

# EAO and JCMT

An adventure story

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# What makes a good story?

- Need a central character, a tragic figure who faces a dreadful uncertain future
- Four new young adventurers (NAOC, NAOJ, ASIAA and KASI) join up with two battle-scarred veterans (UK and Canada) — this merry band of heroes come out of seemingly nowhere to aid our beloved heroine
- A journey filled with sudden, unpredictable dangers and unforeseen challenges
- A deadline our heroes must beat in order to triumph



# Setting the scene. . . March, 2015

- Some back



must

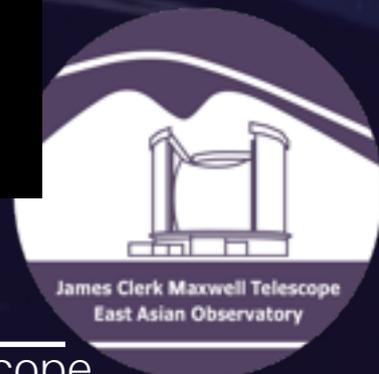
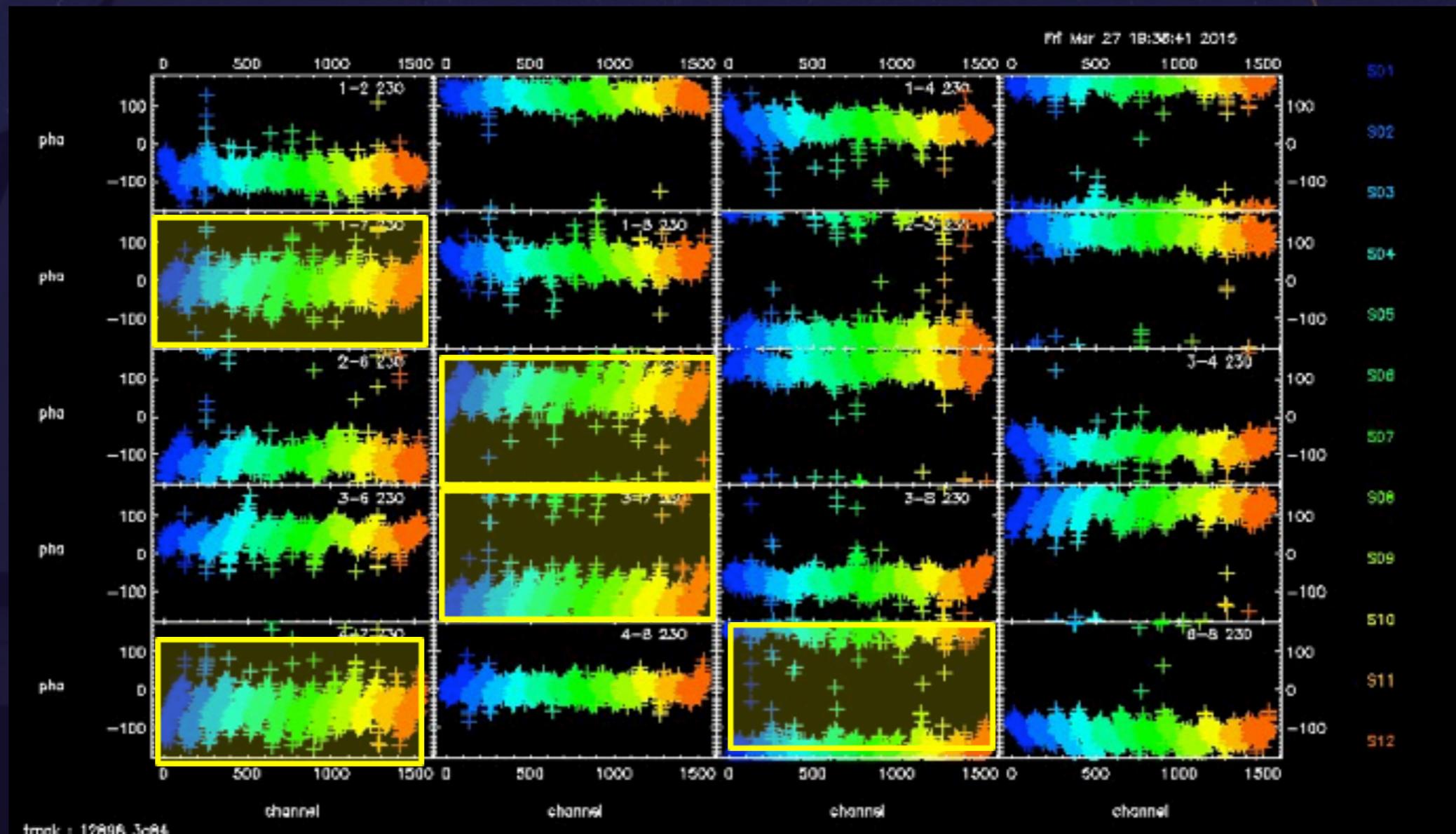
time

tup, so naturally...



# First VLBI fringes - March 20th

- JCMT and 6 SMA antennas
- JCMT baselines in yellow

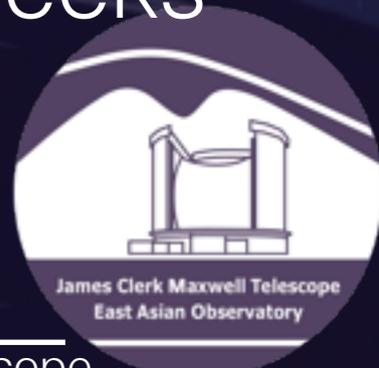


# Creating a community

- How do you create a full science program with four new communities in three weeks?
- You make it free - Pilot Science: 30 hours of time, no strings attached.
- Call opened on March 1st
- Very worried that we would start on sky with no programs...

