A Virtual Observation Network System for Global Ground-Based Observatories

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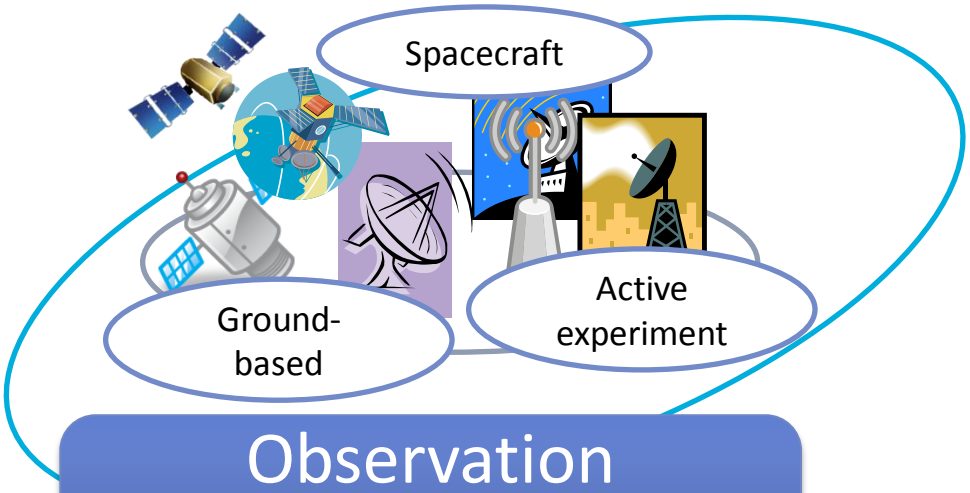
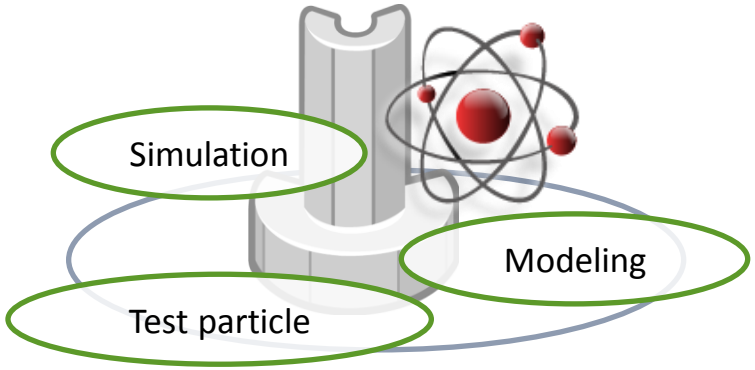
National Institute of Information and Communications Technology
Applied Electromagnetic Research Institute
Space Weather and Environment Informatics Laboratory
4-2-1 Nukui-kita, Koganei 184-8795 JAPAN

Two methodologies for Space Weather



Observation
via Ground-based observatory and satellite



Simulation
via super computer

NICT Space Weather Monitoring Networks

Magnetometer

HF radar

Magnetometer & HF radar observations in Far East Siberia

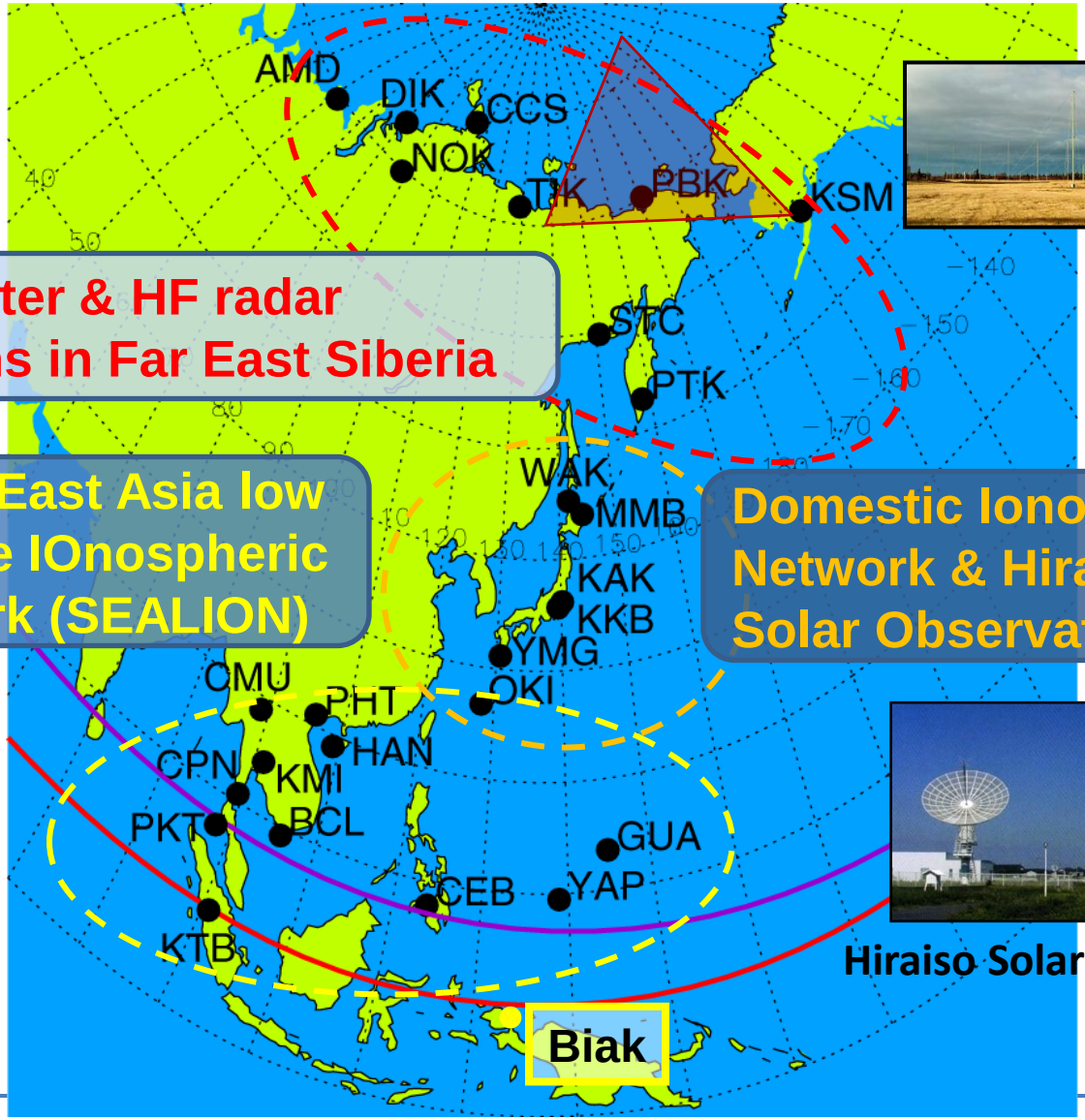
Ionosonde

South-East Asia low latitude IOnospheric Network (SEALION)

Domestic Ionosonde Network & Hiraiso Solar Observatory

Ionospheric observation at Syowa Station

Hiraiso Solar Observatory



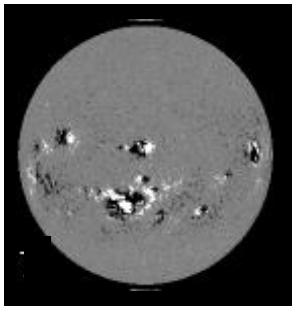
NICT Space Weather Numerical Simulations

Solar Wind Monitoring
(ACE satellite)

telemetry

ACE antenna

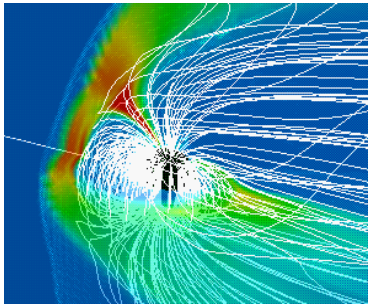
Mag. Field data
（SOHO satellite)



input

Super Computer

input



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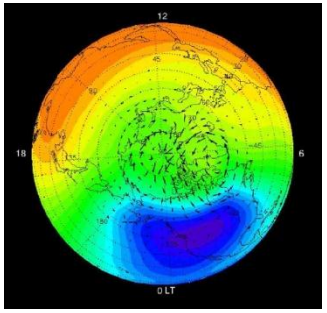
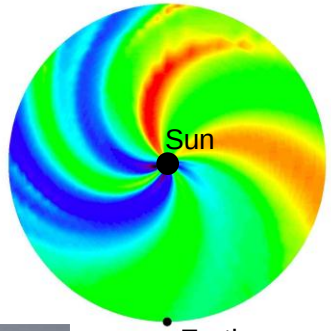
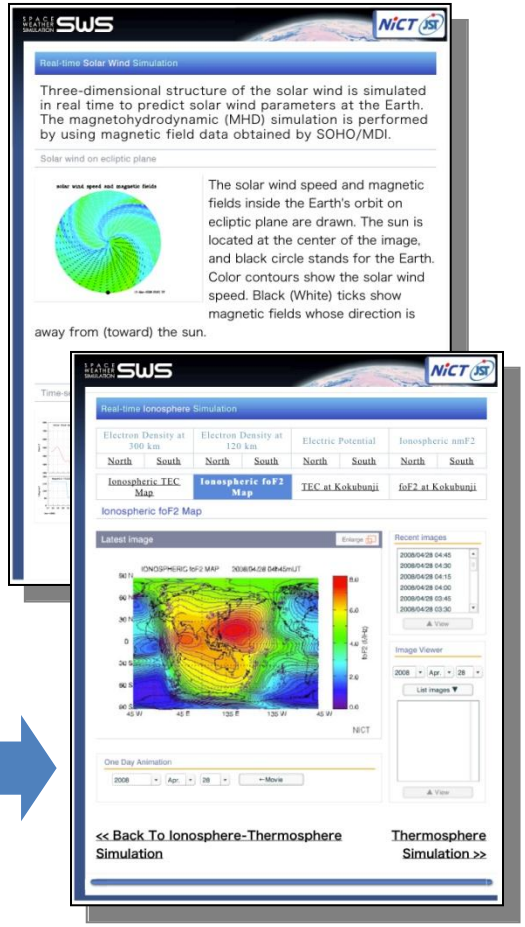


Sun/Solar Wind simulation



Vis.

Vis.



NICT Web

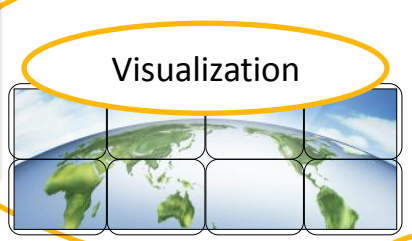
Magnetosphere simulation

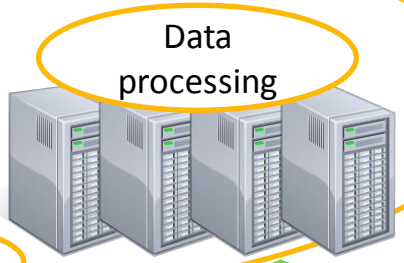
Ionosphere simulation

“Science Cloud”; A facility for the 3rd methodology

Data intensive approach of large-scale data

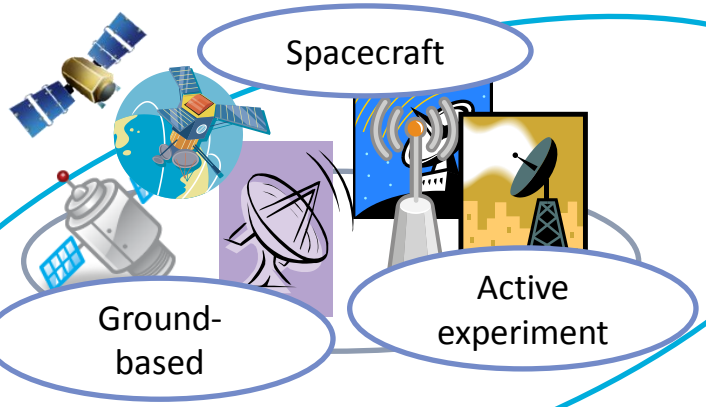
Informatics via “cloud system”

