

# 名大STE研の大気圏・電磁気圏 の地上観測とその データベース化の現状

塩川和夫、大塚雄一、松見豊、中山智喜、  
水野亮、長浜智生  
(名大STE研)

名大STE研のメタデータ登録はIUGONET開発員(堀智昭、梅村宜生、谷田貝亜紀代)が行ってきました。

Dataset	Parameter	Data type	Instrument	Observatory	Dataset MD status	Granule MD status	Note
<a href="#">muon</a>	MuonTelescope	Numerical Data	Muon Telescope	Nagoya, Sakashita	<a href="#">registered</a>	<a href="#">registered</a>	
	daily mean GG component,	Display Data	Muon Telescope	Nagoya	<a href="#">registered</a>	<a href="#">registered</a>	
SuperDARN	backscatter power, Doppler velocity, spectral width, etc.	Numerical Data	SuperDARN Hokkaido East HF radar,	Hokkaido East, Japan;	<a href="#">registered</a>	<a href="#">registered</a>	<a href="#">Load routine for UDAS is available</a>
			SuperDARN Hokkaido West HF radar,	Hokkaido West, Japan;			
			SuperDARN King Salmon HF radar	King Salmon, Alaska			
<a href="#">Interplanetary Scintillation measurement</a>	Solar wind velocity, scintillation level	Numerical Data	UHF radio telescope	Fuji, Kiso, Sugadaira, and Toyokawa	<a href="#">registered</a>	<a href="#">registered</a>	
	Annual solar wind speed map	Display Data	UHF radio telescope	Fuji, Kiso, Sugadaira, and Toyokawa	<a href="#">registered</a>	<a href="#">registered</a>	

Dataset	Parameter	Data type	Instrument	Observatory	Dataset MD status	Granule MD status	Note
210 Magnetic Meridian (210MM) magnetometer chain	1 Hz magnetic field	Numerical Data	Fluxgate magnetometer	Tixie, Russia; Zhigansk, Russia; Yakutsk, Russia; Irkutsk, Russia; Popv Island, Beijing, China; Luning; Muntinlupa; Pontianak; Watukosek; Learmonth; Katanning; Kotel'nyy, Russia; Chokurdakh, Russia; Zyryanka, Russia; Magadan, Russia; Paratunka, Russia; Moshiri, Japan; Rikubetsu, Japan; Onagawa, Japan; Kagoshima, Japan;	<a href="#">registered</a>	<a href="#">registered</a>	<a href="#">Load routine for UDAS is available</a>
STEL Magnetometer Data	64 Hz magnetic field	Numerical Data	Induction magnetometer	Athabasca, Canada; Magadan, Russia; Paratunka, Russia; Sata, Japan	<a href="#">registered</a>	<a href="#">registered</a>	

Dataset	Parameter	Data type	Instrument	Observatory	Dataset MD status	Granule MD status	Note
<a href="#">Optical Mesosphere Thermosphere Imagers (OMTIs)</a>	airglow/aurora emissions, neutral wind velocity, neutral temperature	Numerical Data	Multi-wavelength all-sky optical imager	Ithaca, U.S.A.; Rsolute Bay, Canada; Tromso, Norway; Athabasca, Canada; Magadan, Russia; Paratunka, Russia; Rikubetsu, Japan; Shigaraki, Japan; Sata, Japan; Yonaguni, Japan; Chiang Mai, Thai; Darwin, Australia; Kototabang, Indonesia	<a href="#">registered</a>	<a href="#">registered</a>	
		Display Data	Fabry-Perot interferometer,	Darwin, Australia; Shigaraki, Japan; Tromso, Norway; Chiang Mai, Thai; Kototabang, Indonesia	<a href="#">registered</a>	<a href="#">registered</a>	
		Display Data	Tilting Photometer	Rikubetsu, Japan; Shigaraki, Japan; Athabasca, Canada	<a href="#">registered</a>	<a href="#">registered</a>	
		Display Data	Airglow Temperature Photometer	Sata, Japan; Rikubetsu, Japan; Shigaraki, Japan; Kototabang, Indonesia	<a href="#">registered</a>	<a href="#">registered</a>	
		Display Data	Spectral Airglow Temperature Imager	Shigaraki, Japan;	<a href="#">registered</a>	<a href="#">registered</a>	

Dataset	Parameter	Data type	Instrument	Observatory	Dataset MD status	Granule MD status	Note
<a href="#">Ionospheric scintillation</a>	Scintillation index (S4)	Display Data	GPS receiver	Kototabang, Indonesia	<a href="#">registered</a>	<a href="#">registered</a>	
	Scintillation index (S4),	Numerical Data	GPS receiver	Kototabang, Indonesia	<a href="#">registered</a>		Observational Data is Off-line.
	Scintillation drift velocity						
<a href="#">VHF radar</a>	SNR, Doppler velocity, Doppler width	Display Data	VHF radar	Kototabang, Indonesia	<a href="#">registered</a>	<a href="#">registered</a>	
<a href="#">VLF/ELF measurement</a>	frequency spectra	Display Data	VLF/ELF antenna	Kagoshima, Japan; Athabasca, Canada	<a href="#">registered</a>	<a href="#">registered</a>	
		Numerical Data		Mosiri, Japan; Kagoshima, Japan; Athabasca, Canada	<a href="#">registered</a>		Observational Data is Off-line.

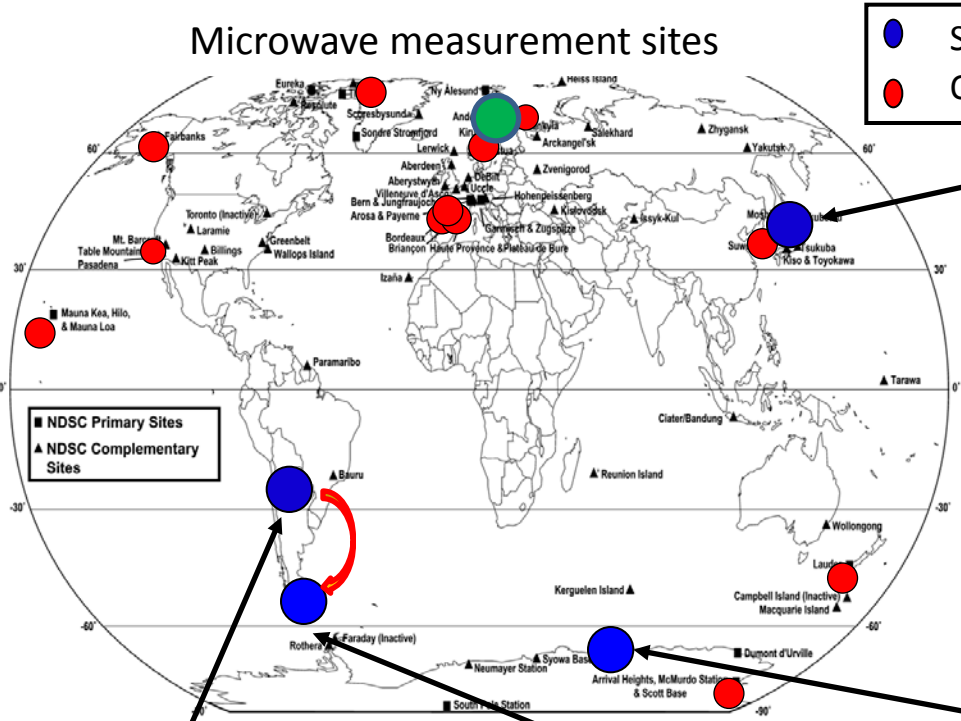
Dataset	Parameter	Data type	Instrument	Observatory	Dataset MD status	Granule MD status	Note
<a href="#">EISCAT Database</a>	Electron density/temperature, Ion temperature, Ion velocity, Collision frequency, O+/Ne number density ratio	Numerical Data	EISCAT UHF radar	Tromsøe, Norway	<a href="#">registered</a>		Granule Metadata is released by NIPR.
	(Summary Plot)	Display Data			<a href="#">registered</a>		
	Electron density/temperature, Ion temperature, Ion velocity, Collision frequency, O+/Ne number density ratio	Numerical Data	EISCAT VHF radar		<a href="#">registered</a>		
	(Summary Plot)	Display Data			<a href="#">registered</a>		
	Electron density/temperature, Ion temperature, Ion velocity, Collision frequency, O+/Ne number density ratio	Numerical Data	EISCAT ESR radar	Longyearbyen, Svalbard	<a href="#">registered</a>		
	(Summary Plot)	Display Data		<a href="#">registered</a>			
	Doppler velocity	Display Data	Meteor radar	Bjornoya, Svalbard	<a href="#">registered</a>		
	Doppler velocity	Display Data	MF radar	Tromsøe, Norway	<a href="#">registered</a>		
	Visible image	Display Data	Digital camera imager		<a href="#">registered</a>		
	airglow/aurora emission intensity	Display Data	4-wavelength photometer		<a href="#">registered</a>		
	Proton aurora image	Display Data	Proton imager		<a href="#">registered</a>		
	Neutral temperature in lower thermosphere	Display Data	Na Lidar		<a href="#">registered</a>		

