Reports from Subaru Telescope
— Abstract —

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2023-01-31

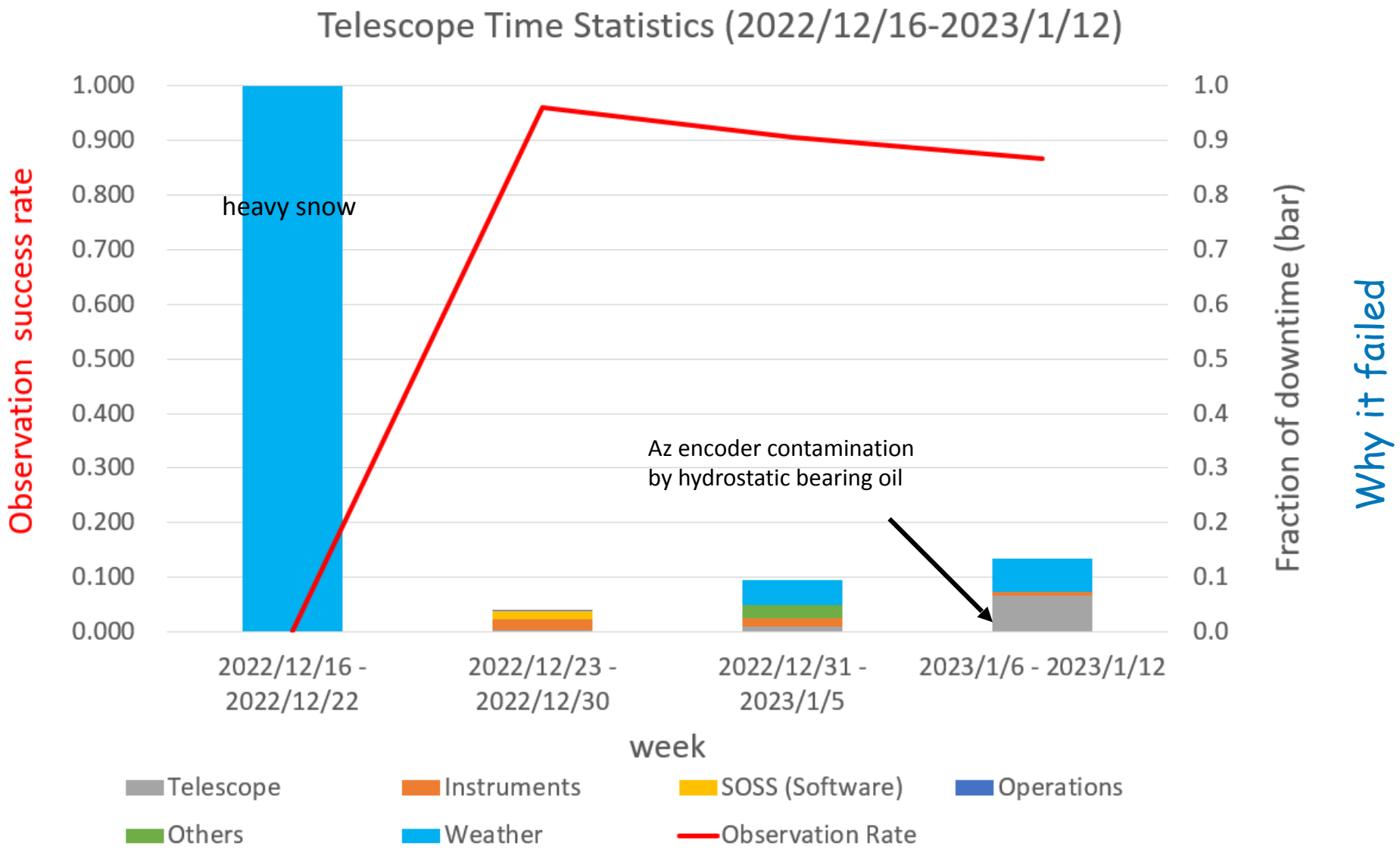
Presentation for Subaru UM FY2022 at Mitaka

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

From Subaru SAC Jan 17

Operation

- Severe winter storm caused significant impacts.



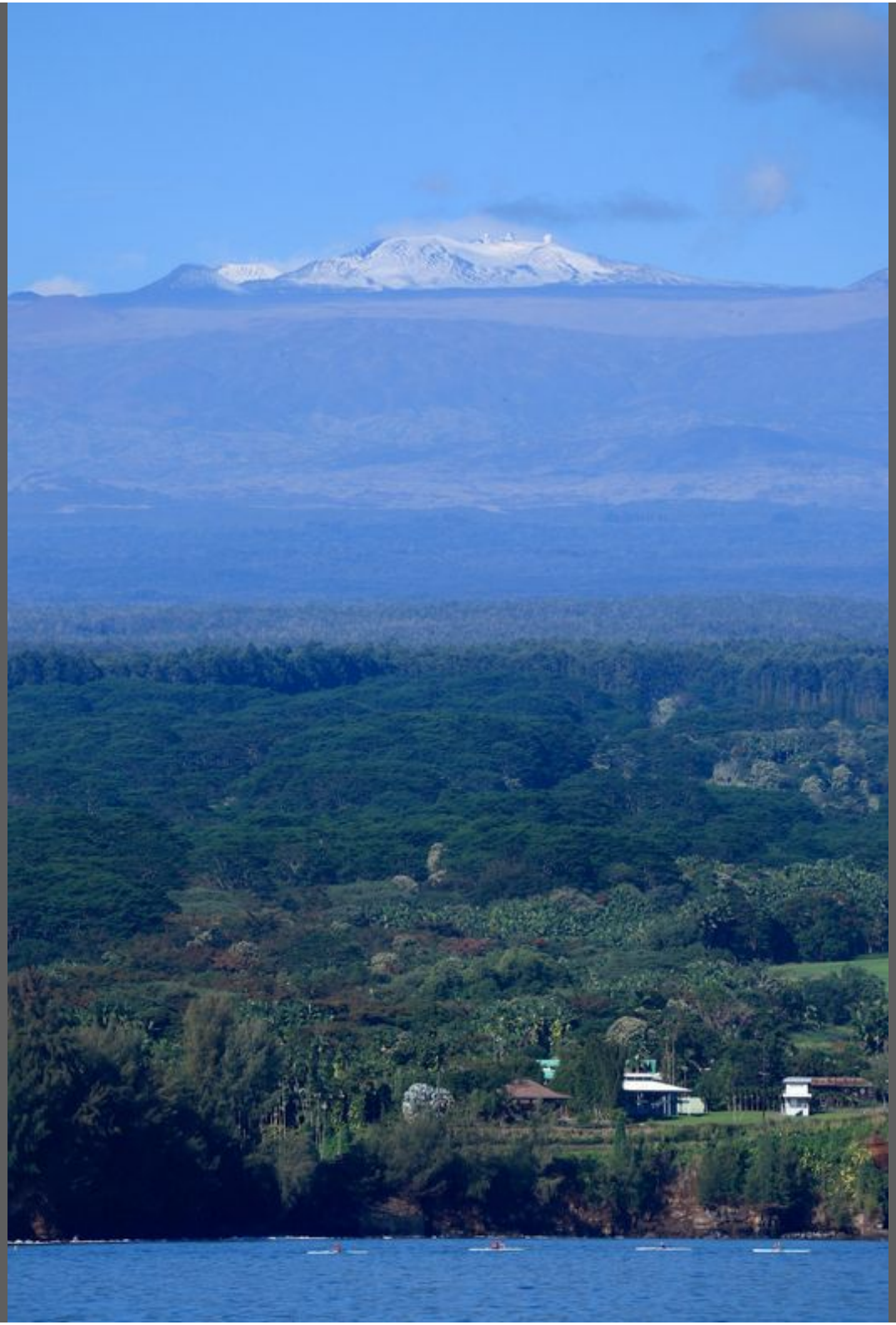
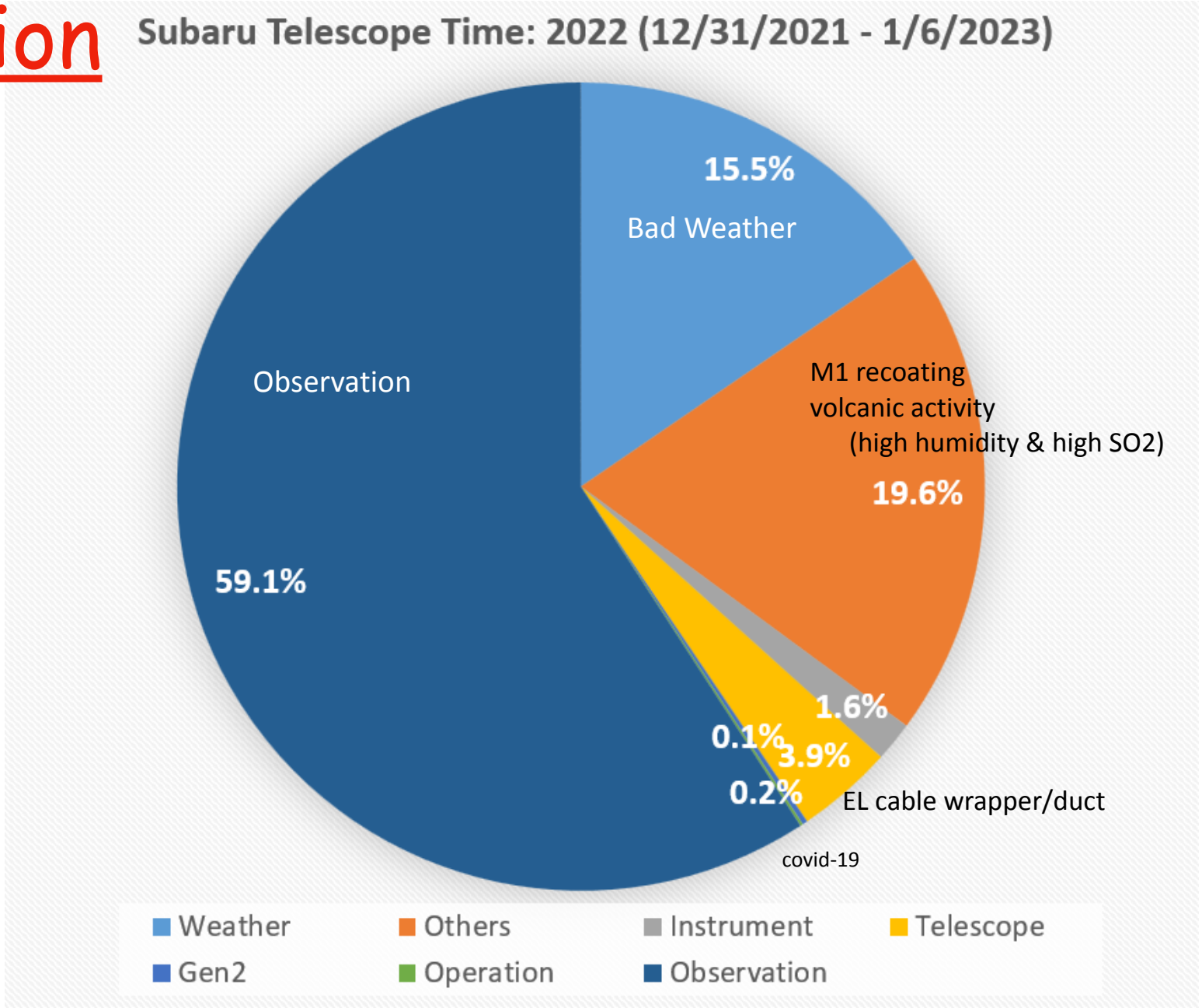