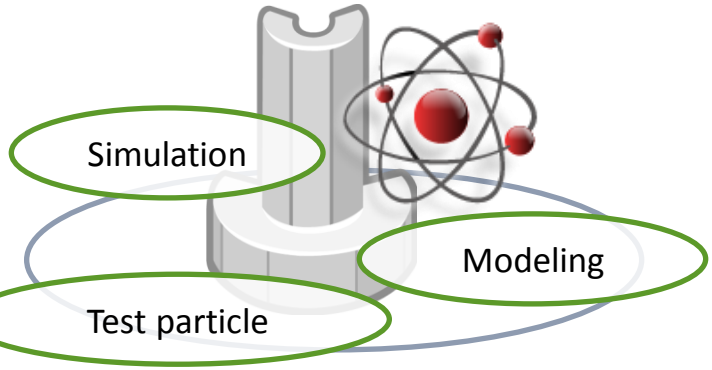




Data

Data





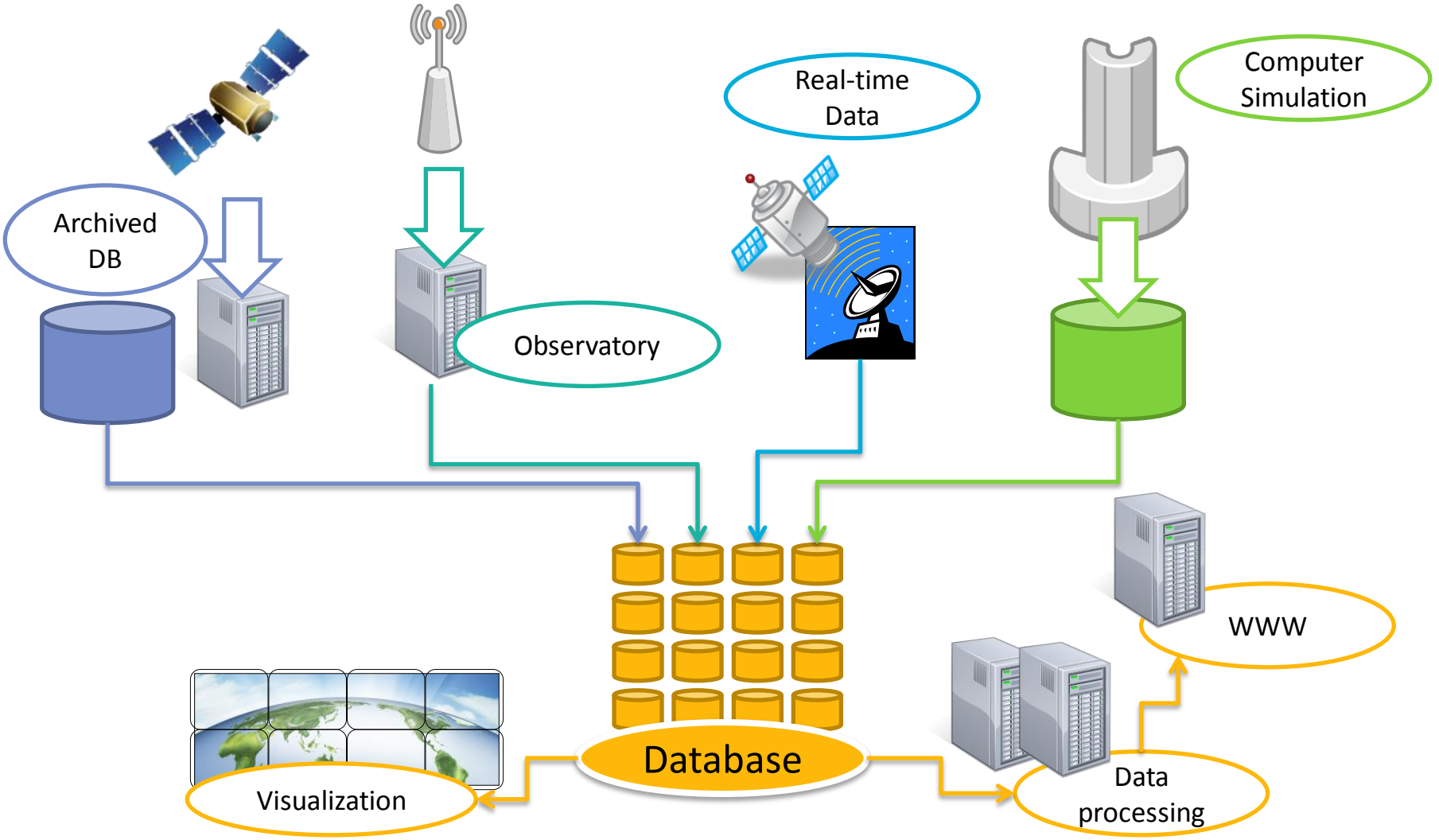
Observation

via Ground-based observatory and satellite

Simulation

via super computer

Integrated Database for SW data



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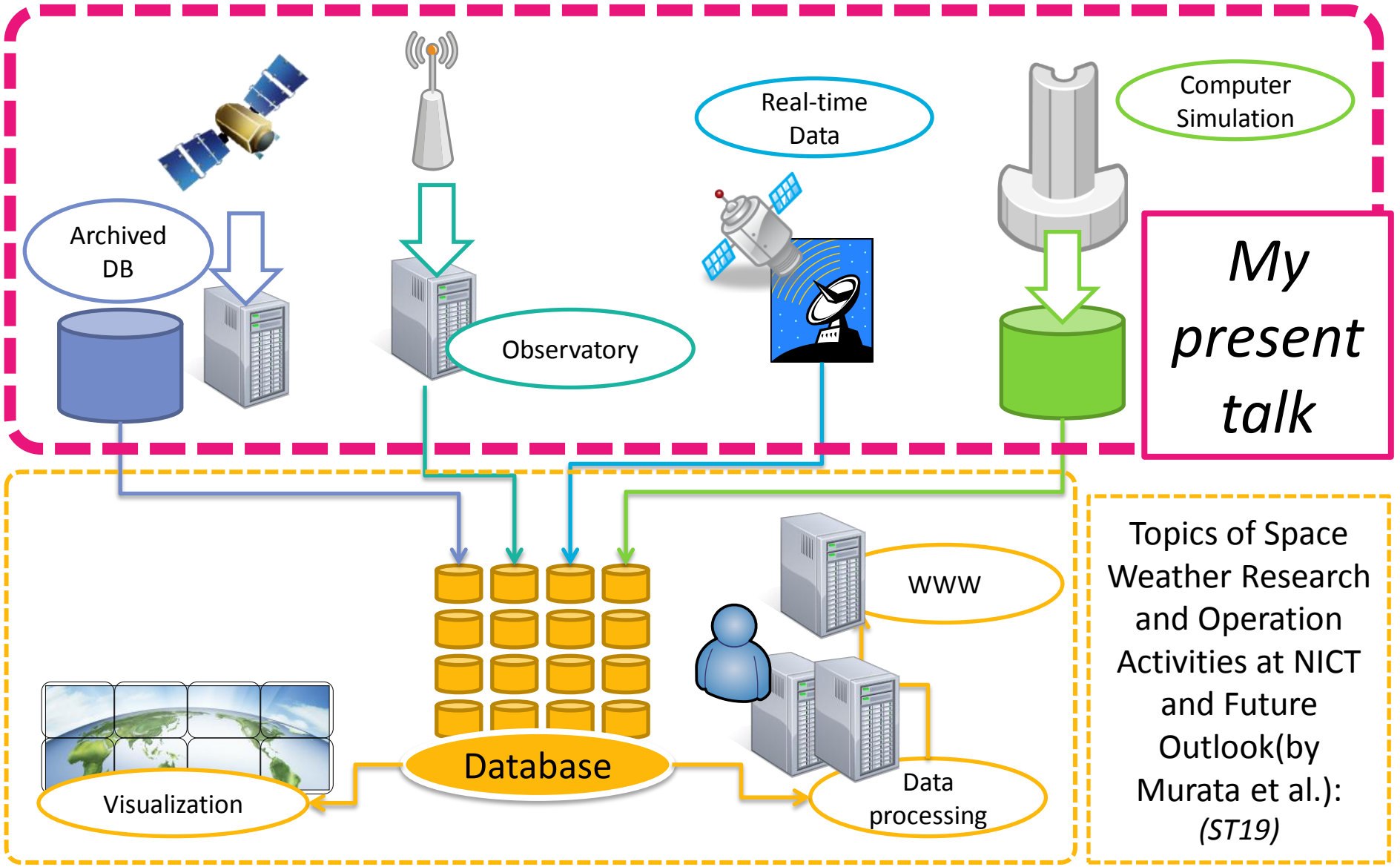
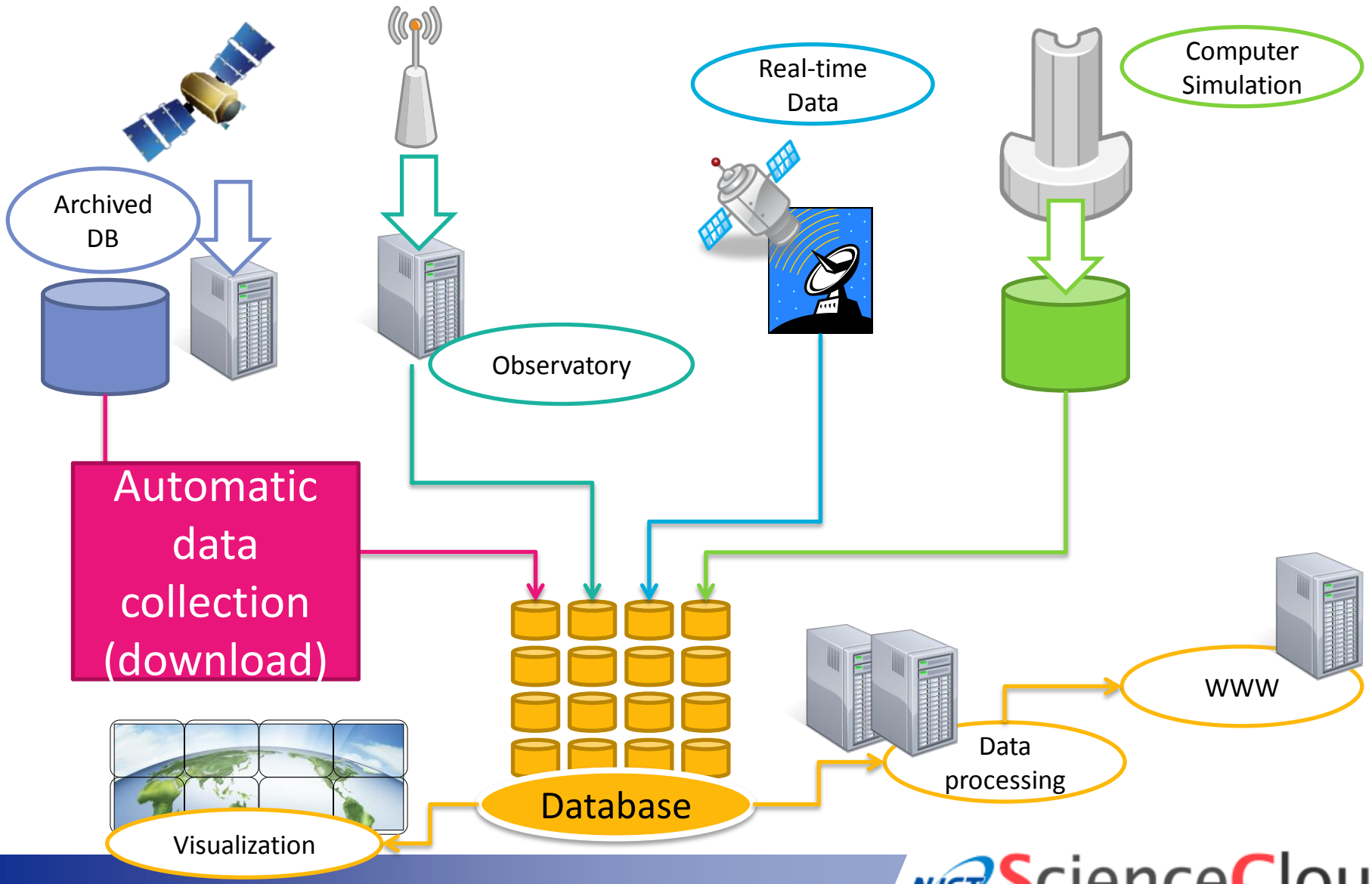
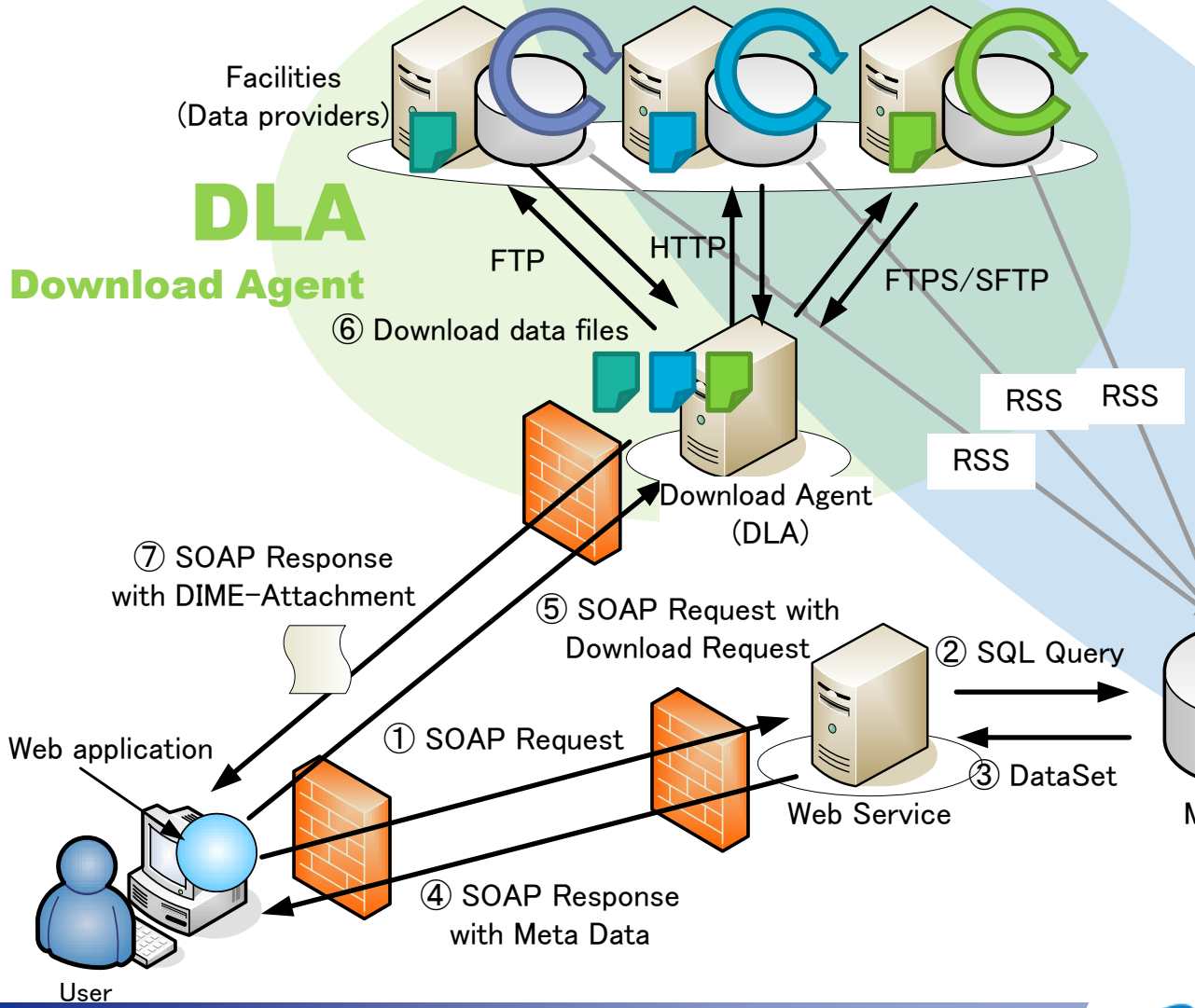


Integrated Database for SW data



NiCTy
DLA

NICT Technology
Automatic Data Collection System
for Science Data



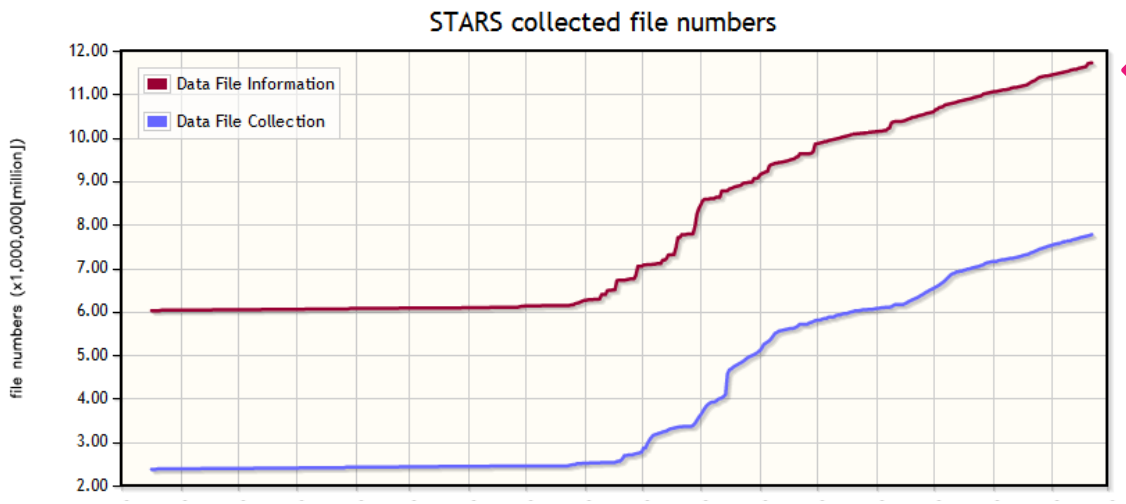
Sept. 2010

Target	#
Target Countries	7
Target Organizations	33
Target Data Types	345
Collected meta-data	5,724,175
Collected data files	1,058,047
Total data file size	370TB

