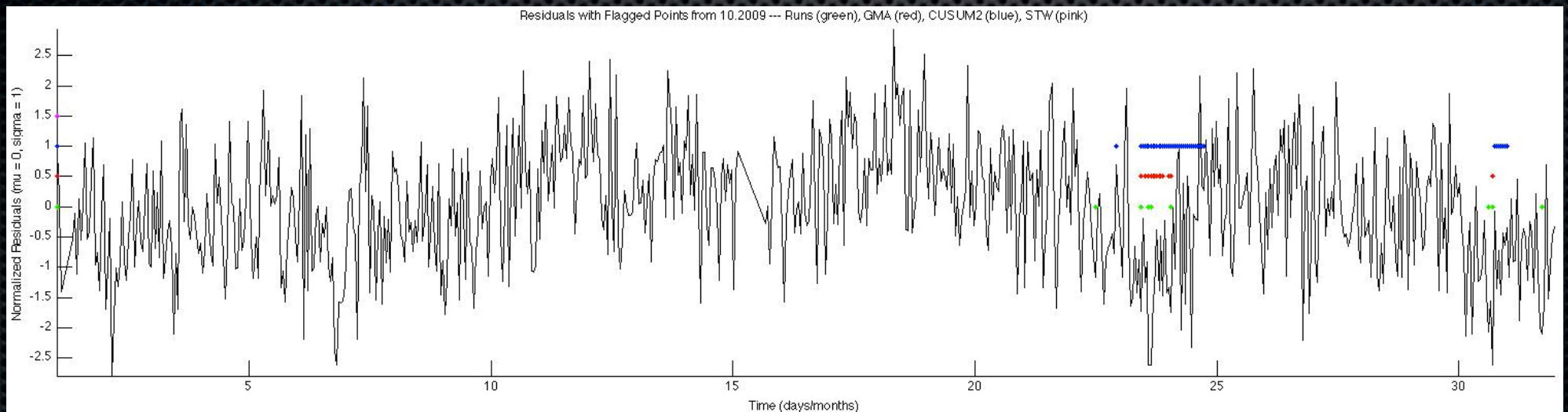
○  
Sun

Mars





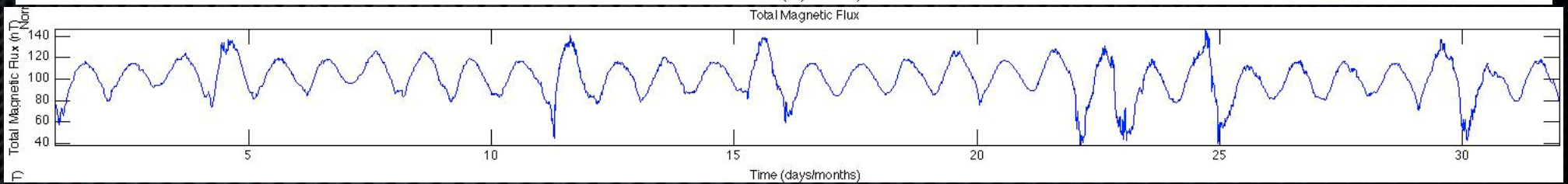
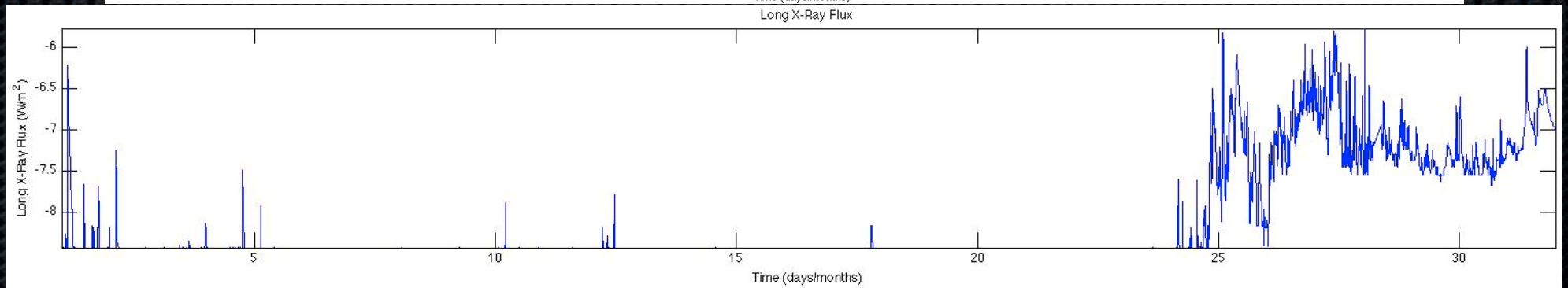
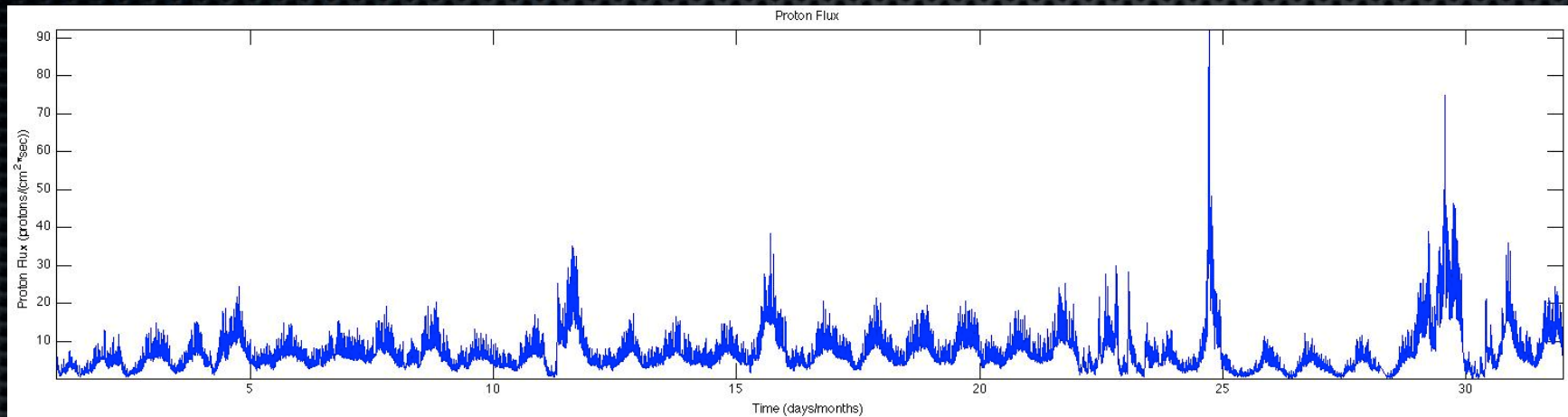
# Watching the Proverbial Paint Dry



- The normalized decay data is ran through multiple statistical tests to find points of “varied” decay.



# The Smoking Sun





# Checkpoints Reached:

- We have a program with the capability to detect varied decay rates.
- We have seen how decay rates change under the influence of major solar events.
- We have obtained correlated events within both the decay and solar data.



“Could it be that a concept so uniformly accepted and central to modern life is wrong?”

- Through the Wormhole:  
How does the Universe work?