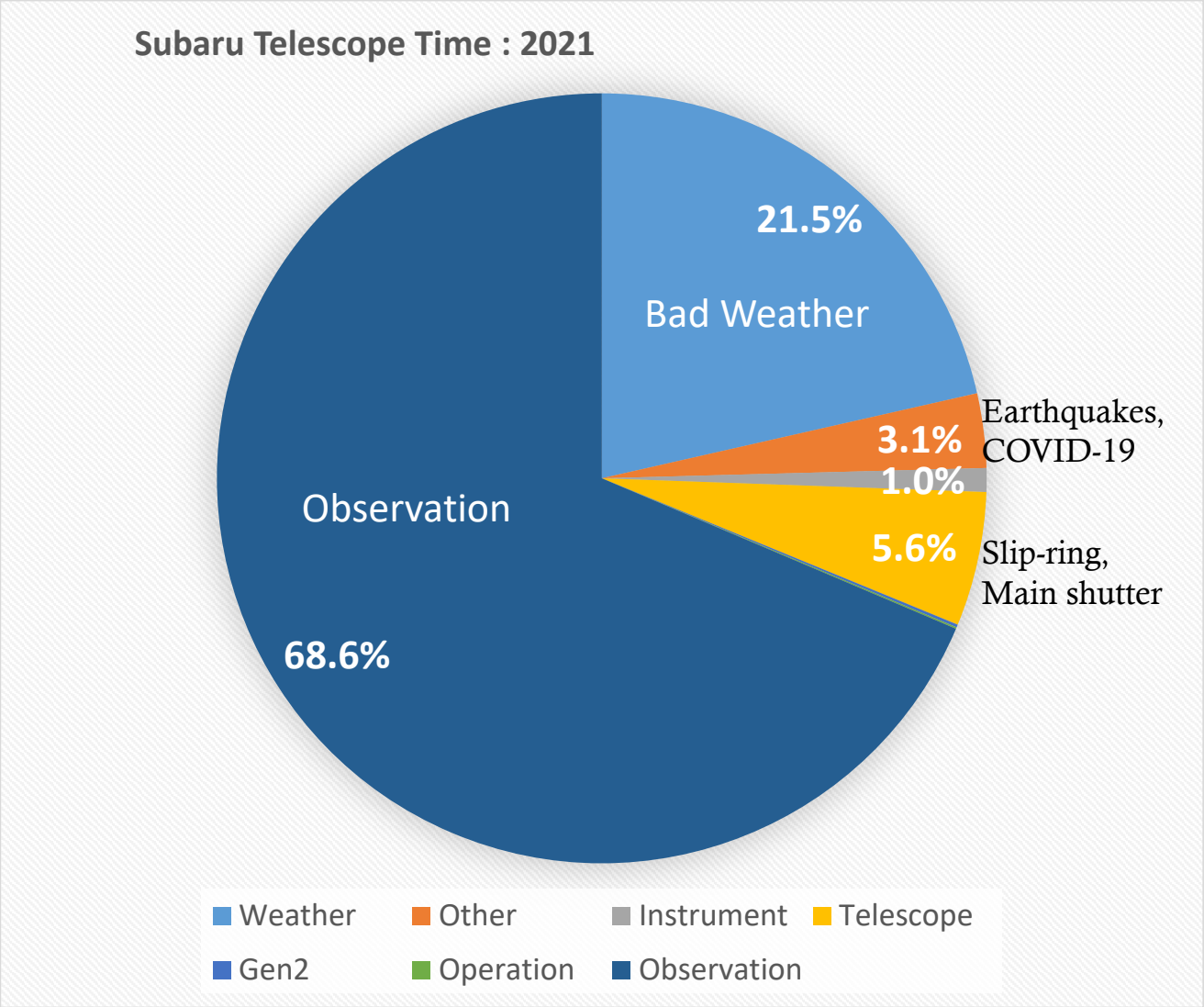
Photo taken on
Dec. 17, 2022 HST

Operation


Subaru Telescope Time: 2022 (12/31/2021 - 1/6/2023)
15.5%
Bad Weather
M1 recoating
volcanic activity
(high humidity & high SO2)
19.6%
Observation
59.1%
1.6%
0.1%
3.9%
0.2%
EL cable wrapper/duct
covid-19
Weather
Others
Instrument
Telescope
Gen2
Operation
Observation