Dataset	Parameter	Data type	Instrument	Observatory	Dataset MD status	Granule MD status	Note
Campaign observation of NO <sub>x</sub> and ozone mixing ratios	NO <sub>2</sub> , O <sub>3</sub> mixing ratio	Numerical Data	Laser-induced fluorescence detector for NO <sub>2</sub> , Ozone monitor	Hongo, Tokyo; Fukue, Goto, Nagasaki	<a href="#">registered</a>		Observational Data is Off-line.
Atmospheric minor constituents	O <sub>3</sub> , ClO, H <sub>2</sub> -18O, NO mixing ratio,	Numerical Data	millimeter-wave spectroscopic radiometer for O <sub>3</sub> , ClO, H <sub>2</sub> -	Rio Gallegos, Argentina;	<a href="#">registered</a>		Observational Data is Off-line.
				Syowa station, Antarctica;			
				Atacama highland, Chile;			
				Rikubetsu, Japan;			
Aerosol observation	Sampling temperature, Aerosol extinction coefficient, Aerosol size distribution	Numerical Data	Aerosol extinction spectrometer, Scanning	Hongo, Tokyo;	<a href="#">registered</a>		Observational Data is Off-line.
				Shigaraki, Shiga;			
				Nagoya, Aichi;			
				Wakayama Forest, Wakayama			

Dataset	Parameter	Data type	Instrument	Observatory	Dataset MD status	Granule MD status	Note
Campaign observation of NO <sub>x</sub> and ozone mixing ratios	NO <sub>2</sub> , O <sub>3</sub> mixing ratio	Numerical Data	Laser-induced fluorescence detector for NO <sub>2</sub> , Ozone monitor	Hongo, Tokyo; Fukue, Goto, Nagasaki	<a href="#">registered</a>		Observational Data is Off-line.
Atmospheric minor constituents	O <sub>3</sub> , ClO, H <sub>2</sub> -18O, NO mixing ratio,	Numerical Data	millimeter-wave spectroscopic radiometer for O <sub>3</sub> , ClO, H <sub>2</sub> -	Rio Gallegos, Argentina;	<a href="#">registered</a>		Observational Data is Off-line.
				Syowa station, Antarctica;			
				Atacama highland, Chile;			
				Rikubetsu, Japan;			
Aerosol observation	Sampling temperature, Aerosol extinction coefficient, Aerosol size distribution	Numerical Data	Aerosol extinction spectrometer, Scanning	Hongo, Tokyo;	<a href="#">registered</a>		Observational Data is Off-line.
				Shigaraki, Shiga;			
				Nagoya, Aichi;			
				Wakayama Forest, Wakayama			

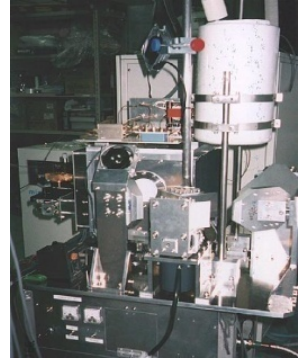


# STEL mm-wave measurement sites

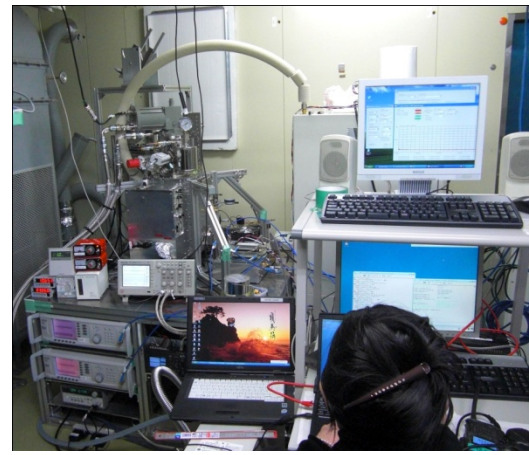


**SIS mixer receiver  
100GHz /250GHz**

**Rikubetsu  
(STEL, NIES)**  
43.5N, 143.8E Since 1999



**Syowa Station  
(STEL, NIPR)**  
69.0S, 39.6E Since 2011



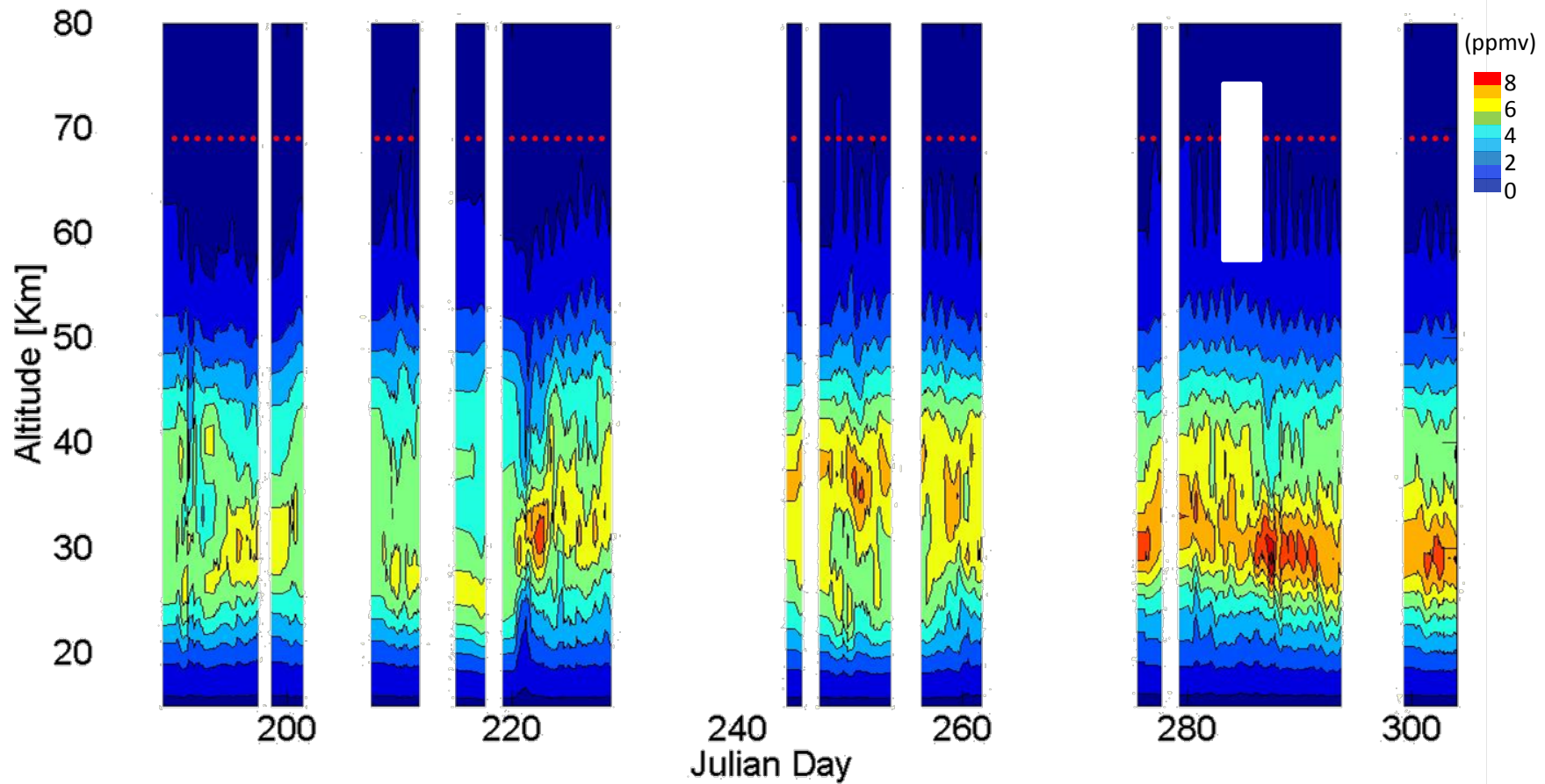
**Rio Gallegos  
(STEL, CEILAP)**  
51.6S, 69.3W  
Since 2011



