

The work of many lives: Four centuries of light curves (and counting...)



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(AAVSO)

Variable stars: astrophysical laboratories

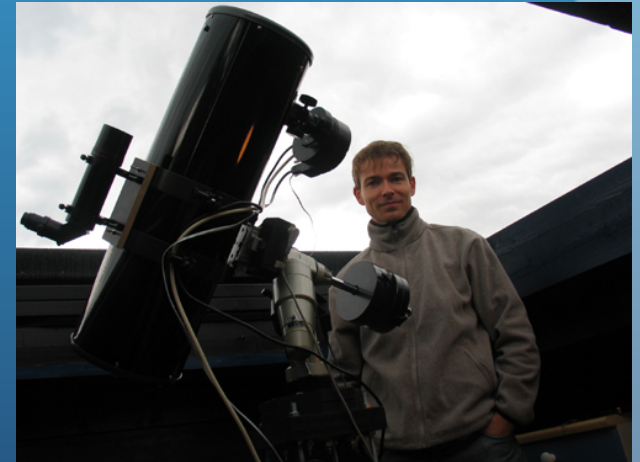
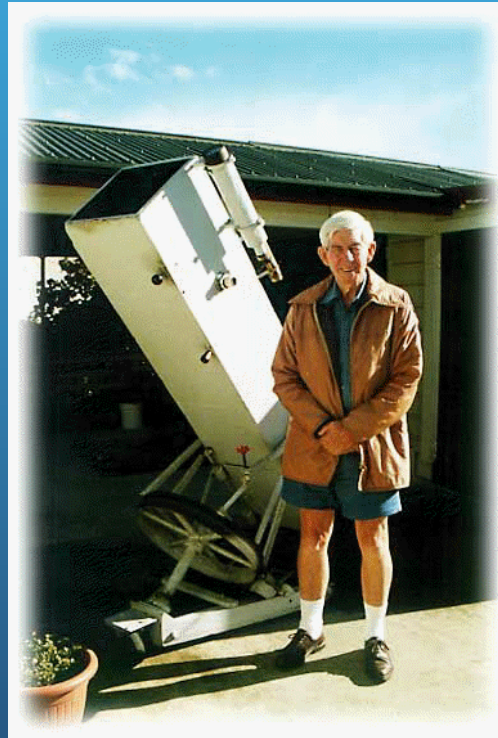
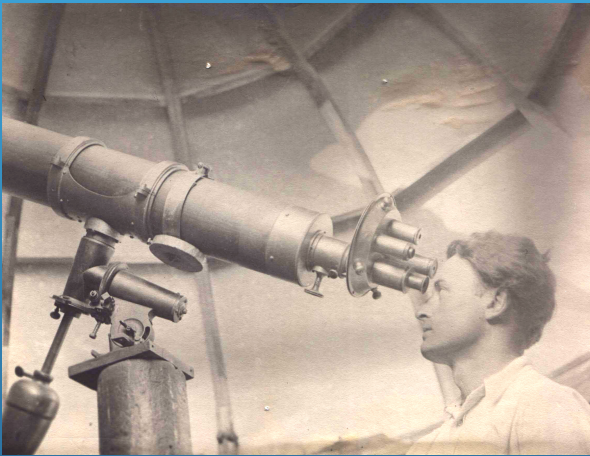
Remote sensing of light is one of the few means we have of exploring the universe. Variable stars provide one of the few means that we have of seeing the universe in action and studying physical processes.

- Physical properties of stars & environments
- Stellar evolution (young and old)
- Cosmic distances
- Cosmic evolution

Variable Stars and the AAVSO

- Formally established in 1911 (part of Harvard U.)
- Independent organization in 1954
- Free, publicly available data archive
- Data covers the entire photometric history of astronomy, from visual to modern instrumental
- We have historical data from well before our founding (including pre-telescopic estimates from the 16th Century)

Where have these data come from?
Amateur astronomers (mostly)