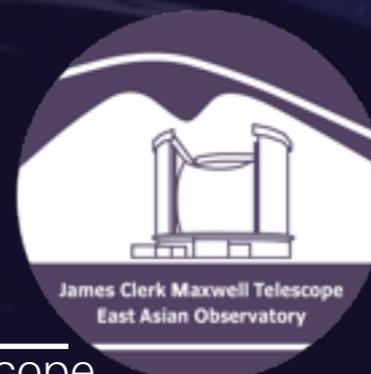
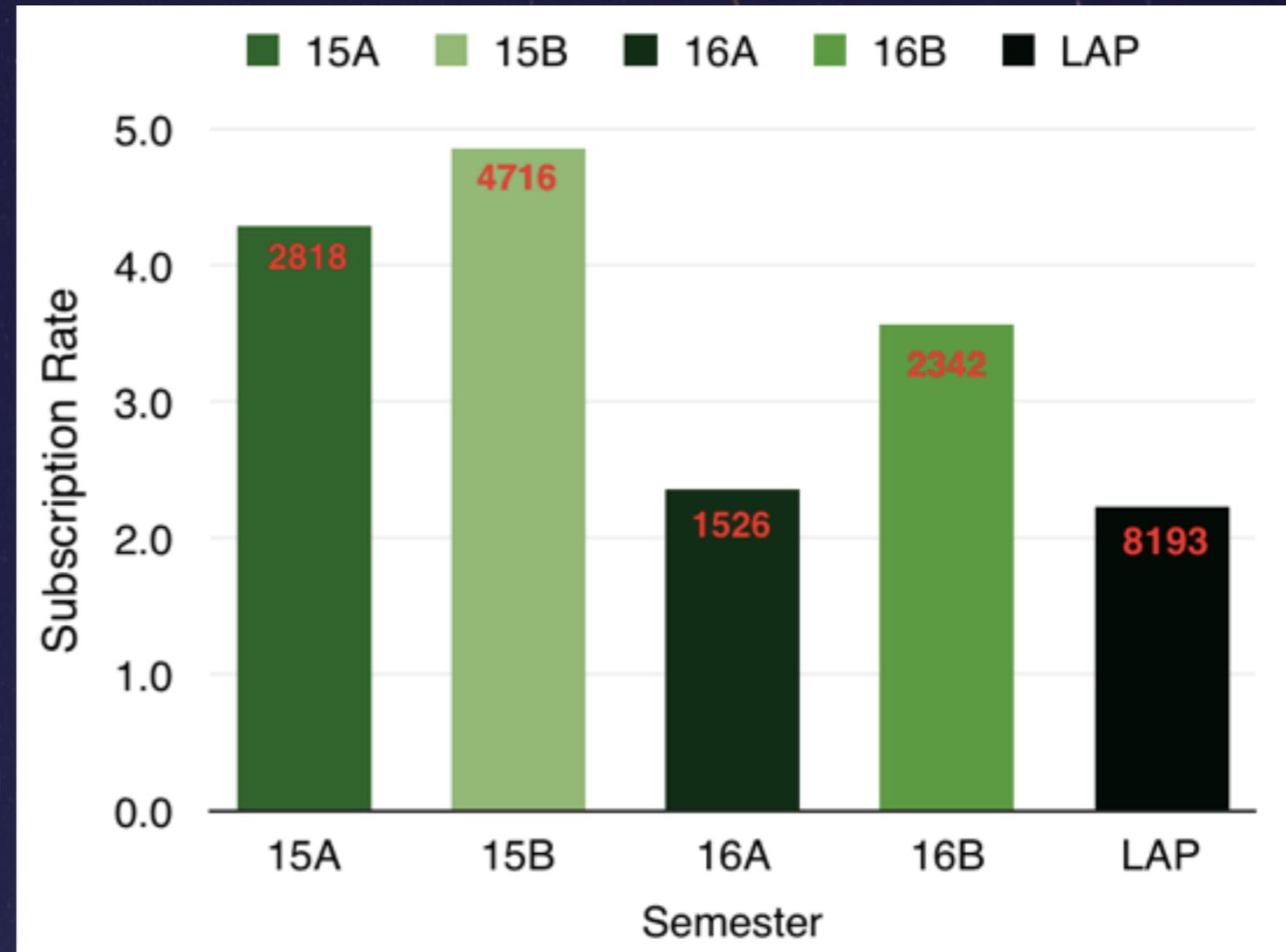


Nope... 144 Programs received in five weeks



# Science Calls

- JCMT has opened five Calls for Proposals in twelve months.
- Pilot Science - 144 proposals
- 15B —first Call assessed by TAC
- Large Programs — 8000 hours requested by 19 programs
- 16A... seeing some proposal fatigue — still an over-subscription of more than 2
- 16B — Call has just closed
- **Total: 20,000 hours requested, 800 investigators from six regions involved**



# Hedwig

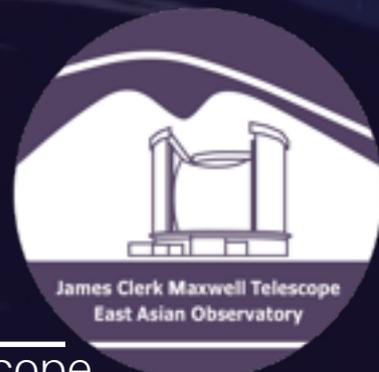
- In the middle of our crazy year, we thought we would have our genius scientific programmer, Graham Bell, write a brand-new proposal system.
- From scratch.
- Hedwig - has been used for 16A and 16B Call for Proposals

The screenshot displays the 'An Example Proposal' page in the Hedwig system. The page is organized into several sections:

- Header:** Navigation links for Home, Your proposals, Your reviews, JCMT, and user information (M17A1001, Logged in as Example Person).
- Proposal Metadata:** A table showing Facility (JCMT), Semester (17A), Queue (International), Proposal Identifier (M17A1001), and Proposal status (Submitted). The 'Submitted' status is highlighted with a red box, and there are links for 'Withdraw proposal' and 'Validate proposal'.
- Abstract:** A section for the proposal's summary, including a 'Star formation' tag and an 'Edit abstract and categories' link.
- Scientific Justification:** A section for the project's rationale, with an 'Edit scientific justification' link.
- Members:** A table listing team members with columns for Name, Affiliation, and Institution.
- Observing Request:** A table detailing the observation plan, including Instrument, Band, and Total time.
- Target Objects:** A table listing specific objects to be observed, including Name, RA/Longitude, Dec/Latitude, System, Time, and Priority.
- Calculation Results:** A section showing the results of a SCUBA-2 observation, including position, time, and technical parameters.
- Technical Justification:** A section for the technical details of the observation.
- Previous Proposals and Publications:** A table linking previous proposals to their corresponding publications.

