

SKYNET WS, Nov. 2021

On the issues and prospects of the SKYNET project

**Teruyuki Nakajima and the International
SKYNET committee**

**Satellite Observation Center, National Institute for
Environmental Studies, Ibaraki, Japan
(terry-nkj@nifty.com)**

SKYNET

- Nakajima+, (AMT'20): An overview
- SKYNET: A research group of using the sky-radiometer
- Sky radiometer: Spectral sky scanning radiometer
- Extending to analysis of other radiometers using the Skynet tools and calibration system
 - Collaboration w WMO MFRSR sun-photometer, AERONET sun-sky photometer, MAX DOAS, PANDORA (AMP) nets etc



POM-01



POM-02



Polar

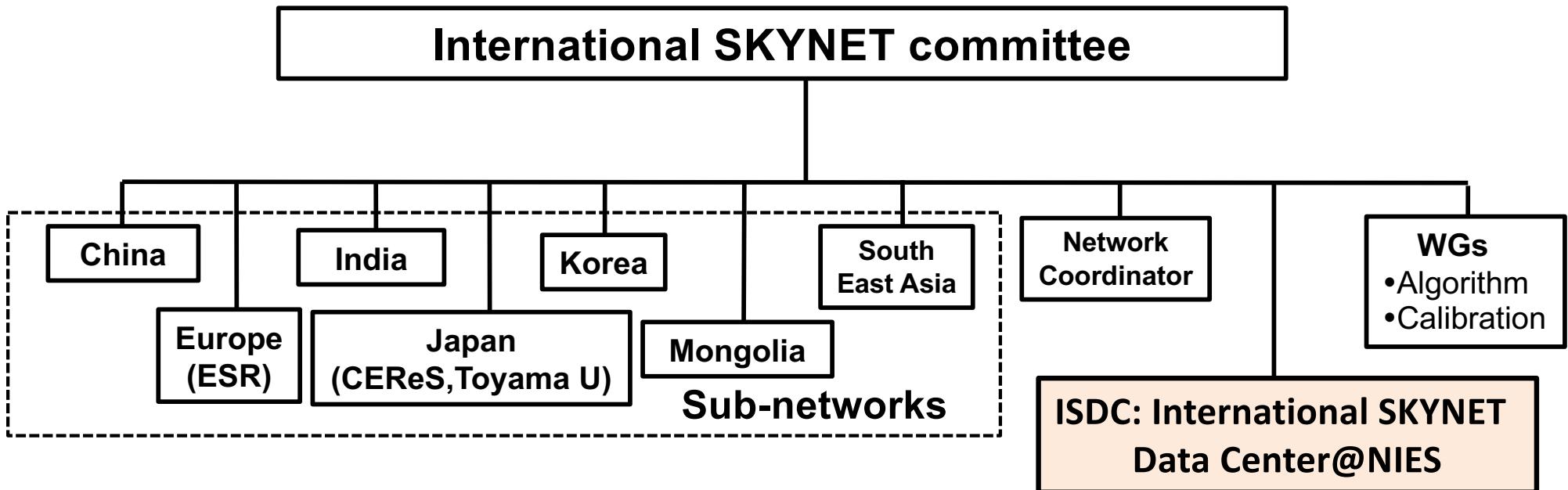


POM-01Mk
Ocean



Polarizaton,
moon, 2D ...

SKYNET entered into the New Phase (2021)



- International SKYNET workshops: Kanazawa ('06), Chiba ('13), Hefei ('14), Rome ('15), India ('19), Japan ('21, remote)
- ~2005: UNEP Asian Brown Cloud (ABC)/EAREX period:
Formed CeRes research, Toyama U database, Subnetworks of ESR, Korea, China etc
- 2017: GAW contributing network
- 2021: International SKYNET Data Center (ISDC): shared operational analyses started



Welcome to the International SKYNET Data Center!

The International SKYNET Data Center (ISDC) was established in 2014 in order to provide products by the common data analysis system.

The ISDC produces standard products on aerosol properties using the standard algorithms approved by the International SKYNET Committee and provides the products via web.