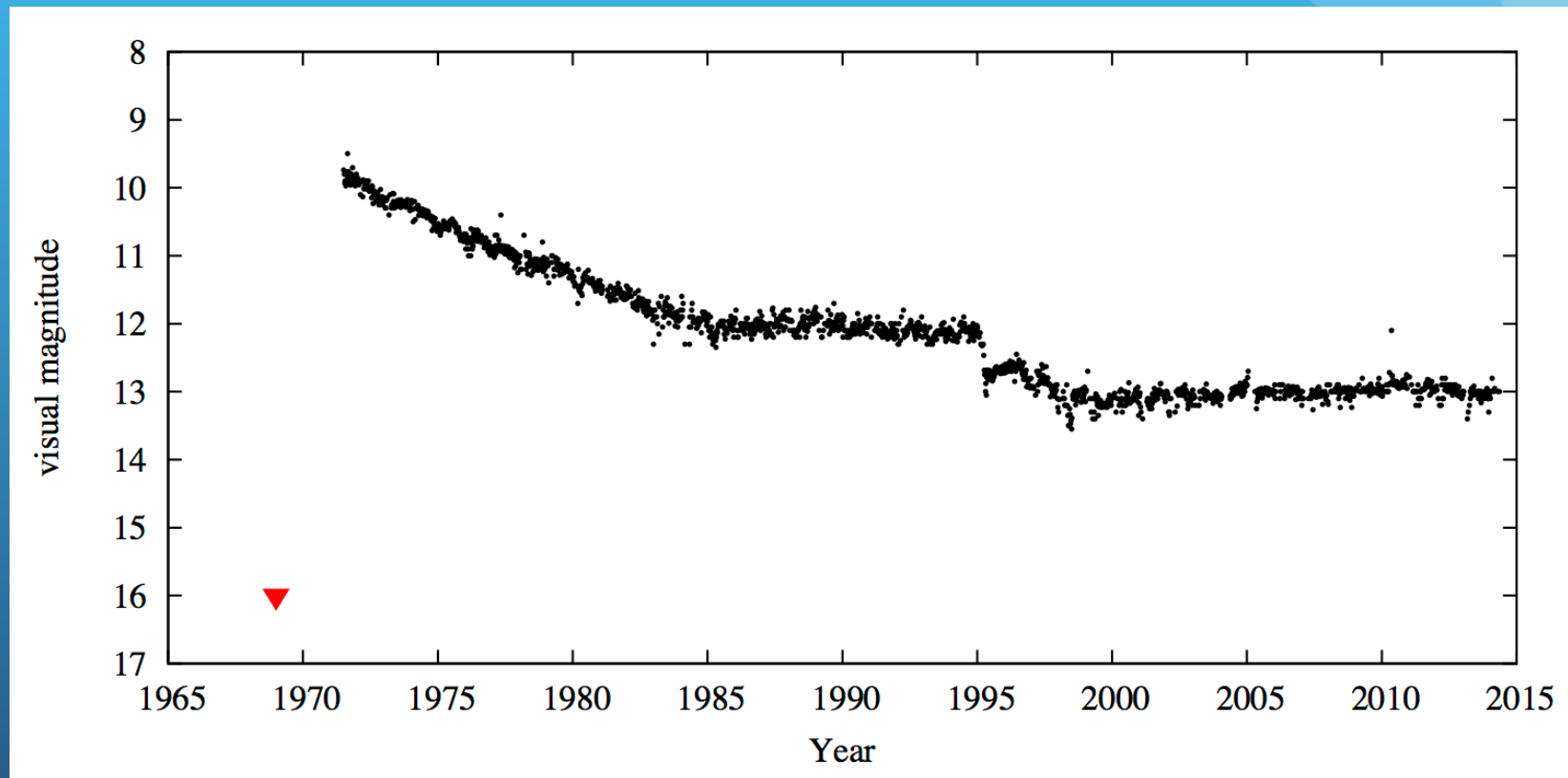


What data does the AAVSO have?