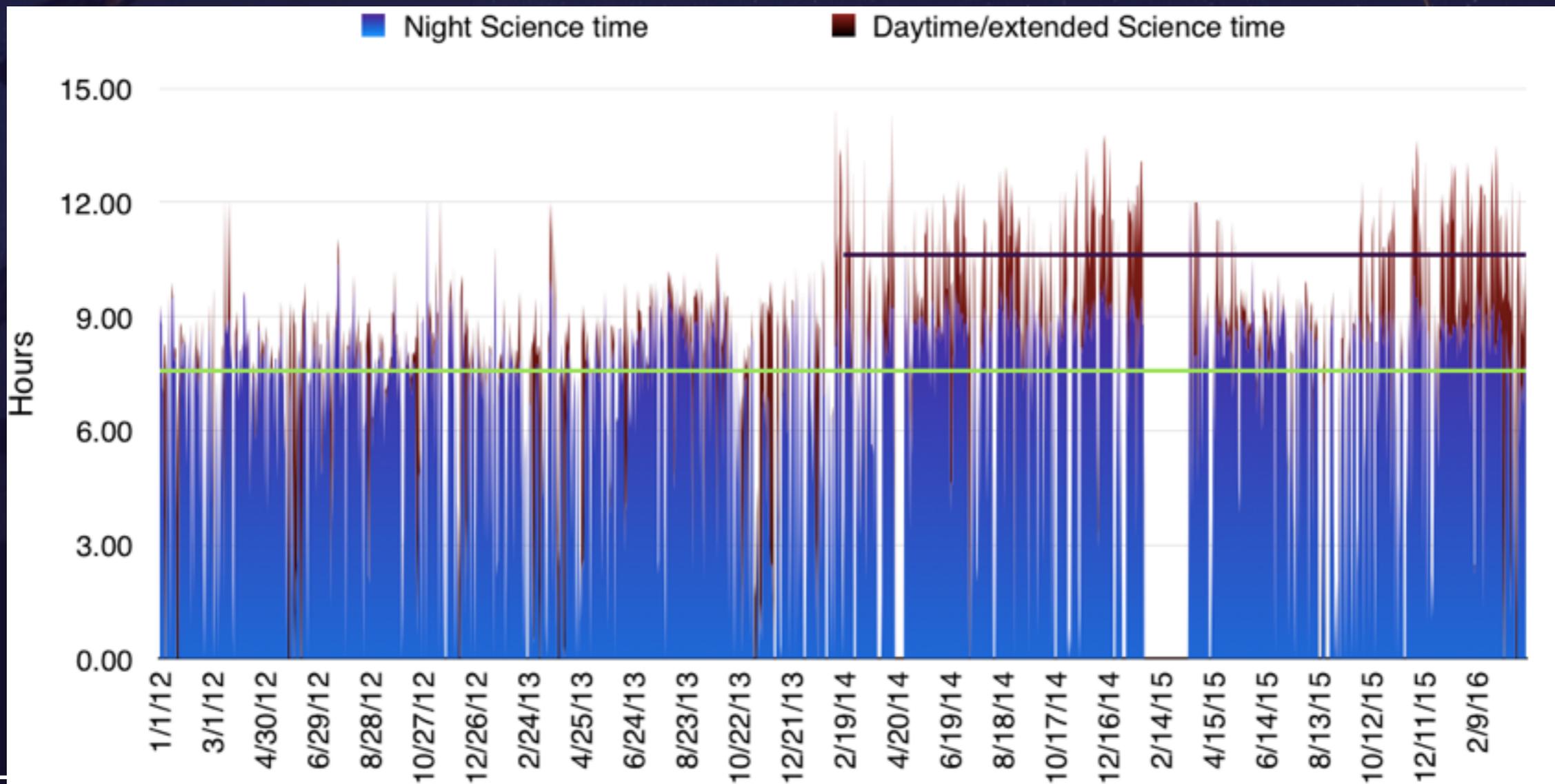
# JCMT Operations

- Observing time distribution: 50% Large Programs; 50% PI Proposals
- Large Programs: Open to all partners participation
- PI Proposals: Any participating partner may submit to the Calls - collaboration encouraged
- PI Proposal Time: Allocated according to cash and in-kind contributions to Operating Budget
- TAC: one unified TAC process - priority on telescope by science ranking
- Observers: Scheduled Projects send Observers - **in one year we have had over 100 scientists visit to observe with us**
- Queue Mode: Flexible Schedule according to Weather
- Currently partial on-site and partial remote night observing (1/3 of time) + extended observing



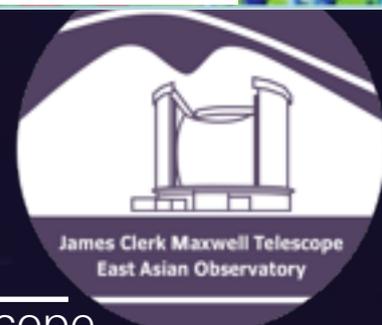
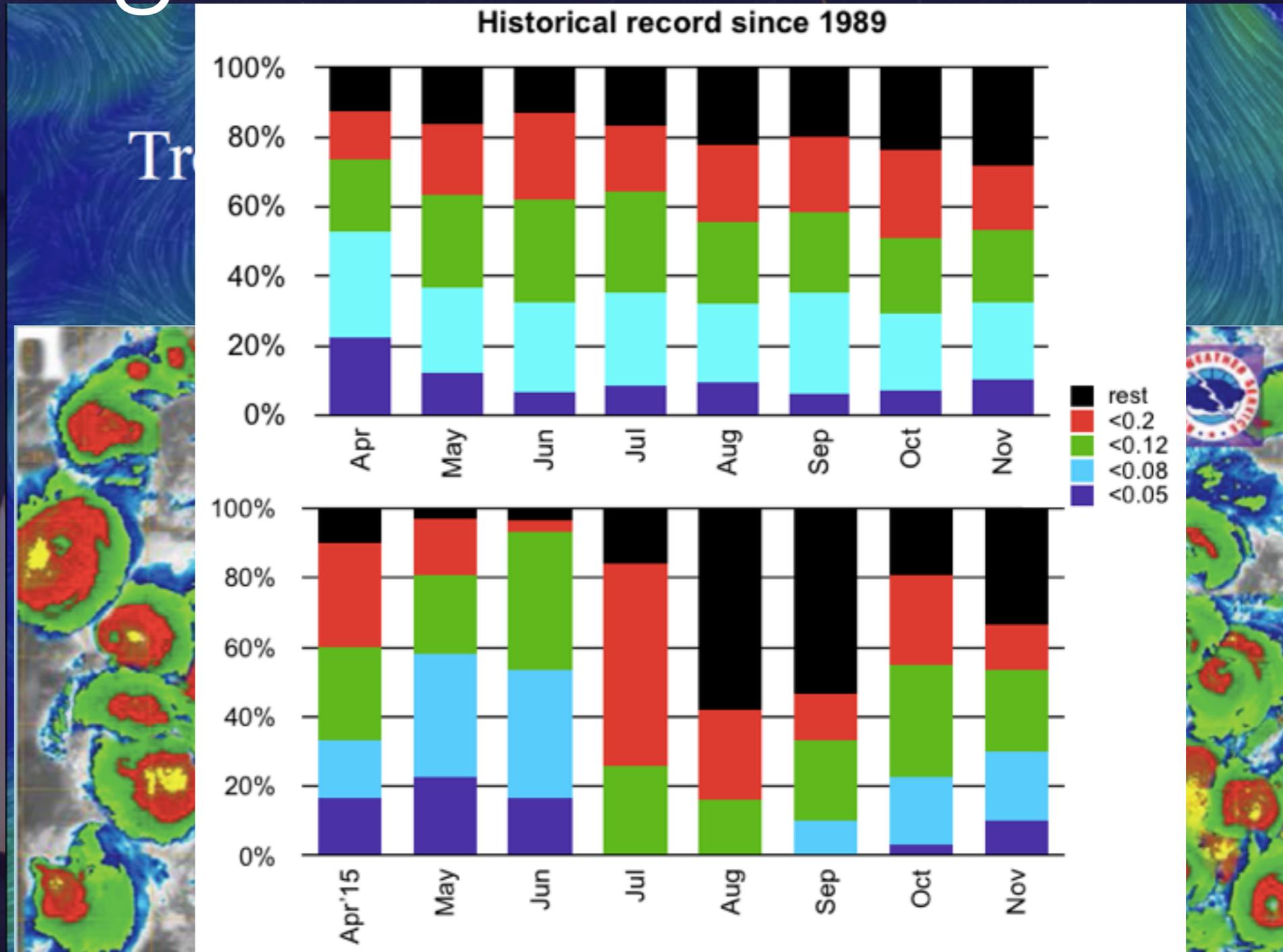
# JCMT Ops