Benefits

- Unified accuracies
- Unified user portal
- Reduction of sub-network burden for more researches



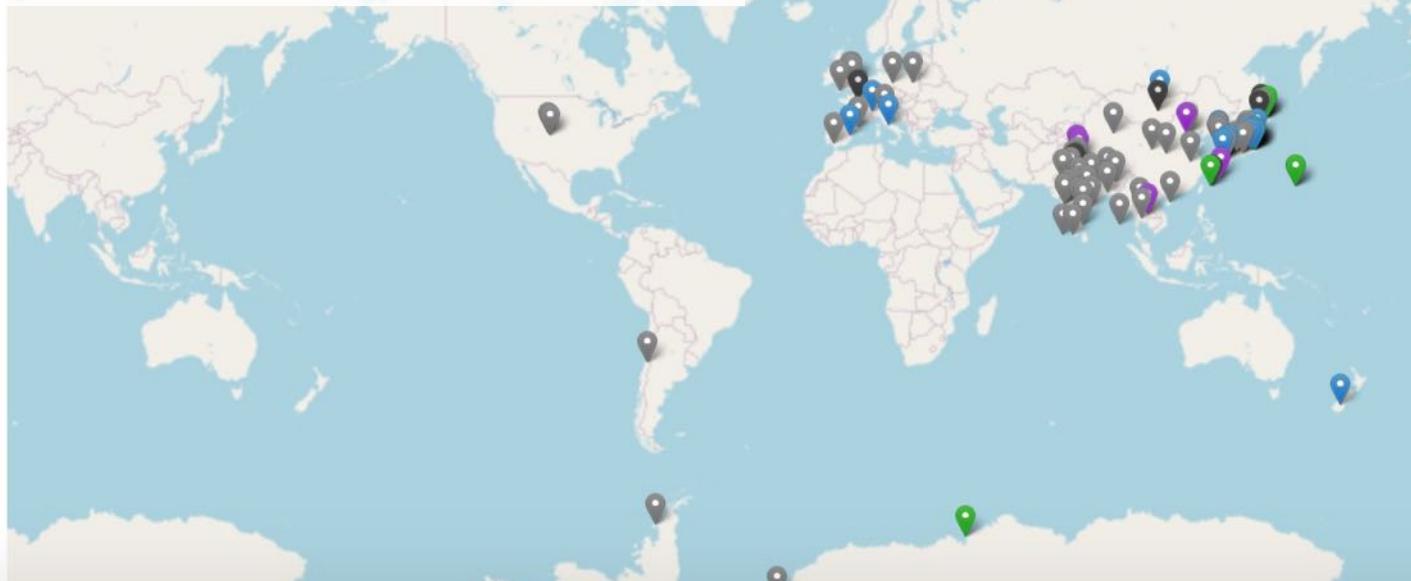
ISDC

Data policy | Meetings

News & Notice
The ISDC held its regular meeting signified by the virtual meeting on 11 November 2021.

2021. 11. 11. The ISDC held its regular meeting signified by the virtual meeting on 11 November 2021. For details of the WS, please visit the site: <http://www.iisdc.u-tokyo.ac.jp/jpn/news/skynews2021/>

