

Subaru and Subaru 2



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2023-09-27

Presentation for 2023 Kosekitenren Symposium at Mitaka

- Operation
- Telescope Maintenance and the Upgrade
- Observing Instrument Development
- Others
 - Science Highlights
 - Annual budget
 - Priority for the observatory

Operation

- Severe winter storm caused significant impacts.

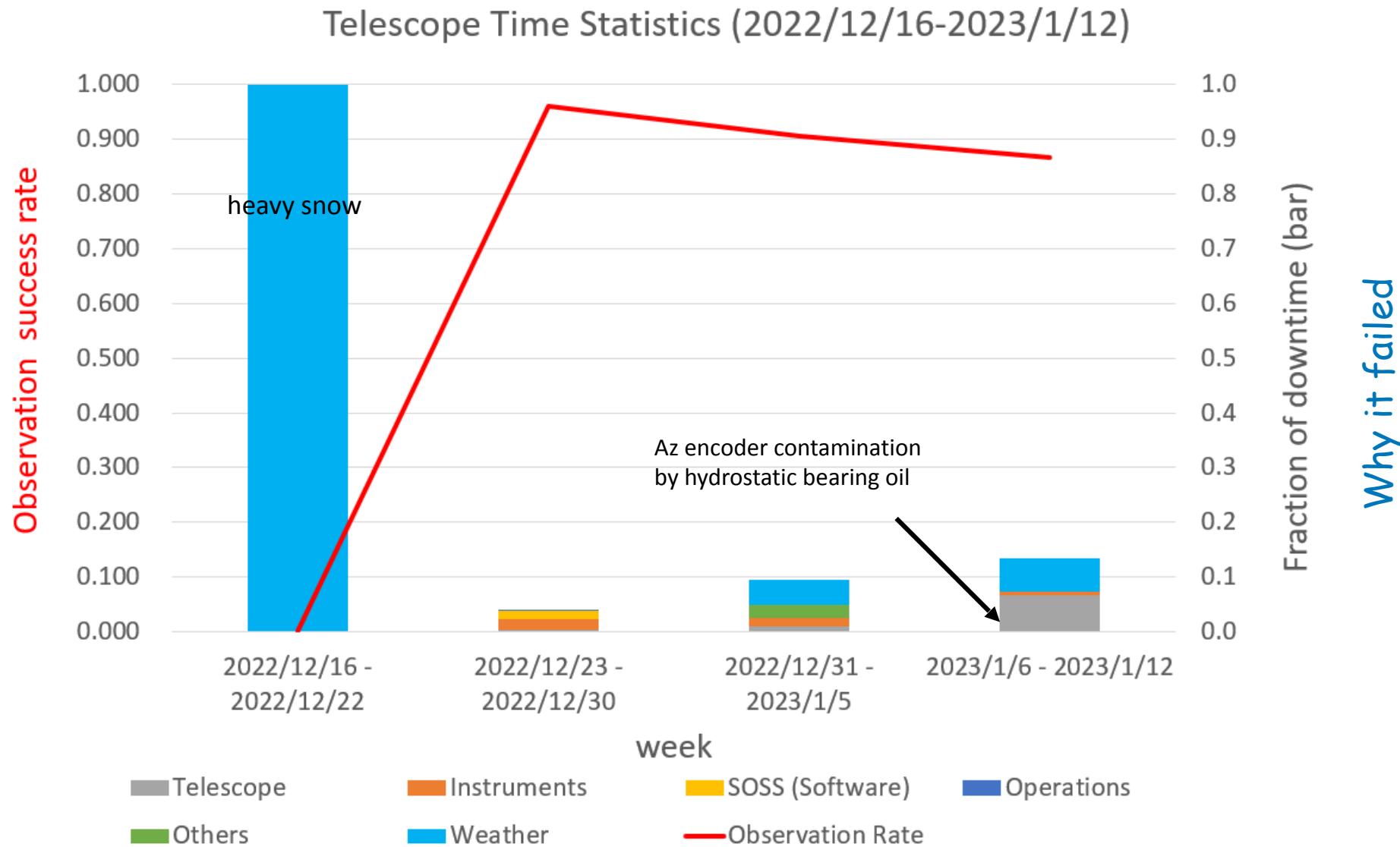
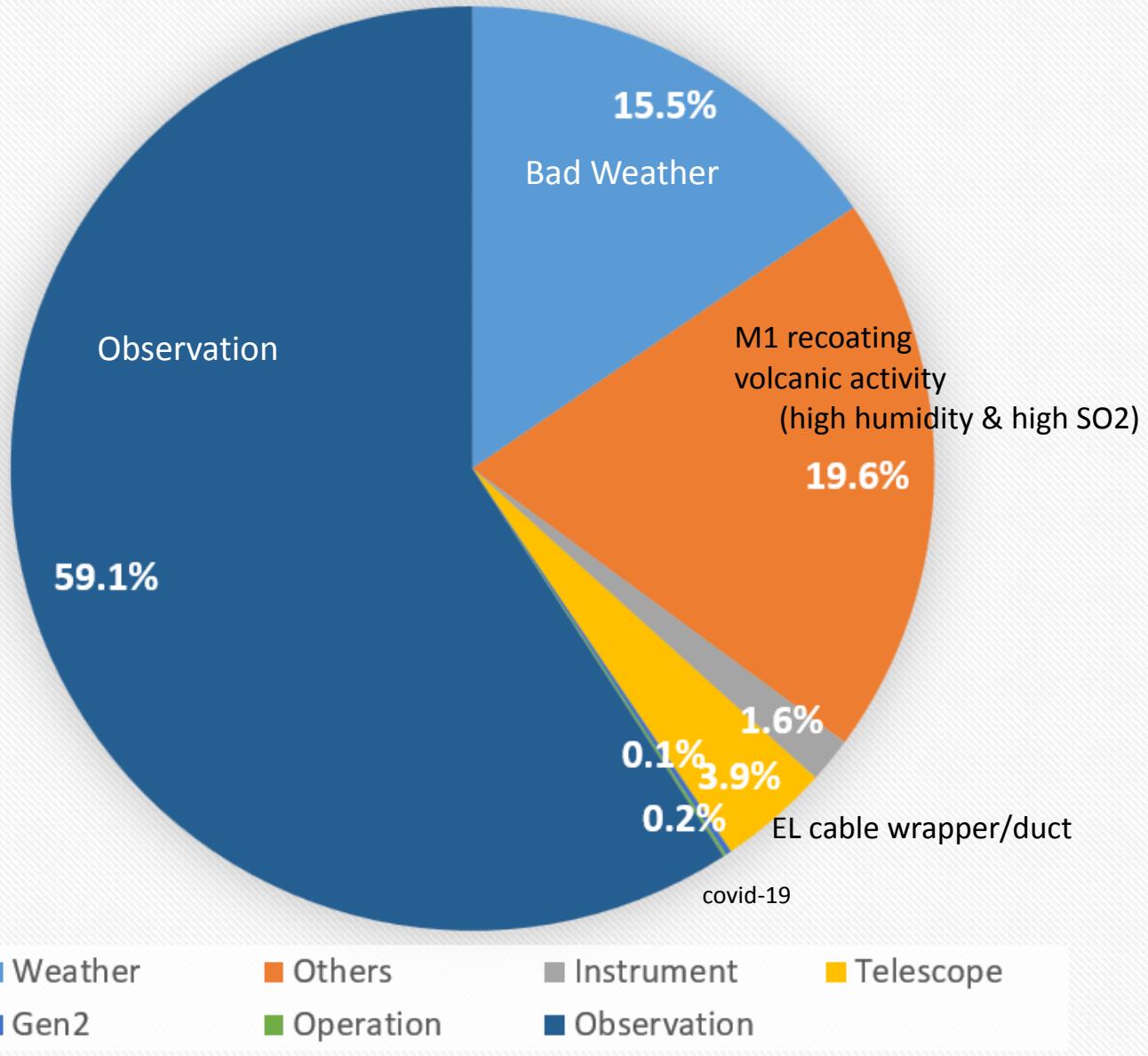


Photo taken on
Dec. 17, 2022 HST



Operation

Subaru Telescope Time: 2022 (12/31/2021 - 1/6/2023)