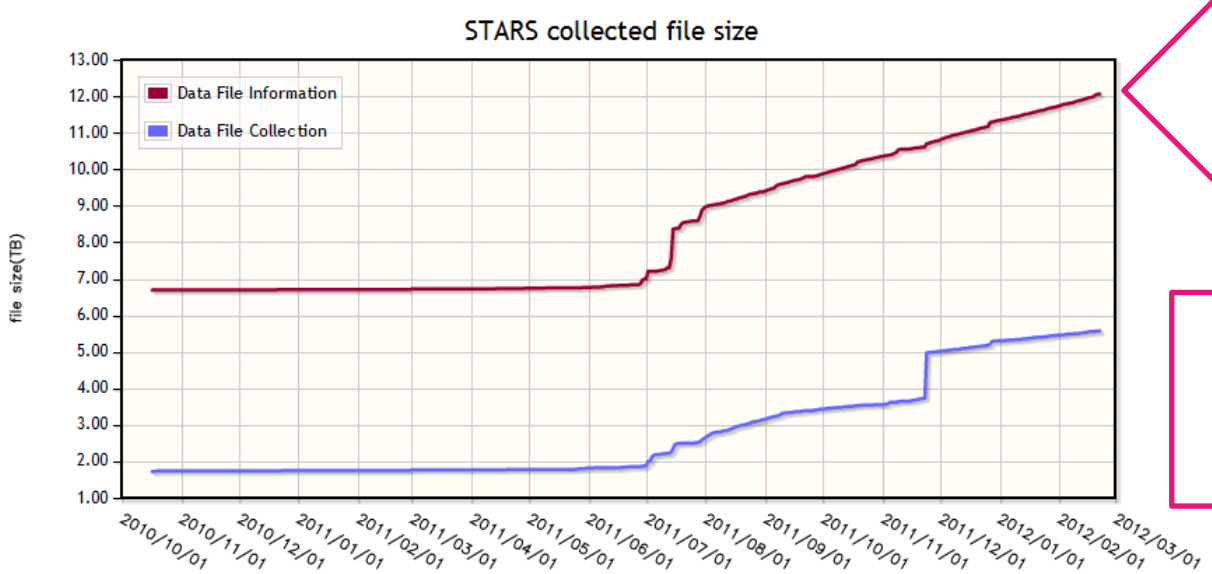
For Space Weather data

9
NICT ScienceCloud

Automatic Data Collection



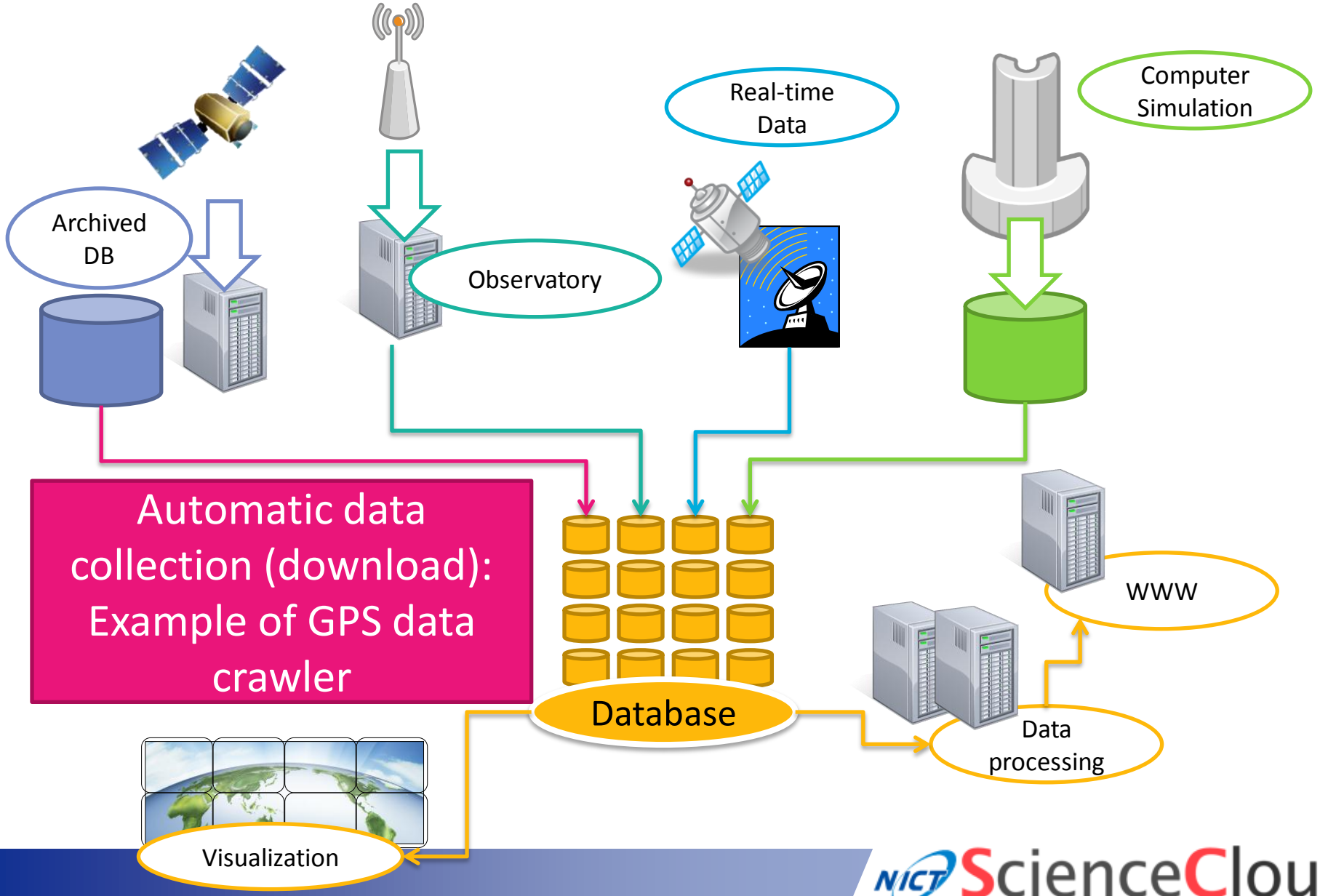
More than 11 million files



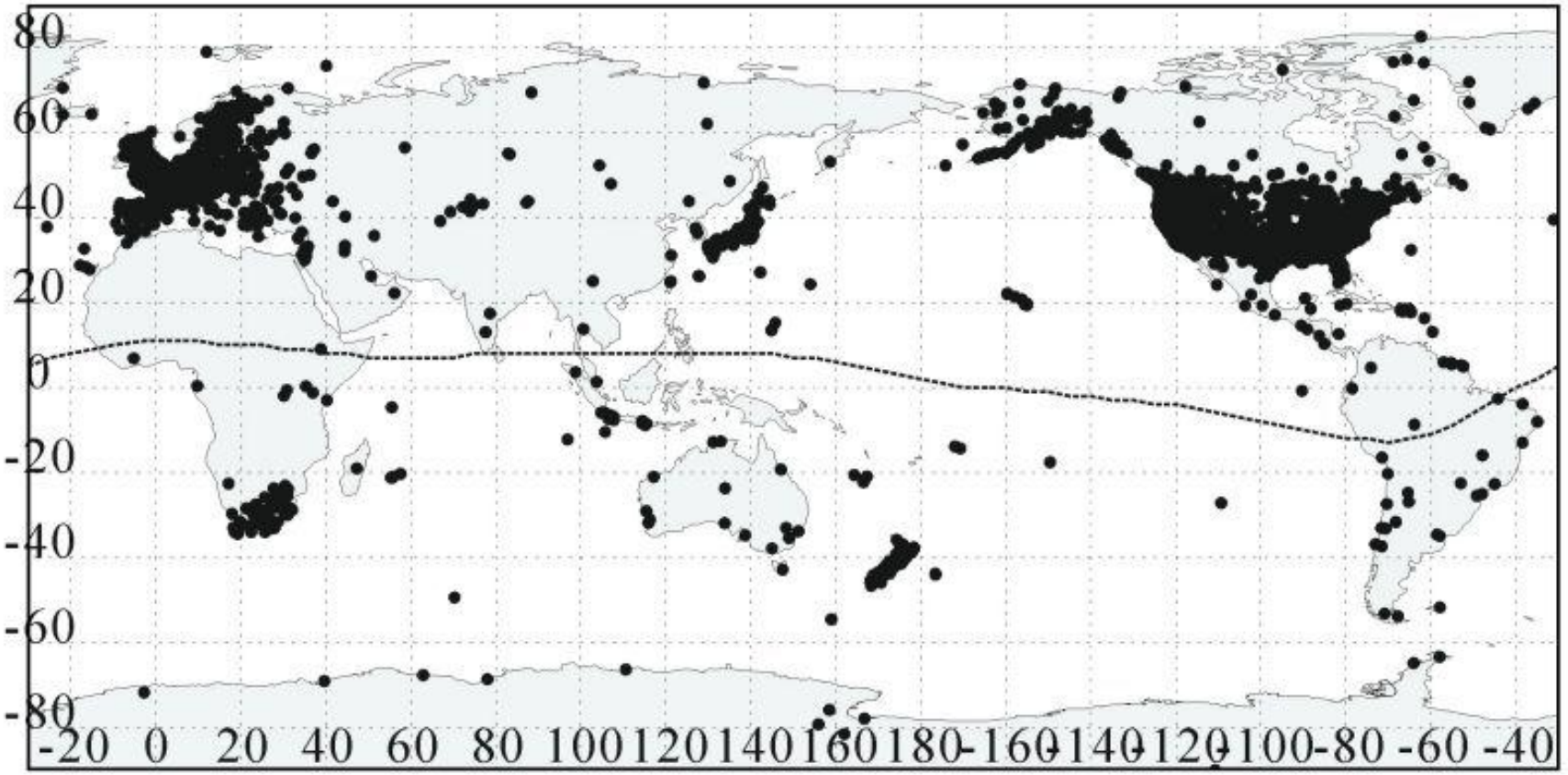
More than 12 tera bytes

Target Data:
More than 400

Integrated Database for SW data



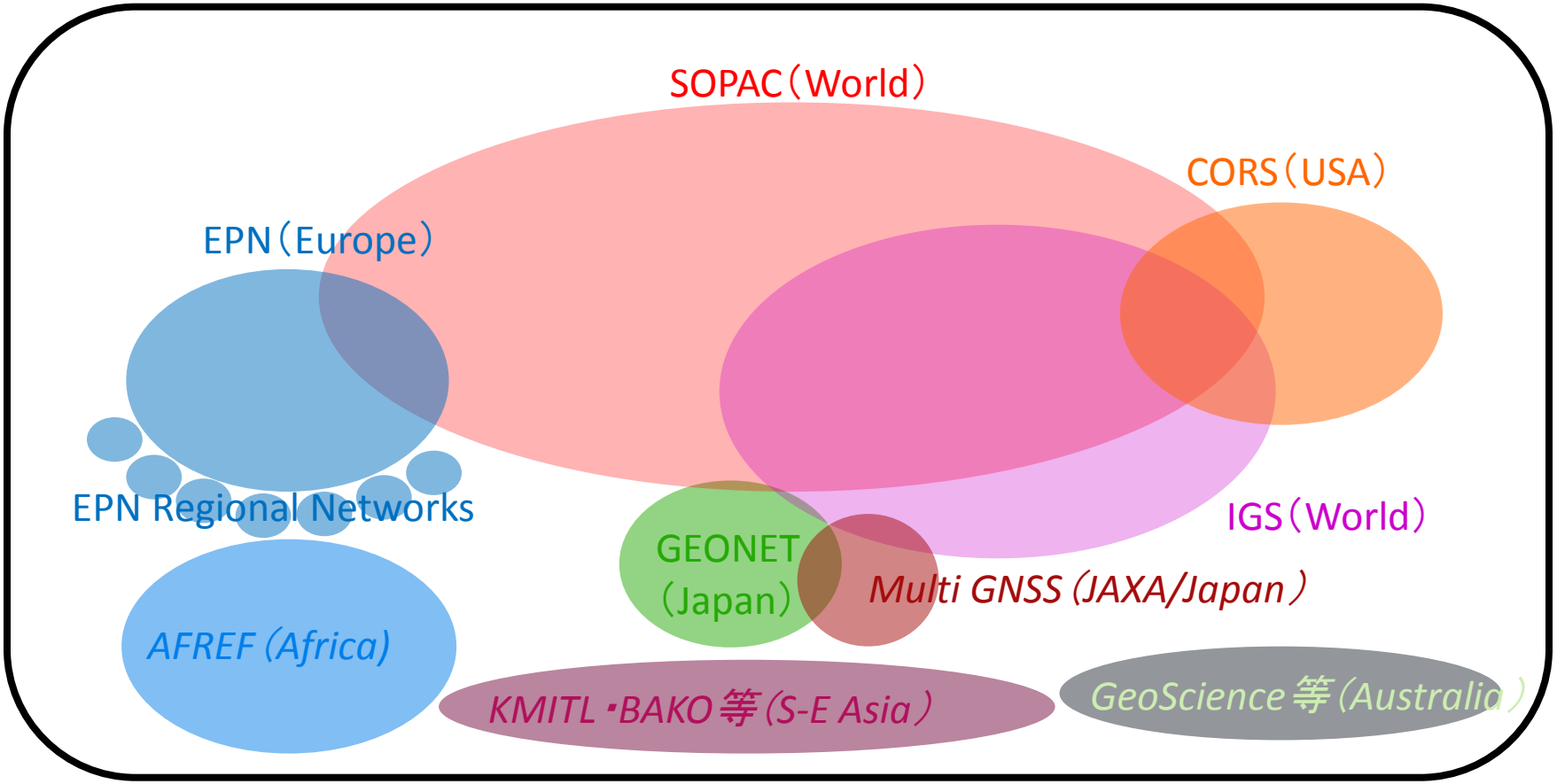
Global GPS Receiver Network



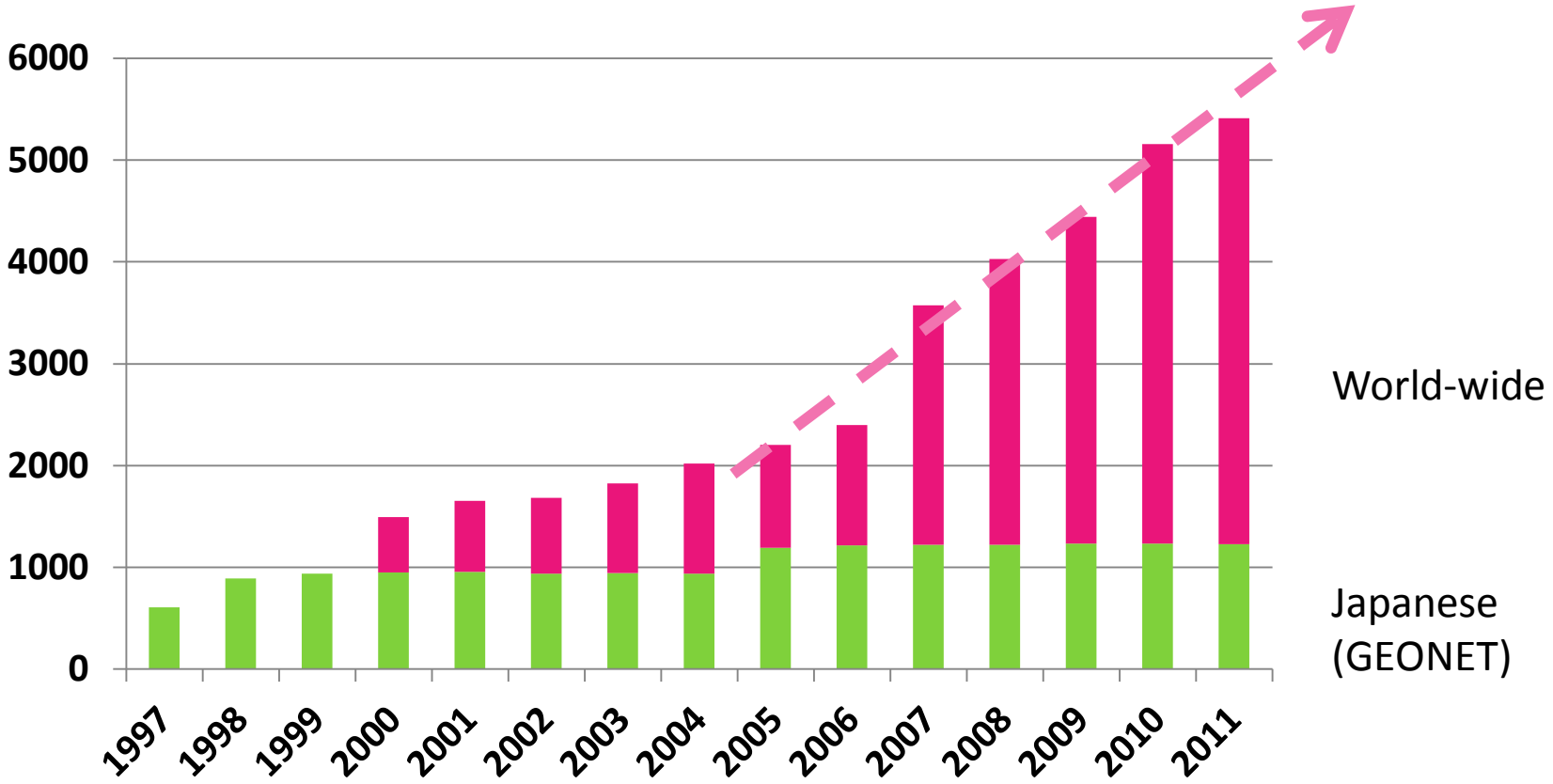
- As of April 2010, NICT is collecting all the available GPS receiver data (~5,000 receivers) which belong to GEONET, SOPAC, IGS, CORS, EPN, etc.
- We plan to provide regional/global high-resolution maps of absolute TEC, detrended TEC, ROTI, loss-of-lock on GPS signals.

GNSS Data providers（including future plan）

NICT GNSS TEC Data Service（5000 receivers）⇒5000 files/day



Trend of the number of GSP receivers



- The annual trend of the number of GSP receivers (world-wide since 2000 and domestic (Japan) since 1997) .

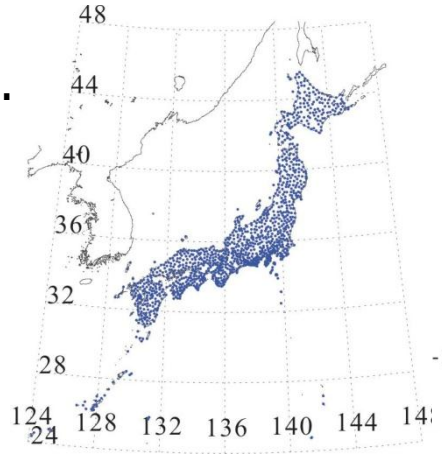
Ionospheric Disturbance via High-Resolution GPS-TEC

Region
# of GPS Rec.

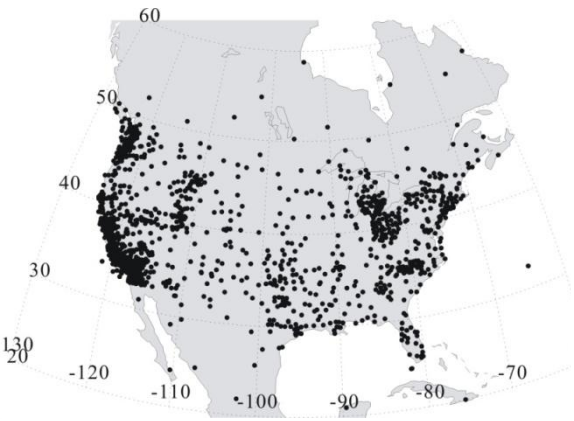
GPS Receivers

Detrended TEC Map (30sec, 0.15°x0.15°)