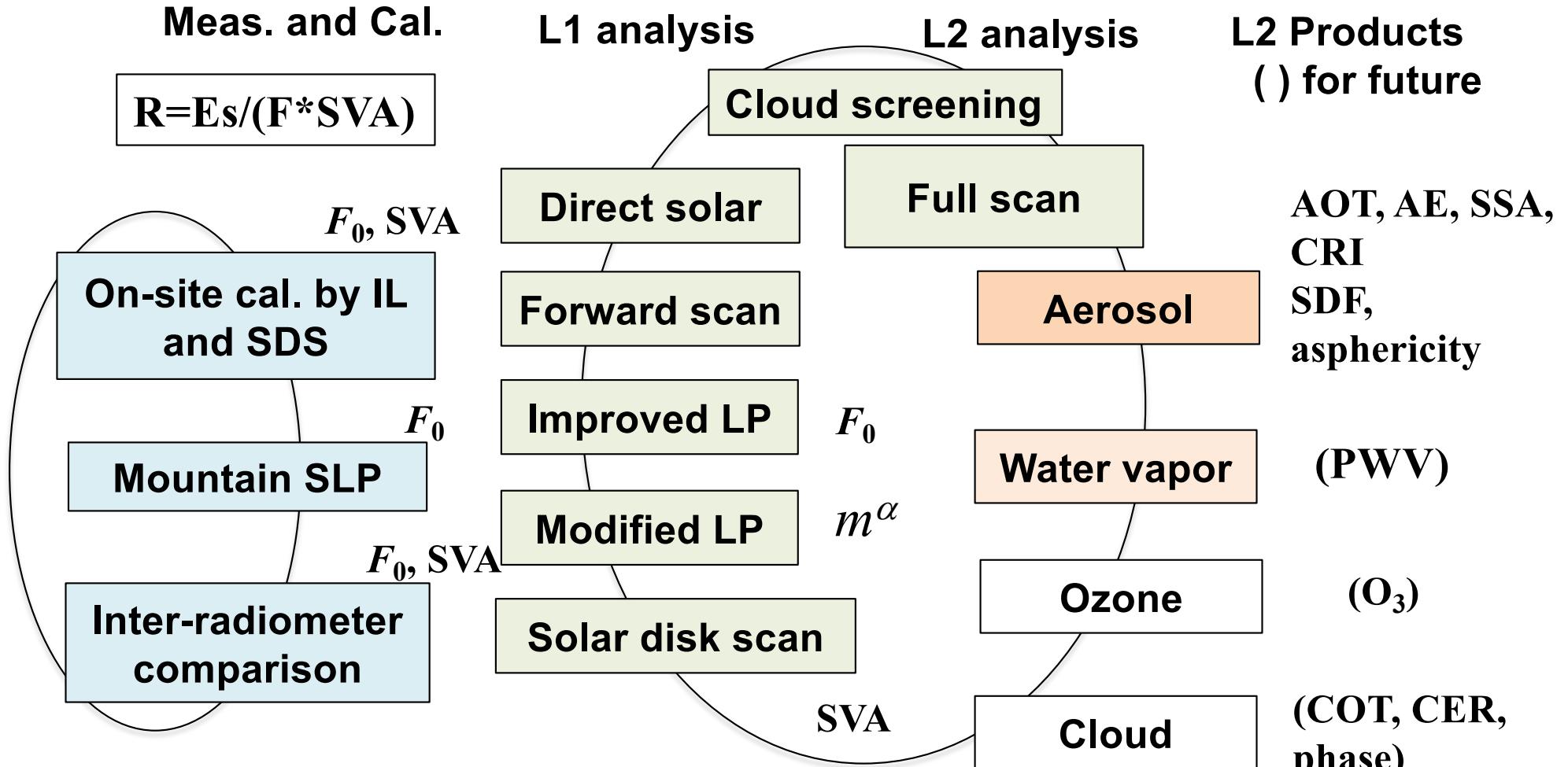
SKYNET site map



London	University College London-UAO	Hitoshi Irie (hitoshi.rie@chiba-u.jp)
Mandargovi	Chiba-U	Shantikumar S. Ningombam (shanti@iap.res.in)
Merak	Indian Institute of Astrophysics	
Minamitorishima	MRI	Jun Ohtake (j-ohtake@met.kishou.go.jp)
Minamitorishima JMA	JMA	Vijay K. Soni (vijay.soni@imd.gov.in)
Mincoy	IMD	
Miyakojima	MRI	
Moshiri	NIES	Isamu Morino (morino@nies.go.jp)
Nagasaki	Nagasaki-U	Kazuaki Kawamoto (kawasaki@nagasaki-u.ac.jp)
Nagpur	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
New Delhi/ITM	Indian Institute of Tropical Meteorology	G. Pandithurai (pandit@iitmet.res.in)
New Delhi/MD	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
New Delhi/NPL	National Physical Laboratory, India	
Ny-Alesund	NPRI	Masatake Shiobara (sho@npri.ac.jp)
Okayama	AIST	Kazuma Aoki (kazuma@sci.u-toyama.ac.jp)
Oriens	NIES	Isamu Morino (morino@nies.go.jp)
Osaka	Kinki-U	Ikuo Sano (sano@info.kindai.ac.jp)
Phimai	Chiba-U	Hitoshi Irie (hitoshi.rie@chiba-u.jp)
Plymouth	Plymouth Marine Lab.	
Port Blair	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
Puducherry	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
Pune/ITM	Indian Institute of Tropical Meteorology	G. Pandithurai (pandit@iitmet.res.in)
Pune/MD	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
Qionghai	IAP-CAS	Minzheng Duan (dmz@mail.iap.ac.cn)
Rajipur	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
Ranichauri	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
Rohatik	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
Rome	CNR-ISAC	Monica Campanelli (m.campanelli@iac.cnr.it)
Rothera	British Antarctic Survey	
Saga	Saga-U, NIES	Isamu Morino (morino@nies.go.jp)
Sagar	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
Sapporo/ILTS	U-Toyama	Kazuma Aoki (kazuma@sci.u-toyama.ac.jp)
