

Current Status and Future Plans of SMOKA

<https://smoka.nao.ac.jp/index.jsp>

Hiroki Onozato

Yasushi Nakajima, Takeaki Ozawa,
Hisanori Furusawa, Shin-ichi Ichikawa
(Astronomy Data Center, NAOJ)



What is SMOKA?

2

- An archive system for astronomical data taken by Japanese optical and infrared telescopes
 - 34 instruments, 36.6 million frames, 361 TB (as of 2023-02-02)
 - **Subaru:** Suprime-Cam, FOCAS, HDS, OHS/CISCO, IRCS, CIAO, COMICS, CAC, MIRTOS, MOIRCS, Kyoto-3DII, HiCIAO, FMOS, HSC, CHARIS, IRD (**REACH, new**) , SWIMS, MIMIZUKU, VAMPIRES
 - **OA0 188 cm:** ISLE, KOOLS, HIDES, OASIS, SNG, MuSCAT
 - **Kiso Schmidt:** 1kCCD, 2kCCD, KWFC
 - **MITSuME:** MTA, MTO
 - **Kanata:** HOWPol, HONIR
 - **Nayuta:** NIC
 - **Seimei:** KOOLS-IFU
- [Digitized photographic plates data](#), and [Tomo-e Gozen data](#) from Kiso Schmidt, and [sky monitor imaging data](#) are also available in other systems.

Search Mode

- Simple Search (**object name**)
- Advanced Search (**RADEC**, **observation mode**, etc.)
- Suprime-Cam Search (**quality**, e.g., **seeing size**)
- HSC Search (**quality**)
- Pinpoint Search
- Calendar Search
- All Keywords Search

The screenshot displays the 'Advanced Search Page' interface, which is organized into several functional sections. At the top, the 'Search Conditions' section includes an 'Object Name' field, a 'Resolver' section with radio buttons for 'SIMBAD' (selected), 'NED', and 'Don't Resolve', and a 'Resolve' button. Below this, the 'Coordinate System' section features dropdowns for 'Equatorial' and 'Equinox' (set to 'J2000'), and radio buttons for 'Circular' (selected) and 'Rectangle'. The 'Field of View (arcmin)' is set to 'auto'. The 'center (RA)' and 'center (DEC)' fields have associated 'copy/paste to' buttons. The 'Radius(arcmin)' is set to '10.0'. The 'From (RA)' and 'From (DEC)' fields have 'To (RA)' and 'To (DEC)' counterparts. The 'Observation Date' section includes fields for 'Observation Date', 'Exp Time (sec)', and 'Observer'. The 'Frame ID' and 'Exposure ID' sections each have a single input field. The 'Output Format' section has radio buttons for 'TABLE' (selected, max 5,000 rows, HTML) and 'ASCII' (max 20,000 rows, text). The 'Frame or Shot mode' section has radio buttons for 'FRAME' (selected) and 'SHOT' (SUP, HSC, and KWF ONLY). Below these are 'Search', 'Reset to defaults', and 'Help...' buttons. The 'Instruments/Filters' section contains four dropdown menus: 'Instruments' (1 selected), 'Observation Mode' (3 selected), 'Data Type' (1 selected), and 'Observation Category' (1 selected). Below these are 'Observation Band' and 'Filter lists / Wavelength' dropdowns. The 'Output Options' section includes 'Output columns' (a list with 'FRAMEID' selected), 'Order by:' (a dropdown with 'FRAMEID' selected and a 'reverse' checkbox), and 'Maximum number of hits:' (a dropdown set to '100'). At the bottom right, there are 'Output Equinox' (set to 'J2000') and a checkbox for 'Show SQL Query'.