- Critical to catch every photon and do something useful with it
- Optimizing operations pays off in more science time
- JCMT fault rate ~2.5% of time every night (less than 10 minutes)
- Extended observing adds up to two additional hours of science time a day
- Average science on sky is 10 hours a night



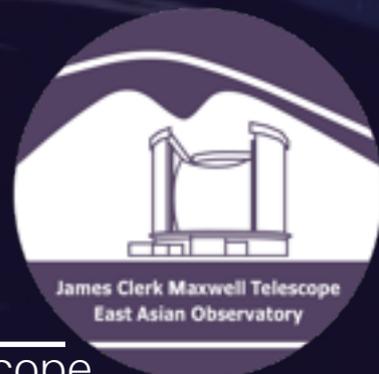
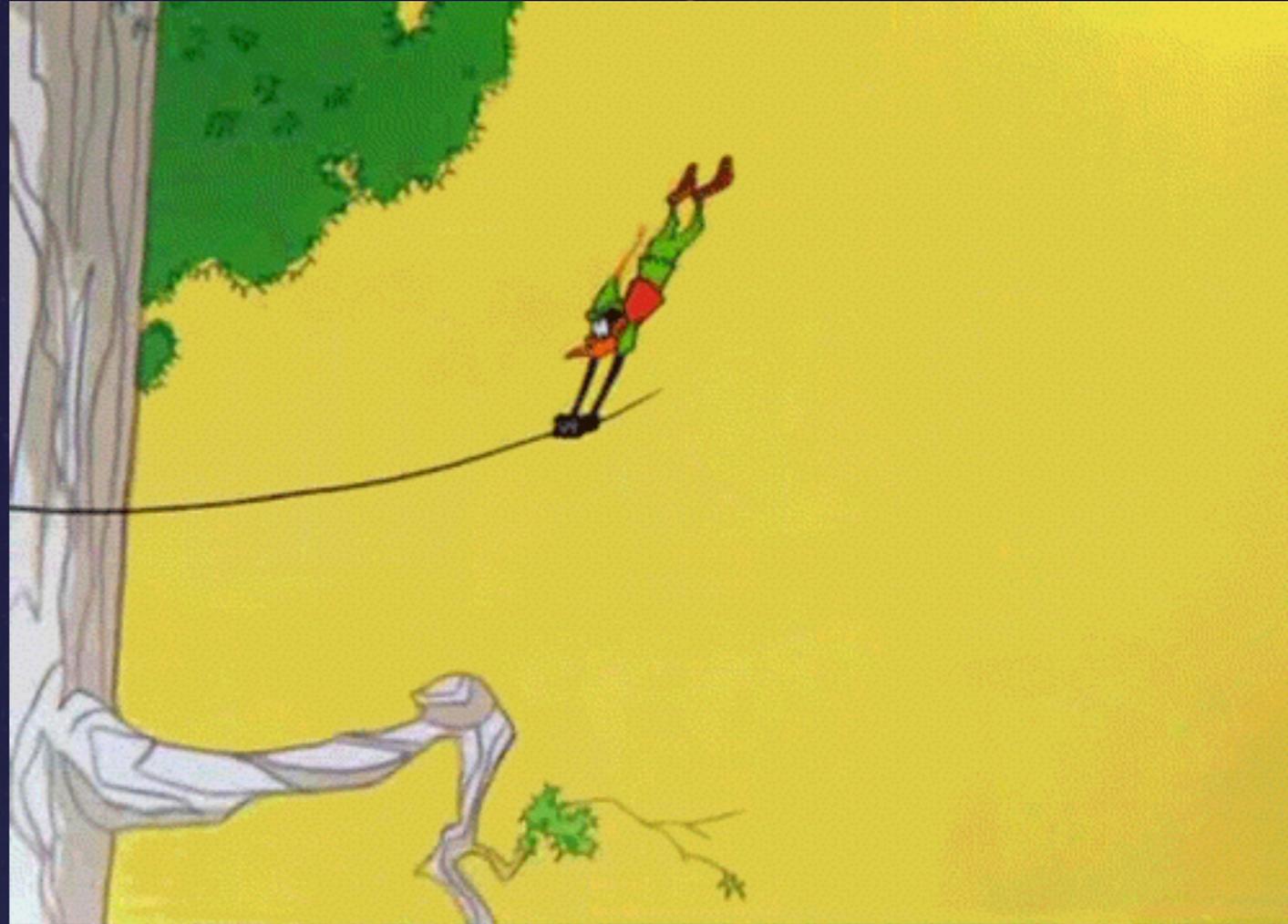
# A challenge for our heroes...

- 15B semester about to start
- Highest ever subscription rates
- Hugely successful Large Program Call
- Everything looking wonderful...
- Enter El Nino