**Atacama highland  
(STEL)**  
23.0S, 67.7W  
Since 2005



# Time series of O<sub>3</sub> vertical distribution in July-October, 2012, over Rio Gallegos in Argentina

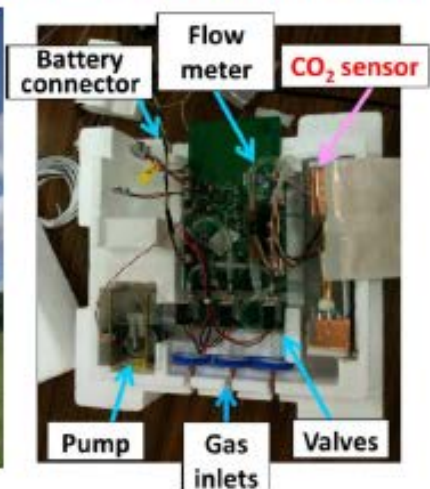


(Salvador et al. 2013)

Dataset	Parameter	Data type	Instrument	Observatory	Dataset MD status	Granule MD status	Note
Campaign observation of NO <sub>x</sub> and ozone mixing ratios	NO <sub>2</sub> , O <sub>3</sub> mixing ratio	Numerical Data	Laser-induced fluorescence detector for NO <sub>2</sub> , Ozone monitor	Hongo, Tokyo; Fukue, Goto, Nagasaki	<a href="#">registered</a>		Observational Data is Off-line.
Atmospheric minor constituents	O <sub>3</sub> , ClO, H <sub>2</sub> -18O, NO mixing ratio,	Numerical Data	millimeter-wave spectroscopic radiometer for O <sub>3</sub> , ClO, H <sub>2</sub> -	Rio Gallegos, Argentina; Syowa station, Antarctica; Atacama highland, Chile; Rikubetsu, Japan;	<a href="#">registered</a>		Observational Data is Off-line.
Aerosol observation	Sampling temperature, Aerosol extinction coefficient, Aerosol size distribution	Numerical Data	Aerosol extinction spectrometer, Scanning	Hongo, Tokyo; Shigaraki, Shiga; Nagoya, Aichi; Wakayama Forest, Wakayama	<a href="#">registered</a>		Observational Data is Off-line.