Operation

Telescope Time Statistics in 2021

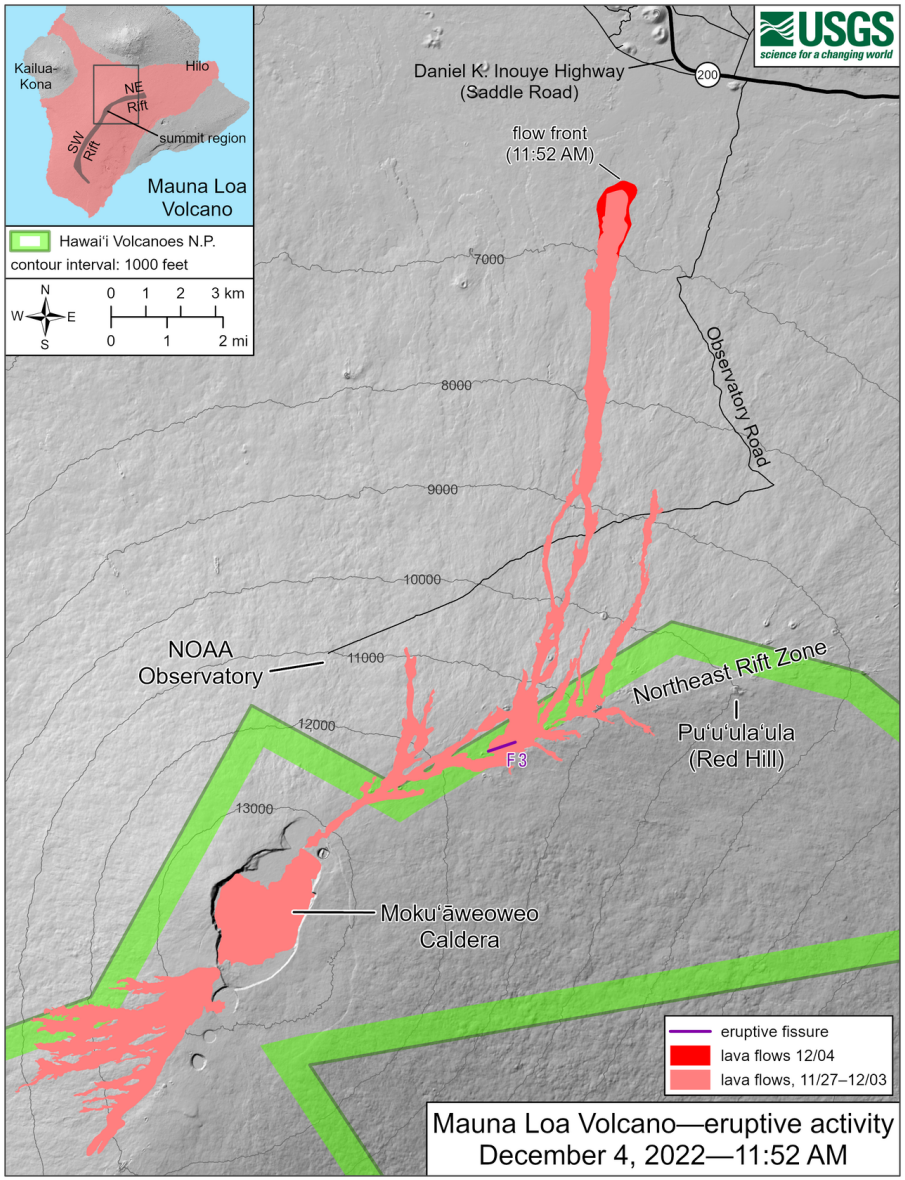


Presented by Yoshida-san last year


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 (Nov28,29) 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.