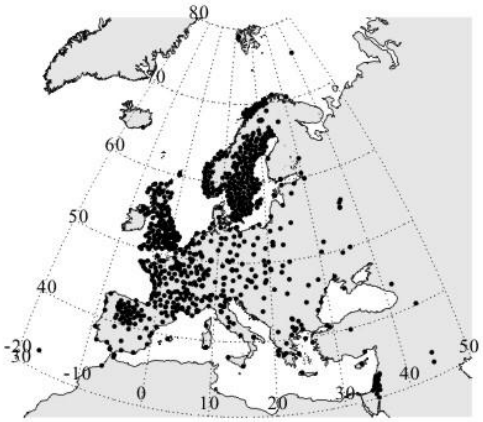
~1,200 receivers

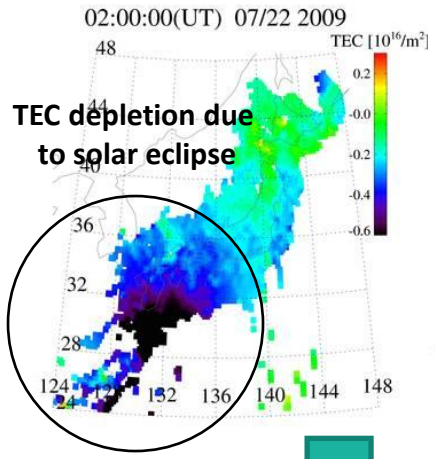


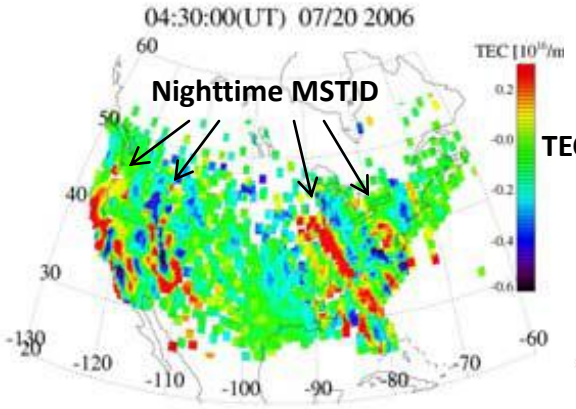
~1,600 receivers

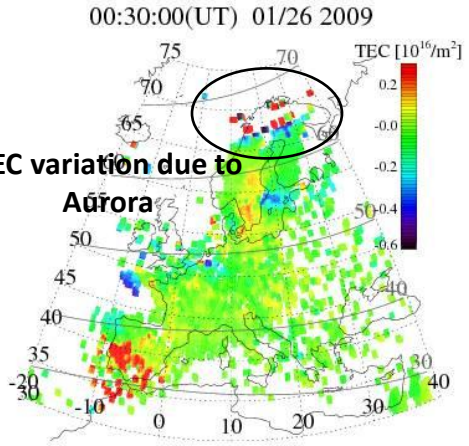


~830 receivers



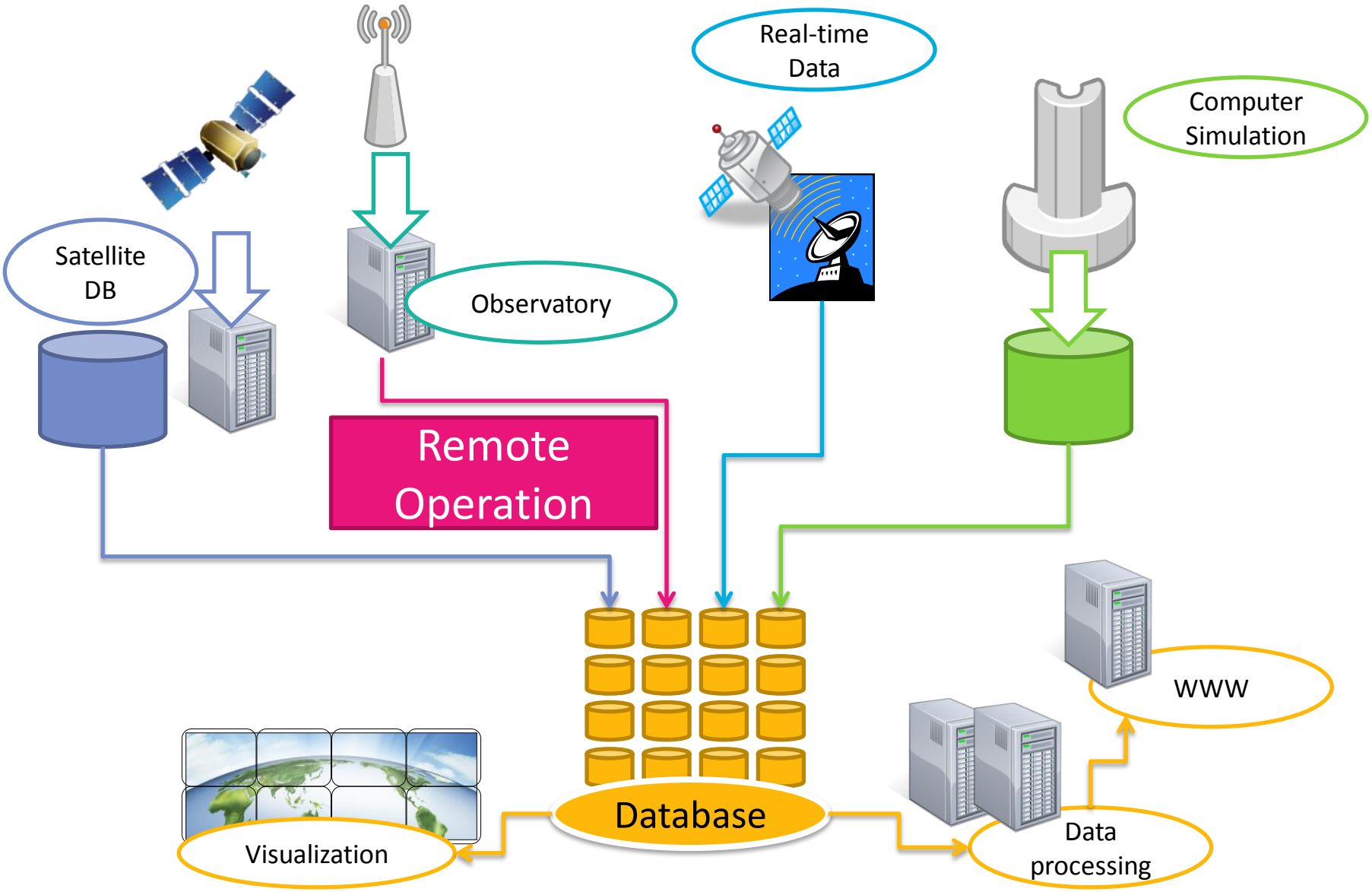






Asia-Oceania GPS-TEC map…

Integrated Database for SW data



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HF radar

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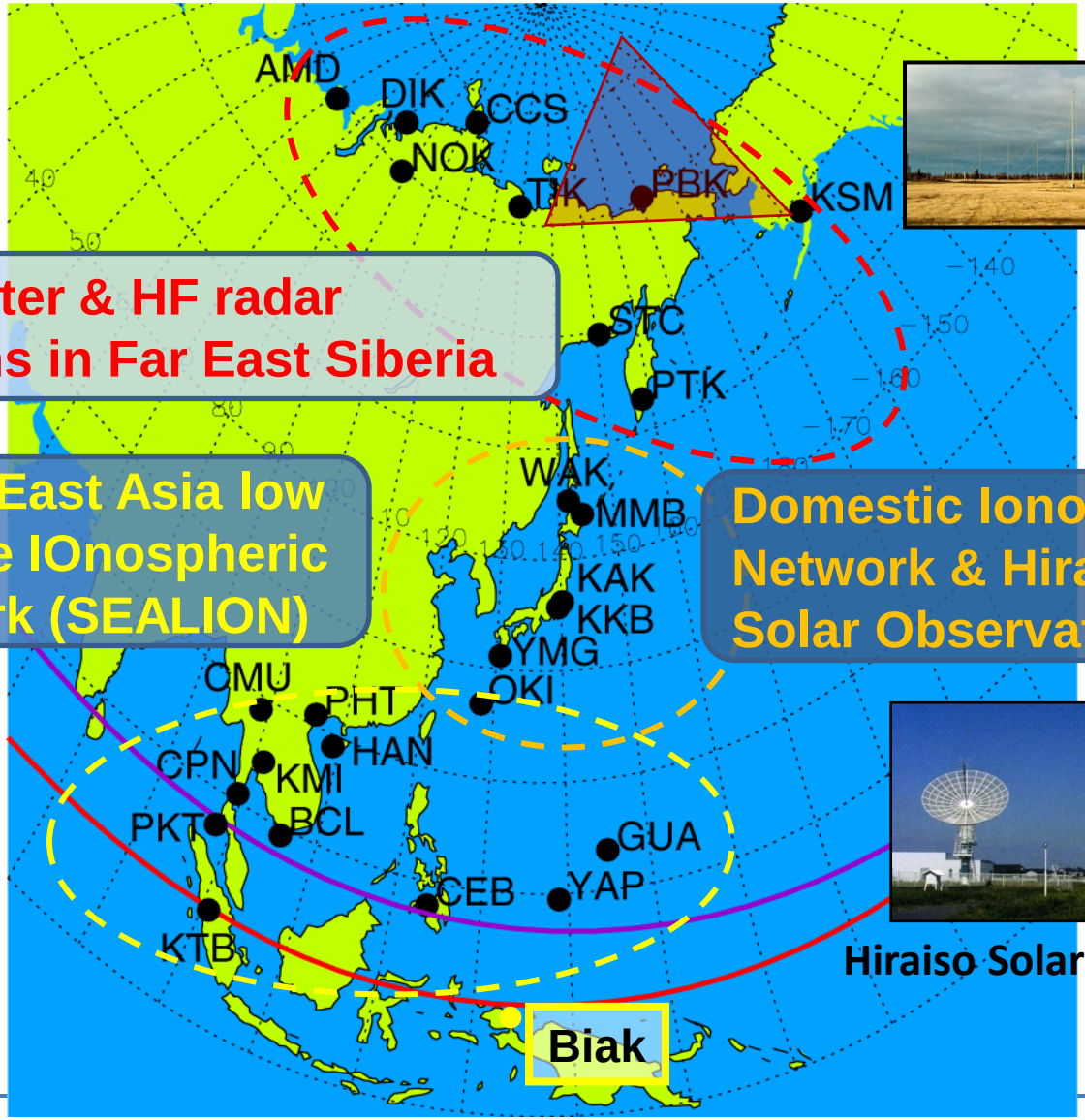


Control/Data transfer Server(Linux)

Magnetometer

UPS

Control Server(Linux)

Data transfer server(Linux)

Router

PS

Control Server(Windows)

Ionosonde

UPS

Data transfer server(Linux)

Router

UPS

GPS

More than 4 operational policies

Control/Data transfer Server(Linux), VPN client

Router

Equipment

slave

Power supply controller

UPS

Control Server(Windows)

Data transfer Server(Linux), VPN client

Router

Equipment

slave

Power supply controller

UPS

Virtualization of observation and data archive

FW/Router

Routing block

Server
- HK monitor
- routing
- redundancy

Virtualization
- VPN network
- Warning system
- Monitoring system

Data transfer monitoring server

VPN server

VPN client

Distributed disk

VPN network

Distributed storage Management server

WWW server

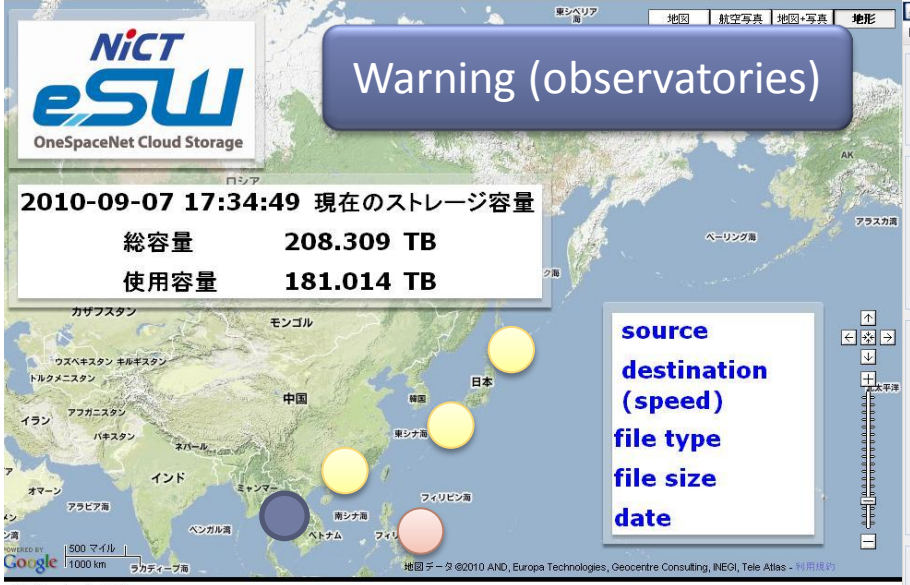
Data Transfer
- Automatic repeat-request (ARQ)
- Data file consistency

Distributed disk

L2 network

Observatory

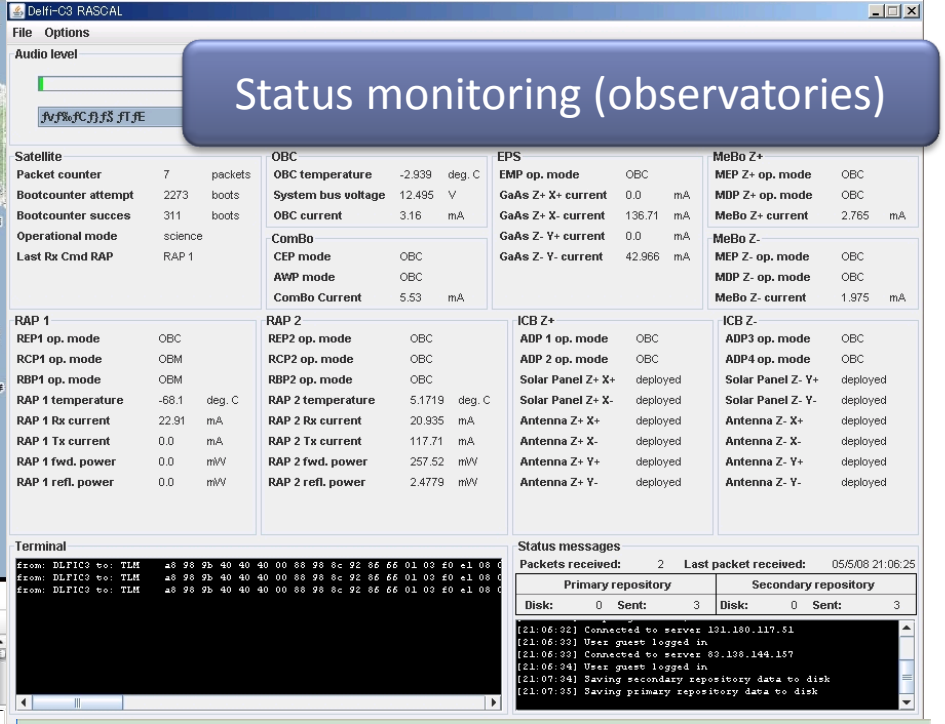
NICT



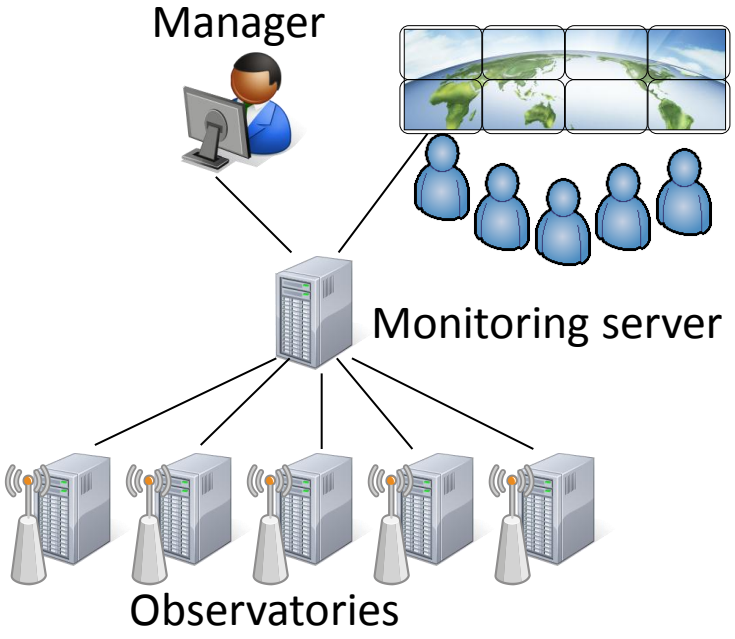
Warning (observatories)

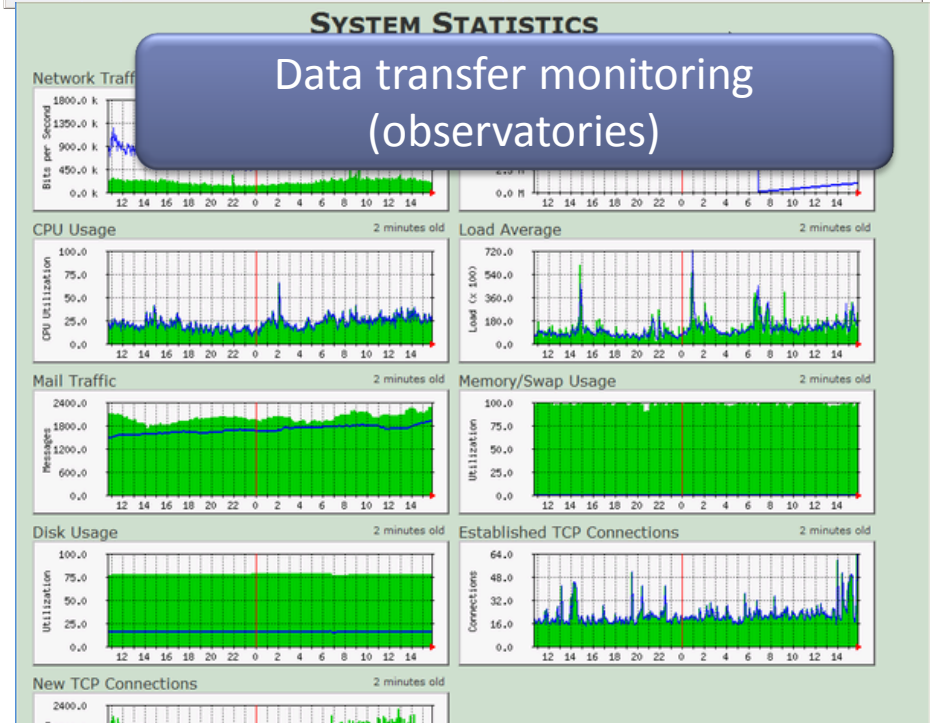
プリケーションログ

source	destination	speed	file type	file size	date
小金井[n13]	小金井[n10]	75.2 MB/s	data	37 MByte	06-11 00:33:38
小金井[n13]	沖縄[n51]	21.5 MB/s	data	37 MByte	06-11 00:33:38
大阪[n30]	沖縄[n50]	0.9 MB/s	data	27 MByte	06-11 00:34:34



Status monitoring (observatories)

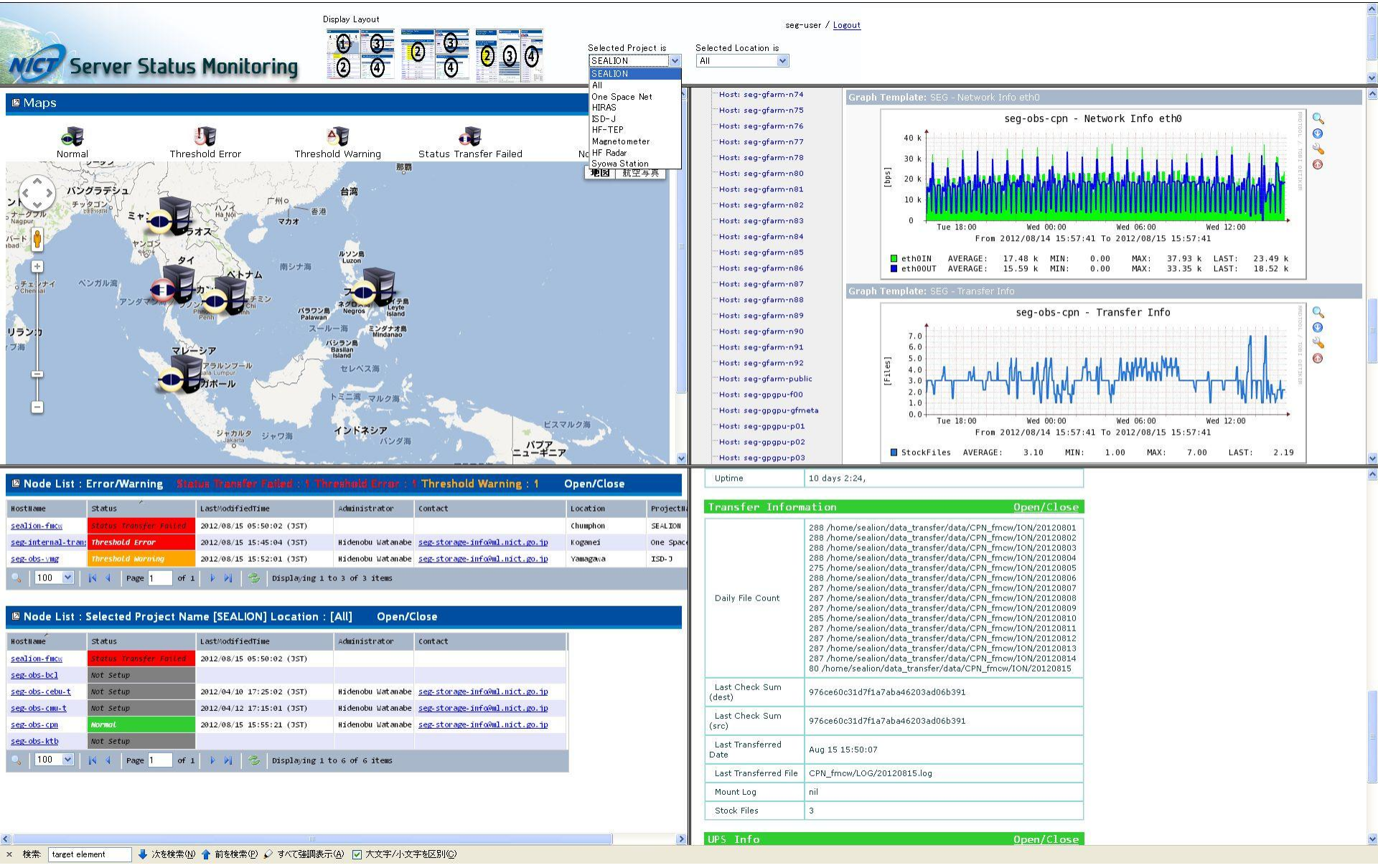




Data transfer monitoring (observatories)