Sapporo/ILTS, MRI	U-Toyama	Kazuma Aoki (kazuma@sci.u-toyama.ac.jp)
Sapporo/JMA	JMA	Jun Ohtake (j-ohtake@met.kishou.go.jp)
Sendai	Tohoku-U	Tadahiro Hayasaka (tadahiro@fm.tohoku.ac.jp)
Seoul	SNU	Sang Woo Kim (sangwookin@snu.ac.kr)
Seville	Universidad de Sevilla	
Shigaraki	U-Toyama	Kazuma Aoki (kazuma@sci.u-toyama.ac.jp)
Showa	NPRI	Masatake Shiobara (sho@npri.ac.jp)
Sri-samroong	Chiba-U	Hitoshi Irie (hitoshi.rie@chiba-u.jp)
Suzu, Ishikawa	U-Toyama	Kazuma Aoki (kazuma@sci.u-toyama.ac.jp)
Takayama	Gifu-U	Hirokazu Yamamoto (hirokazu.yamamoto@aist.go.jp)
Takikawa	U-Toyama	Kazuma Aoki (kazuma@sci.u-toyama.ac.jp)
Toyama	U-Toyama	Kazuma Aoki (kazuma@sci.u-toyama.ac.jp)
Trivandrum	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
Tsukuba	Tsukuba-U	Hirokazu Yamamoto (hirokazu.yamamoto@aist.go.jp)
Tsukuba/MRI	MRI	Hitoshi Irie (hitoshi.rie@chiba-u.jp)
Ulaanbaatar	MUST, Chiba-U	Victor Estelle (estelle@uv.es)
Valencia-Burjassot	Universitat de València	
Varanasi	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
Visakhapatnam	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
Xian	XAUT	Liu Jingjing (jingjing@xaut.edu.cn)
Yonhon	Hankuk University of Foreign Studies	Young Sung Gwinn (ysgwm@hufs.ac.kr)
Yonsei	Yonsei-U	Jhoon Kim (jmk@yonsei.ac.kr)

Name	Instrument Owner	PI*, CI** or contact person of the site (Name (e-mail))
Abashiri	U-Toyama	Kazuma Aoki (kazuma@sci.u-toyama.ac.jp)
Abshiri/JMA	JMA	Jun Ohtake (j-ohtake@met.kishou.go.jp)
Amaravati	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
Anmyon	NIMS	
Aosta	ARPA-VDA	Vijay K. Soni (vijay.soni@imd.gov.in)
Aurangabad	IMD	
Aurora, Colorado	AIST	Hitoshi Irie (hitoshi.rie@chiba-u.jp)
Bangkok	TMD	
Barcelona	Universitat de Barcelona	Hitoshi Irie (hitoshi.rie@chiba-u.jp)
Beijing/CAMS	CMA	Huizheng Che (cheh@cams.cma.cn)
Beijing/IAP	IAP-CAS	Bin Chen (chen_bin@mail.iap.ac.cn)
Belsk	Polish Academy of Science	
Bologna	CNR-ISP	