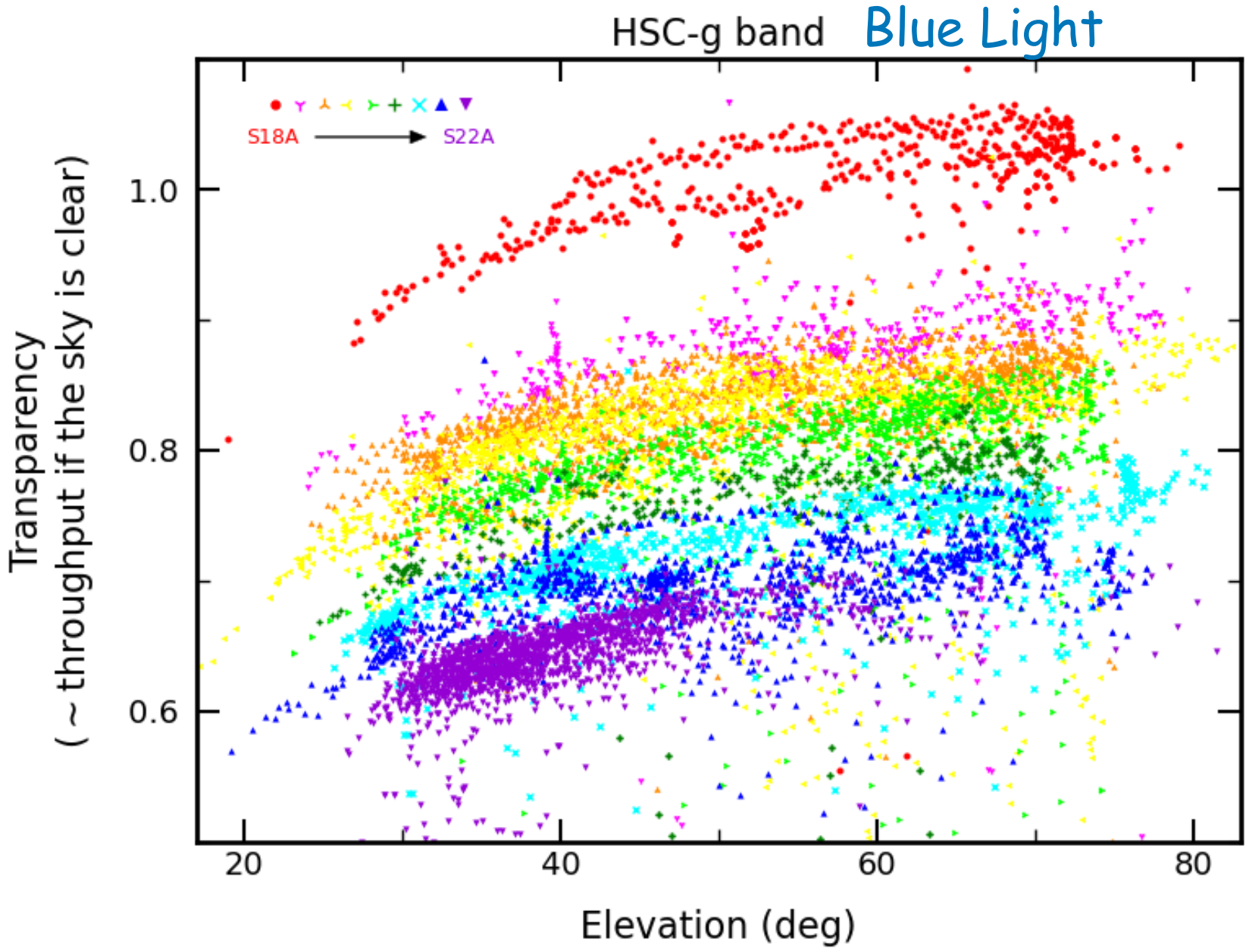


$$SO_2 + H_2O \rightarrow H_2SO_3$$

sulfite: toxic

Telescope

Reflectivity drop over 4 years

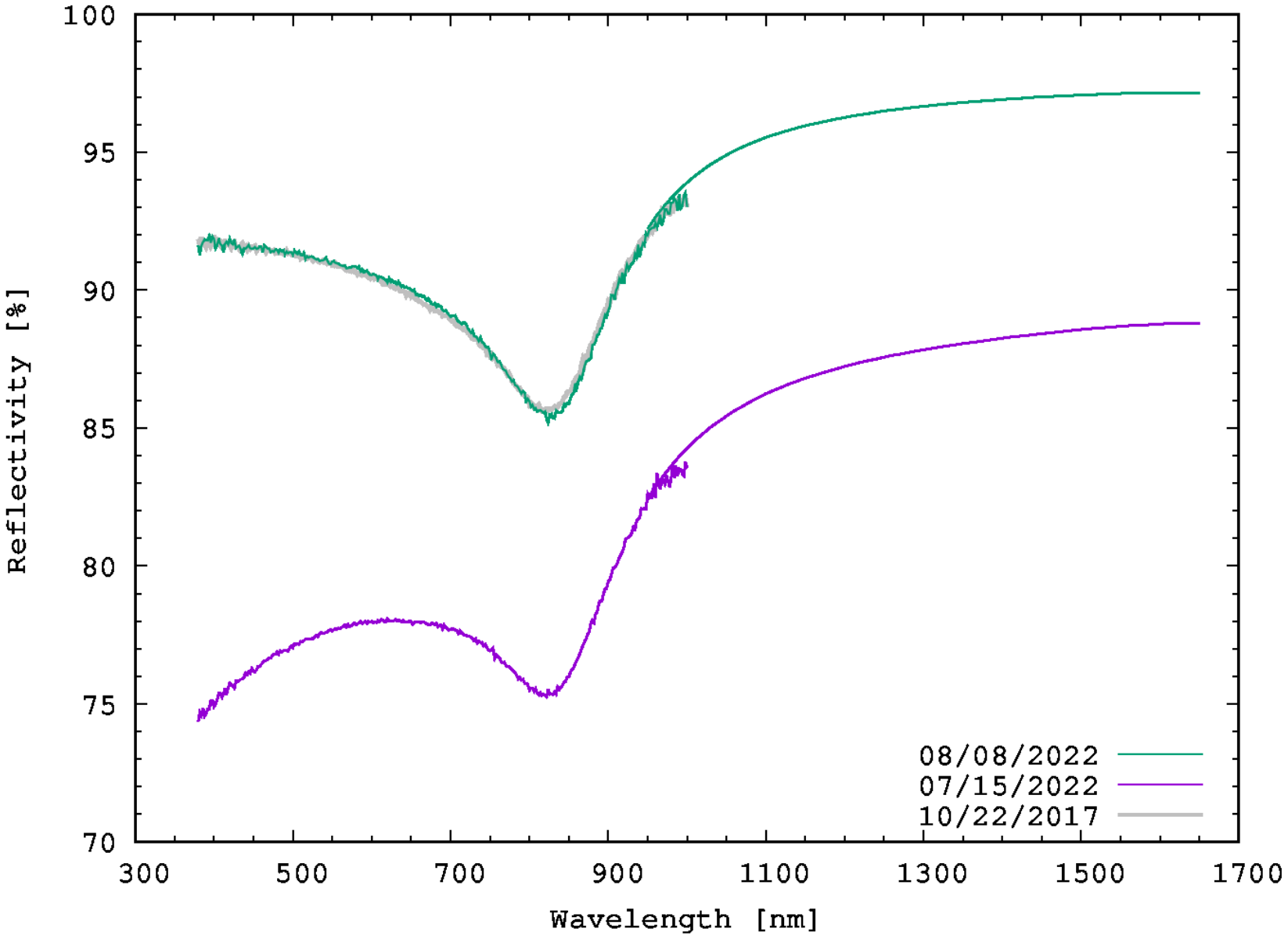


from Terai report


2022
Primary Mirror
Washing Team
洗浄班
TELDIV

Telescope

The result

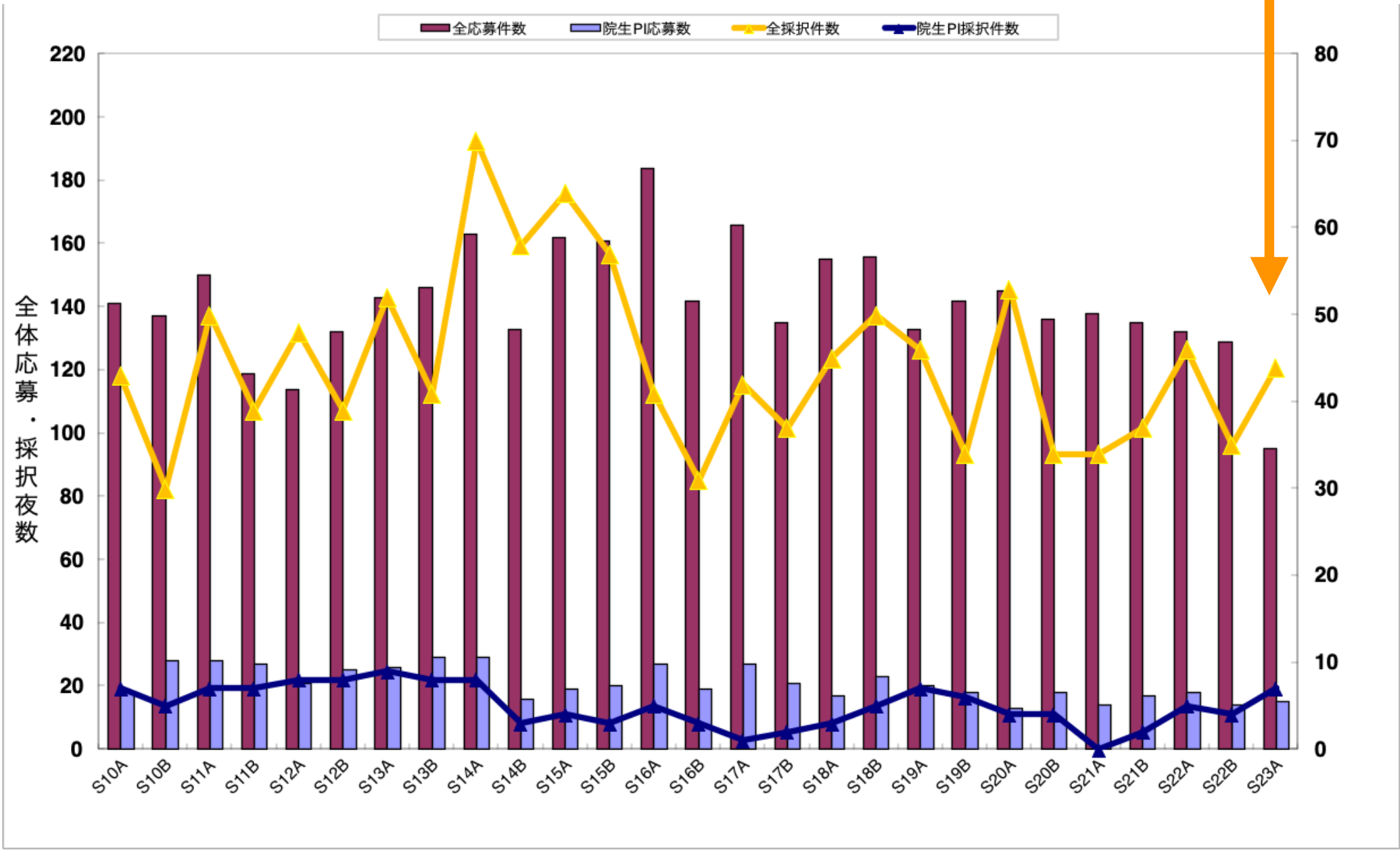


from Okita report

Operation

Proposal Statistics

Crisis !