Operation



Telescope Time Statistics in 2021

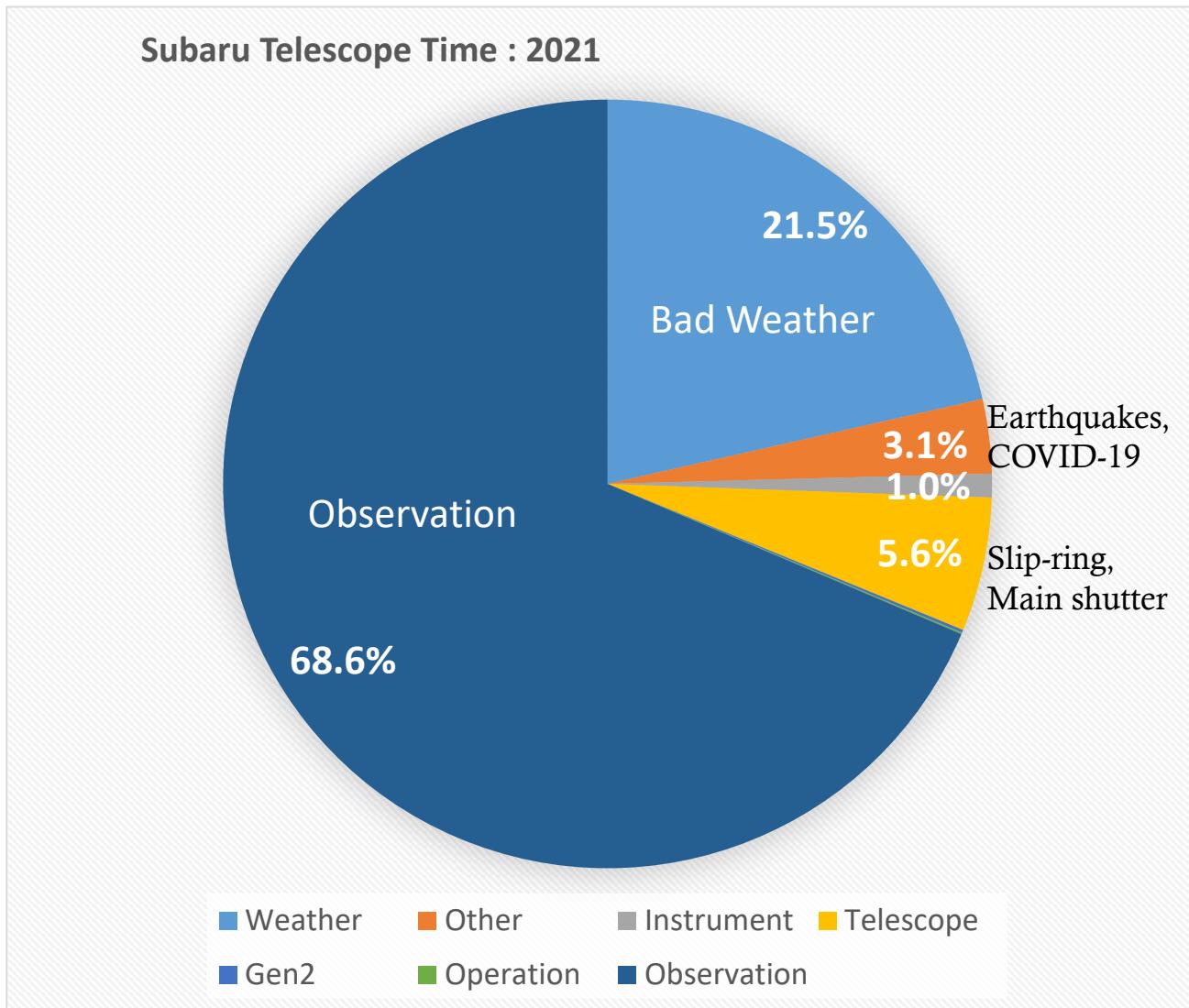
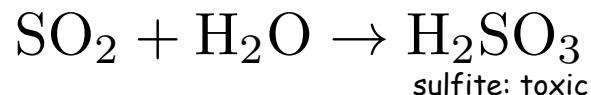
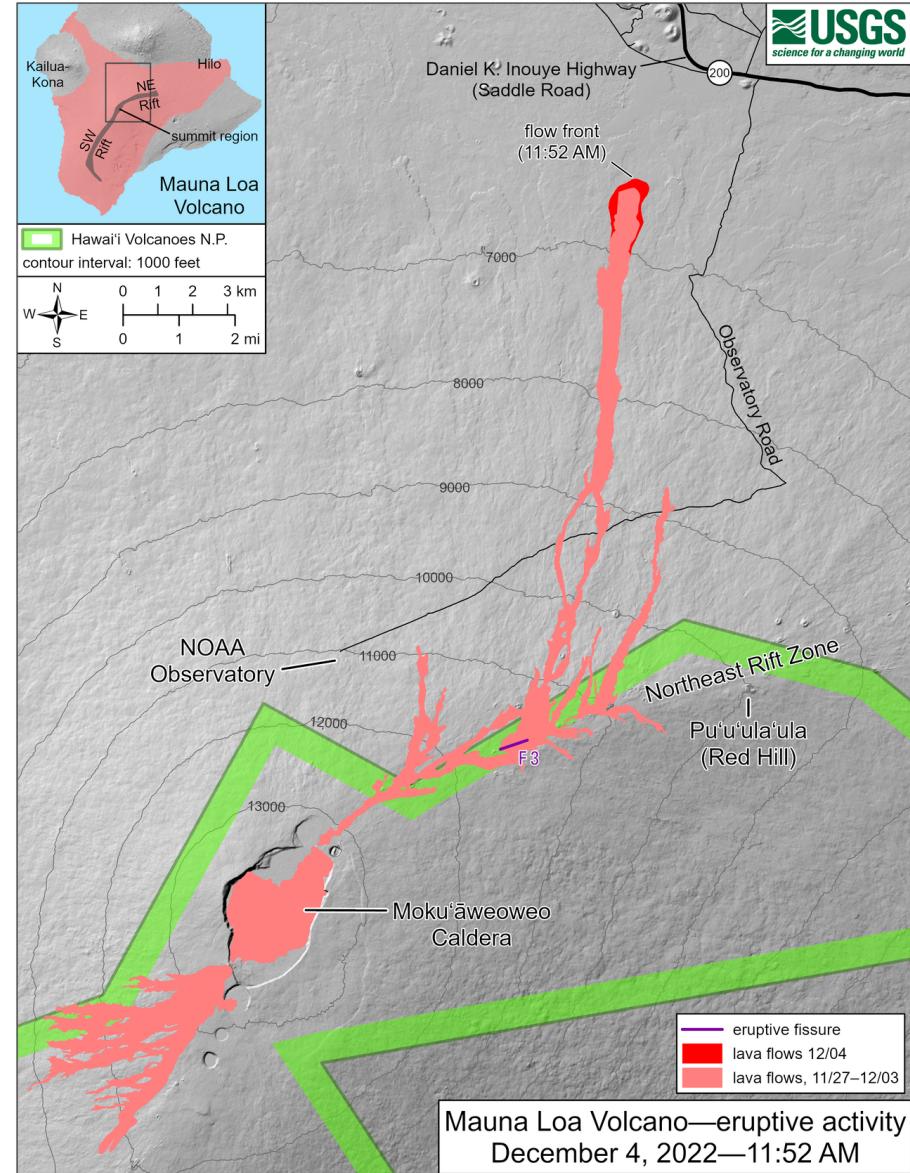


Photo taken by Oka-san
5 am Nov. 29, 2022 HST



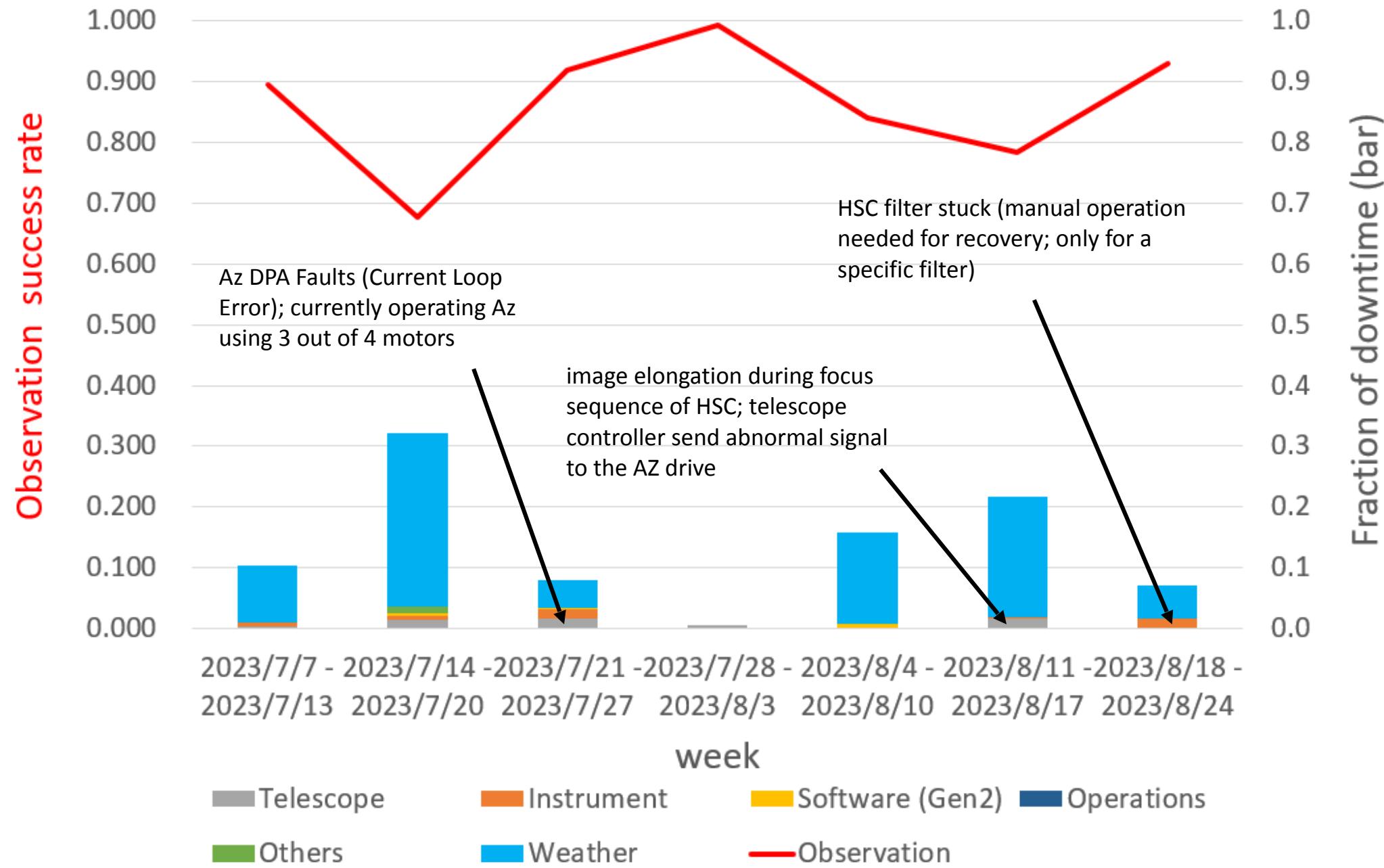
Operation

- Mauna Loa Eruption
 - 2022/11/27 23:30 HST after 38 years
 - Lava flow stopped before the saddle road
 - Impacts on the operation
 - Cancel two nights (Nov 28, 29) to secure the observatory staff (The weather was bad anyway)
 - Sky was too bright due to the lava glow on Nov 30.
 - Necessary to close the dome when the level of SO₂ and/or volcanic ash increased
 - sensor SO₂: Gemini, particle: Keck
 - Observing became intermittent since Dec 2 till Dec 14.