Advanced Search Page

Usage Status

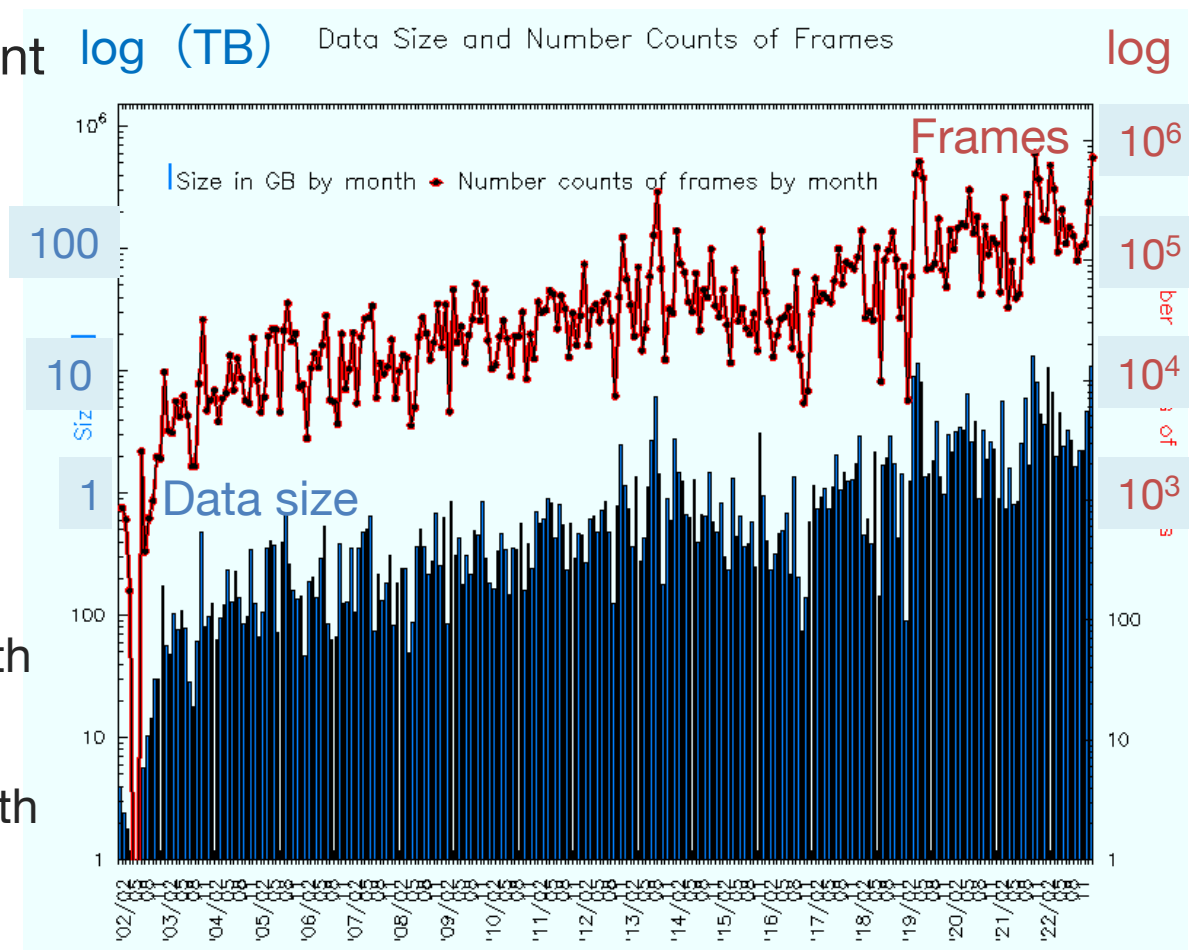
4

- Number of registrant

- ~250 people
- Reset in every fiscal year end

- Amount of Requested data

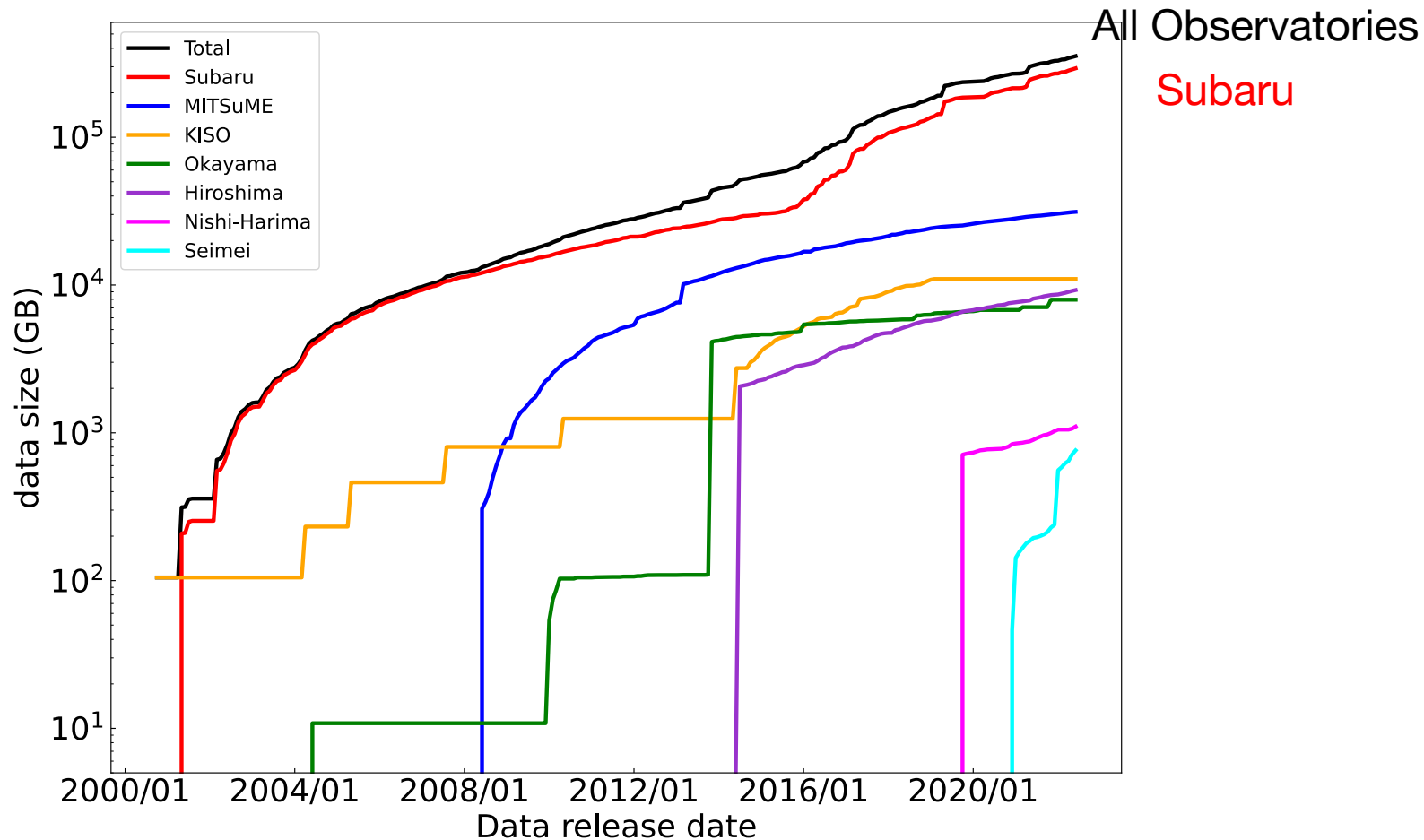
- Number counts
~ 10^5 – 10^6 / month
- Data size
~1-10 TB / month