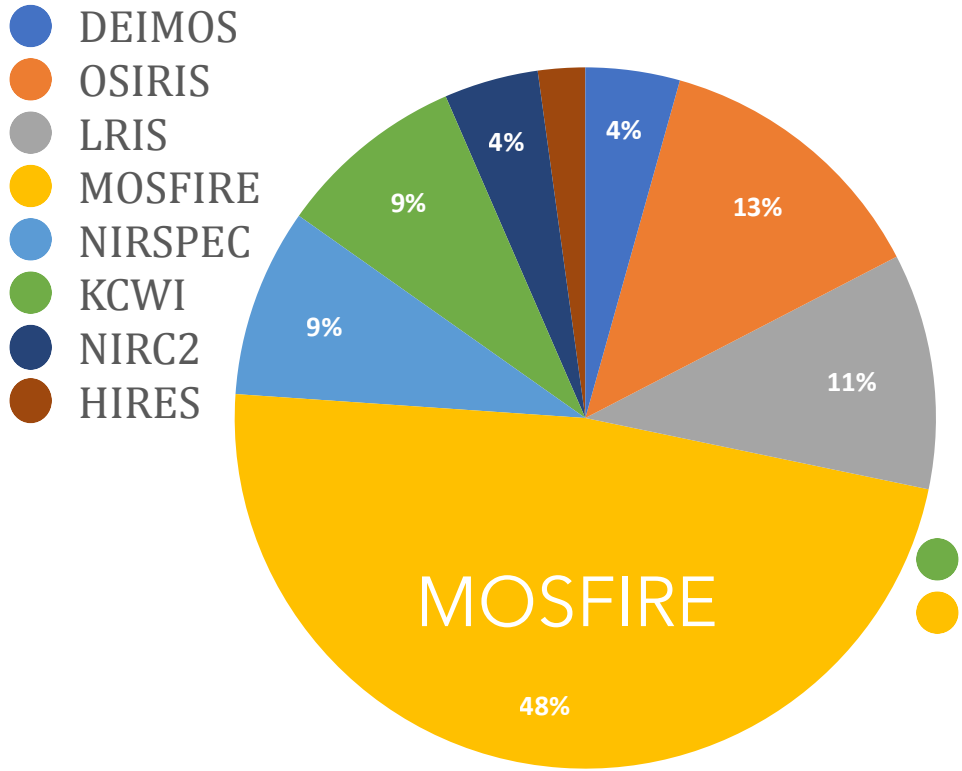
Operation

Subaru-Keck exchange summary

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

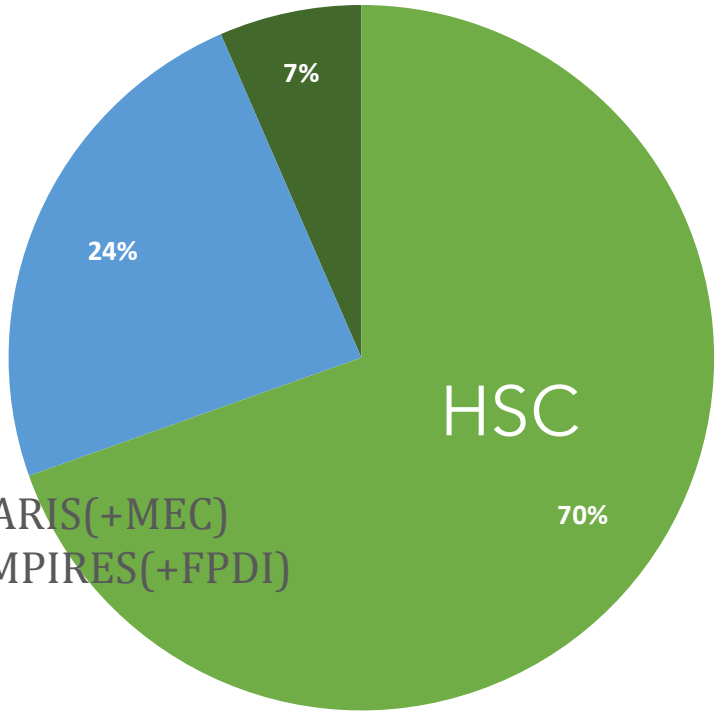
Subaru → Keck

(approved in S21A/S21B/S22A/S22B)



Keck → Subaru

(approved in S21A/S21B/S22A/S22B)