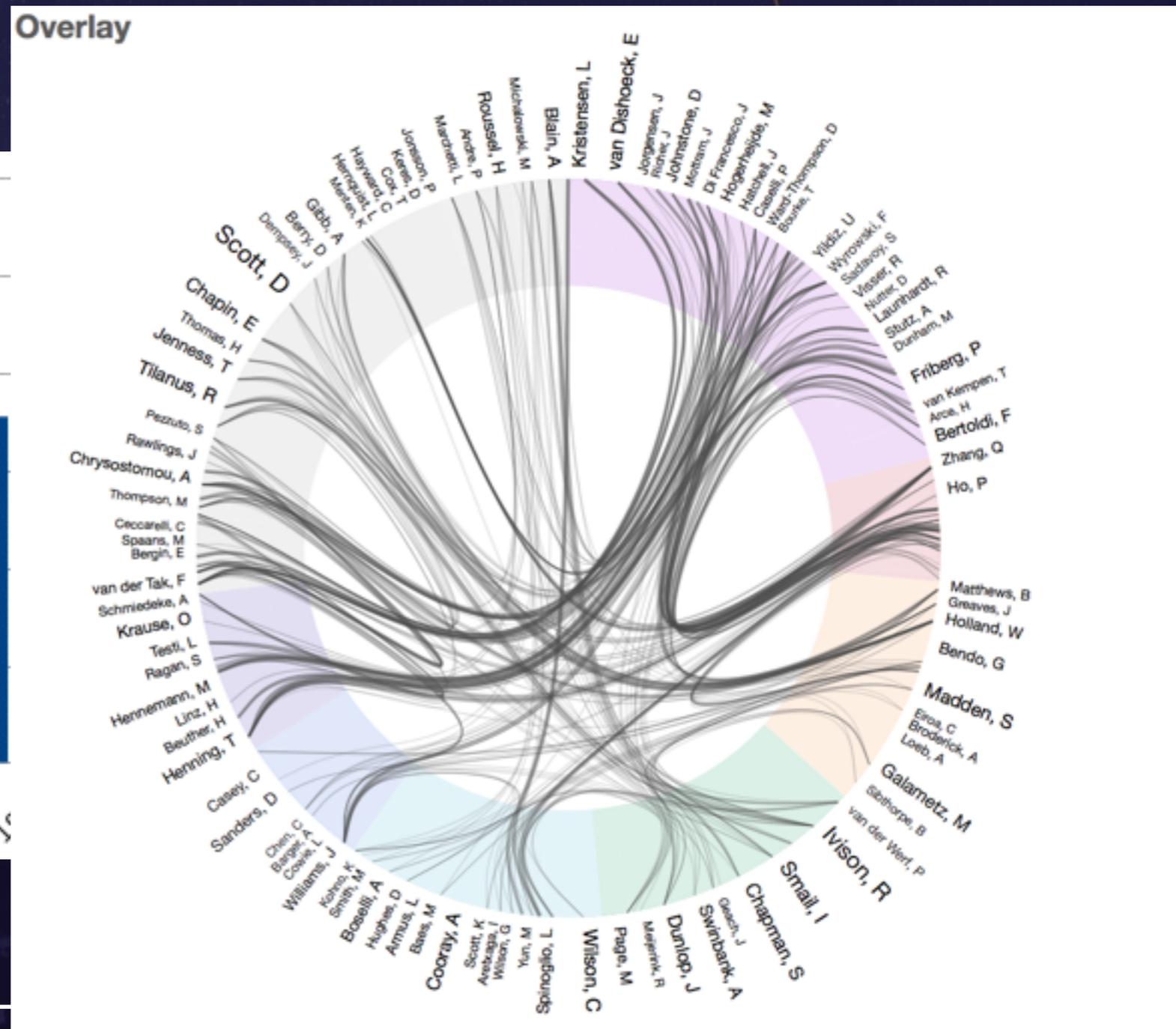
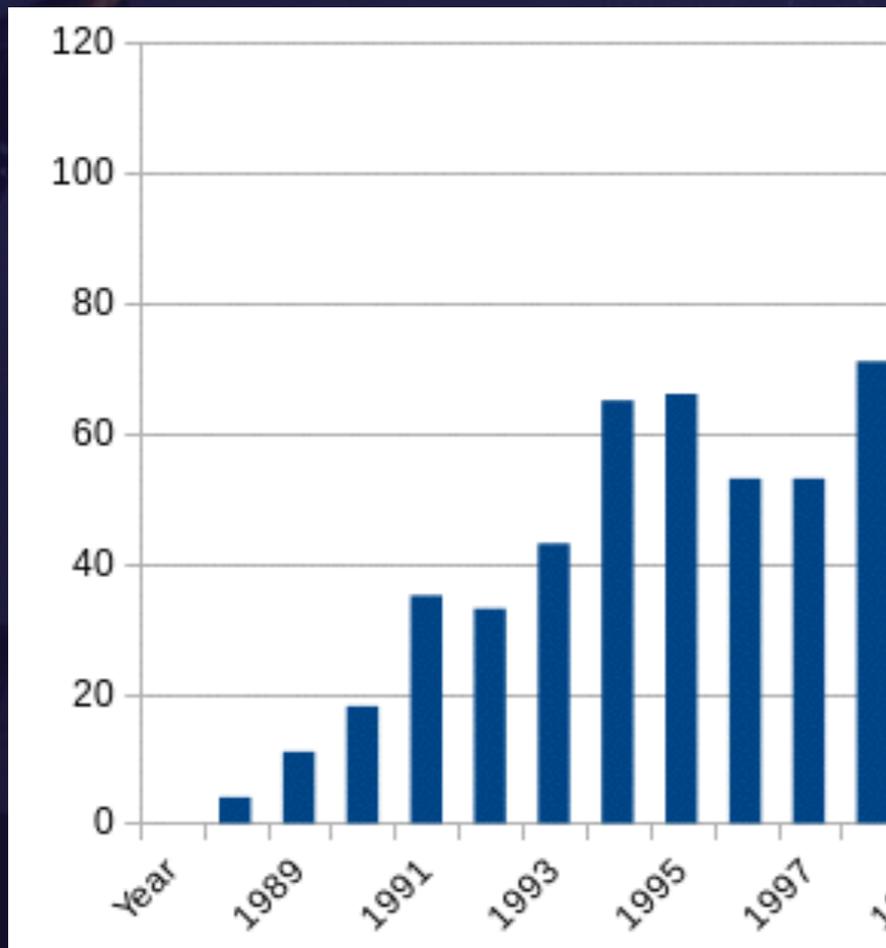
# Maunakea blues

- Significant, sustained protests occurred throughout 2015 on the Big Island in regards to the construction of TMT on Maunakea
- Staff were prevented from operations, stress and tension were high
- Progress was limited though direct confrontations have decreased since the Supreme Court stay of the TMT permit
- A new contested case hearing will occur in August of this year
- The East Asian Observatory is working with other Maunakea Observatories to create ways to restore and improve communication and understanding between the native Hawaiian groups and astronomers to find a way forward together