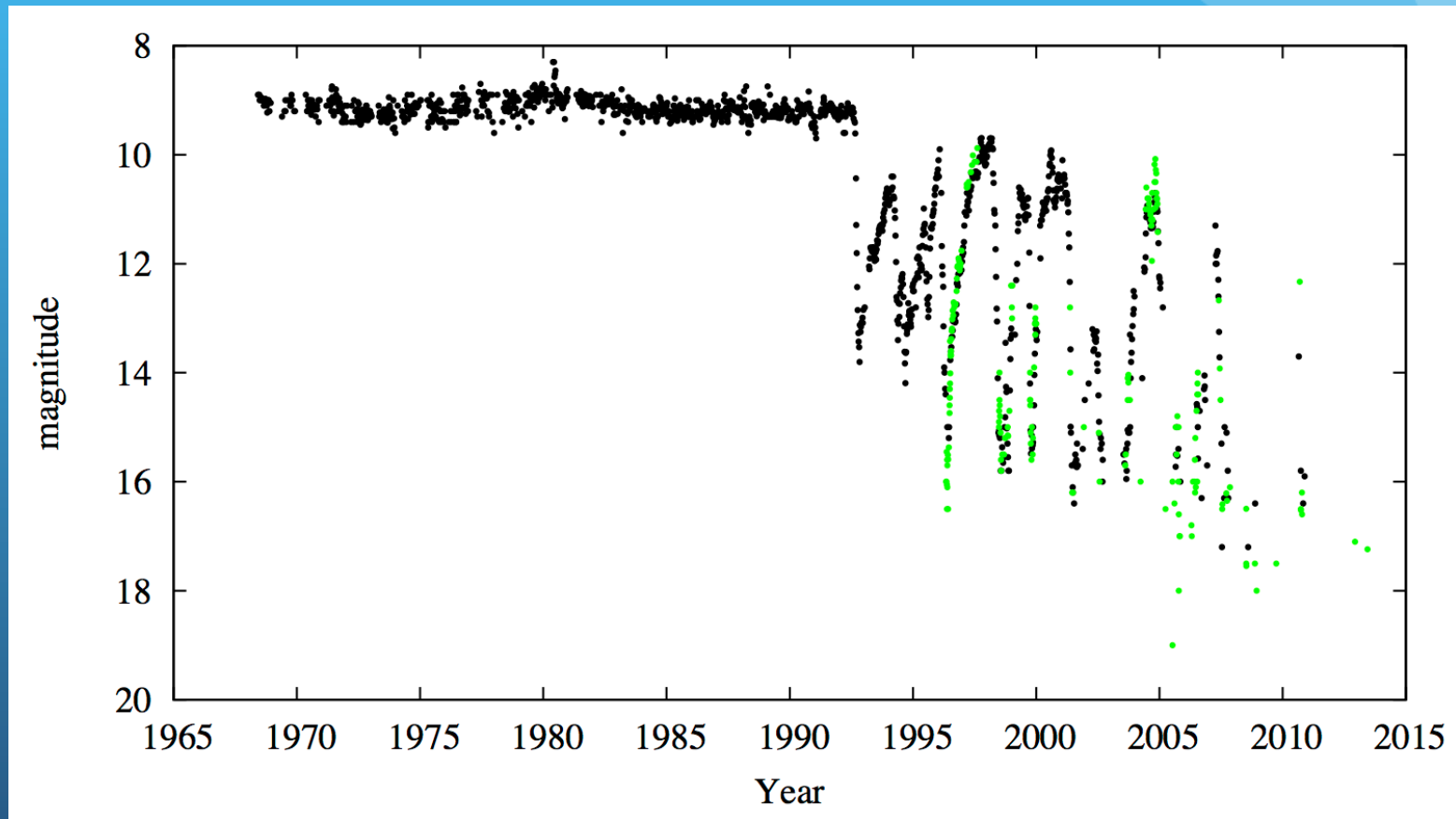
- More than 300 Miras with > 90 years of data; few hundred semiregulars with several decades of data
- More than 200 cataclysmic variables with > 40 years of data; several with >> 50 years; dozens of novae, symbiotics, etc.
- Dozens of RV Tauris; a few with > 100 years
- Few dozen R CrB stars with decades of data
- Few dozen T Tauri/YSOs with decades of data