# 松見グループの主な研究課題

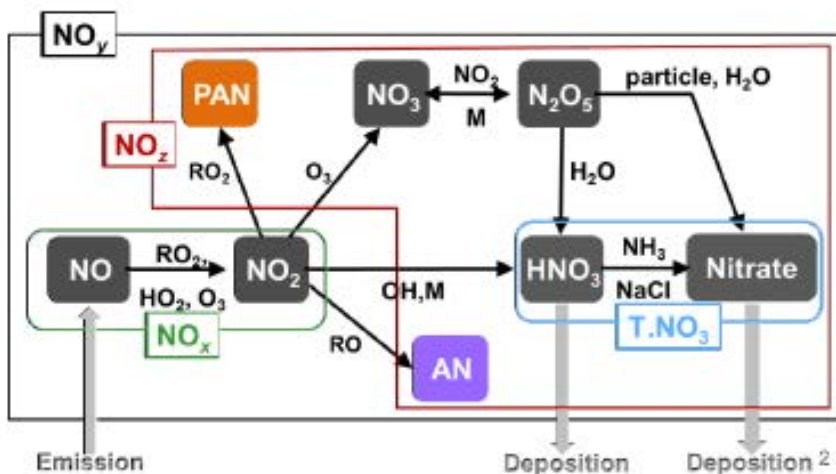
## 1) 気球搭載CO<sub>2</sub>センサの開発/応用



## 2) 赤外レーザー吸収分光法を用いたCO<sub>2</sub>安定同位体の観測



## 3) 大気中窒素酸化物の動態解明

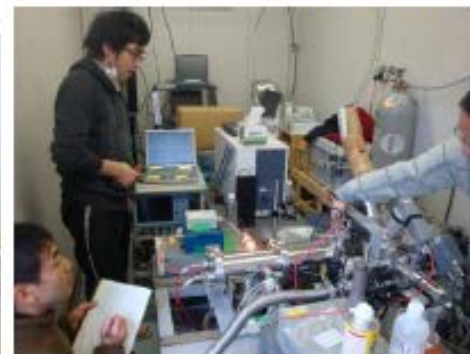


## 4) 大気エアロゾルの動態および気候影響の解明

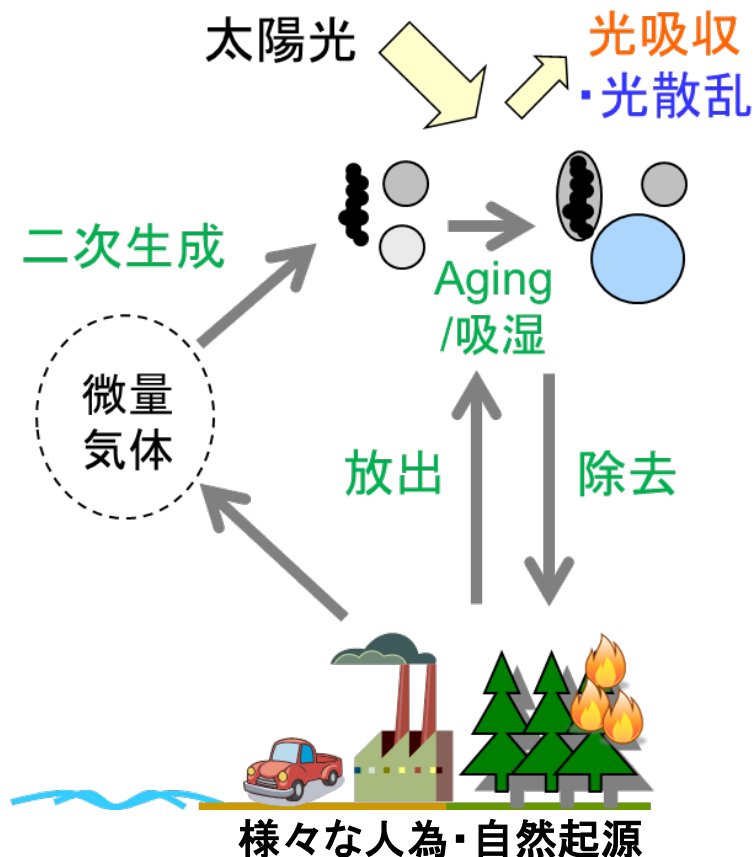
### 光学特性の測定



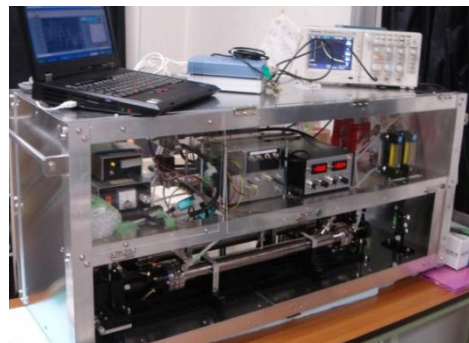
### 個別粒子の化学成分測定



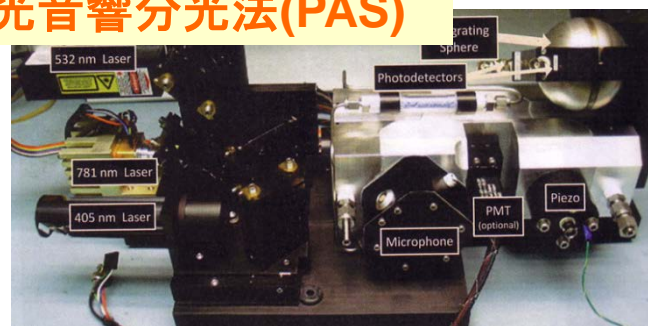
# レーザー分光法を用いた新たな光学特性計測装置



消散: キャビティリングダウン分光法(CRDS)



吸収: 光音響分光法(PAS)

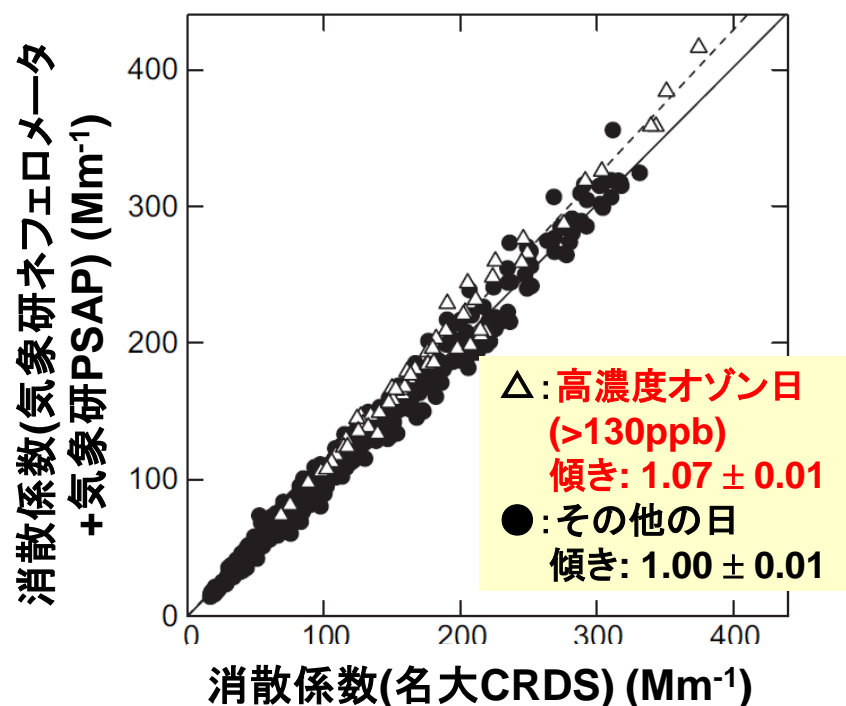


→ 気象研・千葉大・東京大・茨城大・京都大・金沢大・JAMSTEC等と共同観測

- 1) エアロゾル光学特性の化学成分や混合状態との関係の解明
- 2) 従来のその場計測法(積分型ネフェロメータ, フィルター光吸収法)、リモートセンシング(ライダー, MAX-DOAS)との比較

# エアロゾル消散係数(吸収+散乱)の観測

従来法(ネフェロメータ+フィルター光吸収法:  
PSAP)との比較 (2007/8-9@東京)