Cambridge	British Antarctic Survey	
Cardington	Met-Office	
Chajnantor, Atacama	Universidad de Santiago de Chile	
Chiba	Chiba-U	Hitoshi Irie (hitoshi.rie@chiba-u.jp)
Dunhuang	IAS-P	Minzheng Duan (dmz@mail.iap.ac.cn)
Eitchujima	Tokyo Univ. Marine Sci.	Toshiyuki Murayama (tmuray@kaiyodai.ac.jp)
Fuji Hokuroku	AIST	Hirokazu Yamamoto (hirokazu.yamamoto@aist.go.jp)
Fukue	Chiba-U	Hitoshi Irie (hitoshi.rie@chiba-u.jp)
Fukuoka	Kyushu-U	Toshihiko Takemura (toshi@ram.kyushu-u.ac.jp)
Fukukawa	MRI	
Fussa	U-Toyama	Kazuma Aoki (kazuma@sci.u-toyama.ac.jp)
Gangtok	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
Golden	National Renewable Energy Laboratory	
Guveshati	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
Halley	British Antarctic Survey	
Hanle	Indian Institute of Astrophysics	Shantikumar S. Ningombam (shanti@iap.res.in)
Hedo	Chiba-U	Hitoshi Irie (hitoshi.rie@chiba-u.jp)
Heifei	AIOFM-CAS	Zhenhua Wang (zhangwang@iofm.ac.cn)
Hyderabad	National Remote Sensing Agency, India	
Ishigaki	JMA	Jun Ohtake (j-ohtake@met.kishou.go.jp)
Itabashi	Tokyo Kasei Univ.	Kazuma Aoki (kazuma@sci.u-toyama.ac.jp)
Jaipur	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
Jodhpur	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
Jodo	U-Toyama	Kazuma Aoki (kazuma@sci.u-toyama.ac.jp)
Kasaijazaka	Tokyo Univ. of Science	Kazuhiko Murata (murata@rs.tus.tut.ac.jp)
Kamiyukawa	U-Toyama	Kazuma Aoki (kazuma@sci.u-toyama.ac.jp)
kanazawa	Kanazawa Institute of Technology	Kazuma Aoki (kazuma@sci.u-toyama.ac.jp)
Kofu	Chiba-U	Hitoshi Irie (hitoshi.rie@chiba-u.jp)
Kolkata	IMD	Vijay K. Soni (vijay.soni@imd.gov.in)
Kongju	Konkuk National Univ.	Juanrong Bi (bjr@tzu.edu.cn)
Lanzhou	Lanzhou-U	Isamu Morino (morino@nies.go.jp)
Lauder	NIWA, NIES	
Lindenberg	Meteorologische Observatorium Lindenberg	
London	University College London-UAO	
Manitowoc	Chiba-U	Hitoshi Irie (hitoshi.rie@chiba-u.jp)