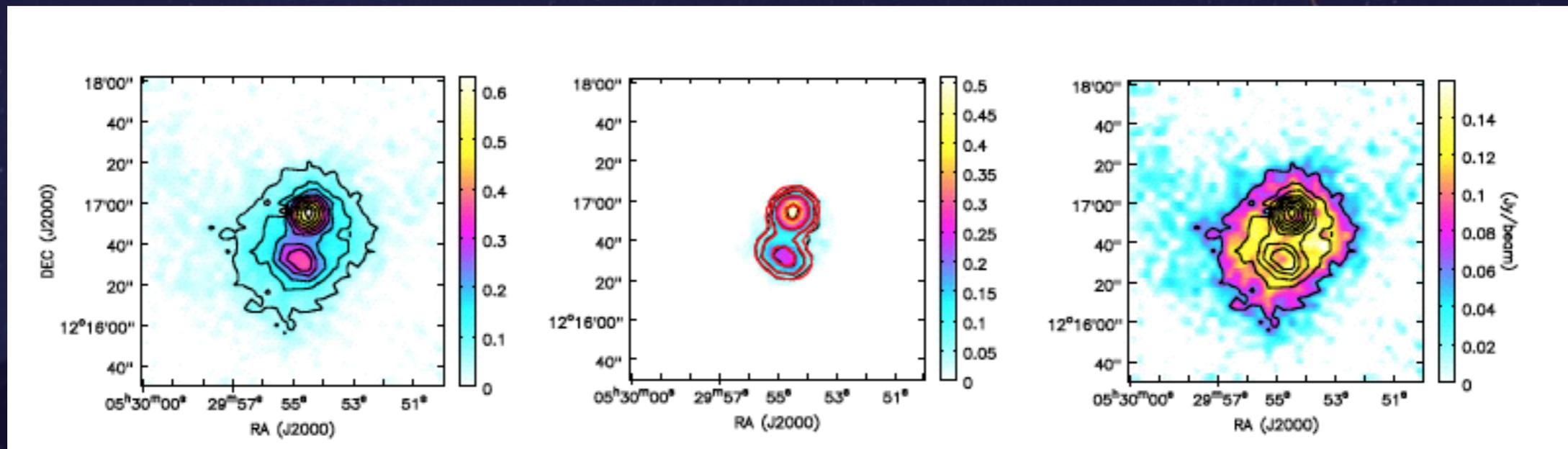


# Publications

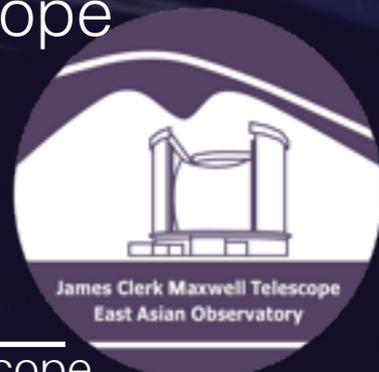
- 84 papers expected in 2016 - good but we can do better!
- Hoping to increase this paper production rate - the key is good, consistent DR and an accessible archive
- And collaboration!



# First EAO Paper

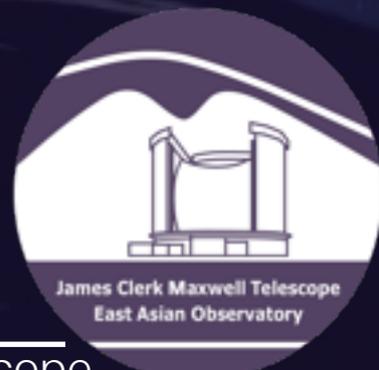
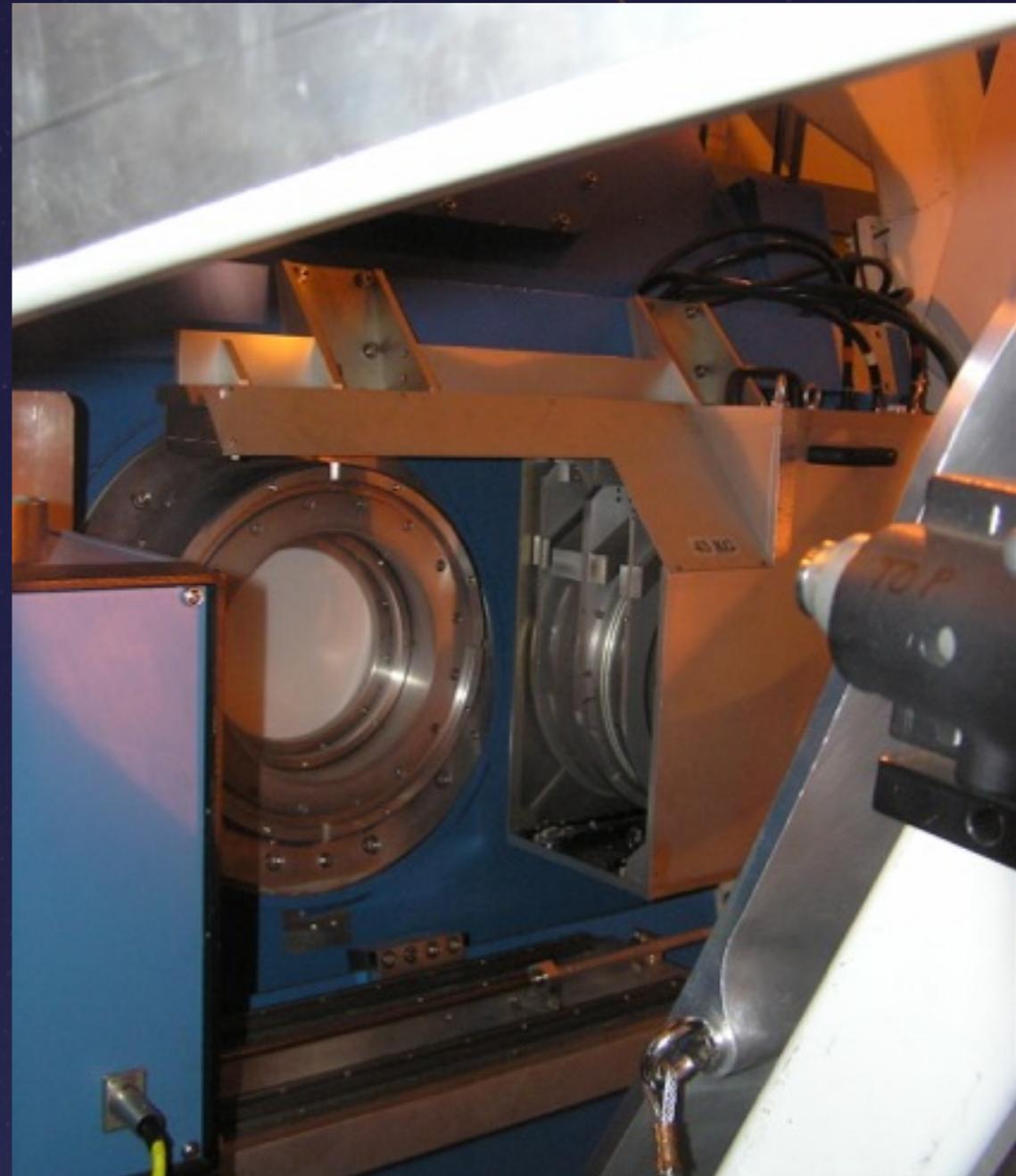