Observatory Equipment Monitoring Web

Green: Normal, Orange: Warning, Red: Mal-functional, Grey: unequipped

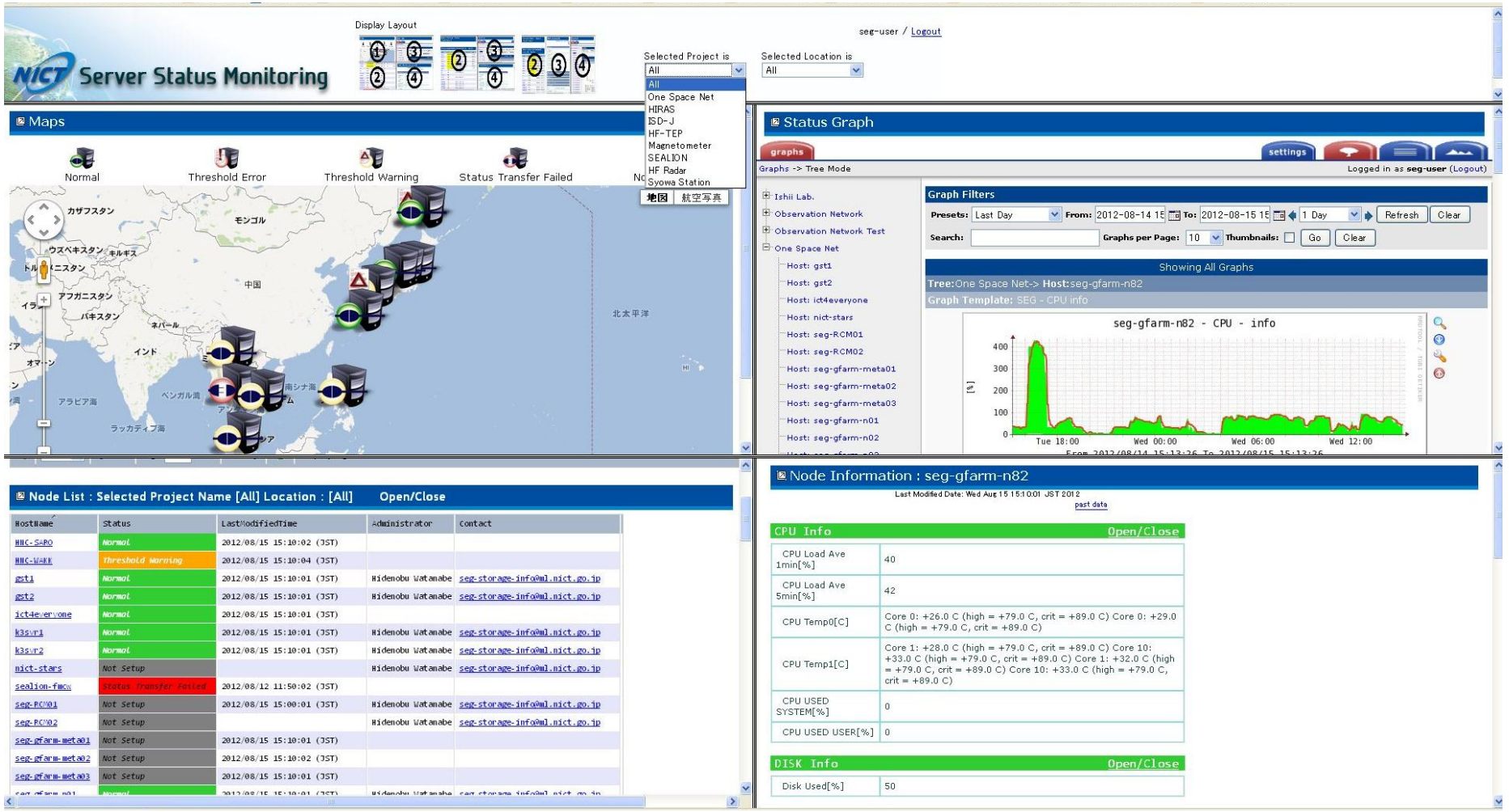


Summary

- Space Weather research works should be separated from data collection.
  - Researchers can simply analyze any types of data without paying attention to data collection, data management and data stewardship.
- NICT has successfully developed a virtual database for space weather data.
  - For (1) archived data over the Internet, (2) real-time data from NICT observatories with remote operation, (3) real-time data from satellites and ground-based observations, (4) large-scale data from super-computers.

Thank you for your attention!

Weekly Space Weather News
http ://www.seg.nict.go.jp/wsw



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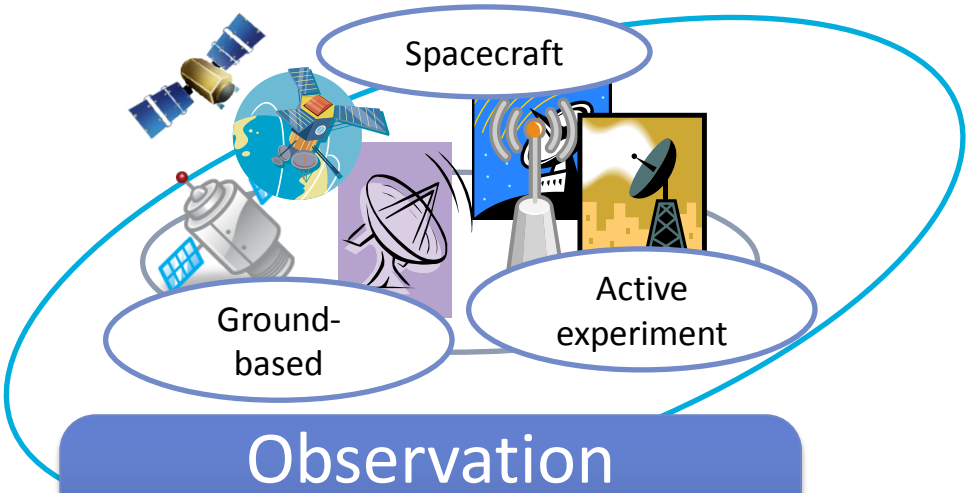

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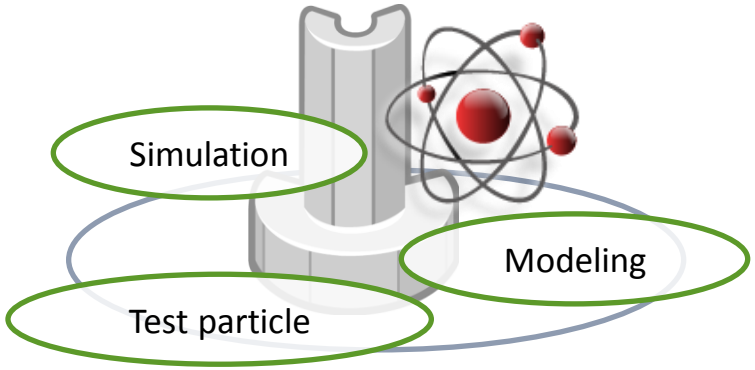

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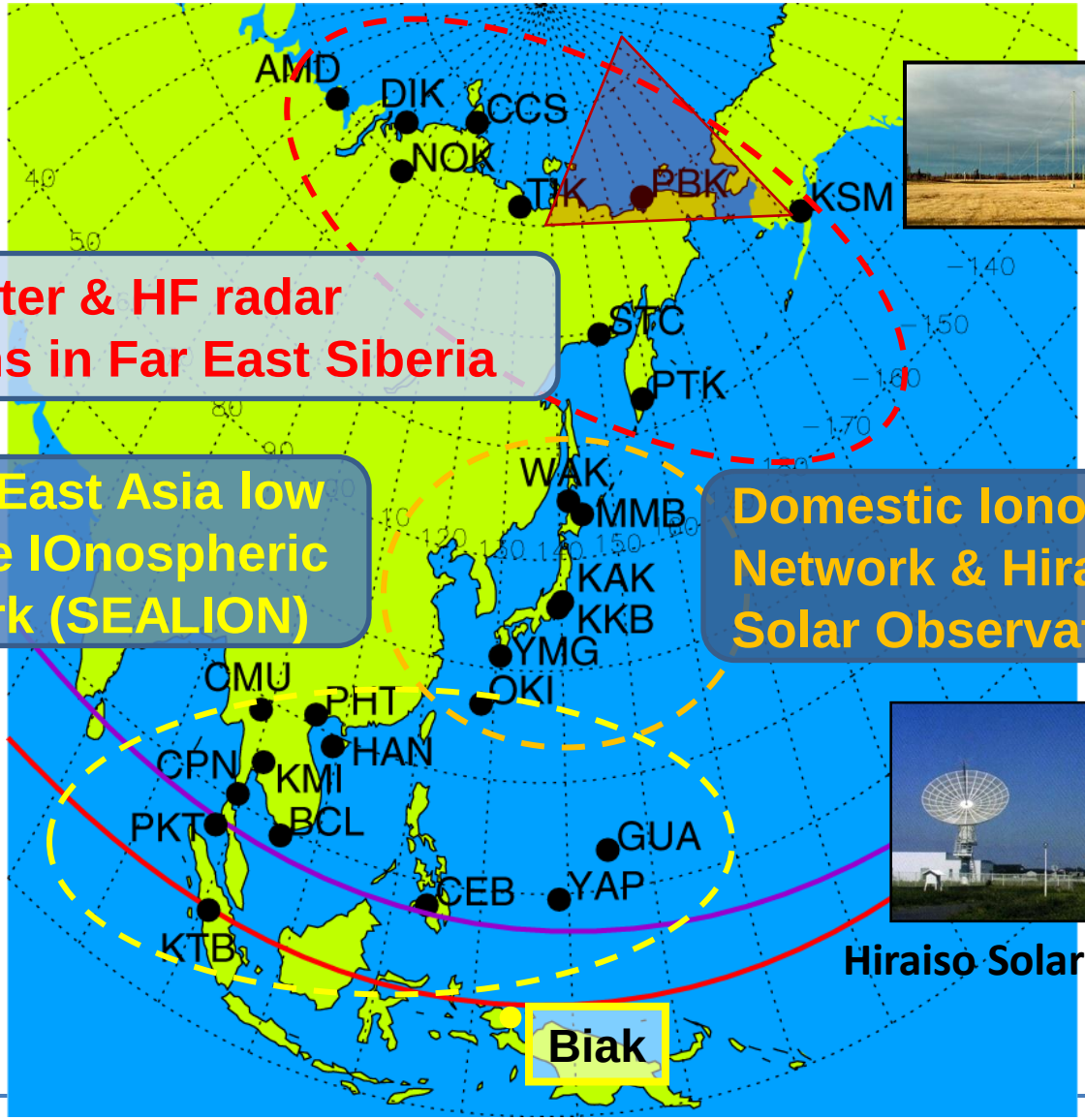


NICT Space Weather Data & Product

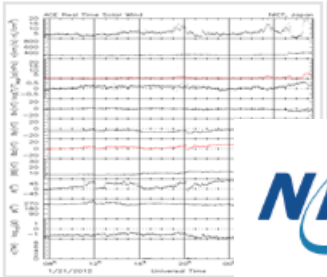
Applied Electromagnetic Research Institute
Space Weather and Environment Informatics Laboratory

http://www.seg.nict.go.jp
(to be open Apr. 2012)

Japanese / English

- **Solar / Solar Wind**
  - HiRAS
  - Hα
  - ACE
  - STEREO
  - Sorar-Terrestrial Activity Chart
- **Magnetosphere**
  - Geomagnetic Index
  - Geomagnetic Observation
  - HF Radar
- **Ionosphere**
  - Regular Ionosonde Observations in Japan
  - Ionosonde Observations at Syowa Station

Solar Wind Observation by ACE



Plots of the real-time solar wind data from the ACE spacecraft which has observed solar wind continuously at the Lagrangian point one (L1). NICT

- ACE Real Time S

NICT Space Weather Data & Product

Applied Electromagnetic Research Institute
Space Weather and Environment Informatics Laboratory

Japanese / English

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  - Regular Ionosonde Observations in Japan
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SEALION (SouthEast Asia Low-latitude IOnospheric Network)

SEALION (SouthEast Asia Low-latitude IOnospheric Network) is an ionospheric observation network in Southeast Asia. It has been conducted by NICT since 2003 for the purpose of monitoring and forecasting equatorial ionospheric disturbances, especially plasma bubbles. SEALION is a unique ionospheric observation network in having the conjugate observational points in the northern and southern hemispheres and around the magnetic equator.

- SEALION Ionogram Viewer
- ALL FMCW sites latest ionogram
- Summary Plots of SEALION Ionograms
- KML for SEALION Ionosonde Data
- S4 index at Phu Thuy

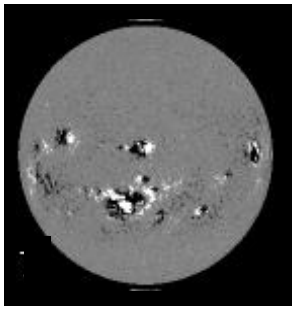
NICT Space Weather Numerical Simulations

Solar Wind Monitoring
(ACE satellite)

telemetry

ACE antenna

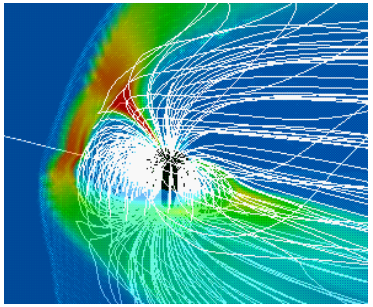
Mag. Field data
（SOHO satellite)



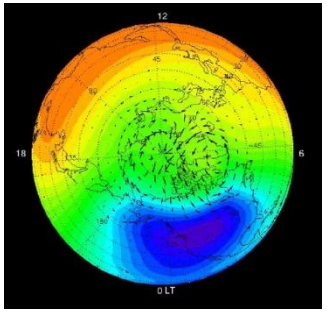
input

Super Computer

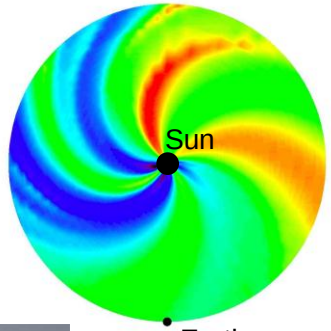
input



input

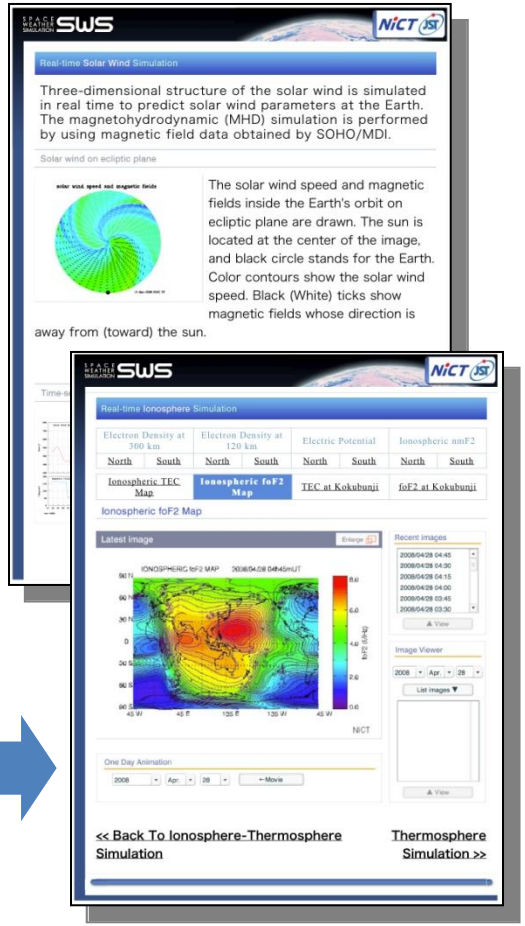


Sun/Solar Wind simulation



Vis.

Vis.