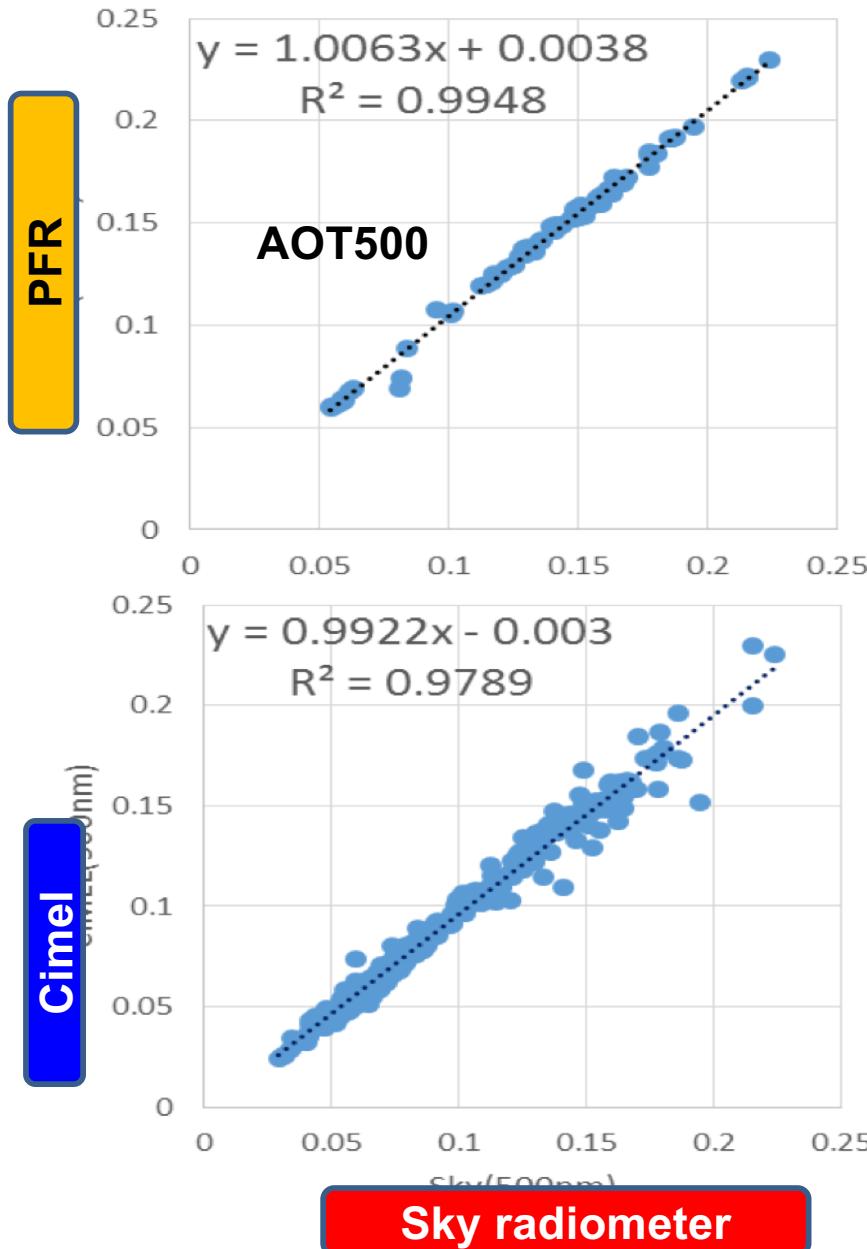
Measurements and analysis



- SVA correction (Uchiyama+, AMT'18)
- Lamp scan for SVA (Manago)
- X-IL (Nakajima+, AMT'20)
- IL for wv band (Momoi+, AMT'20)

- Two ISDC flows:
SR-CEReS (V5, Hashimoto+, AMT'12)
ESR-MRI (Kudo+, AMT'21)

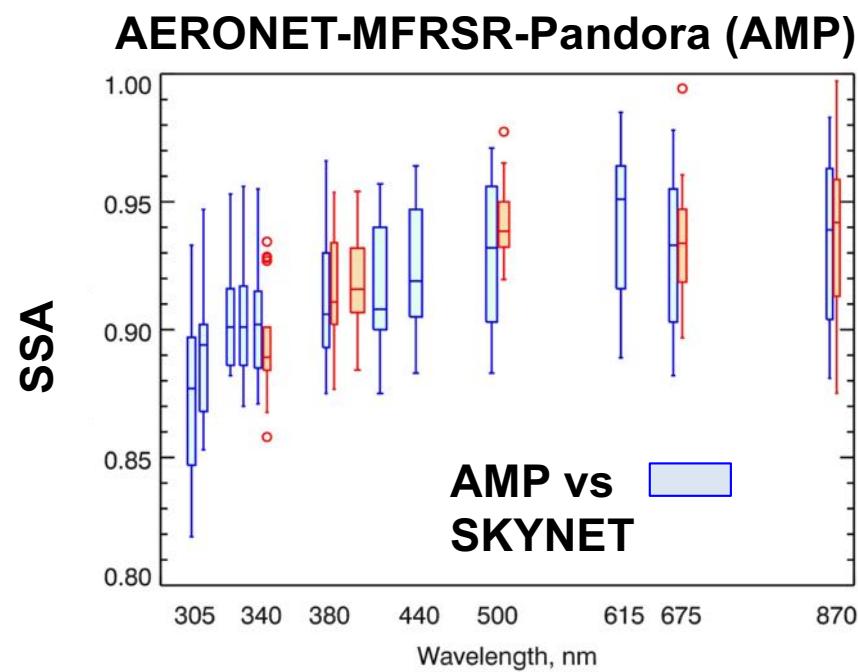
$\sigma\text{AOT} \sim 0.02$ ($>500\text{nm}$), 0.03 ($<500\text{nm}$)



Accuracies of aerosol products

- SSA underestimation
- F0 and SVA errors
- Inversion of coarse particles
- Cloud screening

Hashimoto+(AMT'12) , Khatri+ (JGR'16)