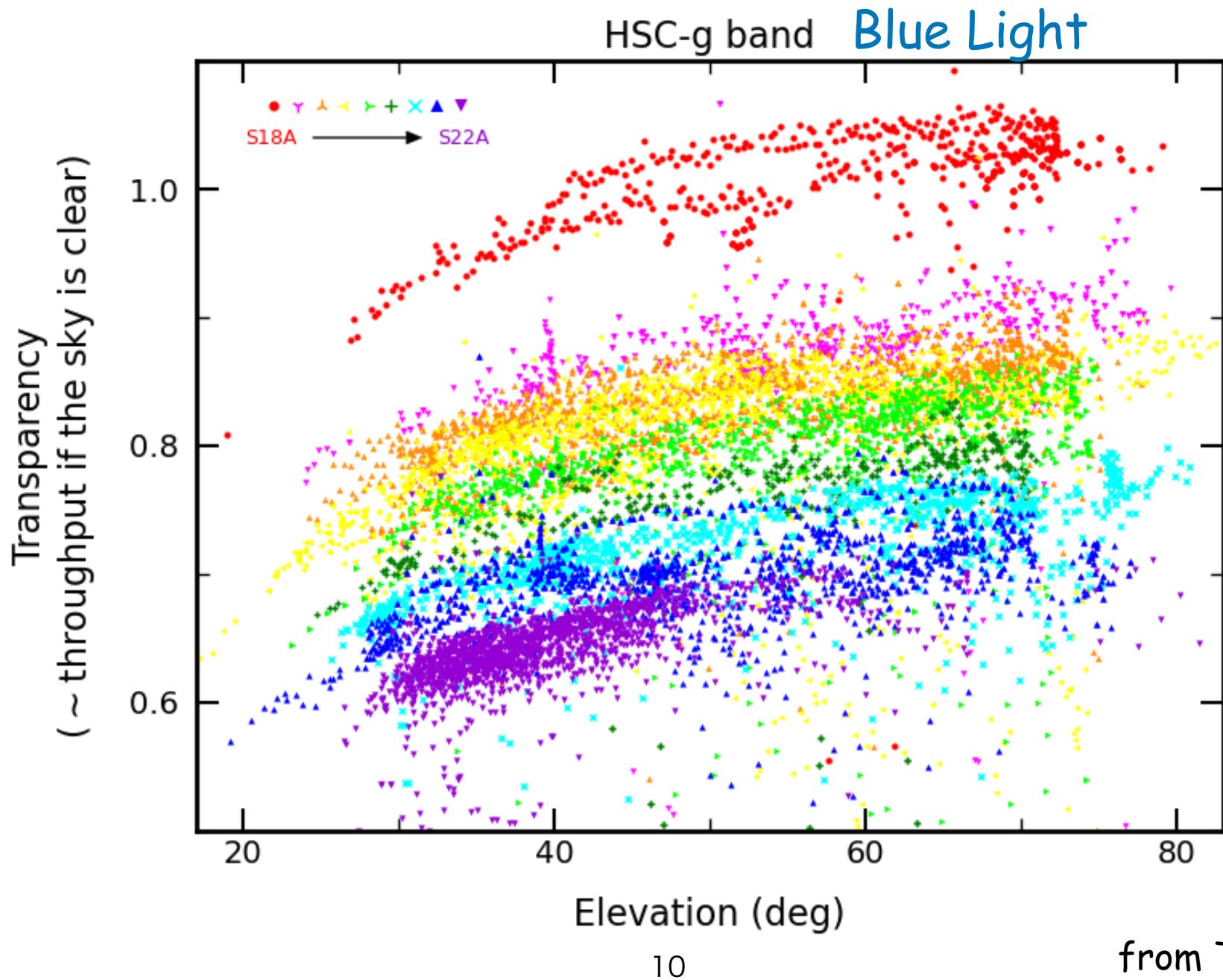
Operation

Telescope Time Statistics (2023/7/7-2023/8/24)