Lots of potential projects that explore *long-term changes!*

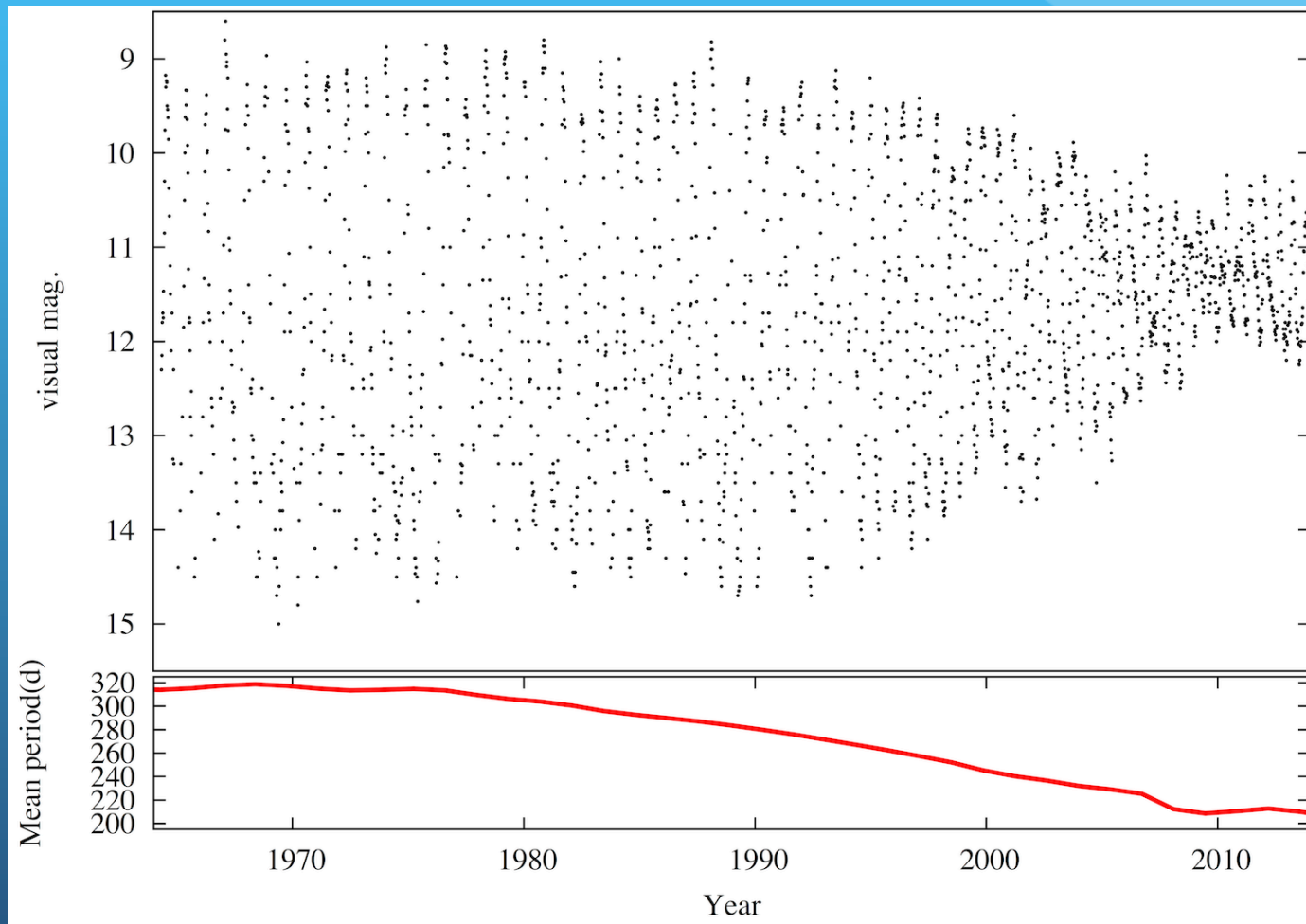
V1057 Cygni: star birth



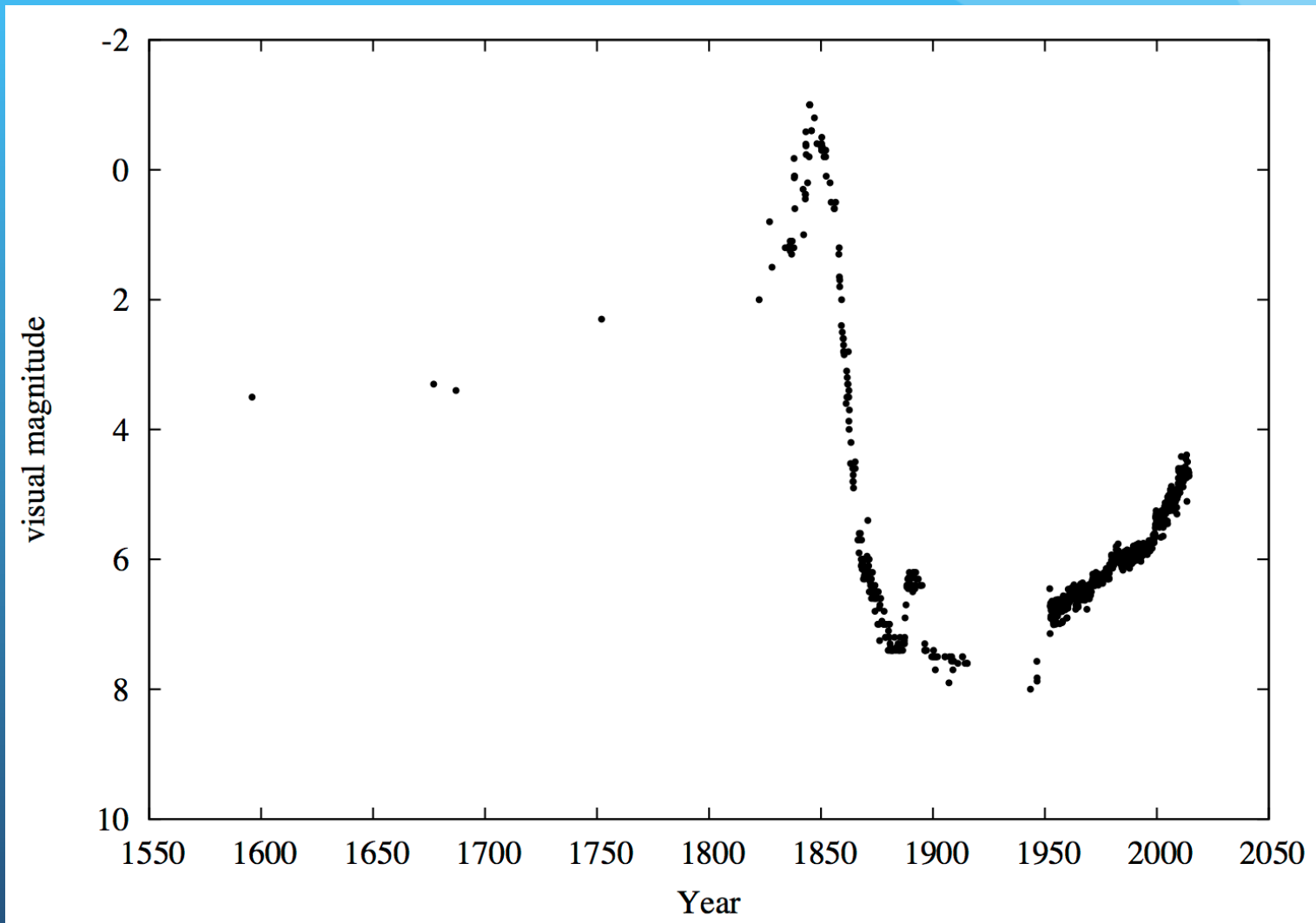
FG Sagittae: star death



T Ursae Minoris: evolution in action?