- Liu et al. Planck Cold Clumps in the  $\lambda$  Orionis Complex. I. Discovery of an Extremely Young Class 0 Protostellar Object and a Proto-brown Dwarf Candidate in the Bright-rimmed Clump PGCC G192.32-11.88; *Ap.J.S.*, 222, 7; 01/2016.
- JCMT resolves G192 into 2 compact sources (middle) plus an extended envelope (right)
- Distance  $\sim 400$ pc; Sources: G192N (0.43 Mo); G192S (0.23 Mo); Envelope (1.2 Mo) — G192S may be forming a brown dwarf ( $<0.08$  Mo)
- Taken during Pilot Science! (April 2015)

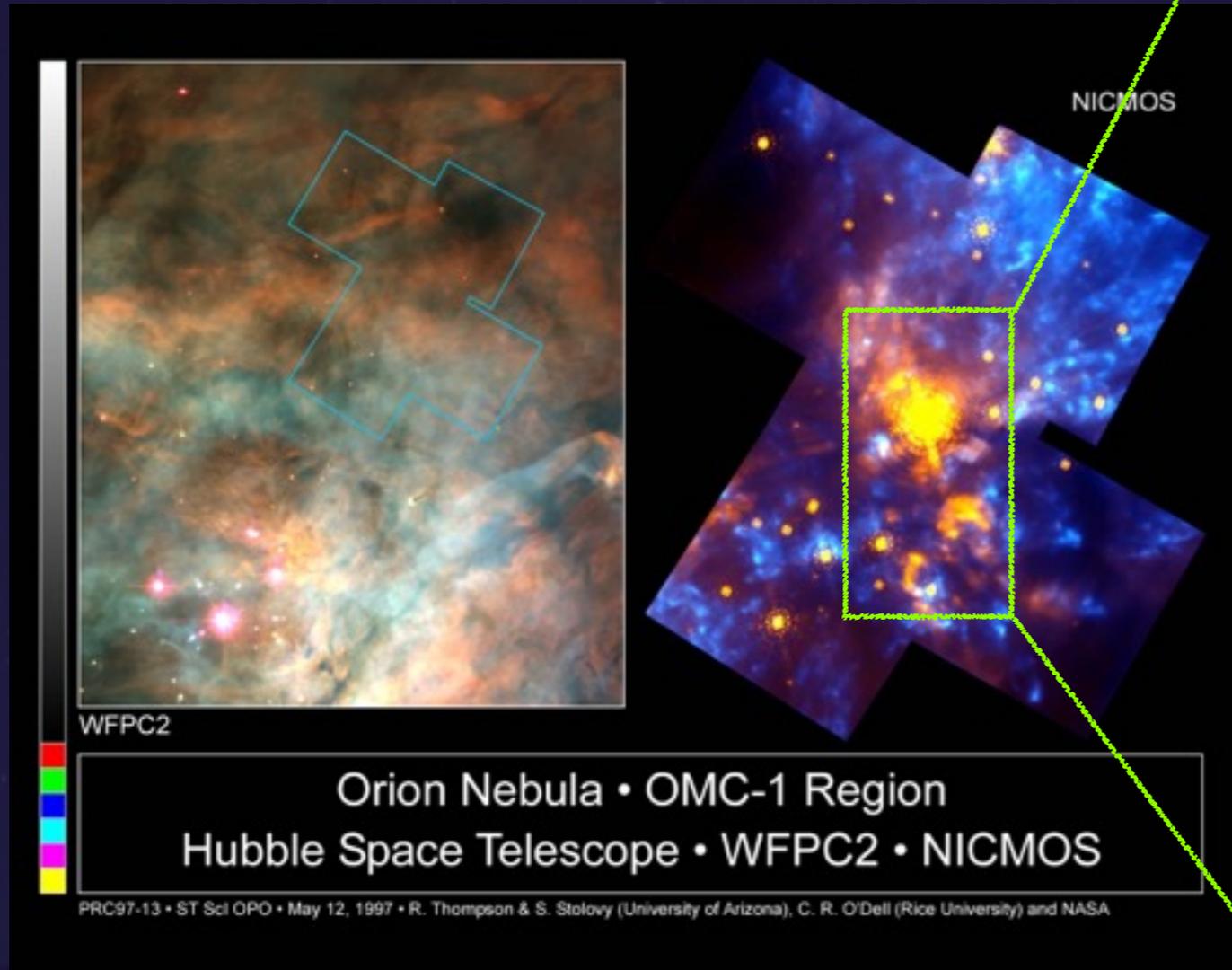


# POL-2: the little polarizer that could

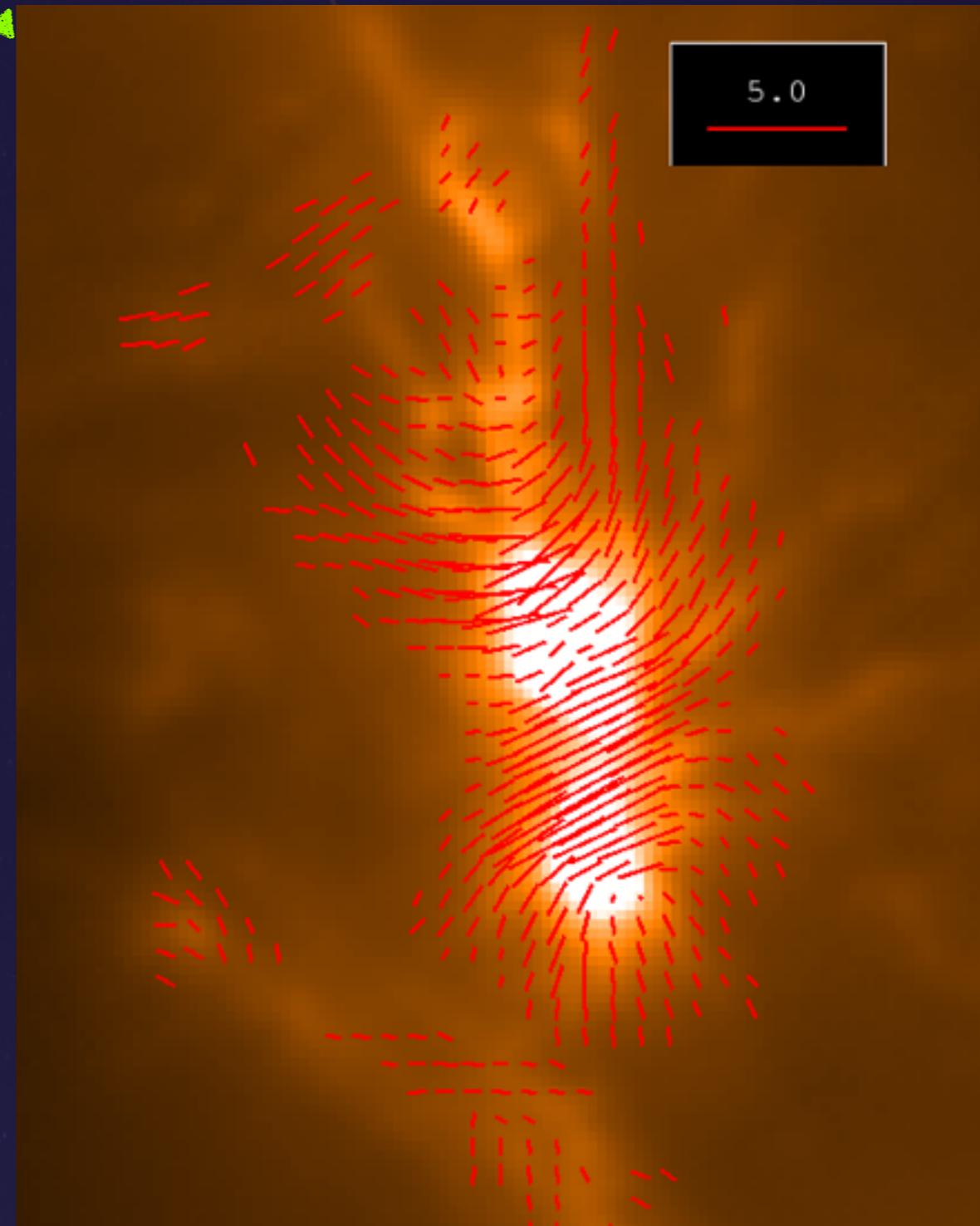
- POL-2 commissioning became the Observatory's highest priority once operations were running again
- The first observing mode, the POL-2 daisy, was successfully commissioned in February
- The instrument was made available for 16B observing - Hedwig has an integration time calculator for using the instrument
- The BISTRO large program is also now starting to use the instrument
- Instrument Polarization still not well understood
- New observing mode options still to be investigated