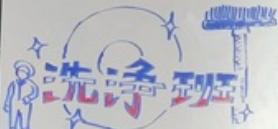
Telescope

Reflectivity drop over 4 years





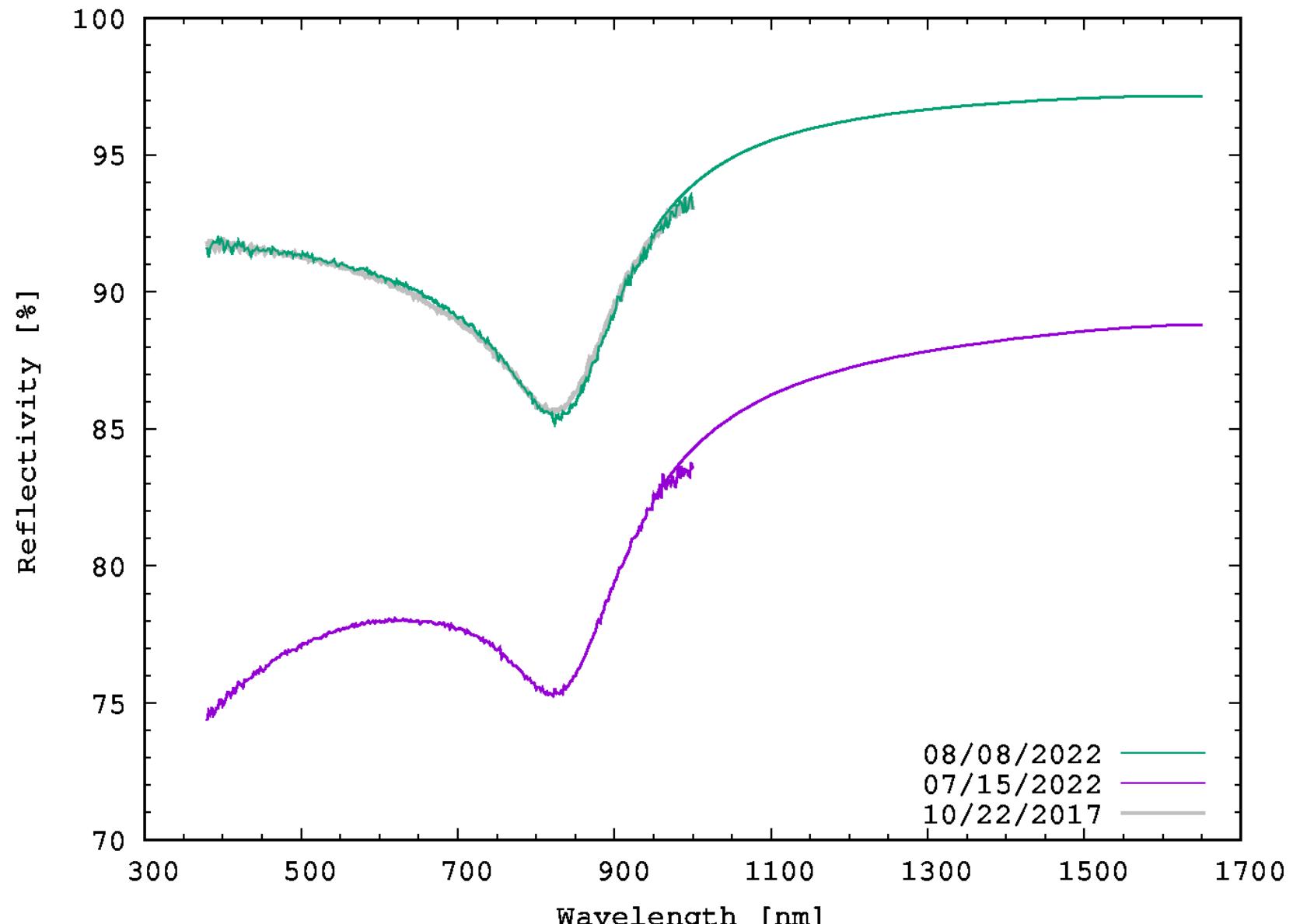
2022
Primary Mirror
Washing Team

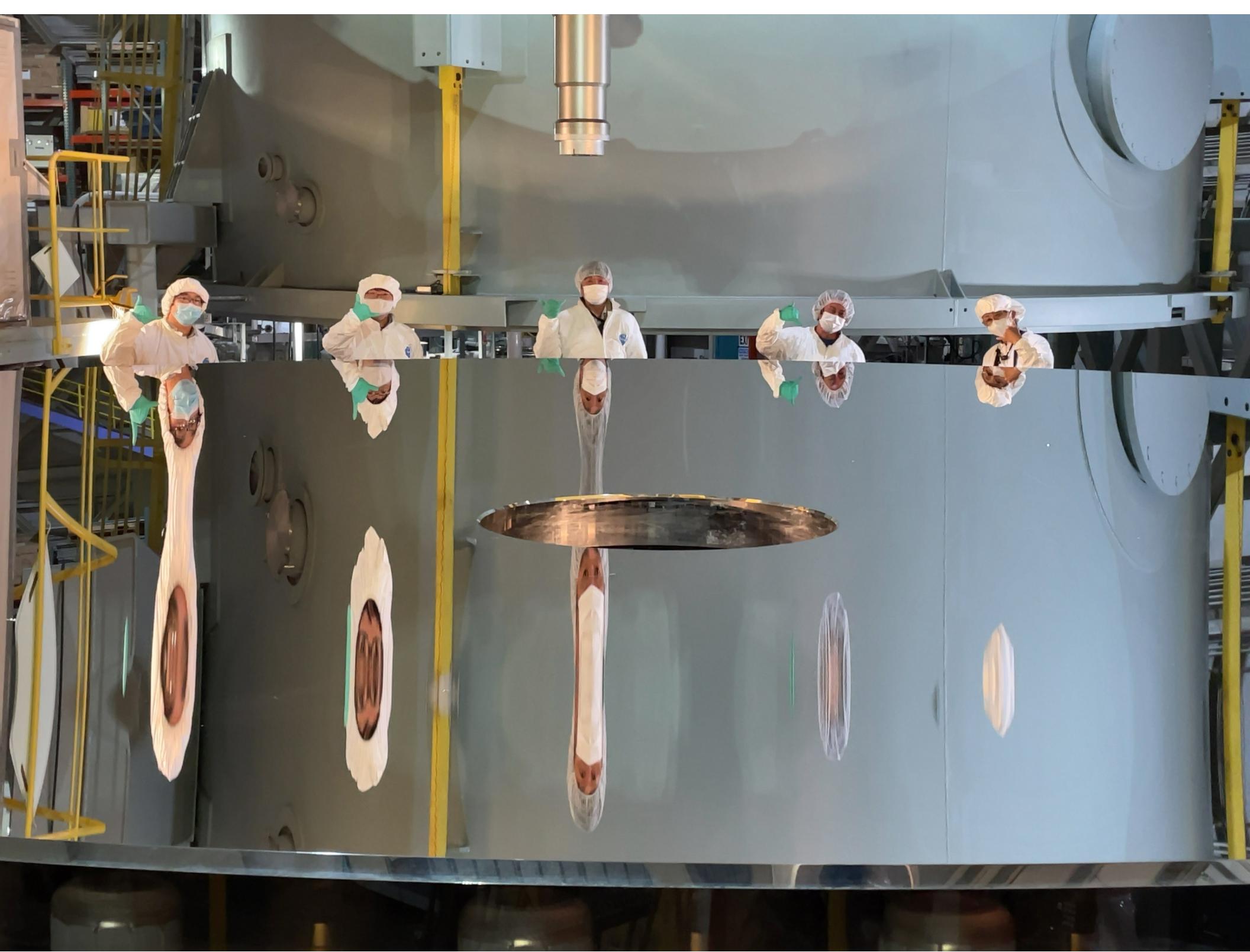


TEL DIV

Telescope

The result

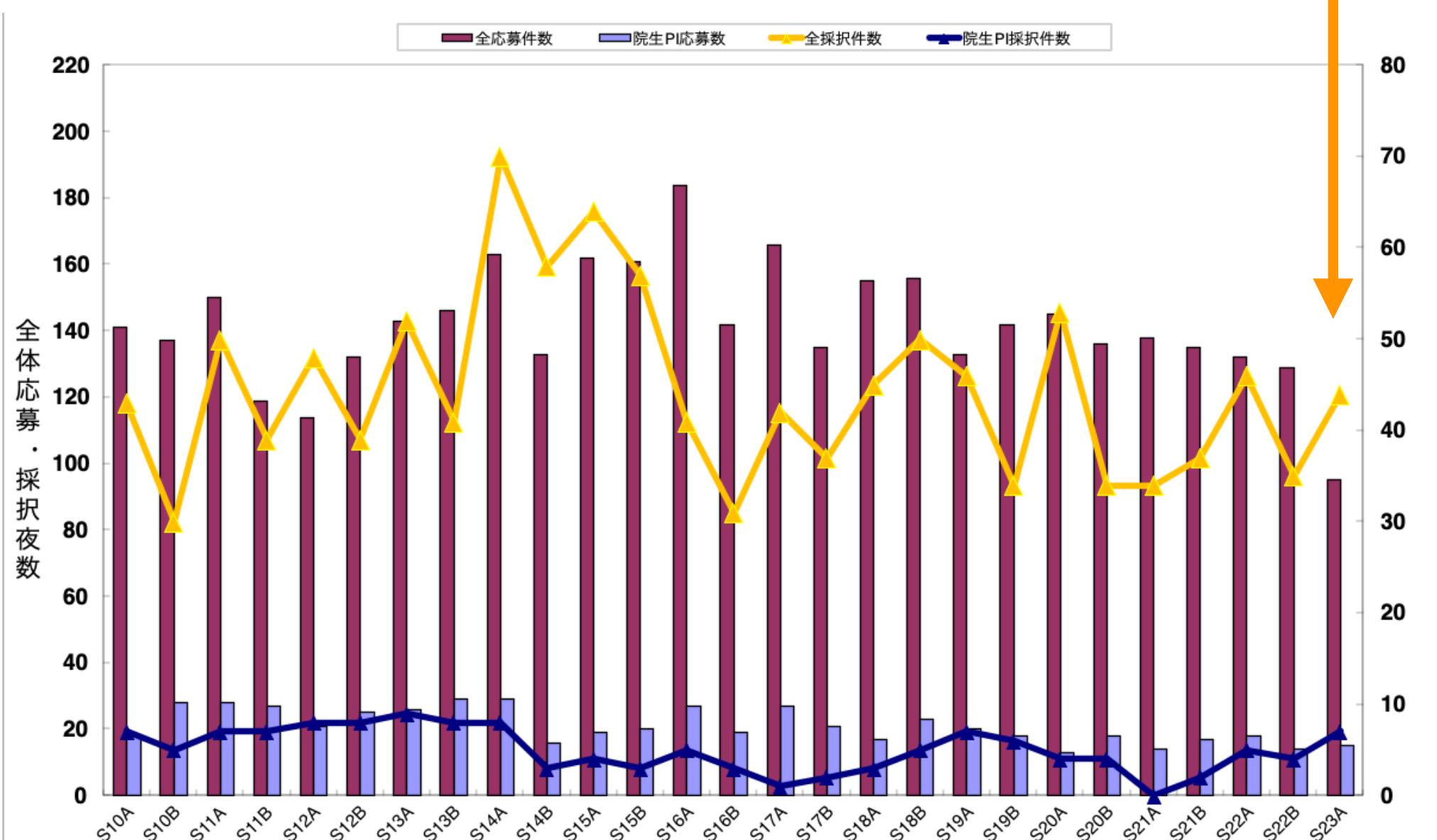




Operation

Proposal Statistics

Crisis !

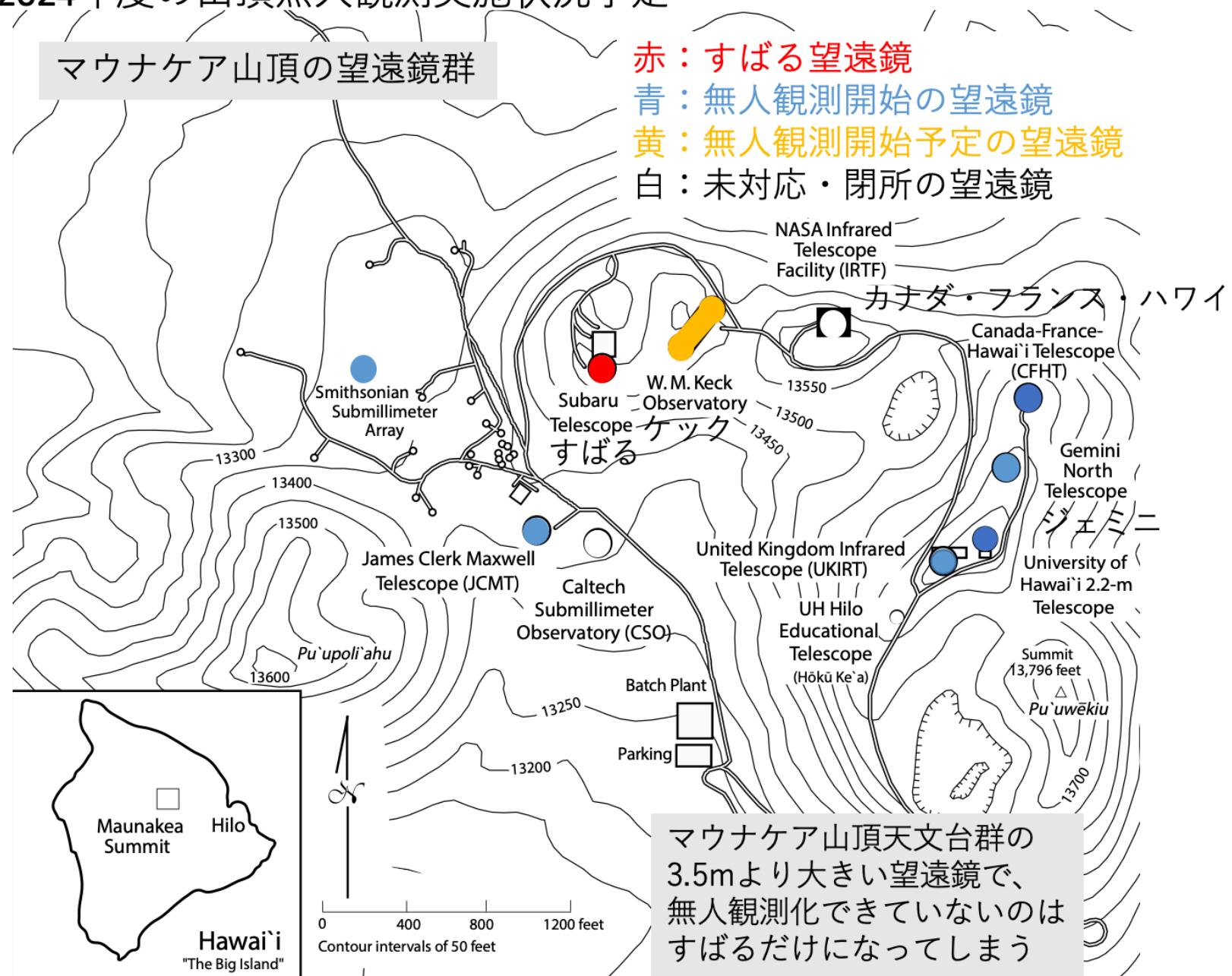


Operation

- S23Bより学生PIの現地観測を再開
 - 学生分の旅費は支援。観測後の滞在もOK。
 - 教育目的
 - 観測所運用を担う後継者の発掘
 - できればポスドクまで拡大したい（予算制限）
 - Un-manned Night Operation体制に移行後は実施不可能