従来法は、高濃度 $O_3$ 時に過大評価  
する可能性を示唆

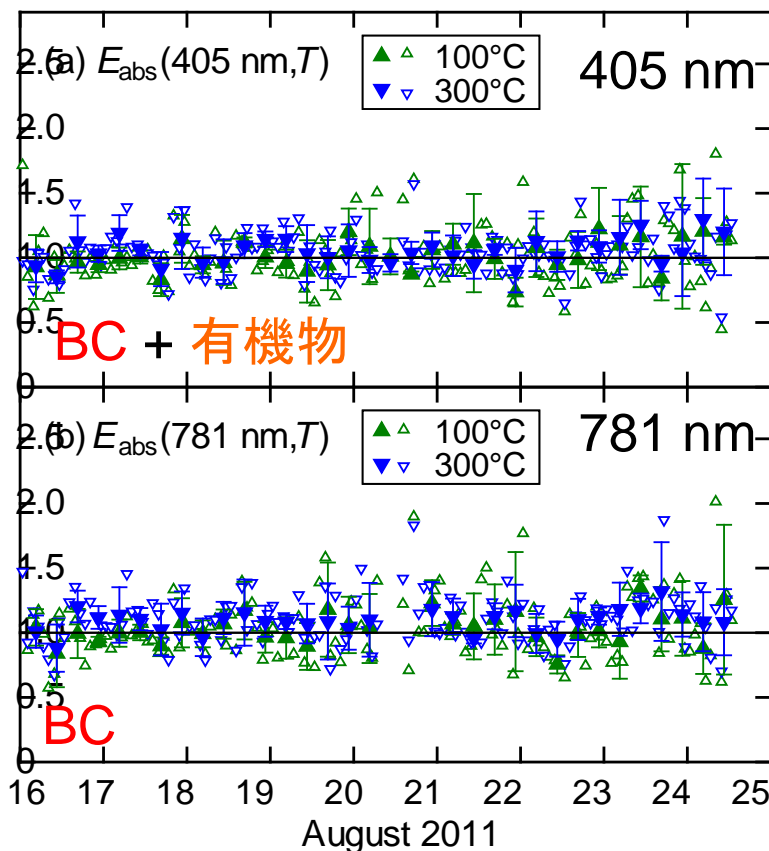
# 黒色炭素(BC)/有機物粒子の光吸収の観測@名古屋

August 2011

January 2012

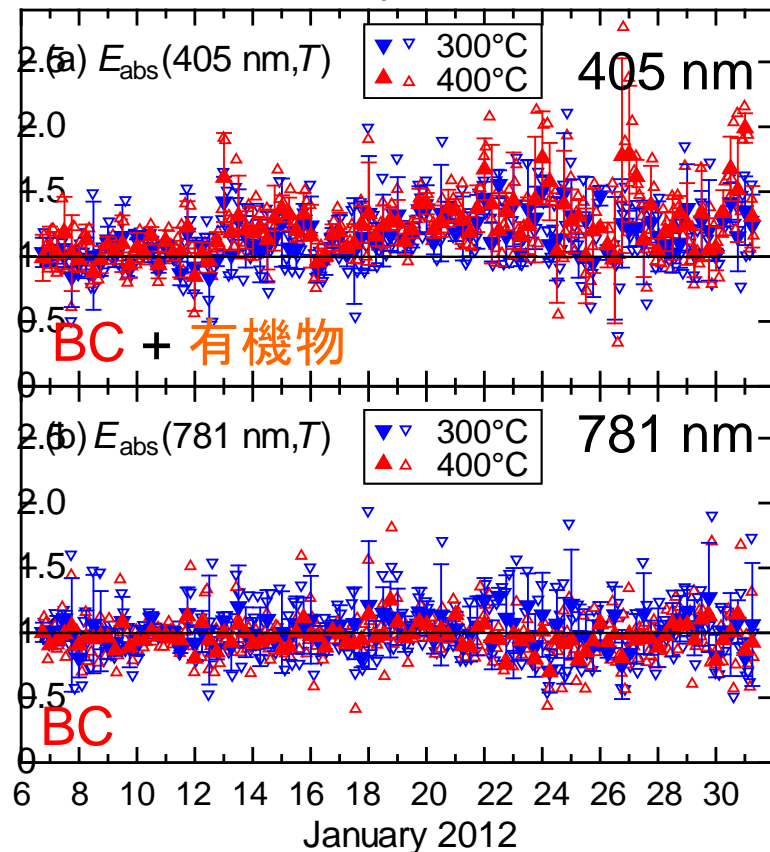
有機物粒子による  
光吸収の増加

被覆によるBCの  
光吸収増加



有機物粒子による  
光吸収の増加

被覆によるBCの  
光吸収増加



- ・他成分の被覆によるBCの光吸収の増加は0-10%と小さい
- ・冬季には、有機物による光吸収が全光吸収の10-20%の寄与を持つ

# これまでに実施・参画した主な観測キャンペーン

## <CO<sub>2</sub>気球>

守谷:2008/11-2013/11(~13 days)