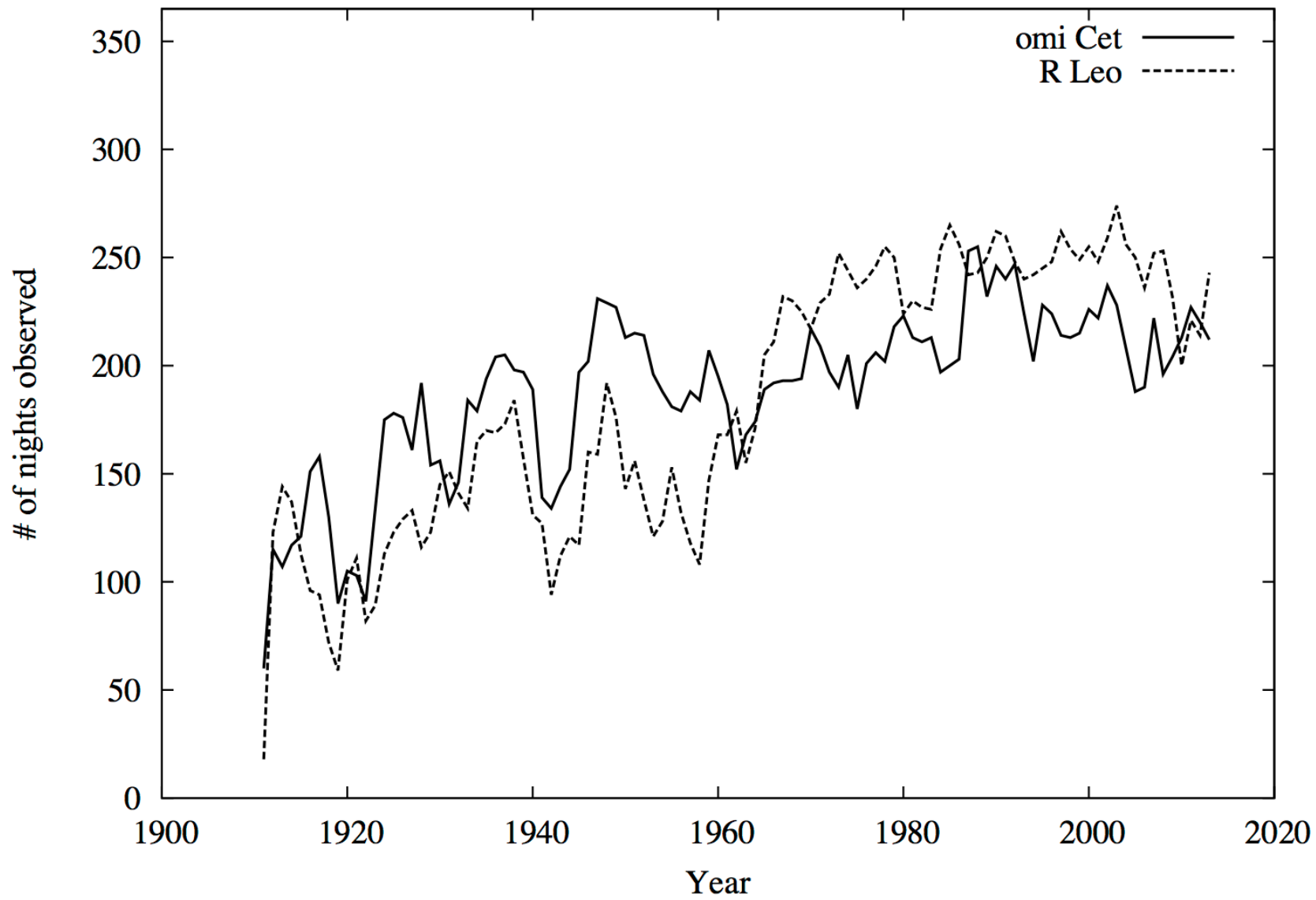
Eta Carinae

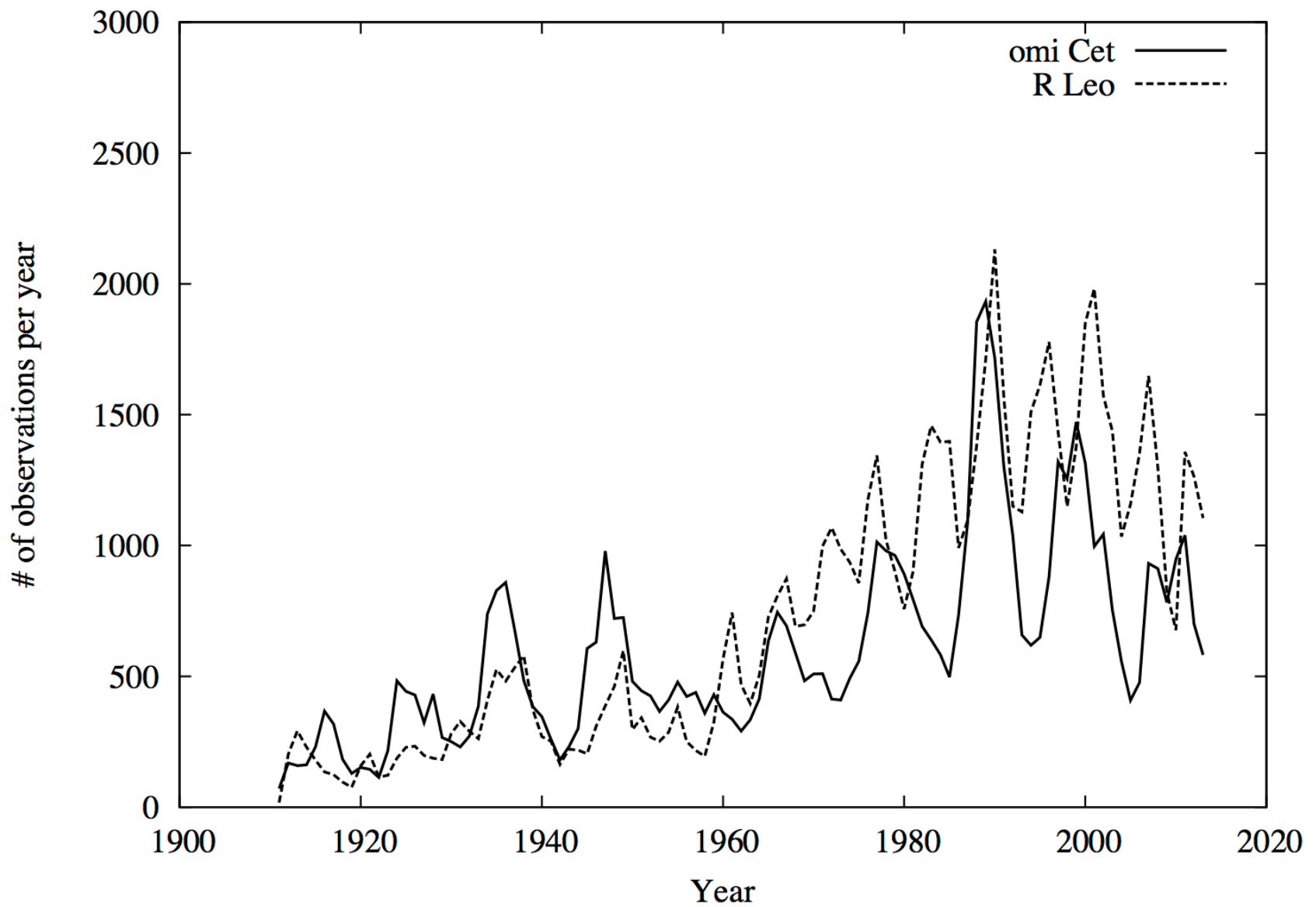


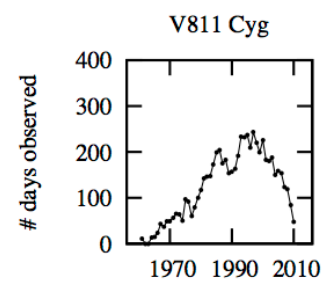
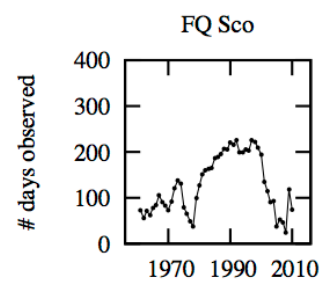
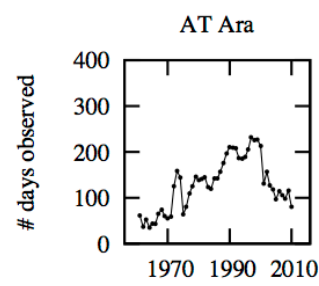
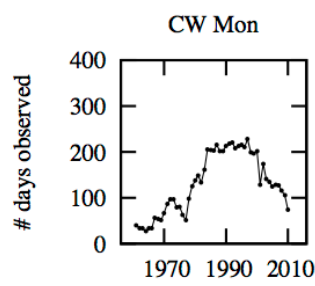
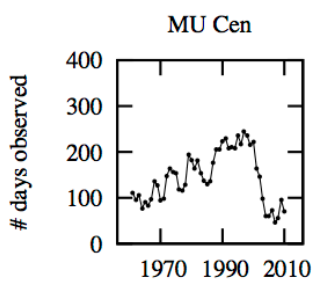