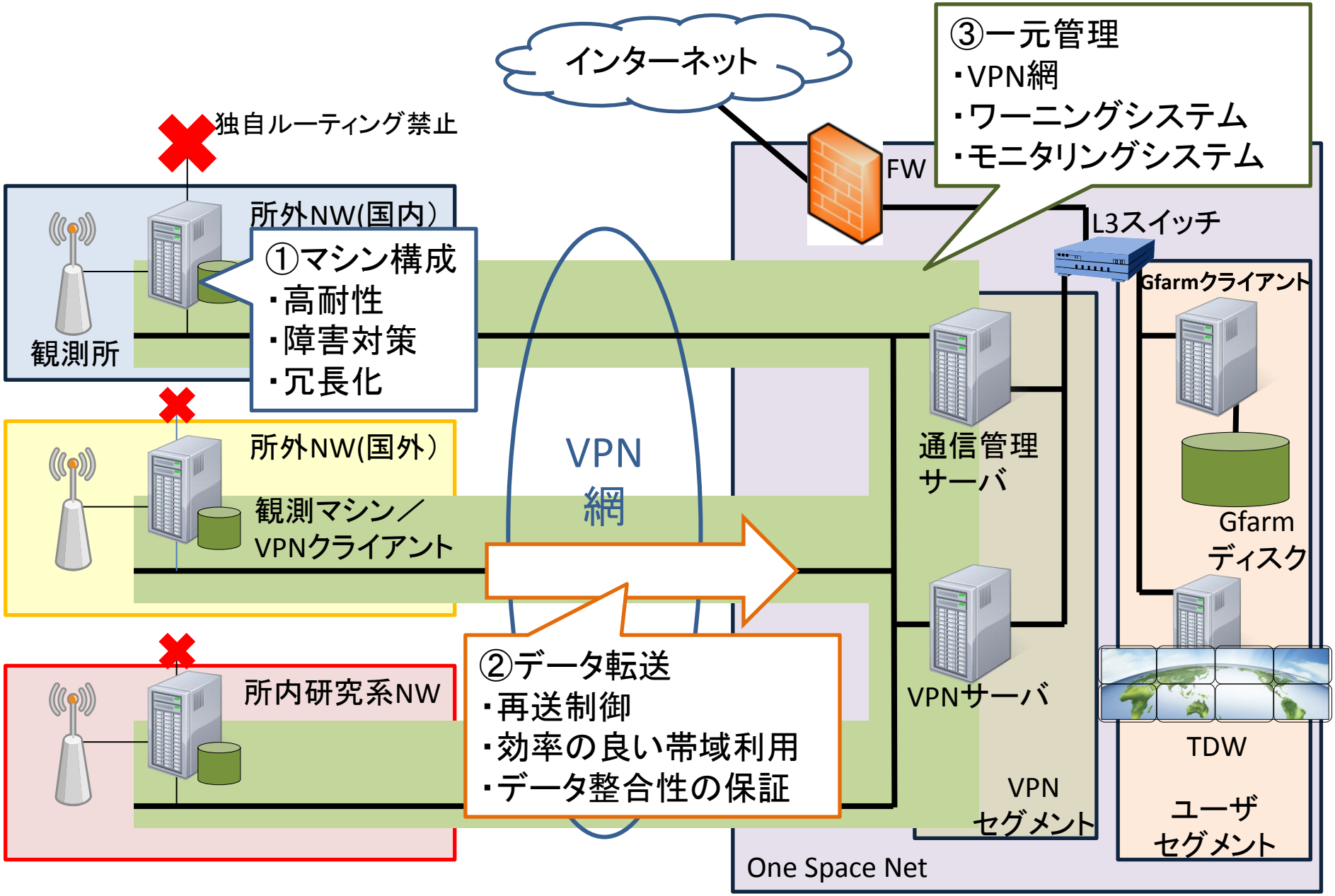


NICT Web

Magnetosphere simulation

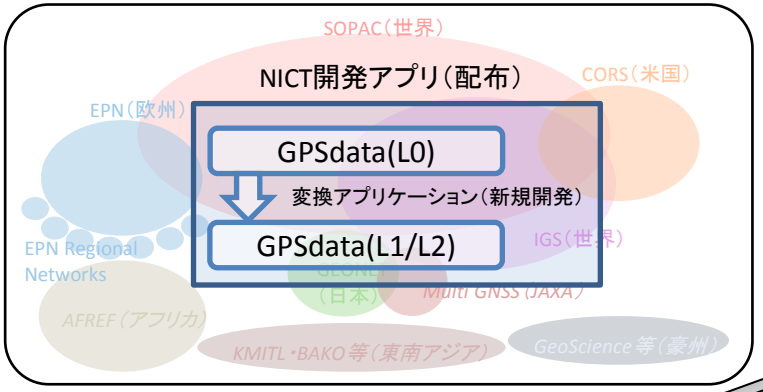
Ionosphere simulation

観測支援システムの概要

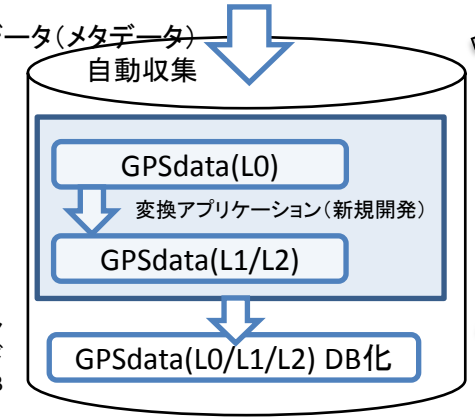


グローバルGPS-TEC計画

世界のGPS(L0)データ公開サイト



L0/L1データ(メタデータ)
自動収集



サイエンスクラウド(WDS)DB

GPSデータの守秘性(非公開データ)

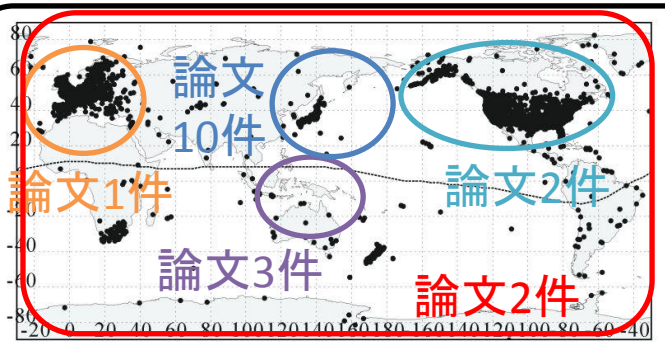
GPS-TECデータの有用性(研究・実用)

GPS-TECデータの標準化(L1)("RINEX準拠")

GPS-TECプロット(L2)DB化

標準化/DB化

NICTから標準化提案へ(統合データシステム室と協力)

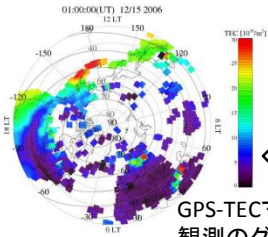


研究・共同研究

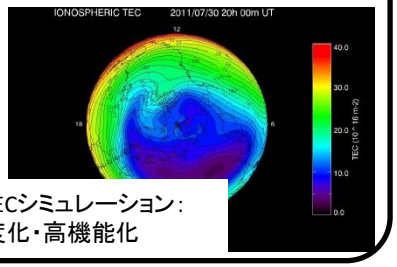
各地域・領域の電離圏先端研究へのGPS-TECデータの提供と共同研究

これまでの成果(2009年から)

シミュレーション融合(今中期～次期中期)



定性的比較から定量的比較へ⇒データ同化モデル実現へ



GPS-TECマップ:
観測のグローバル化

GPS-TECシミュレーション:
高精度化・高機能化

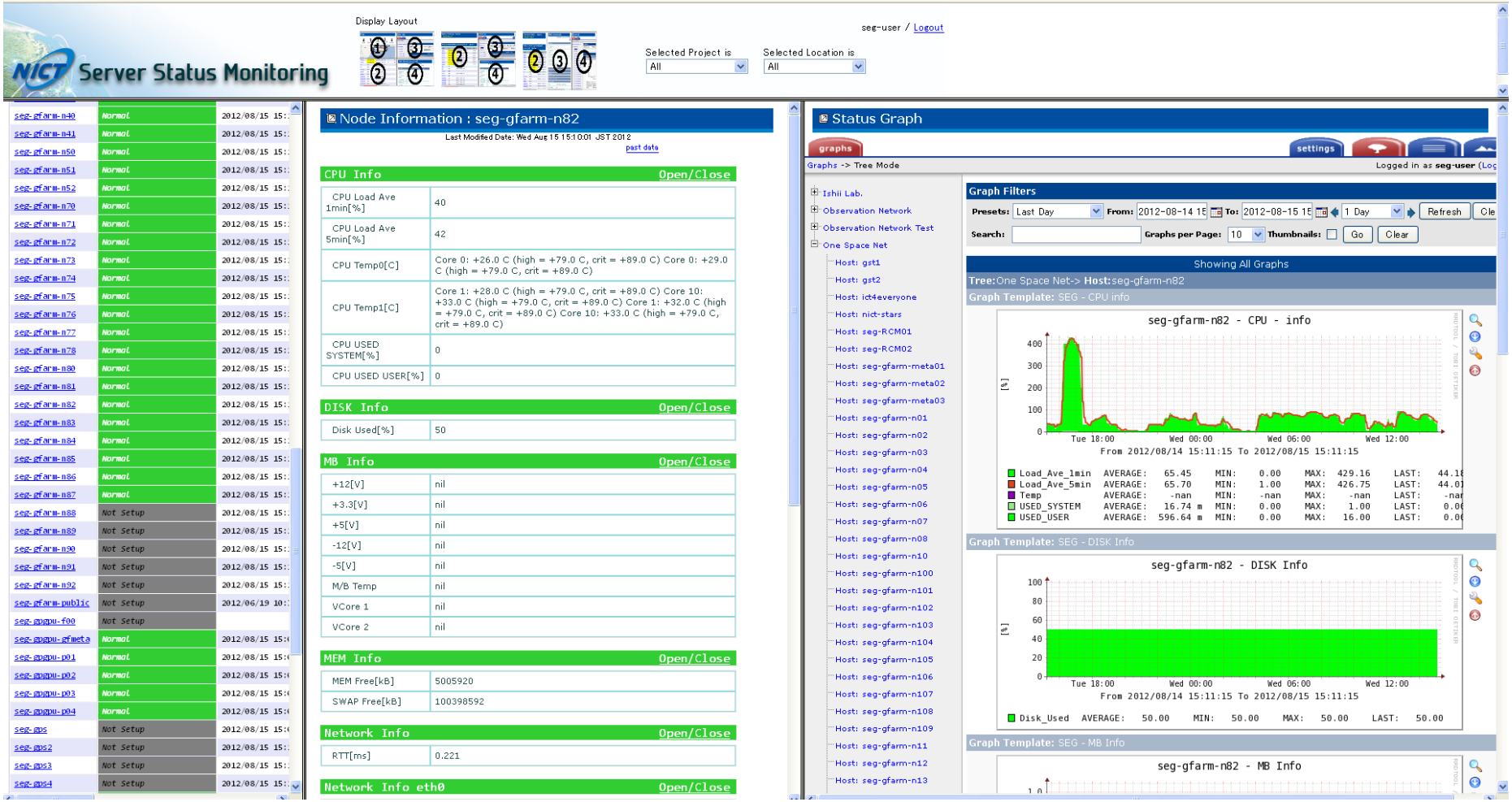
GPSデータファイル数(サイズ)

過去約10年⇒730万ファイル(3.5TB)

今後(予想)⇒360万ファイル(1.7TB)/年

ステーション数:約10,000
⇒マニュアル収集は不可能
⇒NICTYによる自動収集

観測ネットワークモニター


Server Status Monitoring
Display Layout
seg-user / Logout
Selected Project is
All
Selected Location is
All
seg-gfarm-n40 Normal 2012/08/15 15:
seg-gfarm-n41 Normal 2012/08/15 15:
seg-gfarm-n50 Normal 2012/08/15 15:
seg-gfarm-n51 Normal 2012/08/15 15:
seg-gfarm-n52 Normal 2012/08/15 15:
seg-gfarm-n70 Normal 2012/08/15 15:
seg-gfarm-n71 Normal 2012/08/15 15:
seg-gfarm-n72 Normal 2012/08/15 15:
seg-gfarm-n73 Normal 2012/08/15 15:
seg-gfarm-n74 Normal 2012/08/15 15:
seg-gfarm-n75 Normal 2012/08/15 15:
seg-gfarm-n76 Normal 2012/08/15 15:
seg-gfarm-n77 Normal 2012/08/15 15:
seg-gfarm-n78 Normal 2012/08/15 15:
seg-gfarm-n80 Normal 2012/08/15 15:
seg-gfarm-n81 Normal 2012/08/15 15:
seg-gfarm-n82 Normal 2012/08/15 15:
seg-gfarm-n83 Normal 2012/08/15 15:
seg-gfarm-n84 Normal 2012/08/15 15:
seg-gfarm-n85 Normal 2012/08/15 15:
seg-gfarm-n86 Normal 2012/08/15 15:
seg-gfarm-n87 Normal 2012/08/15 15:
seg-gfarm-n88 Not Setup 2012/08/15 15:
seg-gfarm-n89 Not Setup 2012/08/15 15:
seg-gfarm-n90 Not Setup 2012/08/15 15:
seg-gfarm-n91 Not Setup 2012/08/15 15:
seg-gfarm-n92 Not Setup 2012/08/15 15:
seg-gfarm-public Not Setup 2012/06/19 10:
seg-gpgpu-f00 Not Setup
seg-gpgpu-gfmeta Normal 2012/08/15 15:
seg-gpgpu-p01 Normal 2012/08/15 15:
seg-gpgpu-p02 Normal 2012/08/15 15:
seg-gpgpu-p03 Normal 2012/08/15 15:
seg-gpgpu-p04 Normal 2012/08/15 15:
seg-gps Not Setup 2012/08/15 15:
seg-gps2 Not Setup 2012/08/15 15:
seg-gps3 Not Setup 2012/08/15 15:
seg-gps4 Not Setup 2012/08/15 15:
Node Information : seg-gfarm-n82
Last Modified Date: Wed Aug 15 15:10:01 JST 2012
past data
CPU Info Open/Close
CPU Load Ave 1min[%] 40
CPU Load Ave 5min[%] 42
CPU Temp0[C] Core 0: +26.0 C (high = +79.0 C, crit = +89.0 C) Core 0: +29.0 C (high = +79.0 C, crit = +89.0 C)
CPU Temp1[C] Core 1: +28.0 C (high = +79.0 C, crit = +89.0 C) Core 10: +33.0 C (high = +79.0 C, crit = +89.0 C) Core 1: +32.0 C (high = +79.0 C, crit = +89.0 C) Core 10: +33.0 C (high = +79.0 C, crit = +89.0 C)
CPU USED SYSTEM[%] 0
CPU USED USER[%] 0
DISK Info Open/Close
Disk Used[%] 50
MB Info Open/Close
+12[V] nil
+3.3[V] nil
+5[V] nil
-12[V] nil
-5[V] nil
M/B Temp nil
VCore 1 nil
VCore 2 nil
MEM Info Open/Close
MEM Free[kB] 5005920
SWAP Free[kB] 100398592
Network Info Open/Close
RTT[ms] 0.221
Network Info eth0 Open/Close
Status Graph
graphs
settings
Graphs -> Tree Mode
Logged in as seg-user
Ishii Lab.
Observation Network
Observation Network Test
One Space Net
Host: gst1
Host: gst2
Host: ict4everyone
Host: nict-stars
Host: seg-RCM01
Host: seg-RCM02
Host: seg-gfarm-meta01
Host: seg-gfarm-meta02
Host: seg-gfarm-meta03
Host: seg-gfarm-n01
Host: seg-gfarm-n02
Host: seg-gfarm-n03
Host: seg-gfarm-n04
Host: seg-gfarm-n05
Host: seg-gfarm-n06
Host: seg-gfarm-n07
Host: seg-gfarm-n08
Host: seg-gfarm-n10
Host: seg-gfarm-n100
Host: seg-gfarm-n101
Host: seg-gfarm-n102
Host: seg-gfarm-n103
Host: seg-gfarm-n104
Host: seg-gfarm-n105
Host: seg-gfarm-n106
Host: seg-gfarm-n107
Host: seg-gfarm-n108
Host: seg-gfarm-n109
Host: seg-gfarm-n11
Host: seg-gfarm-n12
Host: seg-gfarm-n13
Graph Filters
Presets: Last Day From: 2012-08-14 15 To: 2012-08-15 15 1 Day Refresh
Search: Graphs per Page: 10 Thumbnails: Go Clear
Showing All Graphs
Tree:One Space Net-> Host:seg-gfarm-n82
Graph Template: SEG - CPU info
seg-gfarm-n82 - CPU - info
[%]
Tue 18:00 Wed 00:00 Wed 06:00 Wed 12:00
From 2012/08/14 15:11:15 To 2012/08/15 15:11:15
Load_Ave_1min AVERAGE: 65.45 MIN: 0.00 MAX: 429.16 LAST: 44.1
Load_Ave_5min AVERAGE: 65.70 MIN: 1.00 MAX: 426.75 LAST: 44.0
Temp AVERAGE: -nan MIN: -nan MAX: -nan LAST: -na
USED_SYSTEM AVERAGE: 16.74 m MIN: 0.00 MAX: 1.00 LAST: 0.0
USED_USER AVERAGE: 596.64 m MIN: 0.00 MAX: 16.00 LAST: 0.0
Graph Template: SEG - DISK Info
seg-gfarm-n82 - DISK Info
[%]
Tue 18:00 Wed 00:00 Wed 06:00 Wed 12:00
From 2012/08/14 15:11:15 To 2012/08/15 15:11:15
Disk_Used AVERAGE: 50.00 MIN: 50.00 MAX: 50.00 LAST: 50.00
Graph Template: SEG - MB Info
seg-gfarm-n82 - MB Info

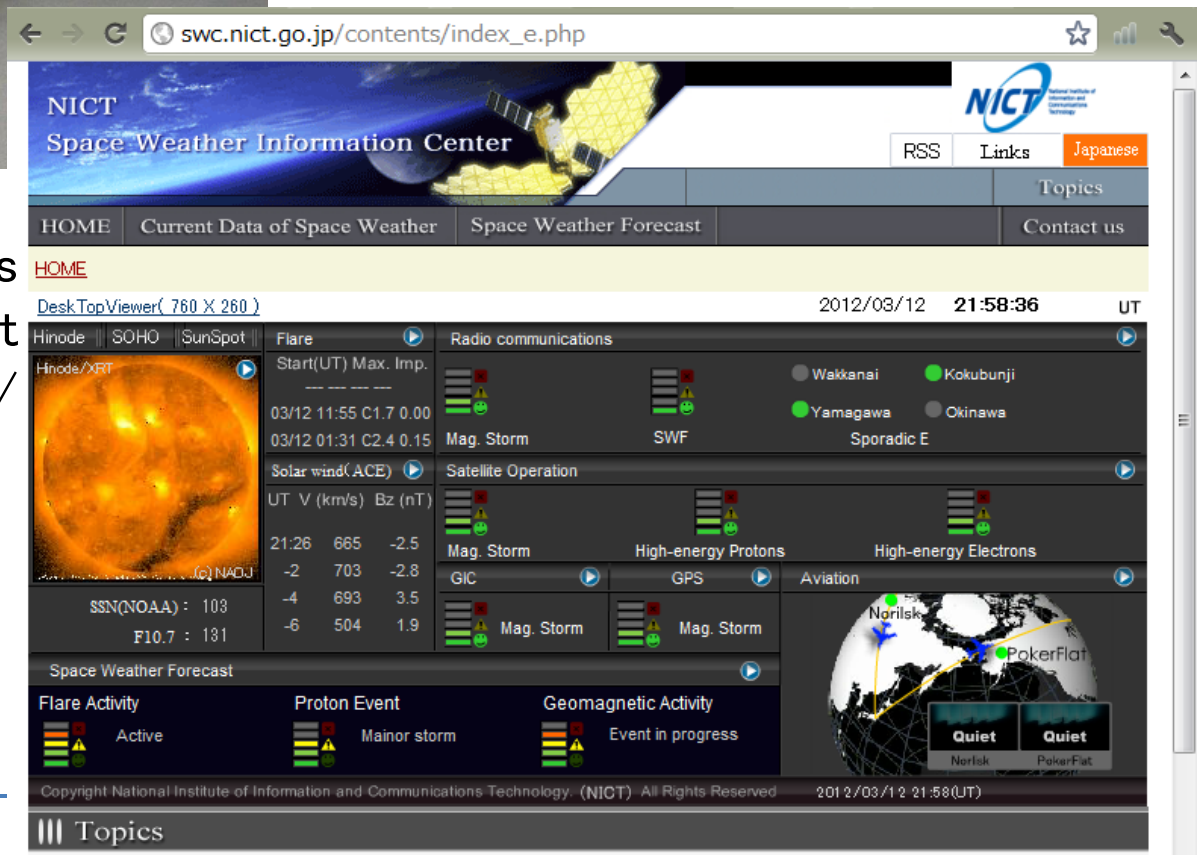
20120129(CX)

20120125(TBS)

Space Weather Forecast Meeting @NICT

Broadcasting of S.W. news on the Internet http://swc.nict.go.jp/

Weekly SW news



NHK BSプレミアム「コズミックフロント（オーロラ）」

星空を見る　宇宙を知る　宇宙番組情報

宇宙の渚

コズミックフロント

過去の放送

- 3月6日 宇宙の渚 File2. 46億年の旅人 流星

宇宙は驚異に満ちている

コズミック フロント

COSMIC FRONT

放送　火曜日　午後9時00分～9時57分
再放送　土曜日　午前0時00分～0時57分
翌週月曜日　午前8時30分～9時27分

最新の放送スケジュールは番組表でご確認ください。

NHK番組表　お気に入り番組へ登録

NASA ESA,STScI/AURA

放送予定

3月13日の放送

「宇宙の渚 File3. 天と地の攻防 オーロラ」

放送　3月13日（火）午後9時00分～
3月20日（火）午前8時15分～

Tonight!
9:00 p.m.