## <CO<sub>2</sub>同位体>

富士吉田:2010/7-8 高山:2011/7-8

名古屋:2008/11, 2009/5-6, 2010/9-10,  
2011/11-12, 2012/7-8

## <窒素酸化物>

豊川:2006/2

東京:2007/8, 2008/8, 2009/8

福江:2010/4-5 京都:2013/8-9

## <エアロゾル光学特性>

東京:2007/8-9, 2008/8, 2009/8

福岡:2008/3-5 宮古島:2008/7

つくば:2010/10, 2012/9

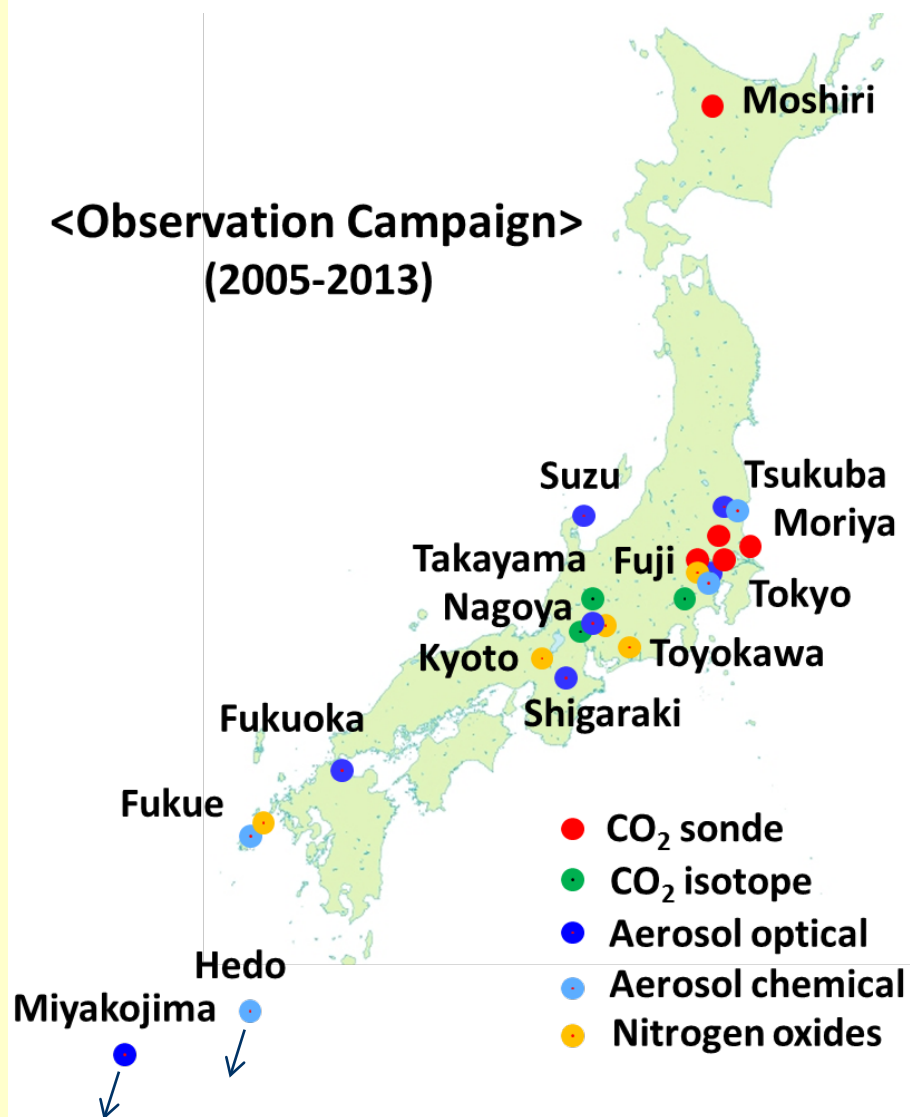
信楽:2010/10-11 珠洲:2013/4-5

名古屋:2010/3-5, 2011/8, 2012/1-2

## <エアロゾル化学特性>

つくば:2004/4-5, 2005/4-5

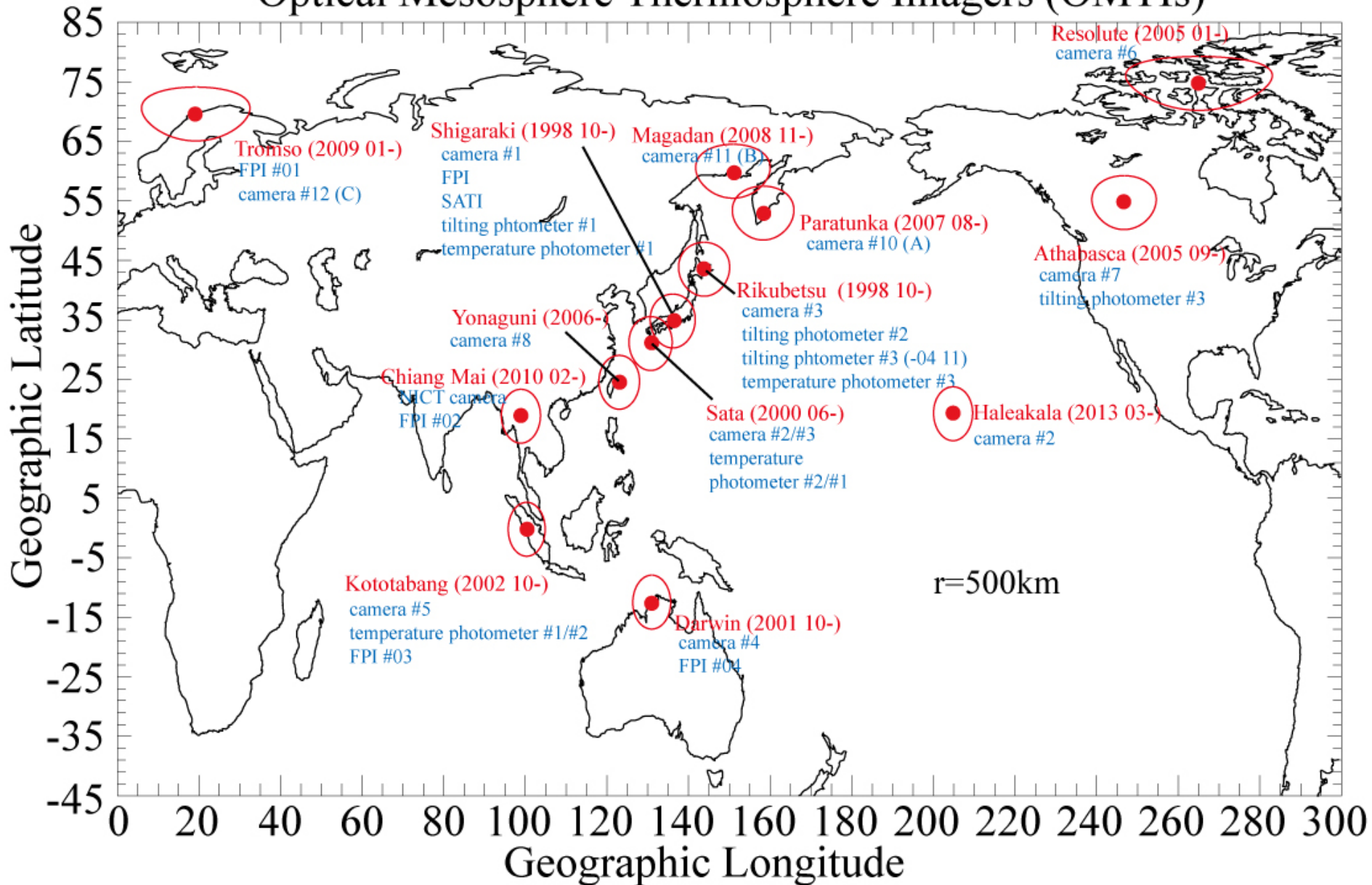
辺戸:2006/3-4 福江:2010/3-4,12

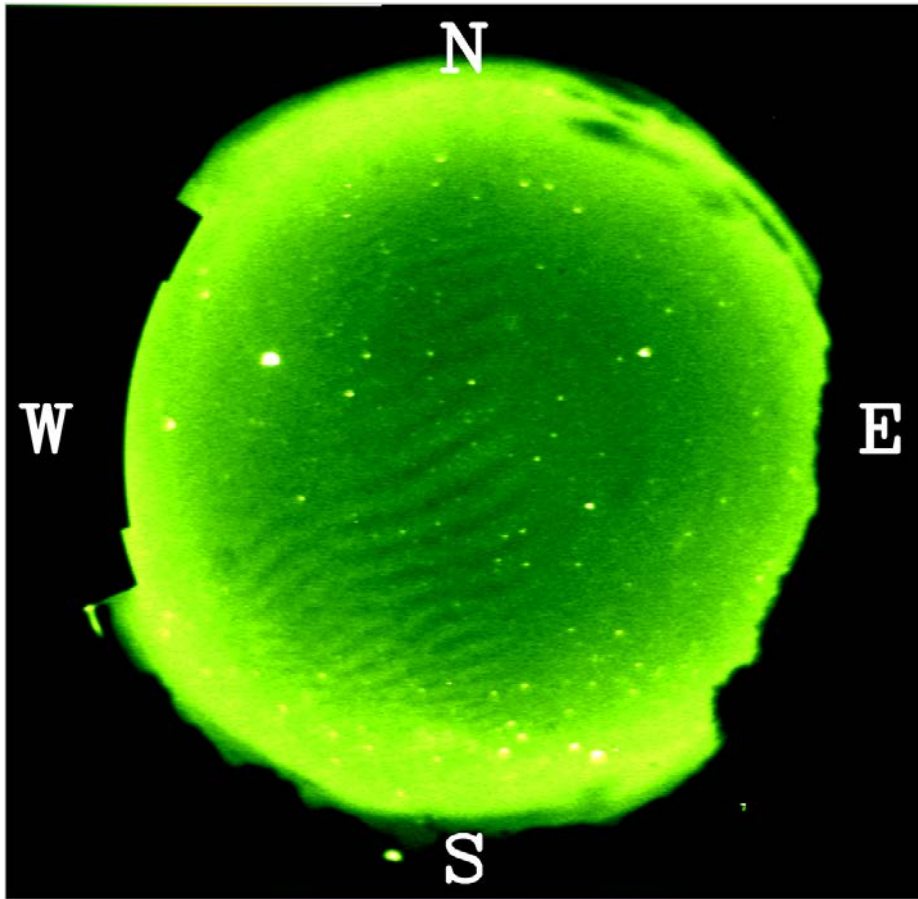




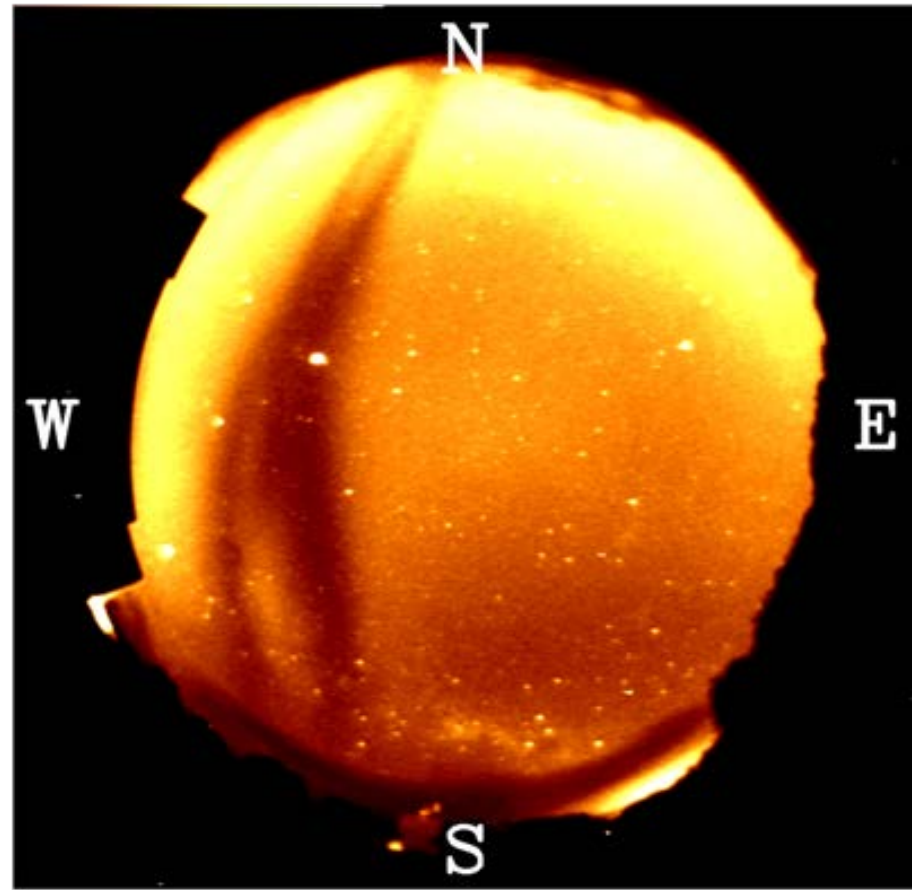
Dataset	Parameter	Data type	Instrument	Observatory	Dataset MD status	Granule MD status	Note
<a href="#">Optical Mesosphere Thermosphere Imagers (OMTIs)</a>	airglow/aurora emissions, neutral wind velocity, neutral temperature	Numerical Data	Multi-wavelength all-sky optical imager	Ithaca, U.S.A.; Rsolute Bay, Canada; Tromso, Norway; Athabasca, Canada; Magadan, Russia; Paratunka, Russia; Rikubetsu, Japan; Shigaraki, Japan; Sata, Japan; Yonaguni, Japan; Chiang Mai, Thai; Darwin, Australia; Kototabang, Indonesia	<a href="#">registered</a>	<a href="#">registered</a>	
		Display Data	Fabry-Perot interferometer,	Darwin, Australia; Shigaraki, Japan; Tromso, Norway; Chiang Mai, Thai; Kototabang, Indonesia	<a href="#">registered</a>	<a href="#">registered</a>	
		Display Data	Tilting Photometer	Rikubetsu, Japan; Shigaraki, Japan; Athabasca, Canada	<a href="#">registered</a>	<a href="#">registered</a>	
		Display Data	Airglow Temperature Photometer	Sata, Japan; Rikubetsu, Japan; Shigaraki, Japan; Kototabang, Indonesia	<a href="#">registered</a>	<a href="#">registered</a>	
		Display Data	Spectral Airglow Temperature Imager	Shigaraki, Japan;	<a href="#">registered</a>	<a href="#">registered</a>	