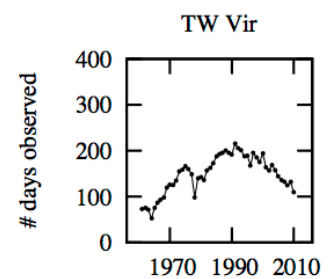
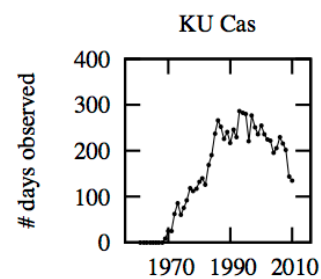
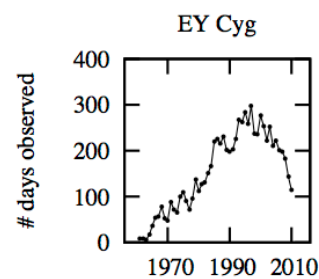
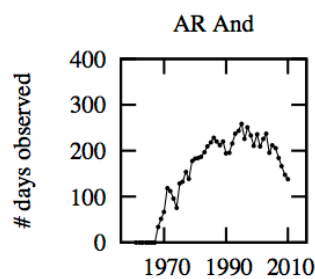
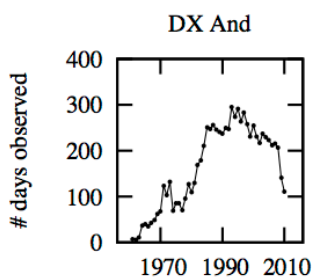
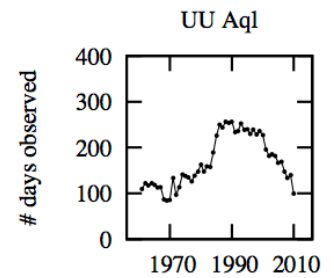
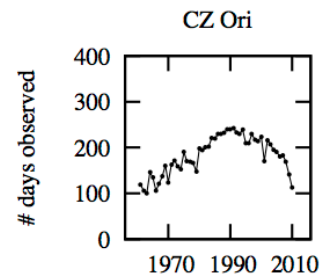
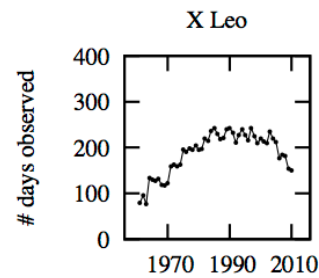