Operation

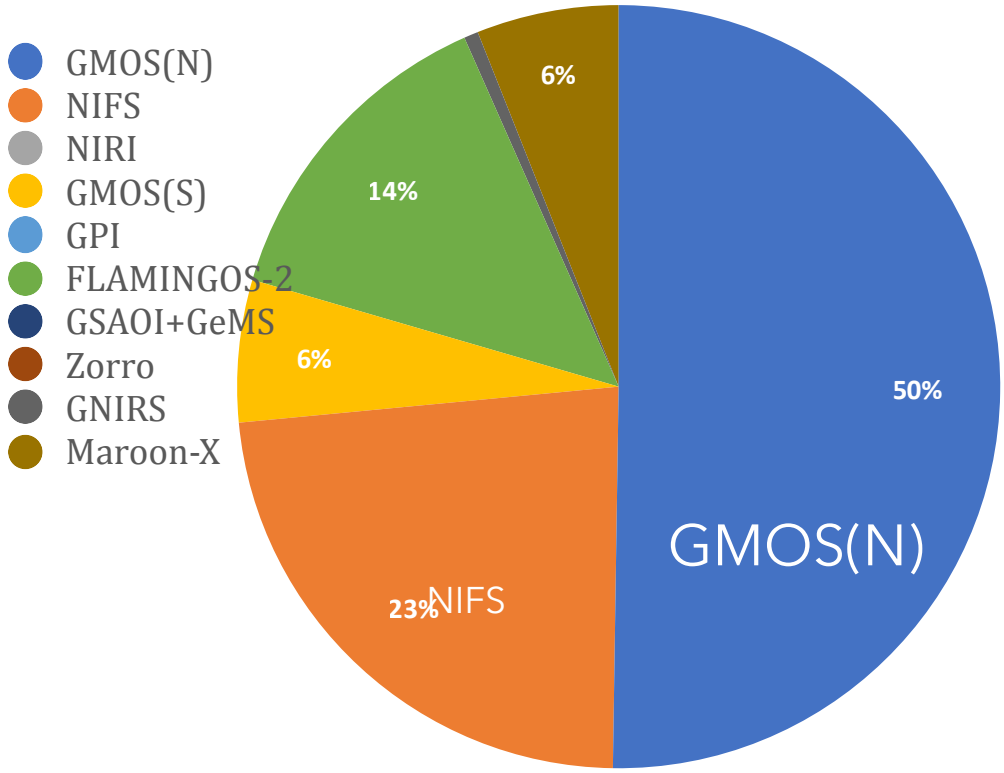
Subaru-Gemini exchange summary

Subaru → Gemini

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

N (proposal) = 3.5 /semester

N (approved nights) = 4.2 n/semester

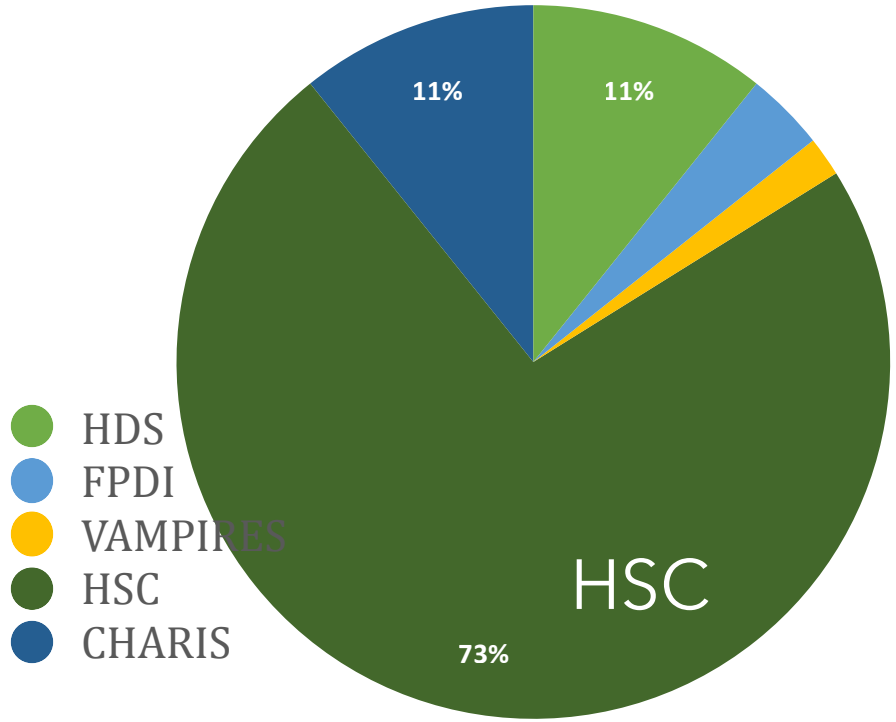


Gemini → Subaru

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

N (proposal) = 3.8 /semester

N (approved nights) = 7.0 n /semester



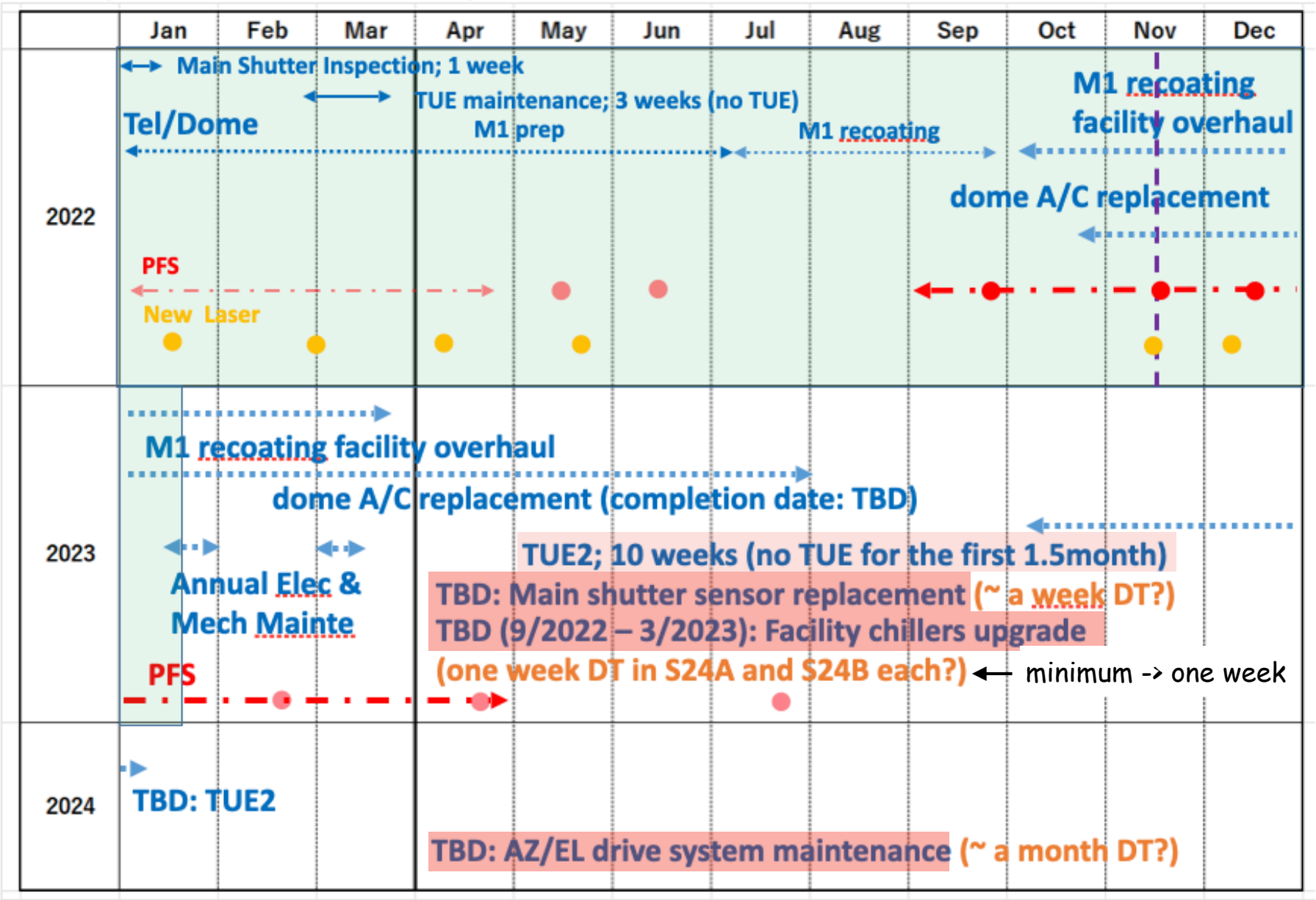
 # Note 1: Subaru→ Gemini FT programs are not included.

 # 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 1/17/2023)



Development

- New laser
  - Will by available in S23A on shared-risk basis
- PFS
  - Had the first light last fall.
  - Start of open use slipped from S24A to S24B
- GLAO
  - PDR passed last December, FDR in a year (!)