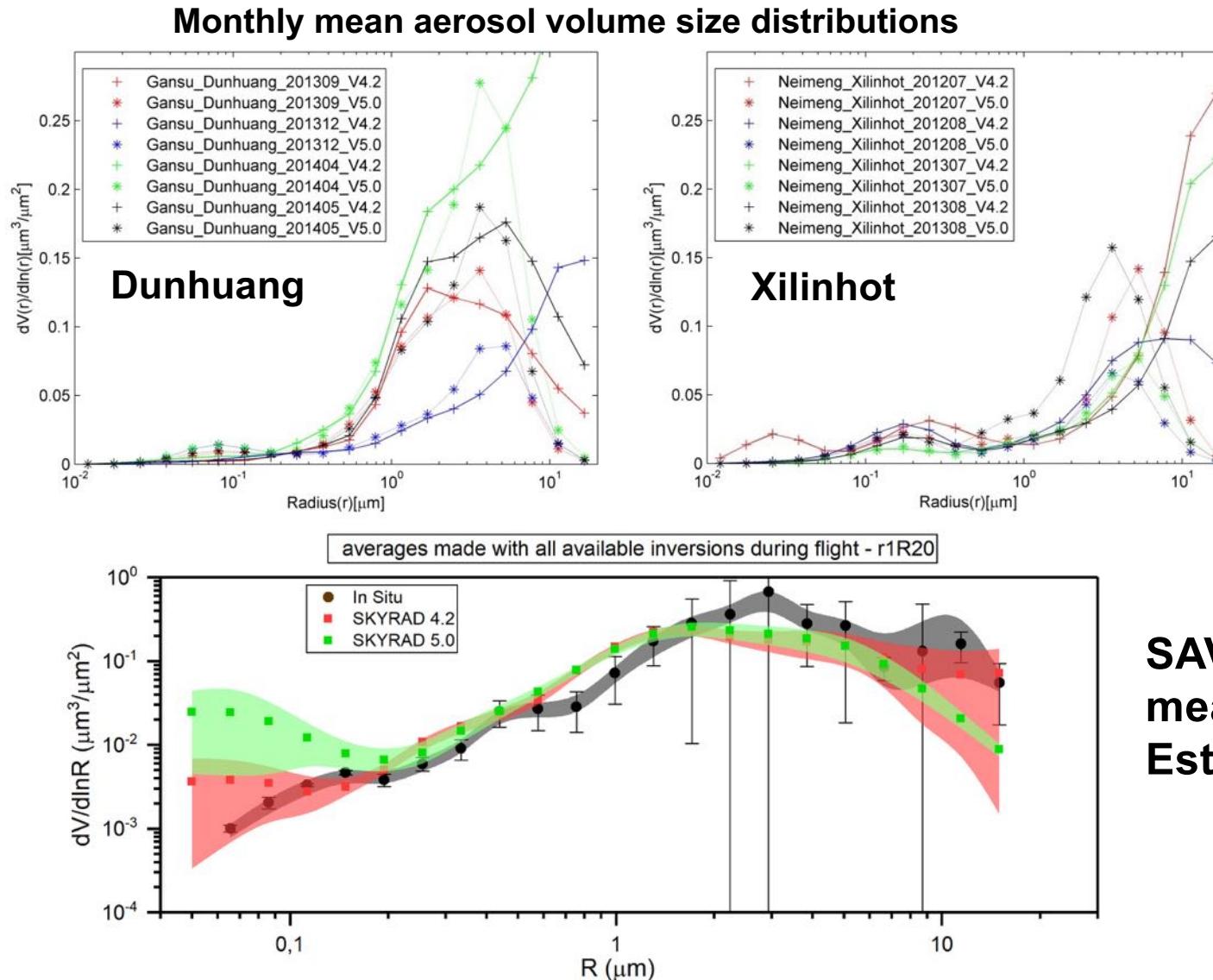


Courtesy H. Irie@CERES

Mok et al. (AMT'18)

Size distributions

- 10 micron constraint OK for dust cases?
- Needs for a climatology of coarse model size distribution



Chinese site data
Jing Zhe @ IAP

SAVEXD (2015) airborne
measurements
Estellés+ (2018)