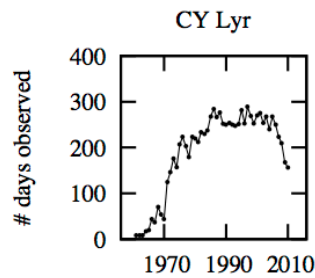
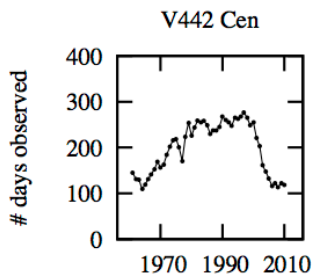
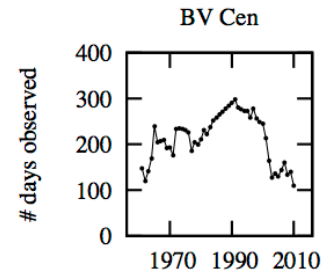
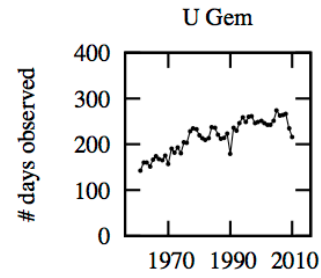
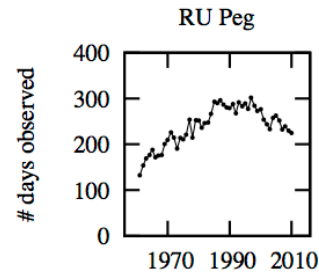
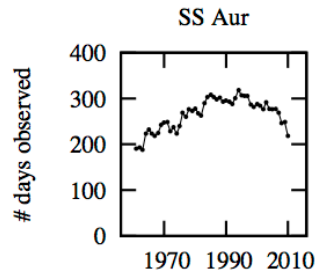
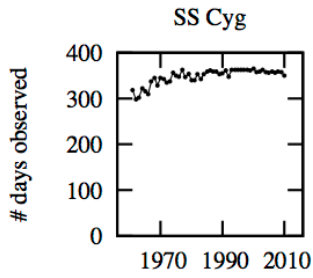
Long term light curves: a declining endeavor?