The transitions of requested data size
and number counts

The amount of public data

5



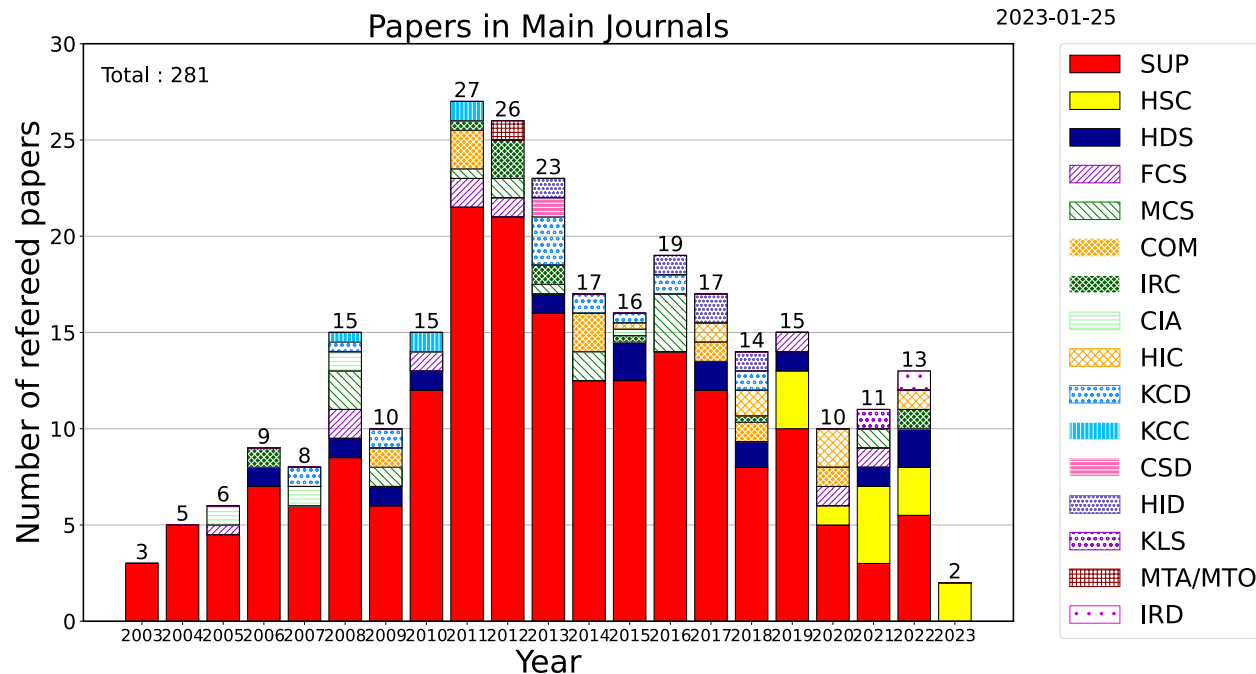
Main SMOKA system only

(Derivative systems are not included, e.g., Tomo-e Gozen)