「宇宙の渚」シリーズ第3回はオーロラ。古川聡宇宙飛行士は国際宇宙ステーションから、世界で初めてオーロラを鮮明に撮影することに挑戦。オーロラ爆発、ぼんやりオーロラなど、様々なオーロラの撮影に20回以上成功した。オーロラは「宇宙の渚」が太陽から降り注ぐ危険な粒子を防ぎ止めた時に放たれる光。美しければ美しいほど、激しい攻撃の証しでもある。オーロラ映像を堪能しながら、地球に叩きつける宇宙の荒波を実感する。

NICT Global MHD simulation
on 2011 Oct. 7

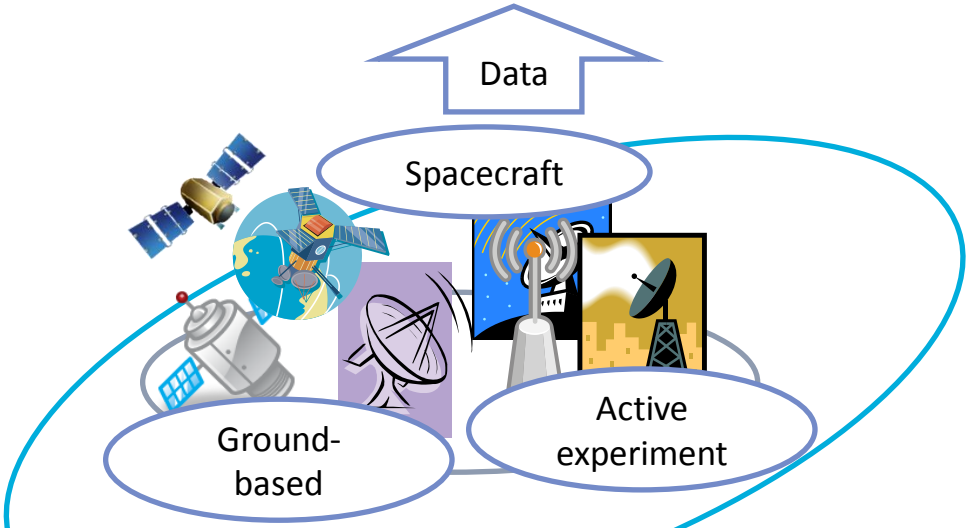
NICT

topics

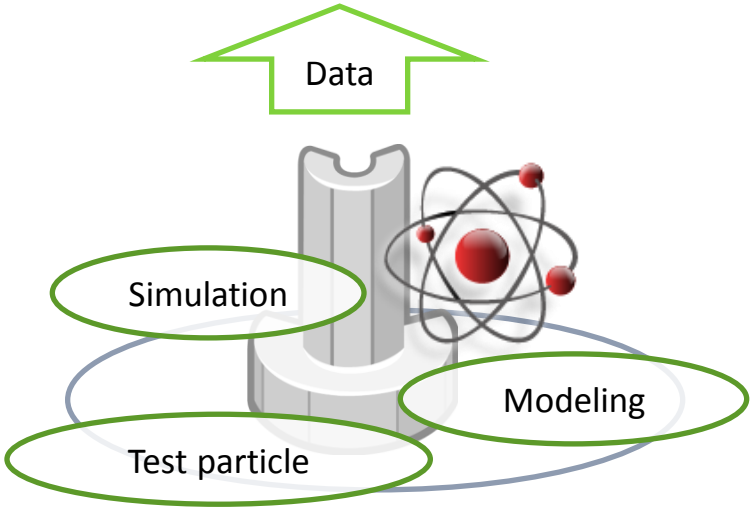
- Brief introduction of NICT space weather operations and researches
- A new methodology for space weather forecasting in NICT
- AOSWA: Asia-Oceania Space Weather Alliance

“Science Cloud”; A facility for the 3rd methodology

Big Data!



Observation
via Ground-based observatory and satellite

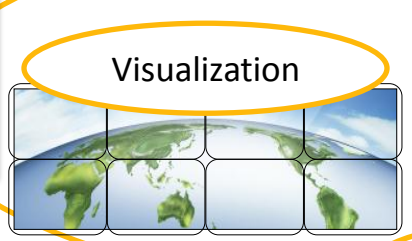


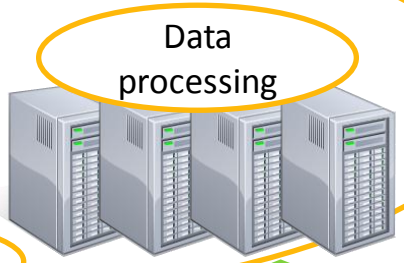
Simulation
via super computer

“Science Cloud”; A facility for the 3rd methodology

Data intensive approach of large-scale data

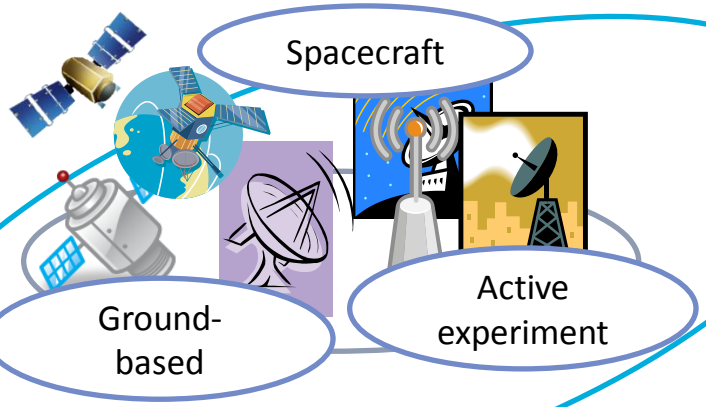
Informatics via “cloud system”

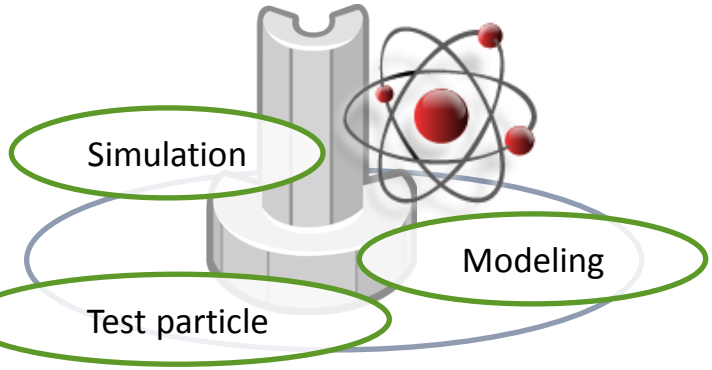




Data

Data





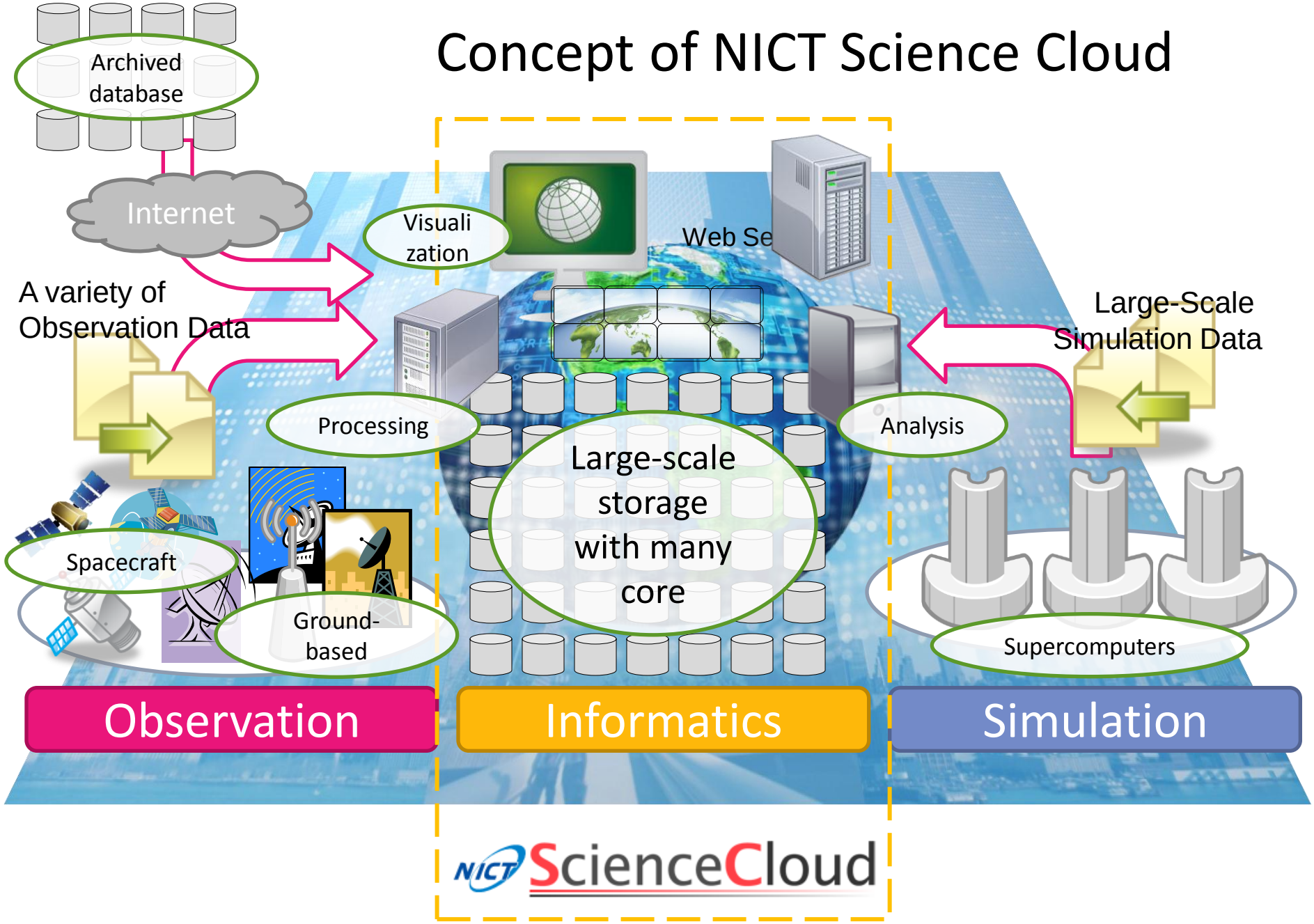
Observation

via Ground-based observatory and satellite

Simulation

via super computer

Concept of NICT Science Cloud



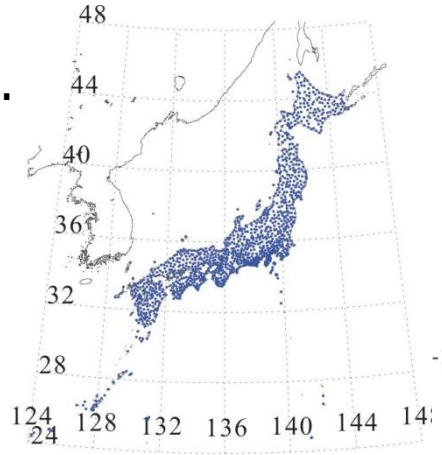
Ionospheric Disturbance via High-Resolution GPS-TEC

Region
# of GPS Rec.

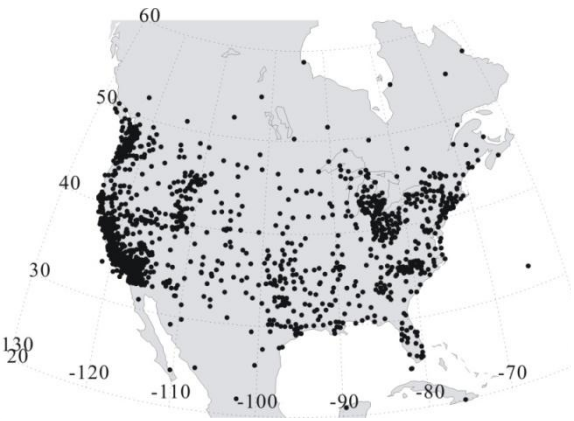
GPS Receivers

Detrended TEC Map (30sec, 0.15°x0.15°)