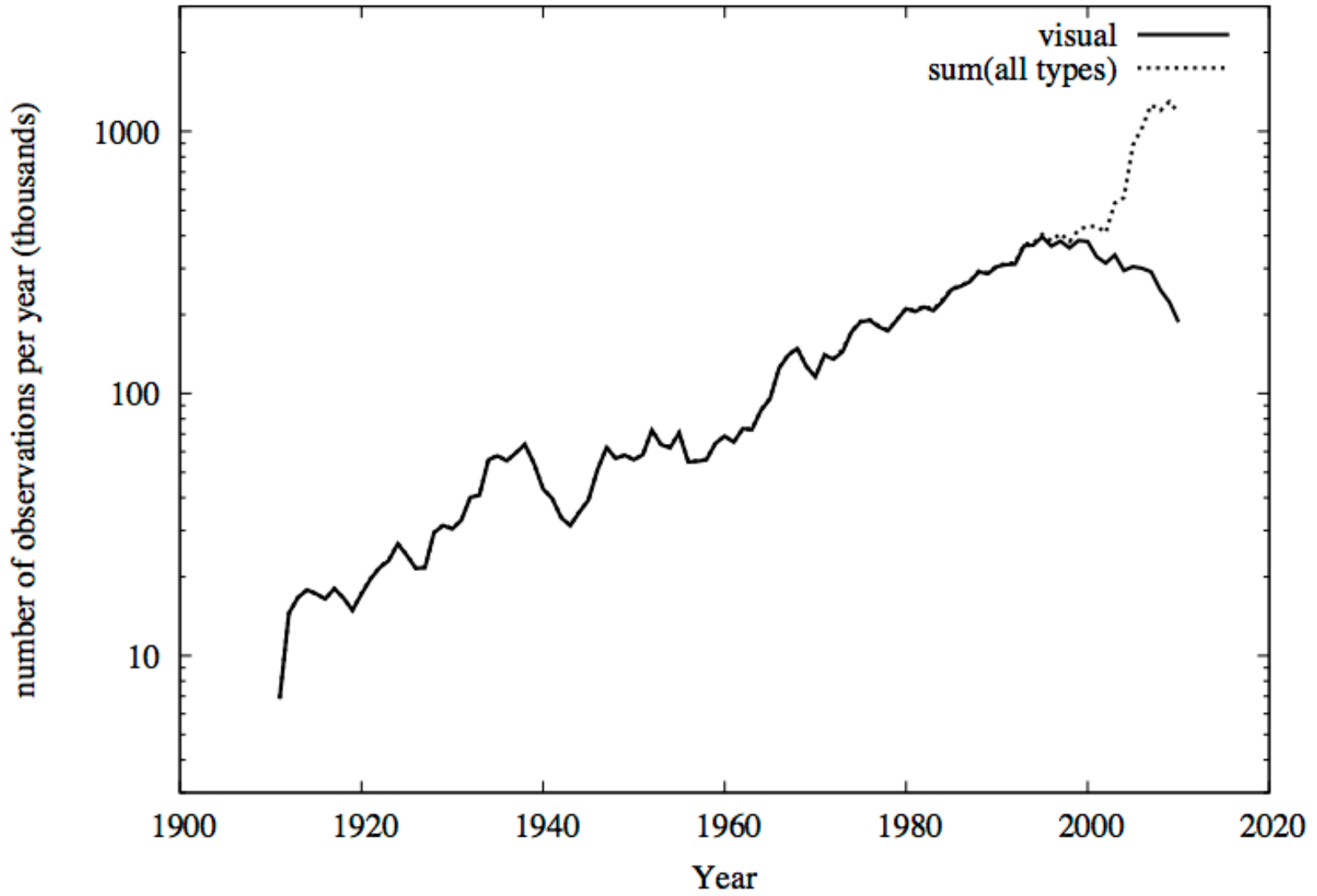
- Fewer observers (especially visual observers)
- Large volumes of CCD time series of few stars, instead of monitoring of many targets
- Different astrophysics is being probed (rapid variations, especially of cataclysmic variables)
- Nightly monitoring is disappearing
- Professional and/or robotic observatories are *not* picking up the slack

The opportunity to study *long time-domain astrophysics* may be fading, even if the AAVSO community still contributes to astrophysics in general.









What is happening to amateur variable star astronomy?

- Aging and retiring
- Ceasing visual observing (switching to CCD)
- Observing different things
- Observing differently
- Too few new observers coming in

Observers need guidance from us on what's scientifically useful. Like everyone, they also need **encouragement, support, and a sense of belonging and camaraderie!**

What can you do?

- Use the data! Show the observers that long-term light curves are interesting.
- Participate in the AAVSO community: become a member, share your expertise and give feedback and suggestions to observers
- Involve the observers in your research, especially publications
- Encourage your students

Visit us!

- <http://www.aavso.org>
- <http://www.aavso.org/aavso-research-portal>
- <http://www.aavso.org/observers>
- <http://www.aavso.org/aavso-membership>

And join us at the Boston AAS meeting, both at our booth and at our Special Session on Long Time-Domain Astronomy!