Publications

6

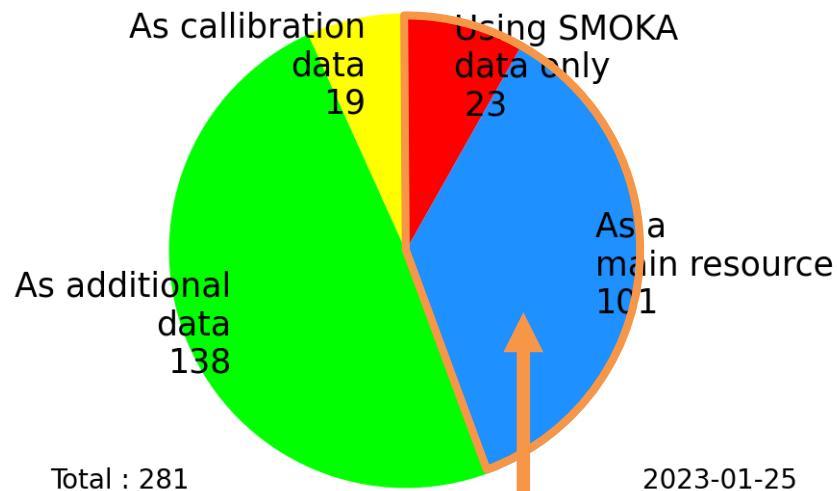
- Published in main journals: 281 papers (as of 2023-02-02)
 - ~14.7 papers / year
 - ApJ, ApJL, ApJS, A&A, PASJ, PASP, MNRAS, ICARUS, Nature, NatAs



Breakdown of SMOKA usage

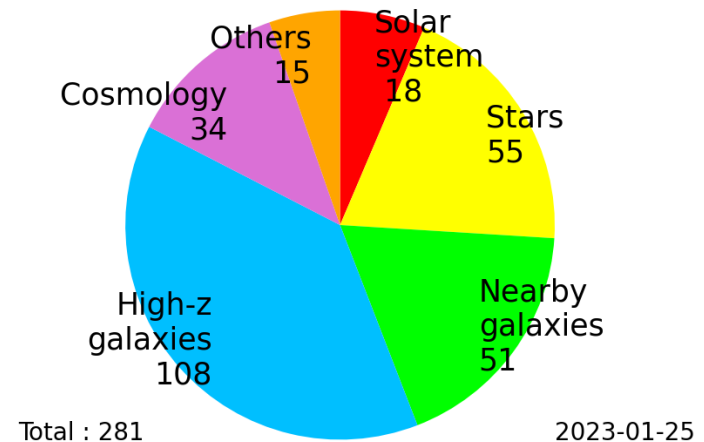
7

Use Cases of SMOKA Data



44% of papers
mainly using SMOKA data

Subject of Research using SMOKA Data



- Kirsten et al. 2022, Nature, 602, 585
 - They found that a repeating fast radio burst (FRB) to be located 2 pc away from the optical center of the globular cluster in M81
 - Many models of repeating FRBs requires young magnetars but globular clusters host old stellar populations
 - HSC data is used to identify the optical counterpart of the FRB

Data Release of New Instruments

- Subaru Telescope
 - REACH (2022-02-02 , open in conjunction with IRD)
- Seimei Telescope
 - KOOLS-IFU (2022-01-31, object frames of openuse)

Data Release of New Instruments

- Subaru Telescope
 - Fast PDI
 - MEC
 - PFS
- Seimei Telescope
 - TriCCS (2023-02-06)
- Kiso Schmidt
 - Raw data of Tomo-e Gozen
(First 100 shots, flat, dark for each observation day)

- Main SMOKA system

中島 他、国立天文台報、2022、22、1-44

「光学赤外線観測データアーカイブシステムSMOKA:
20年間の開発と運用、そして将来」

- SMOKA / Tomo-e Gozen system

中島 他、国立天文台報、2022、23、1-15

「SMOKA / Tomo-e Gozen データ公開システムの開発」

- Speed up searches

小澤 他、国立天文台報、2022、23、16-44

「光赤外線天文学観測データアーカイブシステムにおける
検索高速化の研究」

- SMOKA is an archive system for optical and infrared observational data, which includes data from 7 telescopes and 34 instruments
- We offer a variety of search methods and are working to enhance them
- REACH and KOOLS-IFU data have been newly released since the last Users Meeting, and TriCCS data are coming soon
- Thank you for your continued support of SMOKA and its use in research and educational activities
- We hope SMOKA will be used more and more!