Operation

2024年度の山頂無人観測実施状況予定



Operation

- 夜間無人観測(非常にPriority高い)
 - Conceptual Studyは概ね完了
 - 前回Subaru UM青木報告
 - 実施計画をHead of Engineering(早野)を中心に策定しようとしている
 - 山麓からの通信が途絶えた時に、自律的に望遠鏡をシャットダウンするシステムが重要
 - 安全対策
 - 日中のメンテナンス作業(有人)との切り替え
 - 三菱電機より、安全に対する考え方の整理(難題)を求められて、止まっている

Operation

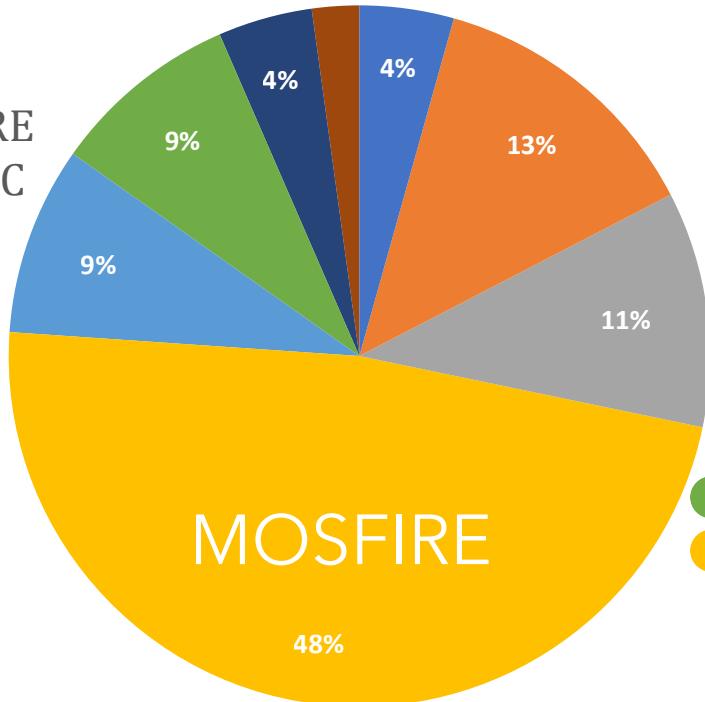
Subaru-Keck exchange summary

We exchanged **5.0n** (S21A), **8.0n** (S21B), **5.5n** (S22A), **4.5n** (S22B) with Keck.

Subaru → Keck

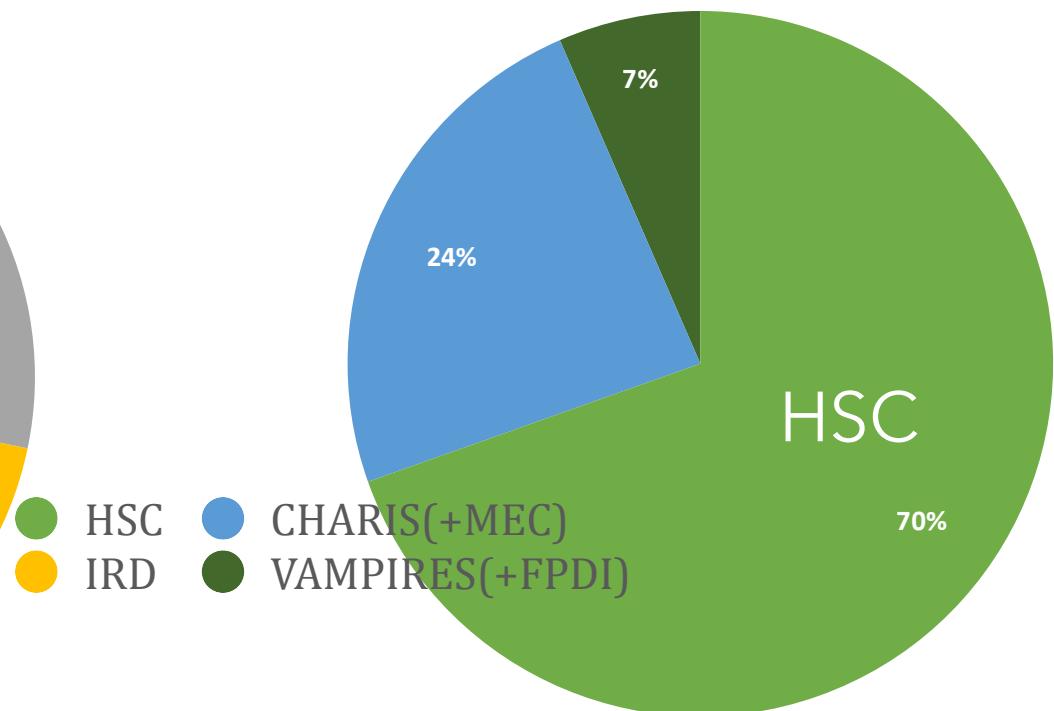
(approved in S21A/S21B/S22A/S22B)

- DEIMOS
- OSIRIS
- LRIS
- MOSFIRE
- NIRSPEC
- KCWI
- NIRC2
- HIRES



Keck → Subaru

(approved in S21A/S21B/S22A/S22B)



Operation

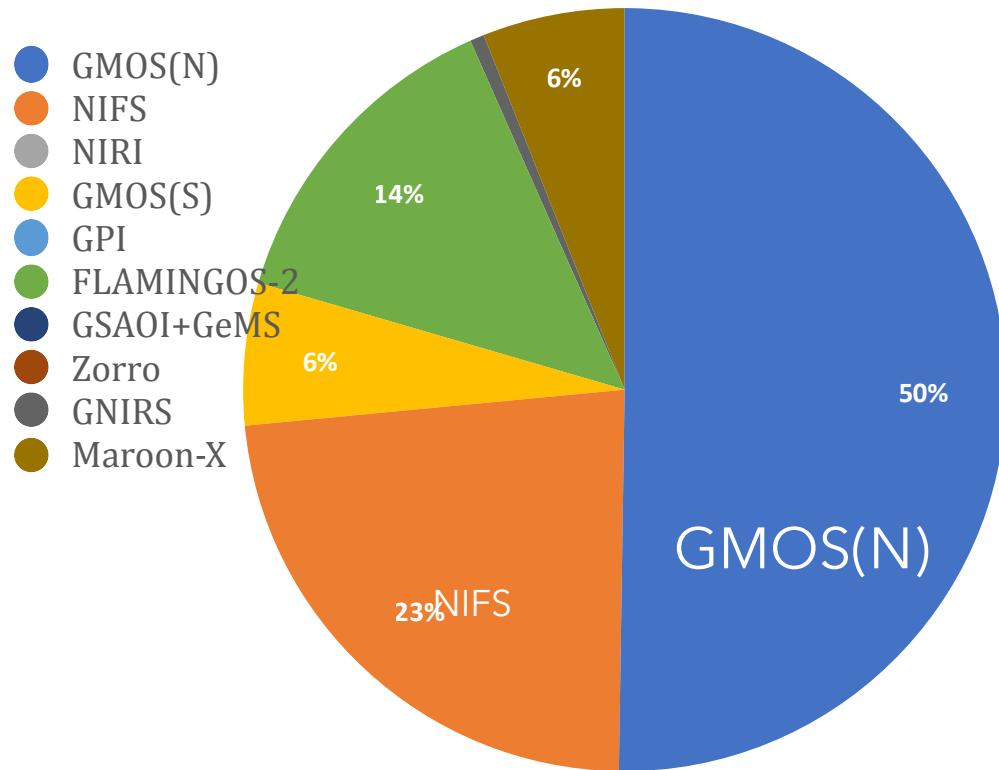
Subaru-Gemini exchange summary

Subaru → Gemini

(**approved** in S21A/S21B/S22A/S22B)

N (proposal) = 3.5 /semester

N (approved nights) = 4.2 n/semester

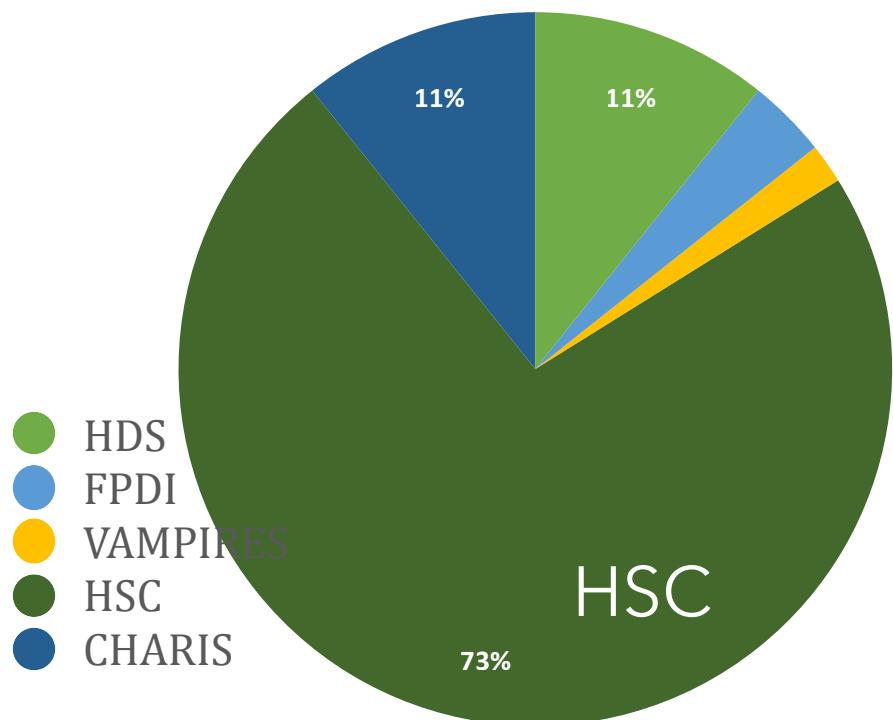


Gemini → Subaru

(**approved** in S21A/S21B/S22A/S22B)

N (proposal) = 3.8 /semester

N (approved nights) = 7.0 n/semester



Note 1: Subaru → Gemini FT programs are not included.

Note 2: Gemini → Subaru statistics include 1 HSC intensive program approved in 20B.