## Optical Mesosphere Thermosphere Imagers (OMTIs)

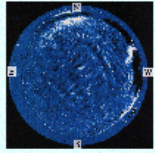




中間圏の大気重力波  
波長557.7nmの夜間大気光  
インドネシア・コタバン 2003年3月6日



電離圏プラズマバブル  
波長630.0nmの夜間大気光  
インドネシア・コタバン 2003年3月6日



## Optical Mesosphere Thermosphere Imagers (OMTIs)

*Solar-Terrestrial Environment Laboratory, Nagoya University*

You are **019762** th visitor since Jan.25, 2002.

The Optical Mesosphere Thermosphere Imagers (OMTI) were developed at the Solar-Terrestrial Environment Laboratory, Nagoya University, in order to investigate the dynamics of the upper atmosphere through nocturnal airglow emissions. In this homepage, plots of intensity, two-dimensional images, rotational temperatures, and Doppler wind velocities of nocturnal airglow obtained at several ground stations are available.

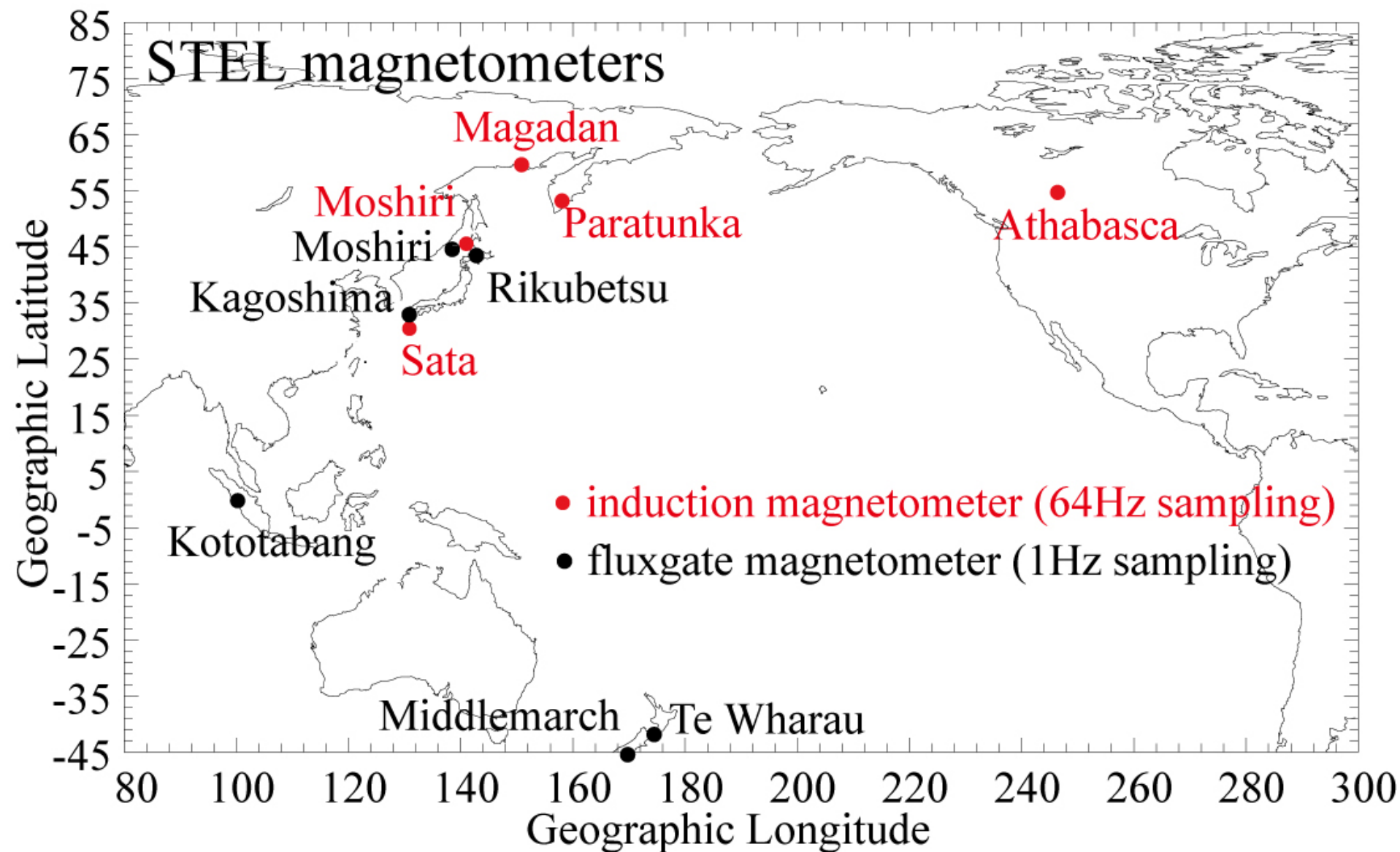
PLEASE CONTACT the Principal Investigators, [K. Shiokawa](#) before using these data for any publications and/or presentations.

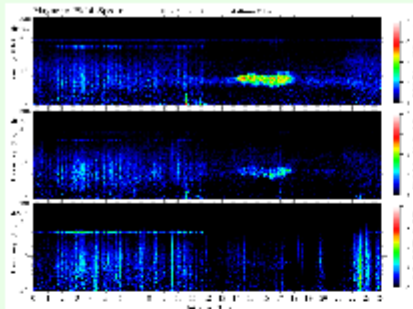
Please note that the data are just for browsing purpose and are not fully calibrated.

1. [Important Notes](#)
2. [Station Locations, Observed Airglow Lines, and Time Resolutions](#)
3. [Figure Captions](#)
4. [Instrumental Papers](#)
5. [Publication List](#)
6. [Picture of the Instruments](#)
7. [Sky Condition \(1-hour value\)](#)
8. [Sky Condition \(1-hour value, Canadian stations\)](#)
9. [Sky Condition \(1-hour value, Ithaca \(USA\) station\)](#)

Dataset	Parameter	Data type	Instrument	Observatory	Dataset MD status	Granule MD status	Note
210 Magnetic Meridian (210MM) magnetometer chain	1 Hz magnetic field	Numerical Data	Fluxgate magnetometer	Tixie, Russia; Zhigansk, Russia; Yakutsk, Russia; Irkutsk, Russia; Popv Island, Beijing, China; Luning; Muntinlupa; Pontianak; Watukosek; Learmonth; Katanning; Kotel'nyy, Russia; Chokurdakh, Russia; Zyryanka, Russia; Magadan, Russia; Paratunka, Russia; Moshiri, Japan; Rikubetsu, Japan; Onagawa, Japan; Kagoshima, Japan;	<a href="#">registered</a>	<a href="#">registered</a>	<a href="#">Load routine for UDAS is available</a>
STEL Magnetometer Data	64 Hz magnetic field	Numerical Data	Induction magnetometer	Athabasca, Canada; Magadan, Russia; Paratunka, Russia; Sata, Japan	<a href="#">registered</a>	<a href="#">registered</a>	

<http://stdb2.stelab.nagoya-u.ac.jp/magne/>





## STEL Magnetometer Data

This homepage is to show quick-look plots of the magnetometer data obtained by the Division II of the Solar-Terrestrial Environment Laboratory, Nagoya University.