# Why Pol-2 is key



Hubble Image  
STScI Thompson et al



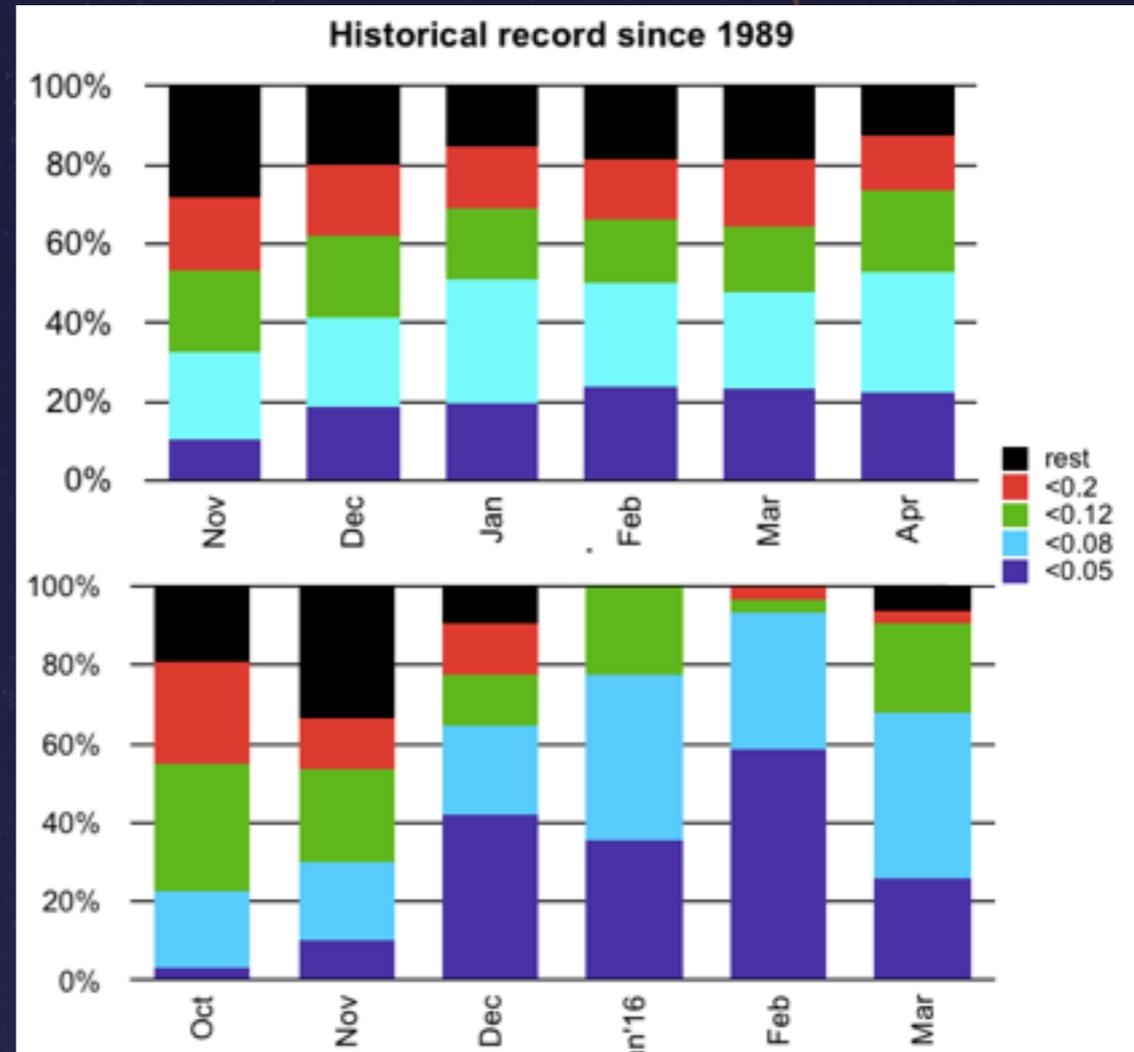
JCMT SCUBA-2 (background)  
Pol-2 (red vectors)

- Dust grains are elongated, and slightly charged, so they align with the magnetic fields present
- Understanding the structure of the magnetic fields provides a wealth of information

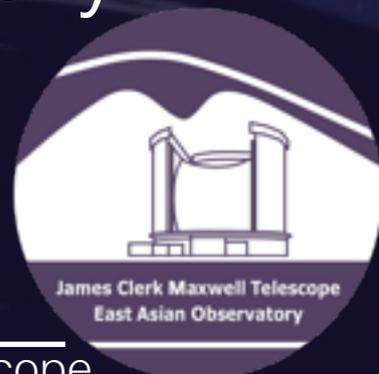


# Large Programs begin

- 7 programs awarded time and observations start in December 2015
- Harriet Parsons will present the details
- Science talks to follow later today
- El Nino turns from villain to hero...



No snow all winter - >80% Grade 1 and 2 weather in February  
Driest winter on record



# The adventure continues

- 2016: An expert panel on new instrument initiatives meets in Taipei: full report by Ming-Tang Chen to come
- Now recruiting! Two students at EAO (from Canada and China) but we want more
- Stay tuned for the exciting next chapter...
- And here are the real heroes of the story