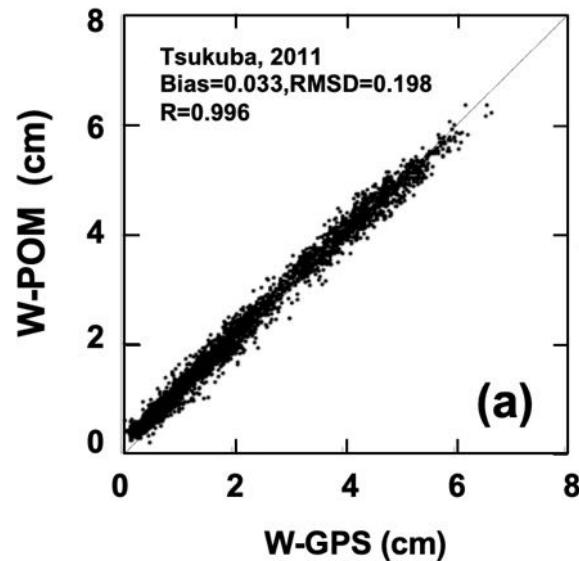
Next candidates of operational products

PWV

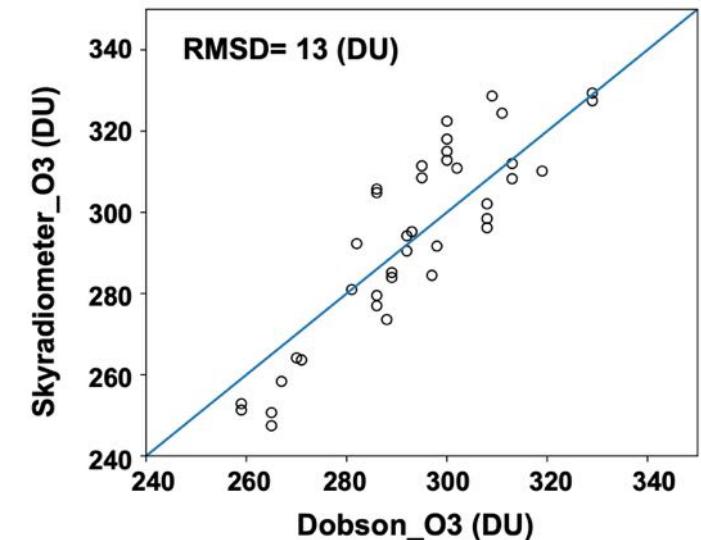
Campanelli+
(AMT'14)

Uchiyama+
(JMSJ'14)

Momoi+(AMT'20)



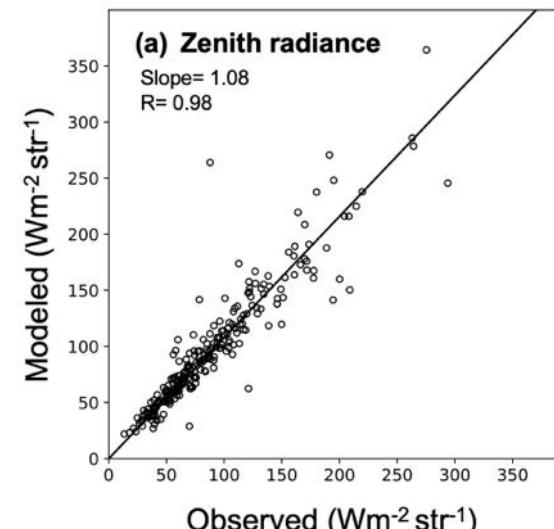
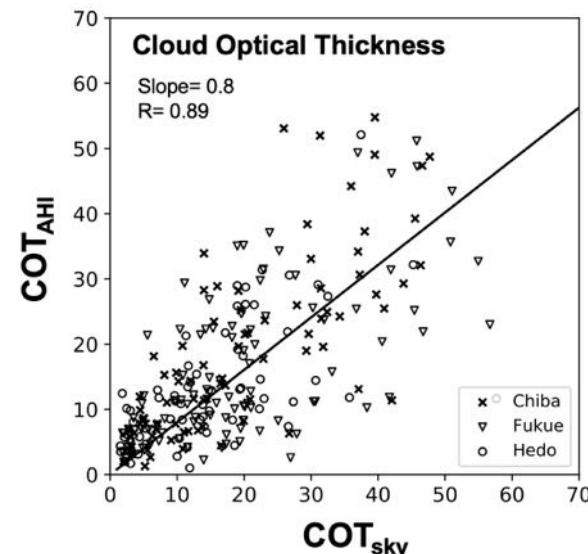
O3



Khatri+(JMSJ'14)

Clouds???

Khatri+ (AMT'19)



Conclusions

- Active development of algorithms, data analysis&assimilation, validation, hardware for air quality monitoring, climate study, satellite remote sensing etc; Thanks!
 - GOSAT2: PM2.5 and BC data from India, China...
- WMO GAW contributing network: SKYNET meta data for their Observing Systems Capabilities Analysis and Review tool (OSCAR)
- ISDC (International Skynet Data Center) has started their operational analysis open to the science community
 - Data arriving
- We appreciate your continued contributions and help