Telescope

Items that require down time

major summit work plan for 2022 - 2024 (as of 8/25/2023)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2022	Tel/Dome ←→ Main Shutter Inspection; 1 week ←→ TUE maintenance; 3 weeks (no TUE) M1 prep M1 recoating M1 recoating facility overhaul dome A/C replacement PFS New Laser											
2023	M1 recoating facility overhaul dome A/C replacement (completion date: TBD) Annual Elec & Mech Mainte TUE2; 10 weeks (no TUE for the first 1.5month) Facility chillers upgrade (7/2023-3/2024; no DT in S23B) PFS											
2024	dome A/C replacement Facility chillers upgrade Main shutter sensor replacement (~ no DT?) TBD: Dome drive system renewal (~ about 2 weeks DT) Inspection for hydraulic system overhaul TBD (2-3 weeks DT in July?) TBD: AZ/EL drive system maintenance (after FY2024 or later ; ~ a month DT?)											

Development

- New laser
 - Will be available in S23B on shared-risk basis
- PFS
 - Had the first light last fall.
 - Start of open use expected from S24B
- GLAO
 - PDR passed last December, FDR preparation underway

Science Highlight

Subaru Press/Web Release 2022

1. Multi-wavelength Study Shows First Comprehensive View of a Stellar Flyby Event (Jan. 13)
2. Subaru Telescope Images Planet Just Starting to Form (Apr. 4)
3. Neptune is cooler than we thought (Apr. 11)
4. Missing-Link Black Hole Found Lurking in Plain Sight (Apr. 13)
5. Supermassive Black Holes Inside of Dying Galaxies Detected in Early Universe (May 26)
6. Near-Sun Comet Roasted to Death (Jun. 14)
7. Brief Encounter with Mysterious Heavenly Event (Jul. 12)
8. Measuring the Universe with Star-Shattering Explosions (Jul. 21)
9. Can a Super-Earth around a Low-Mass Star Harbor Life? (Jul. 31)
10. Scientists Reveal Distribution of Dark Matter around Galaxies 12 billion Years Ago (Aug. 1)
11. Milky Way is Somewhat Normal but not Completely Normal (Aug. 30)
12. Discovery of Two Temperate Super-Earths, the Outer One Orbits in the Habitable Zone (Sep. 8)
13. 40-Year Study Finds Mysterious Patterns in Temperatures at Jupiter (Dec. 20)
14. Black Hole Activity May Protect Growth of Other Galaxies (Dec. 21)