PLEASE CONTACT [K. Shiokawa](#) before using these data for any publications and/or presentations. Please note that the data are just for browsing purpose.

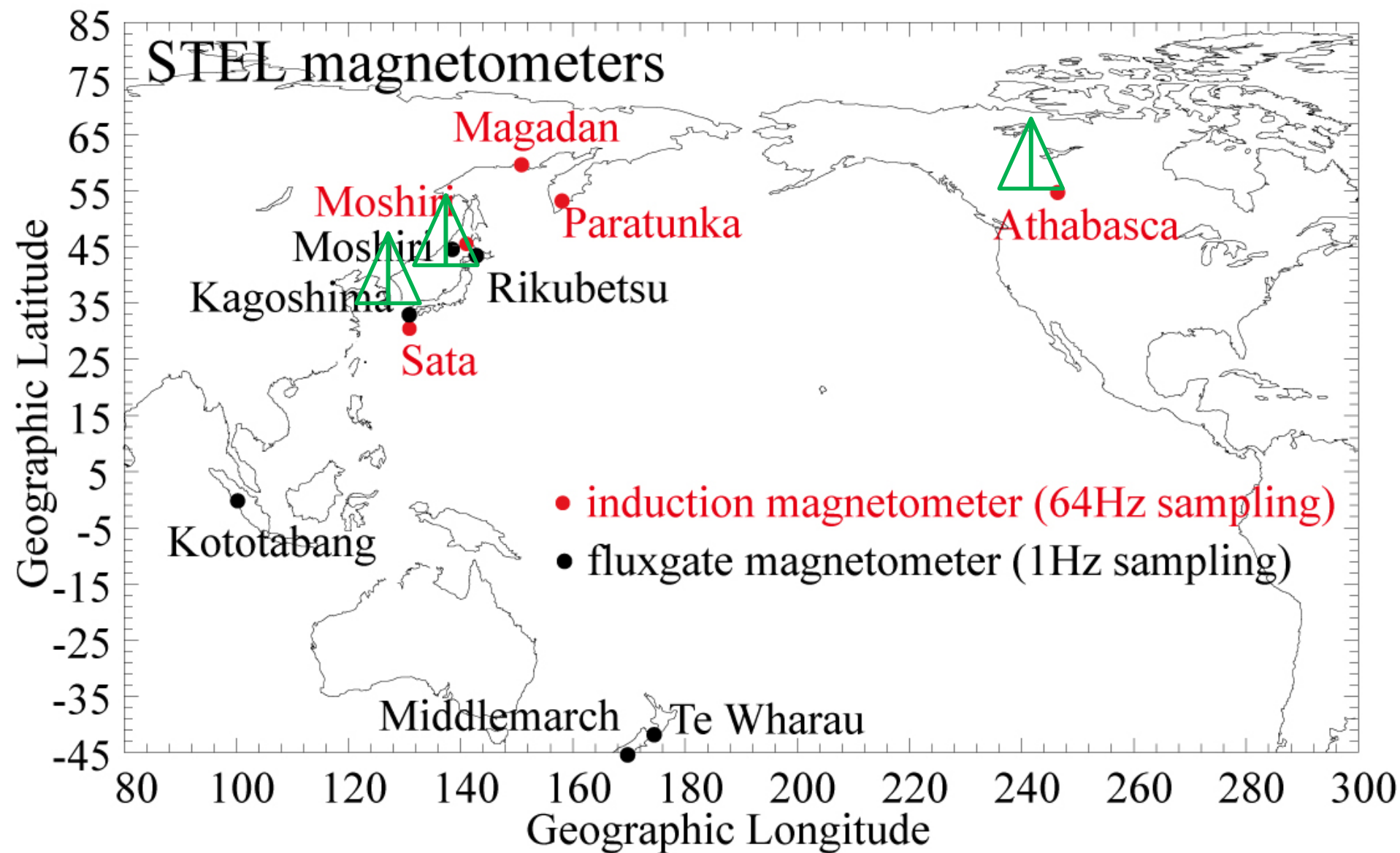
- [Stations, Instruments, and Acknowledgements](#)
- [Some Notes and Data Error Histories](#)
- [Map of Stations](#)
- [Induction Magnetometer Plots \(Dynamic Spectra and Rapid-Run Magnetograms\)](#)
- [Fluxgate Magnetometer Plots \(Ordinary and Rapid Run\)](#)
- [Fluxgate Magnetometer Plots \(Pi2/Pc3 pulsation plots\)](#)
- [Conjunction Event Finder \(CEF\) \*\*NEW\*\*](#)

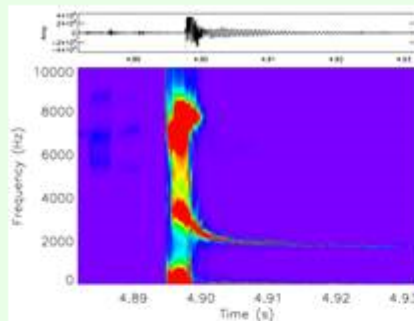


This data has been registered in [IUGONET \(Inter-university Upper atmosphere Global Observation NETwork\)](#) metadata database. The IUGONET metadata database will be of great help to researchers

Dataset	Parameter	Data type	Instrument	Observatory	Dataset MD status	Granule MD status	Note
<a href="#">Ionospheric scintillation</a>	Scintillation index (S4)	Display Data	GPS receiver	Kototabang, Indonesia	<a href="#">registered</a>	<a href="#">registered</a>	
	Scintillation index (S4),	Numerical Data	GPS receiver	Kototabang, Indonesia	<a href="#">registered</a>		Observational Data is Off-line.
	Scintillation drift velocity						
<a href="#">VHF radar</a>	SNR, Doppler velocity, Doppler width	Display Data	VHF radar	Kototabang, Indonesia	<a href="#">registered</a>	<a href="#">registered</a>	
<a href="#">VLF/ELF measurement</a>	frequency spectra	Display Data	VLF/ELF antenna	Kagoshima, Japan; Athabasca, Canada	<a href="#">registered</a>	<a href="#">registered</a>	
		Numerical Data		Mosiri, Japan; Kagoshima, Japan; Athabasca, Canada	<a href="#">registered</a>		Observational Data is Off-line.







## STEL VLF/ELF Data

This homepage is to show quick-look plots and data list of VLF/ELF tapes obtained by the Solar-Terrestrial Environment Laboratory, Nagoya University.

- [Stations, Instruments, and Acknowledgements](#)
- [Tape data obtained by the Kagoshima Observatory since 1976](#)
- [Some notes and errors](#)

## DATA PLOTS

### VLF sound player

Contact Address

[Kazuo Shiokawa](#),

Solar-Terrestrial Environment Laboratory, Nagoya University  
Furo-cho, Chikusa-ku, Nagoya, Aichi 464-8601, Japan

tel:  +81-52-747-6419 fax: +81-52-747-6323

# まとめ

## 太陽地球系科学のデータベースに求められること

1. データの説明 (IUGONETメタデータ)
2. データの有無 (IUGONETメタデータ)
3. データ中の興味あるイベントの有無  
→ PIが用意するQLプロット
4. 共同研究のための解析可能・解析済みのデータの取得  
→ インタラクティブに容易に論文に使える  
プロットが作れる統合解析ツールの開発  
(UDAS, SPEDAS, ERGWATなど)