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

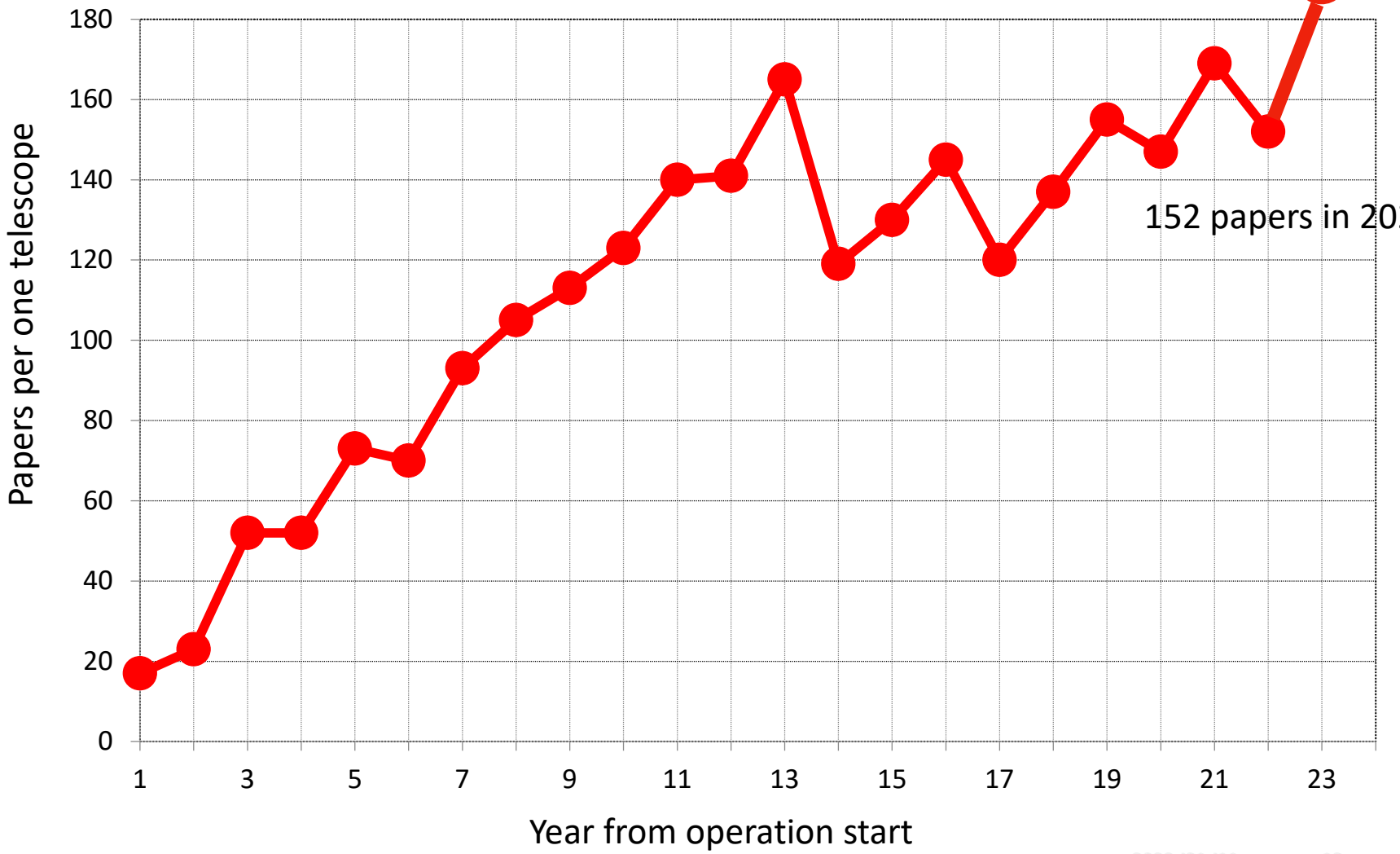
from Ishii list

Publications

Number of Publications

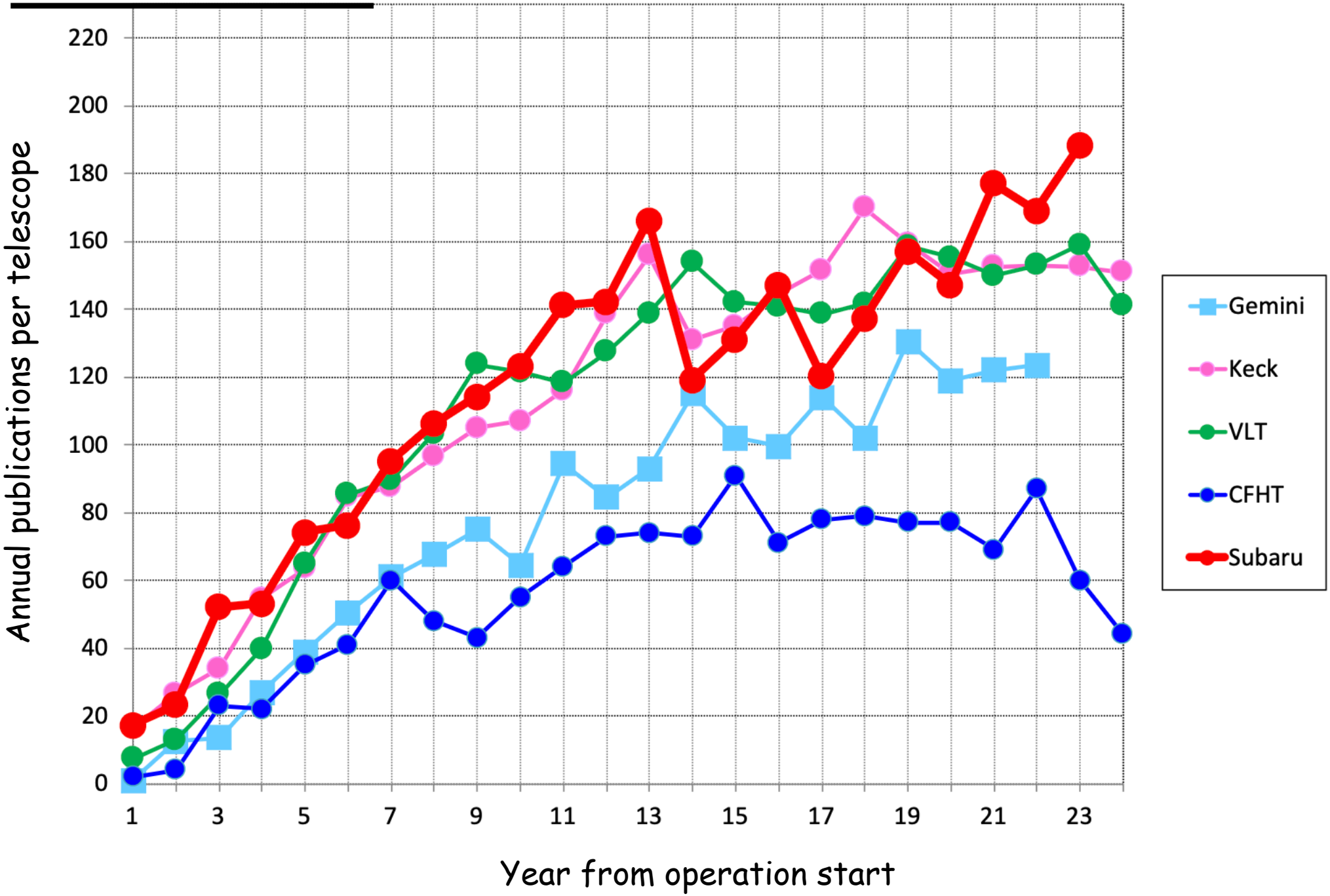
188 papers in 2022

National Astronomical Observatory of Japan

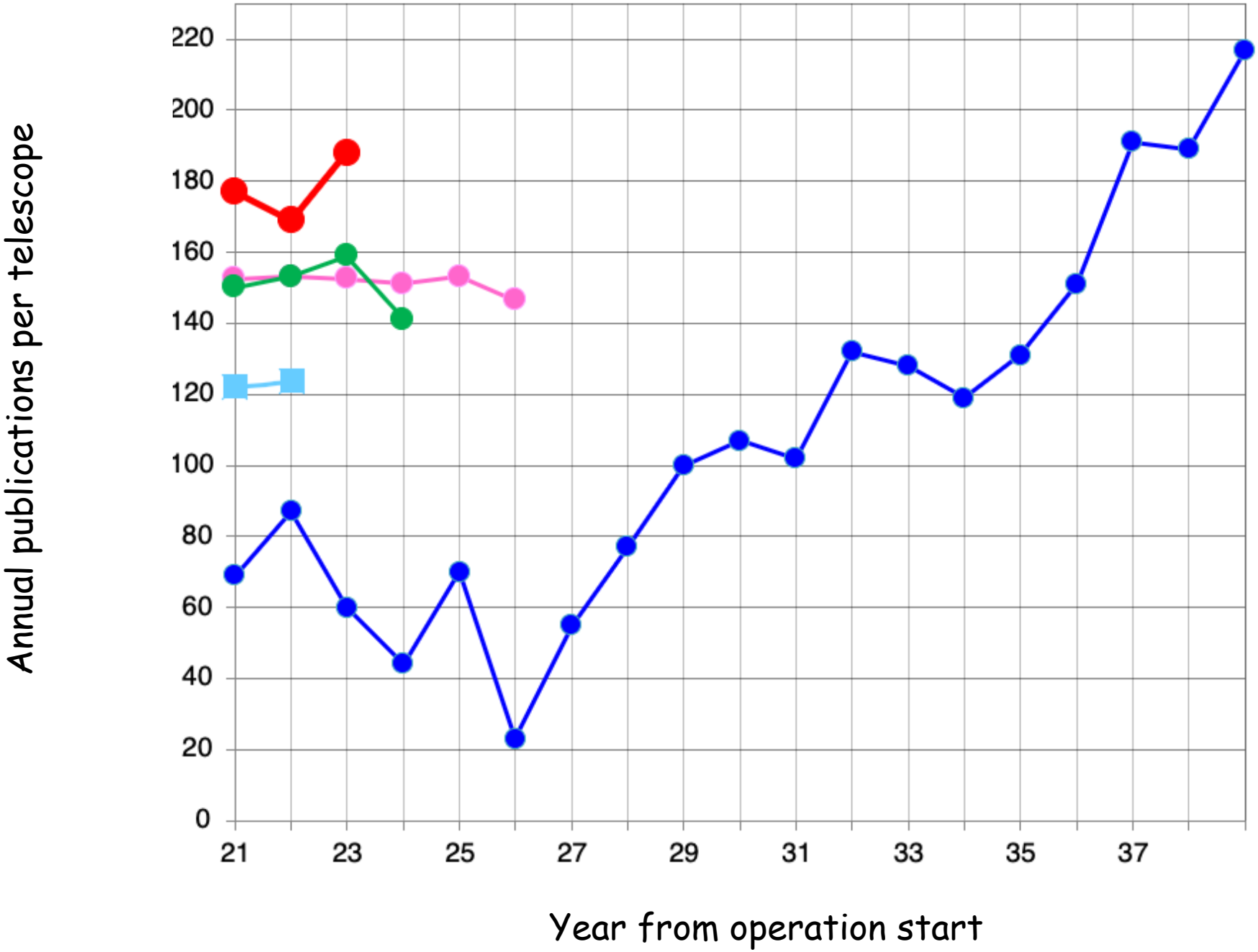


Presented by Yoshida-san last year

Publications



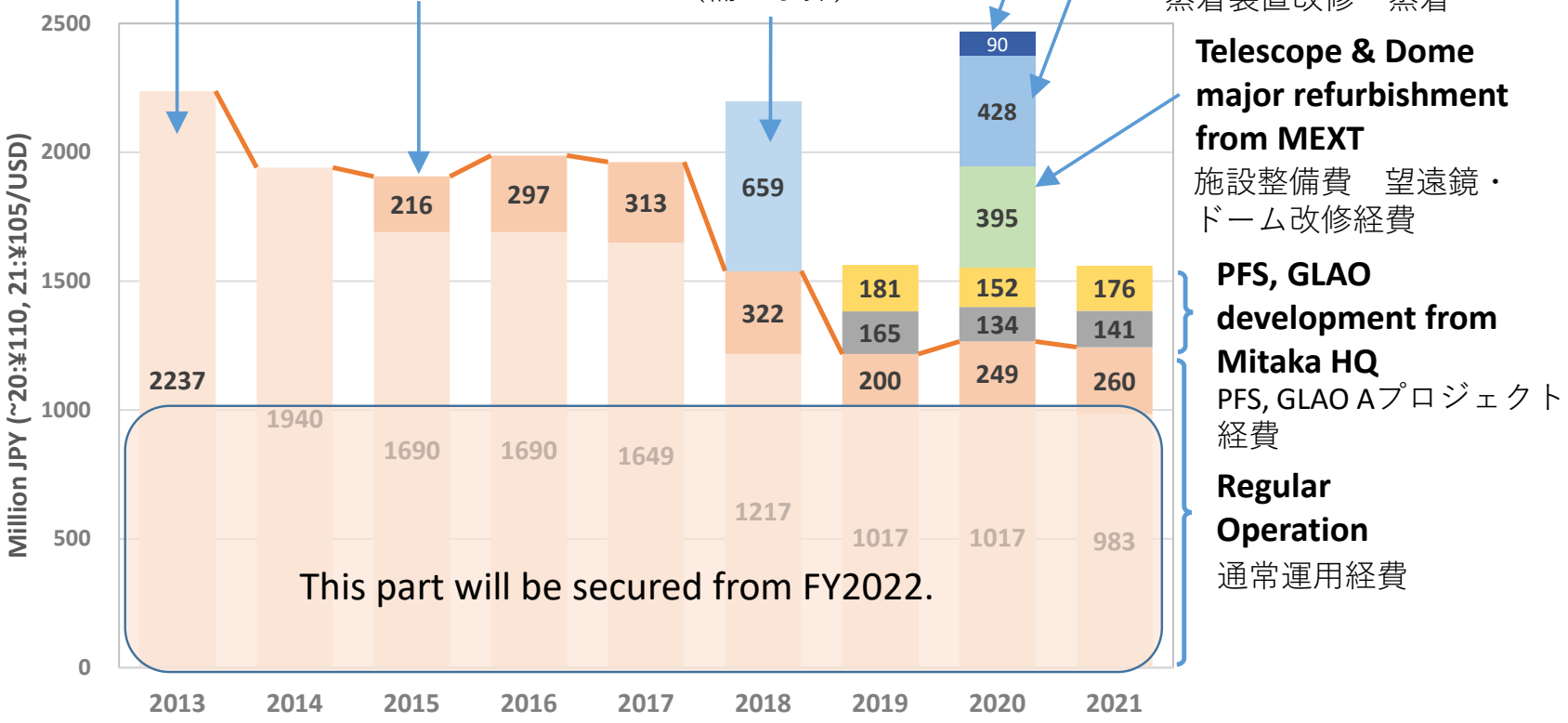
Publications



Annual Budget

Subaru Telescope annual budget from FY2013 to FY2021

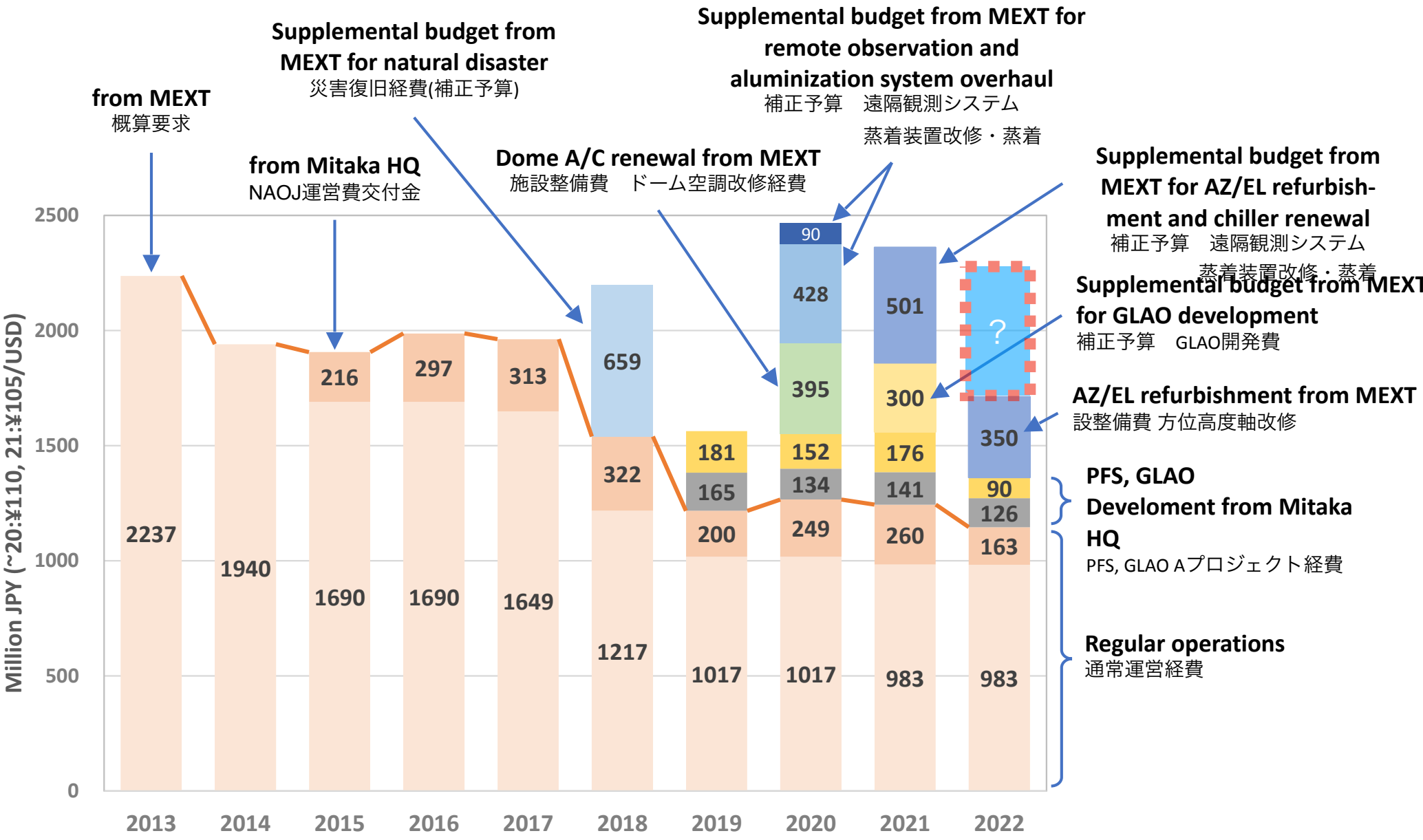
(Salary of NAOJ permanent staff is not included)



Presented by Yoshida-san last year

Annual Budget

Salary of NAOJ permanent staff is not included



Support from the funding agency is steady but …

Priority List given from NAOJ management (FY2022)

プロジェクト/部門全体の組織目標(年度) Project and Organizational Objectives (Fiscal Year)
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ン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、キュー観測運用を拡大し、着実に共同利用観測進める。 5 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。 6 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。 7 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。 8 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。 9 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。 10 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。 11 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。

Priority List given from NAOJ management (FY2022)

- 1. Steady operation
- 2. Renovation of the telescope and dome
- 3. HSC queue
- 4. Swift PFS commissioning and start of science operation
- 6, 7 Work transfers and collaboration with ADC and ATC — "light Subaru"