Solar system Exoplanets Stars Galaxies Cosmology

Publications



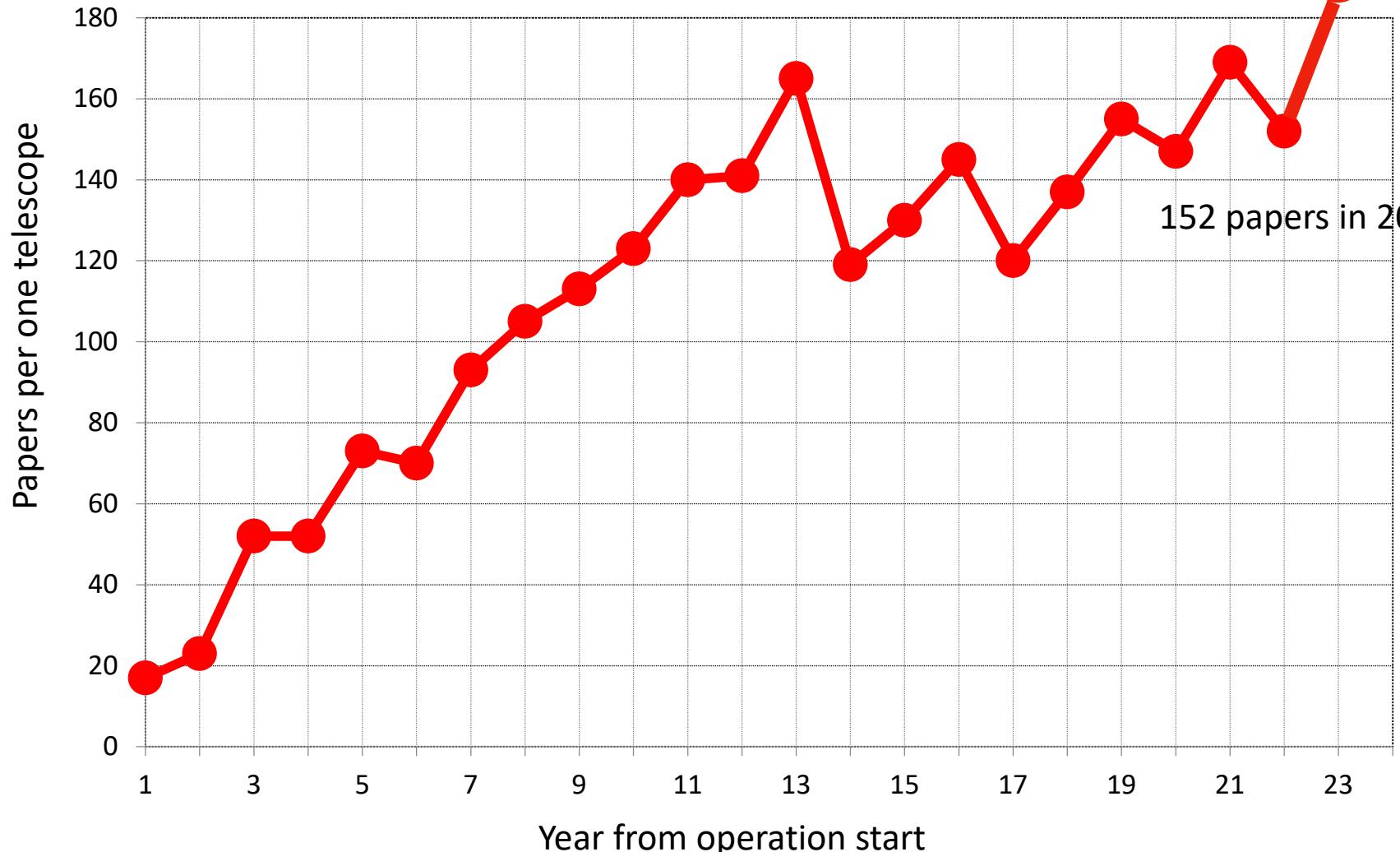
Number of Publications



188 papers in 2022

National Astronomical
Observatory of Japan

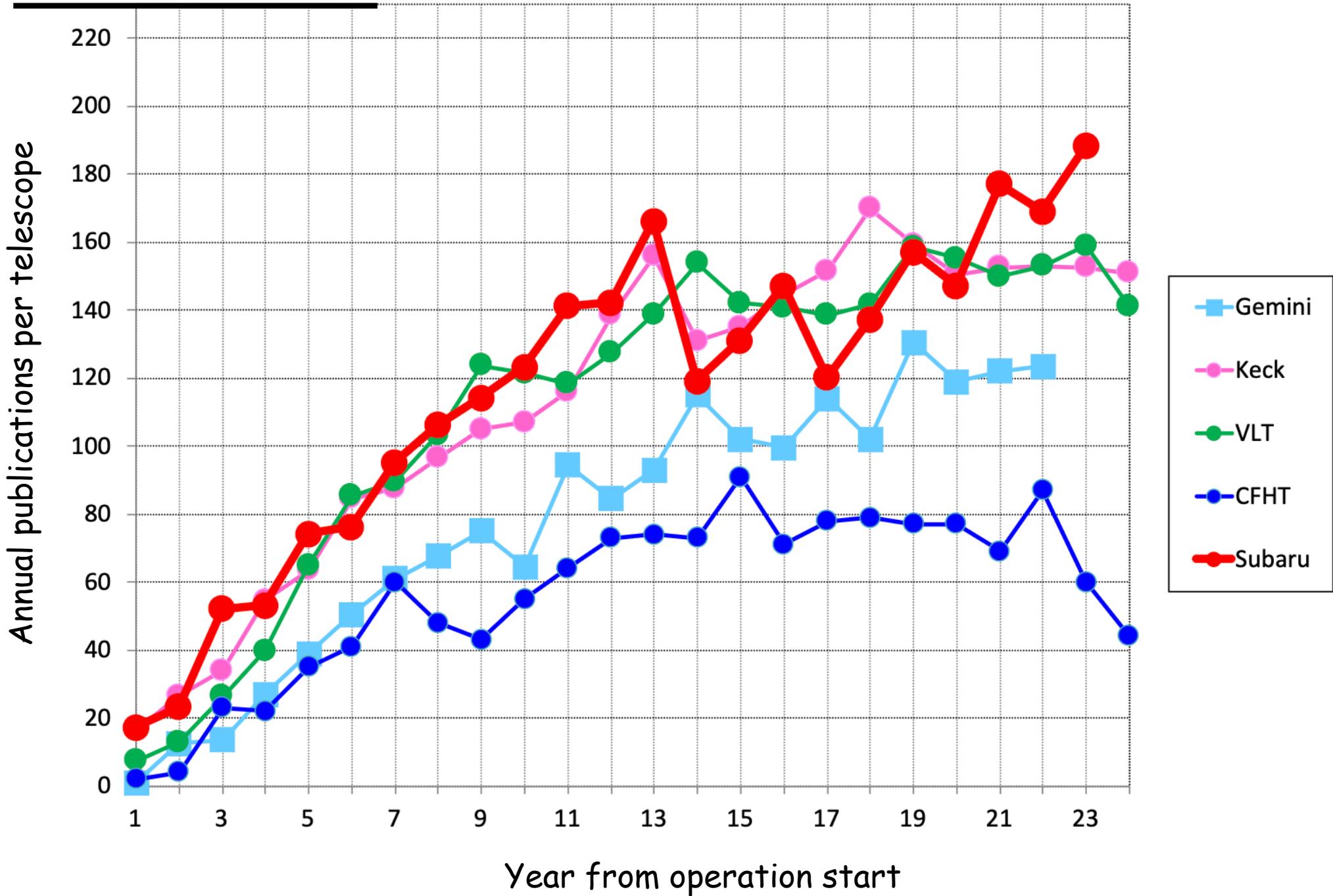
152 papers in 2021



2022/01/11

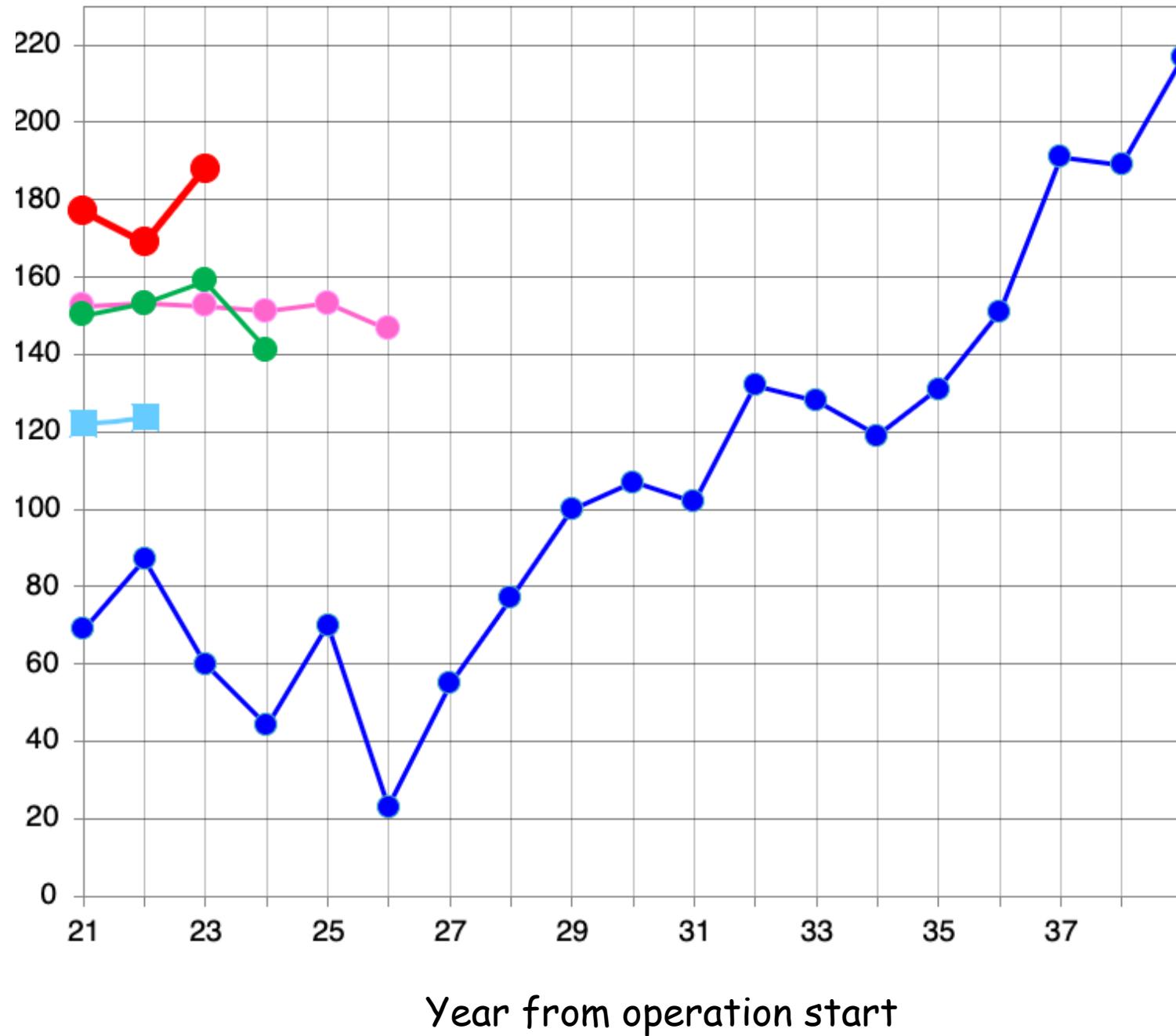
13

Publications



Publications

Annual publications per telescope



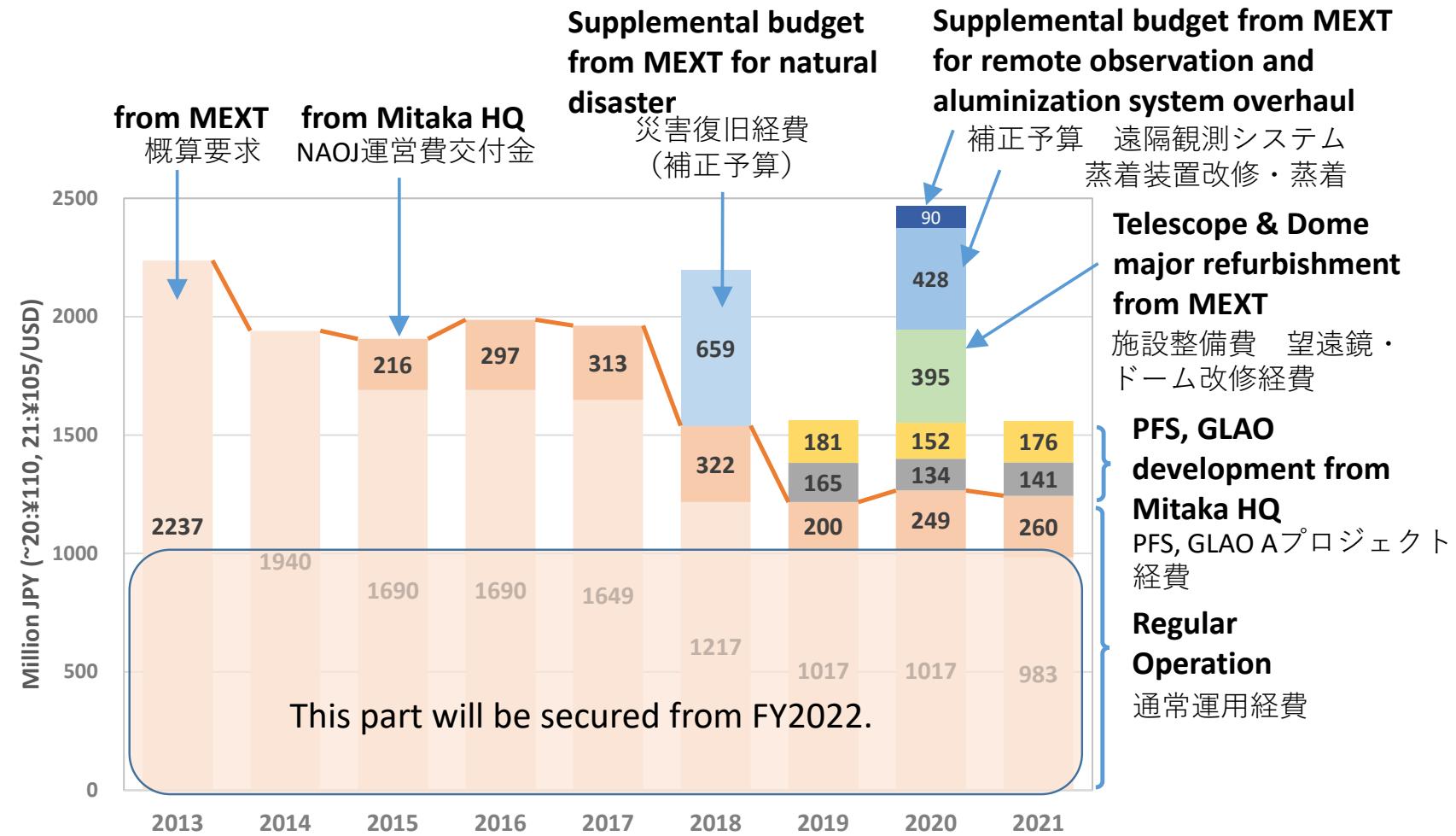
Annual Budget



Subaru Telescope annual budget from FY2013 to FY2021

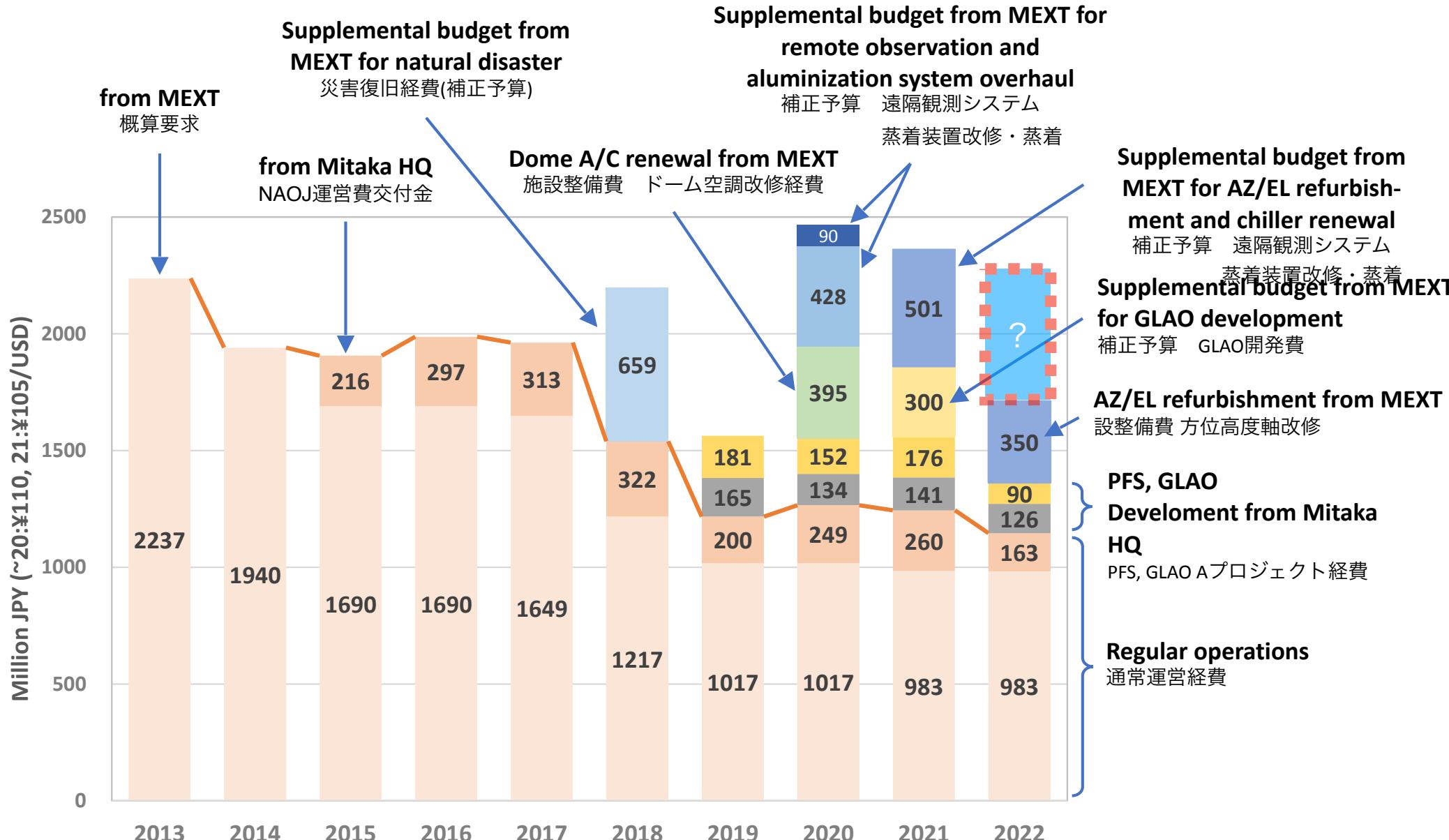


(Salary of NAOJ permanent staff is not included)



Annual Budget

Salary of NAOJ permanent staff is not included



Support from the funding agency is steady but ...

FY23のプロジェクト/部門全体の組織目標(年度)

1. すばる望遠鏡が質・量ともに十分な研究成果を生み出せるように、共同利用観測を着実に実施する。
2. 老朽化する望遠鏡に対して、安全、安定した運用ができるよう対策をとる。
3. 既存観測装置のデコミッショニングを策定されたプランに従って実施し、運営費の軽減を図る。
4. Hyper Suprime-Cam (HSC)を安定に運用し、キー観測運用を拡大し、着実に共同利用観測進める。
5. 山頂夜間無人化を、年次計画を立案し、これを着実に進める。
6. Kavli-IPMUが率いるPrime Focus Spectrograph(PFS)製作に協力し、望遠鏡・ドーム改修を含めPFSの受入・組立・調整試験を実施する。またプリンストン大学を中心に進む、PFSデータ解析ソフト開発に協力する。
7. 天文データセンター(ADC)と密接に協力し、HSC・PFSのデータ公開・研究利用基盤を構築し、共同利用に供する。ADCとは、必要に応じて仕事の分担・責任範囲の移行について協議し、これを実行する。
8. 先端技術センター(ATC)と密接に協力し、望遠鏡及び観測の機能強化と性能向上を図る。
9. 研究のメンターをおくことで、研究系スタッフの研究活動をさらに活発化させる。
10. マウナケア天文台の他観測所と連携し、ハワイで天文学が持続的に発展できるよう、地元における理解の増進に努める。
11. 岡山分室の業務を通じて、京都大学3.8m望遠鏡の共同利用に協力する。
12. TMTプロジェクトとの連携強化をはかり、TMTとの一体運用に向けた具体的な検討を進める。

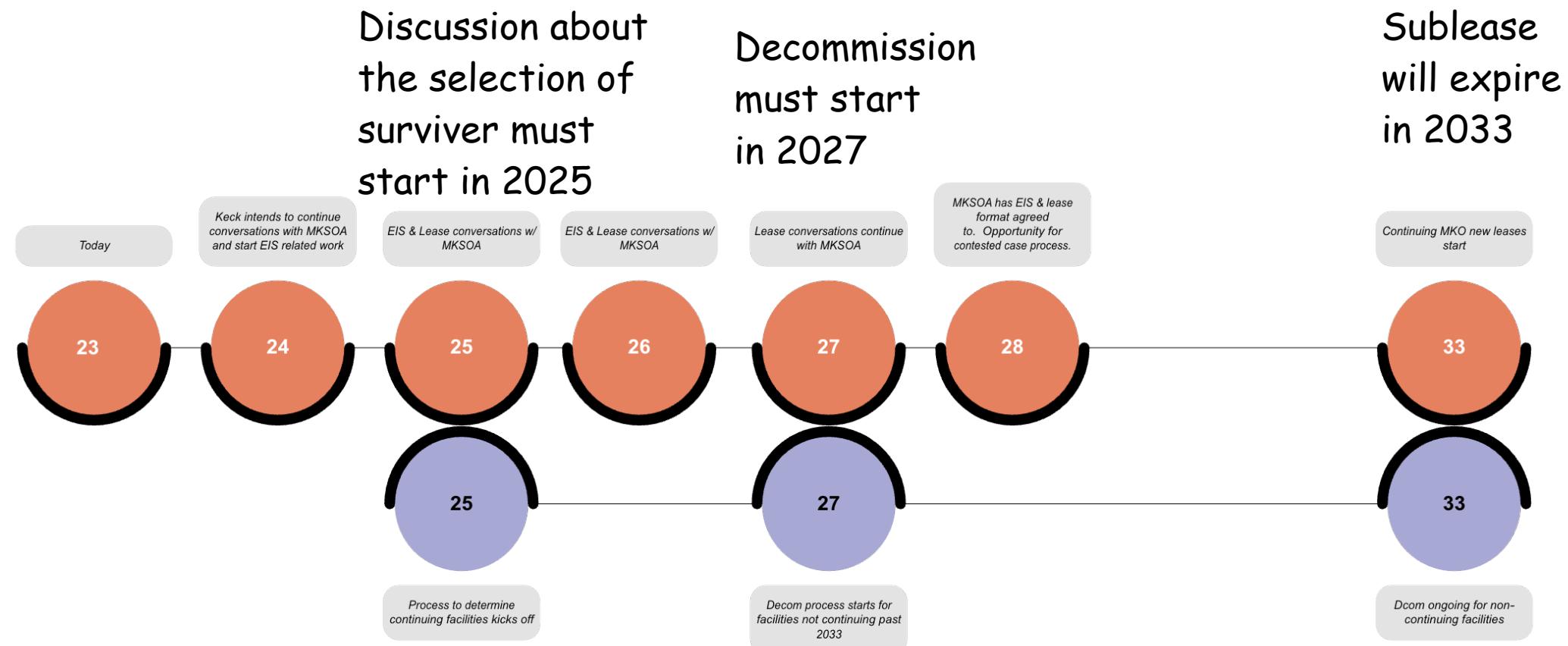
国立天文台執行部から与えられた目標

Others

MKO Directors Meeting: Recent Topics

- Keck urges us to discuss how to deal with the renewal of sublease in 2033 by showing the following diagram.
- Background:
 - Time is limited.
 - The progress of new authority is not quite visible.
- Agreements so far:
 - Have bi-weekly meeting
 - First topics is how to prepare EIS (Environment Impact Statement); individually or as a whole ?
 - Reviewing the EIS works done by UH is the first thing to do

Possible time line toward the renewal of sublease presented at MKO Directors Meeting on June 27, 2023 by Keck



UH of Board
of Regents
Resolution
in Aug 2023

Three telescopes
will be selected
by the end of 2025
for decommissions

UHの山頂管理者としての
立ち位置は法的に微妙では
あるが、New Authority
(MKSOA)を急かしてくれて
いるのはありがたい。

Governor and Maunakea Stewardship and Oversight Authority visit to Mauna (Aug. 30, JST)

- This was the first time for MKSOA member to get together in person since the establishment in 2022/07
- Half day tour of the summit
 - Gemini telescope visit (~ 45 min)
 - Drive around the summit with pauses at TMT construction site and CSO
 - One representatives per MKO served as drivers between Hale Pohaku and the summit
 - Conversations strongly encouraged to know each other
 - I drove J11 and the passengers include ...

Seat Assignments for the tour transportation

PLAN A – GOVERNOR VISITS SUMMIT

Vehicle	MKO Driver/ MKO Passenger	MKSOA/Gov Passengers
1- CFHT	Cuby (CFHT) Sylvester (VLBA)	Adams (County) Bertelmann (Lineal Descendant) Irwin (UHH Chancellor)
2- Gemini	Adamson (Gemini) Bintley (EAO) Norton (SMA)	Horner (Senate Pres Appt) Krug (Education)
3- UH IfA	Simons (UH IfA) Rayner (IRTF)	First Lady Green Wong-Wilson (House Spkr Appt) Kudo (UH Regents)
4- Keck	Matsuda (WMKO)	Komeiji (MKSOA Chair, Business) Gov. Green Oshiro (Sr. Advisor to Gov.) Gov. Security
5- Subaru	Miyazaki (Subaru) Liu (TMT)	Ka'akua (DLNR) Mangauli (Cultural Practitioner) Kanaka'ole (Deputy AG)
6- Gemini	Michaud (Gemini)	Machida (MKSOA Interim Director) Paishon-Duarte (Facilitator) Ahn (MKSOA Exec Asst) Ah Sam (Note-taker)
7- TBD	Extra Vehicle?	(if possible)
8- UH CMS	Ranger	(in case of emergency)

TMT Opponents Halt Groundbreaking Ceremony



EXIT





これからのすばる望遠鏡を考える時に重要なのは・・・

- ・ ユニークネス
- ・ 国際協力
 - ・ 最先端観測施設へのアクセスを持つ人々との協力が特に重要
 - ・ 国際共同運用
- ・ TMT時代(10年後)へのシフトを意識
 - ・ すばるでしかできない観測に特化？
 - ・ Space Program用装置のテストベンチ？
- ・ ナスミスAO装置群 (次回UMでサマリー:田村(直))