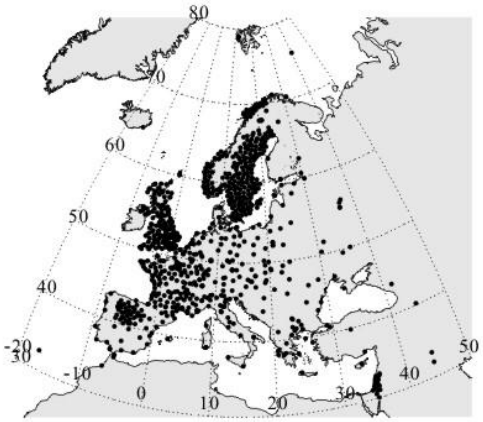
~1,200 receivers

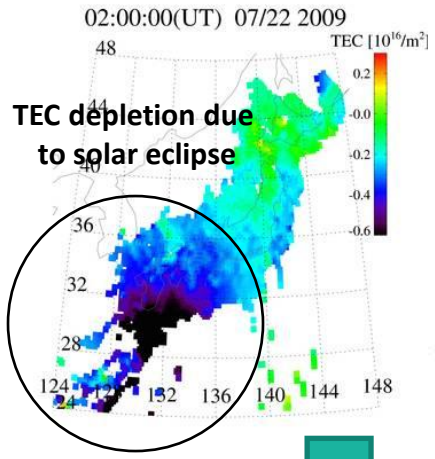


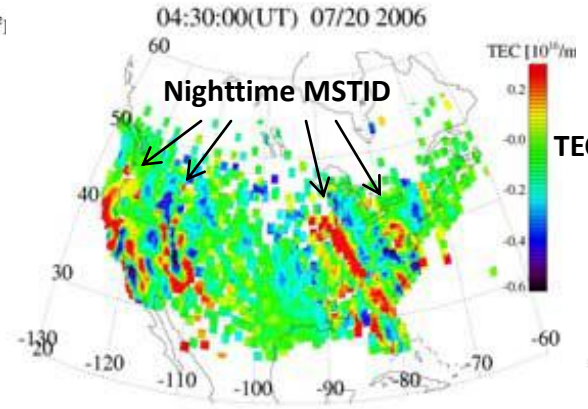
~1,600 receivers

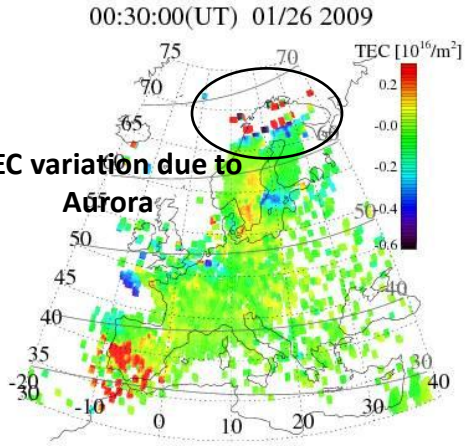


~830 receivers



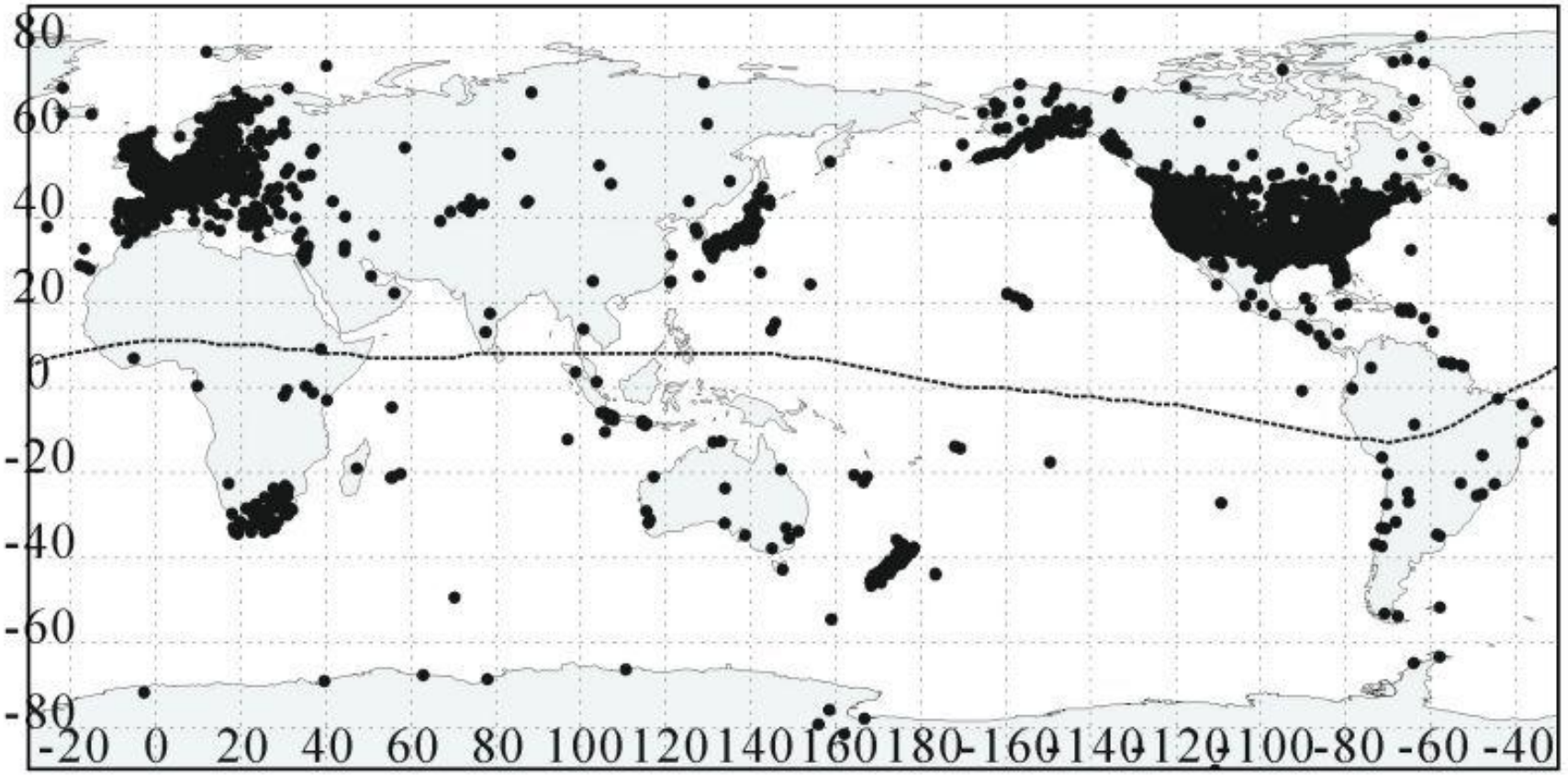






Asia-Oceania GPS-TEC map…

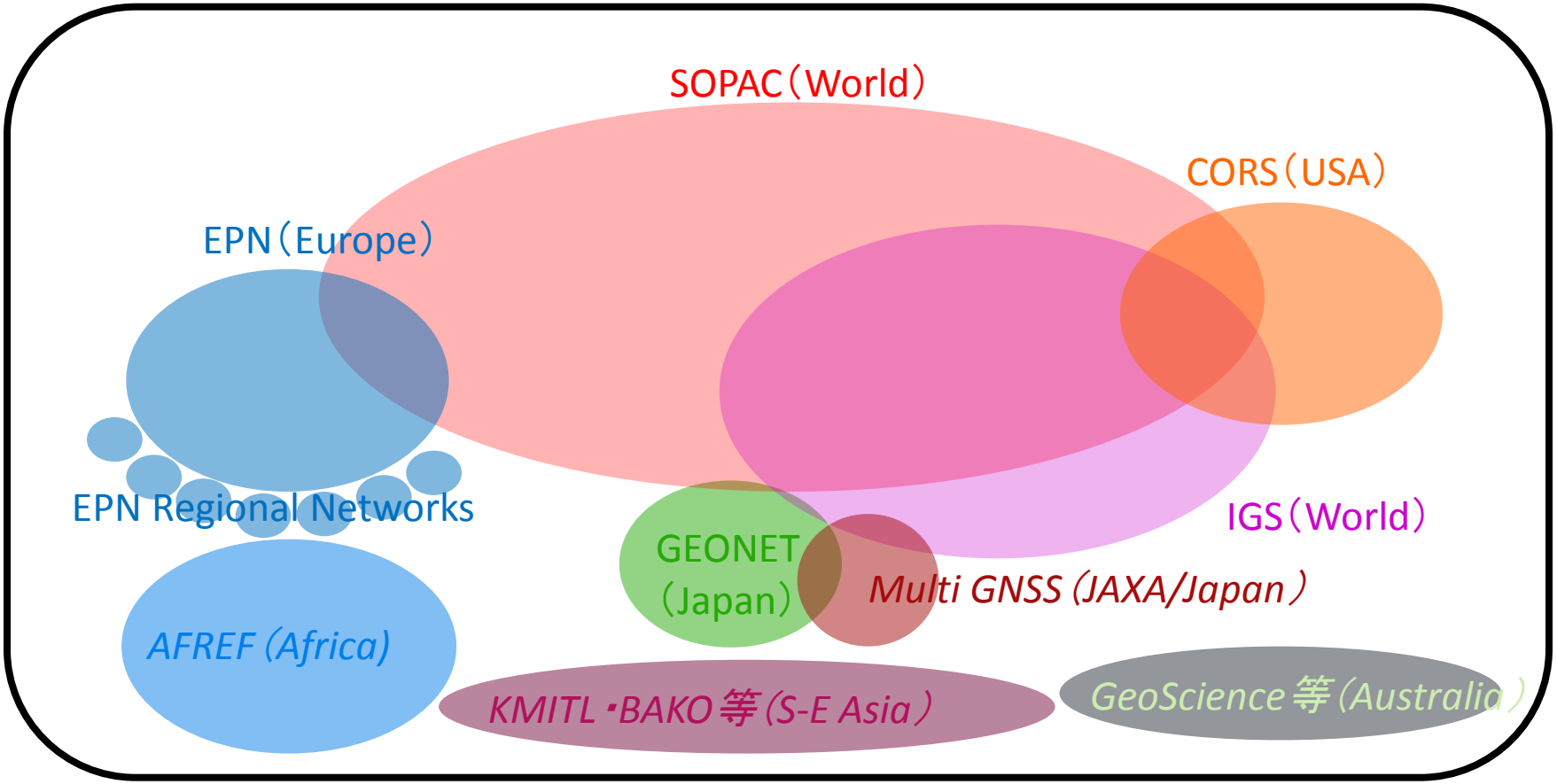
Global GPS Receiver Network



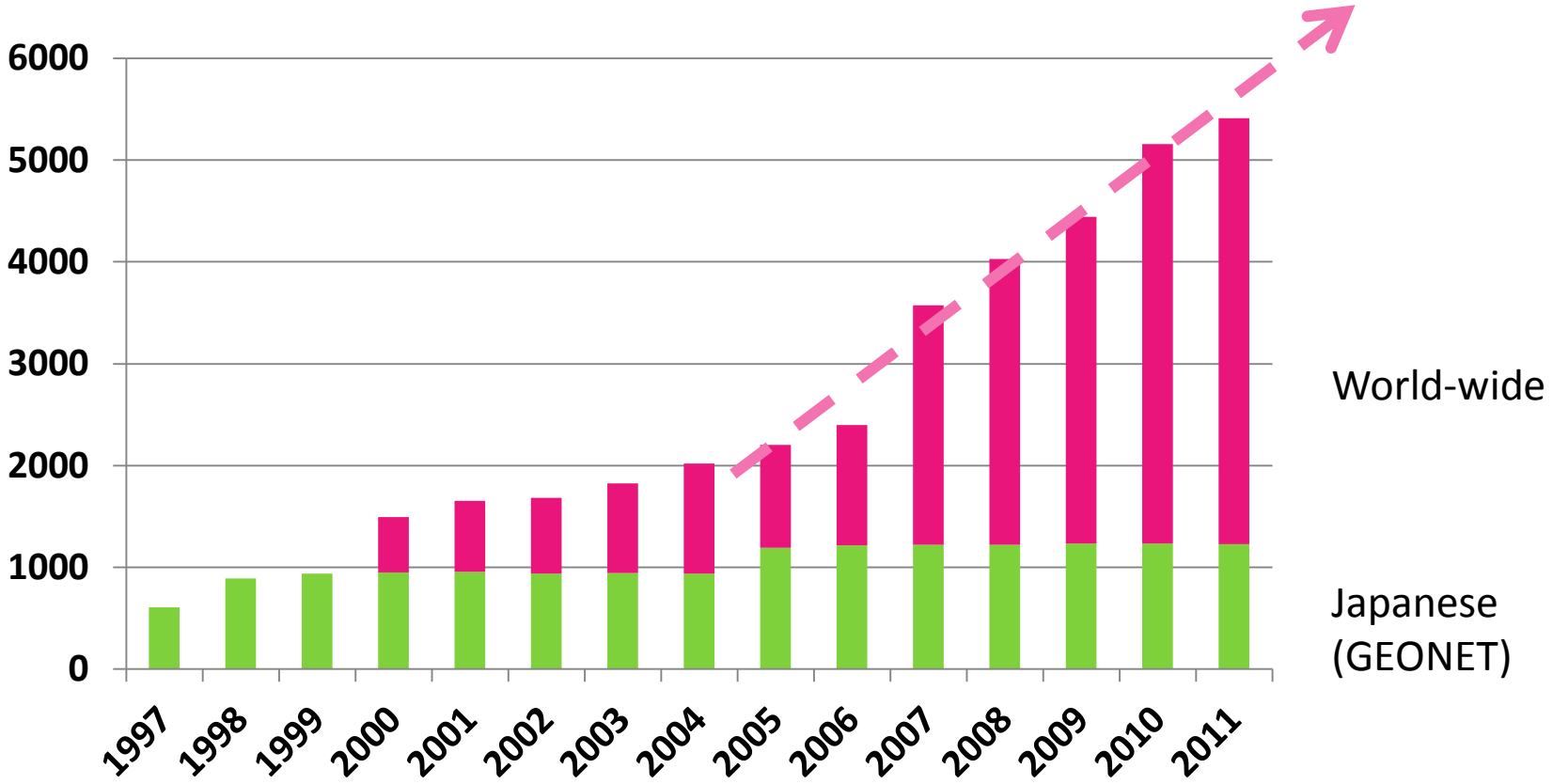
- As of April 2010, NICT is collecting all the available GPS receiver data (~5,000 receivers) which belong to GEONET, SOPAC, IGS, CORS, EPN, etc.
- We plan to provide regional/global high-resolution maps of absolute TEC, detrended TEC, ROTI, loss-of-lock on GPS signals.

GNSS Data providers（including future plan）

NICT GNSS TEC Data Service（5000 receivers）⇒5000 files/day



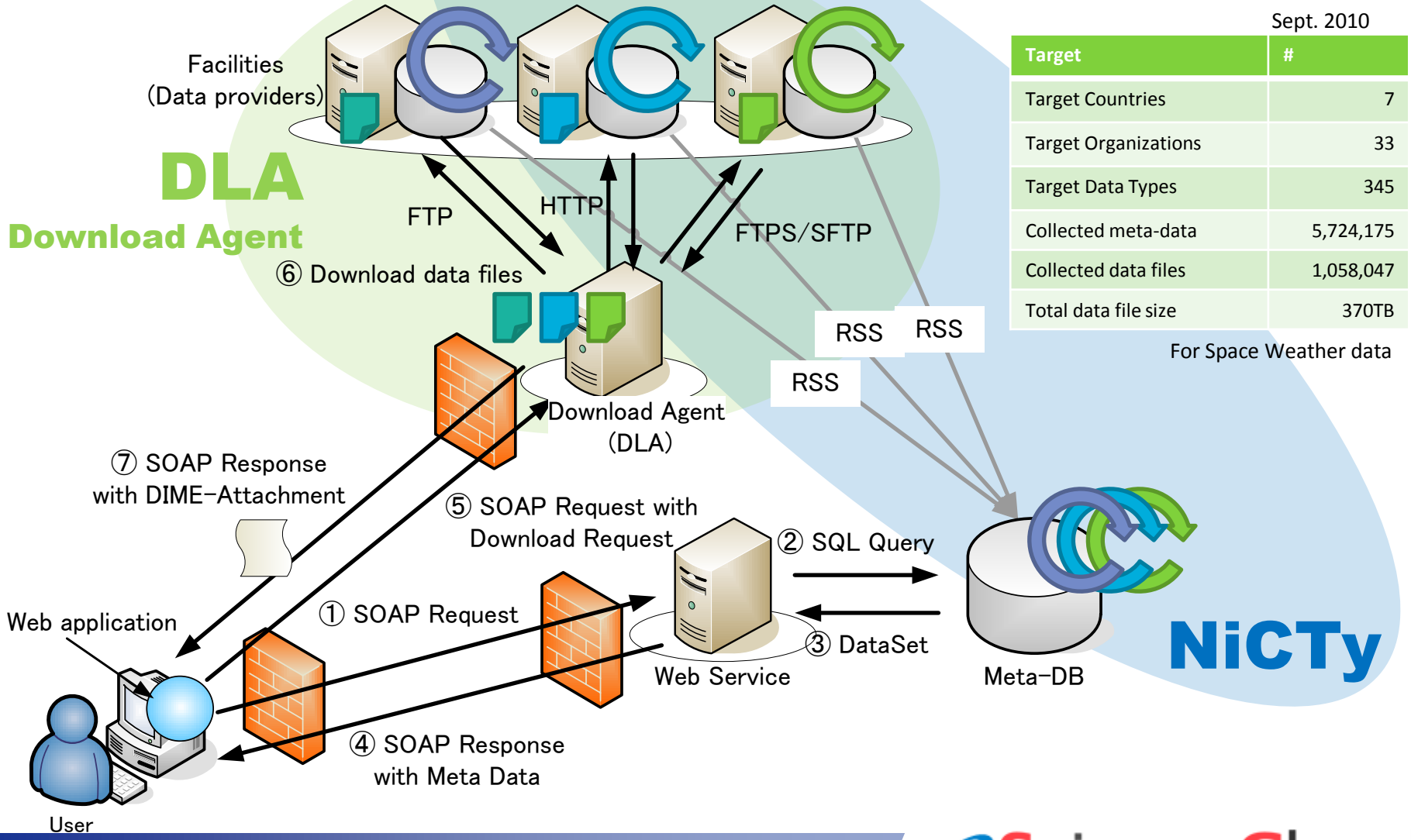
Trend of the number of GSP receivers



- The annual trend of the number of GSP receivers (world-wide since 2000 and domestic (Japan) since 1997) .

NiCTy
DLA

NICT Technology
Automatic Data Collection System for Science Data



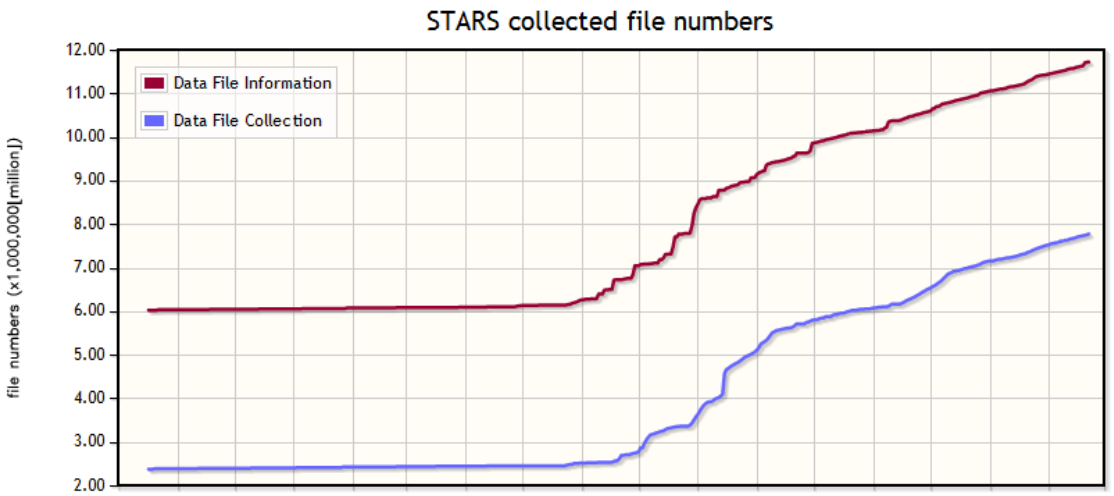
Sept. 2010

Target	#
Target Countries	7
Target Organizations	33
Target Data Types	345
Collected meta-data	5,724,175
Collected data files	1,058,047
Total data file size	370TB

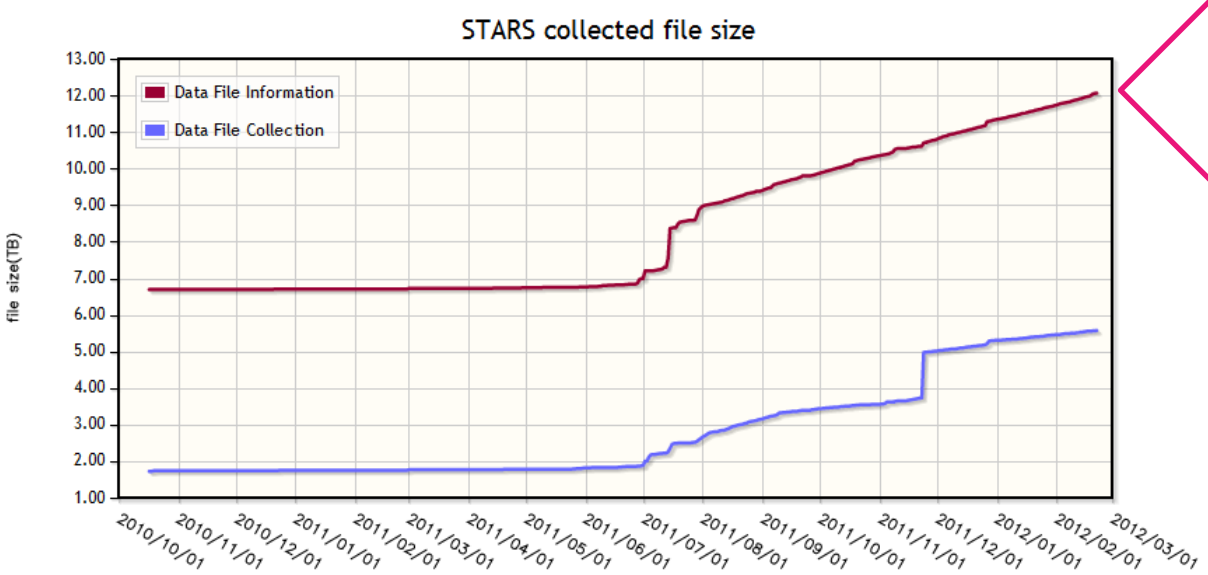
For Space Weather data

44

Automatic Data Collection



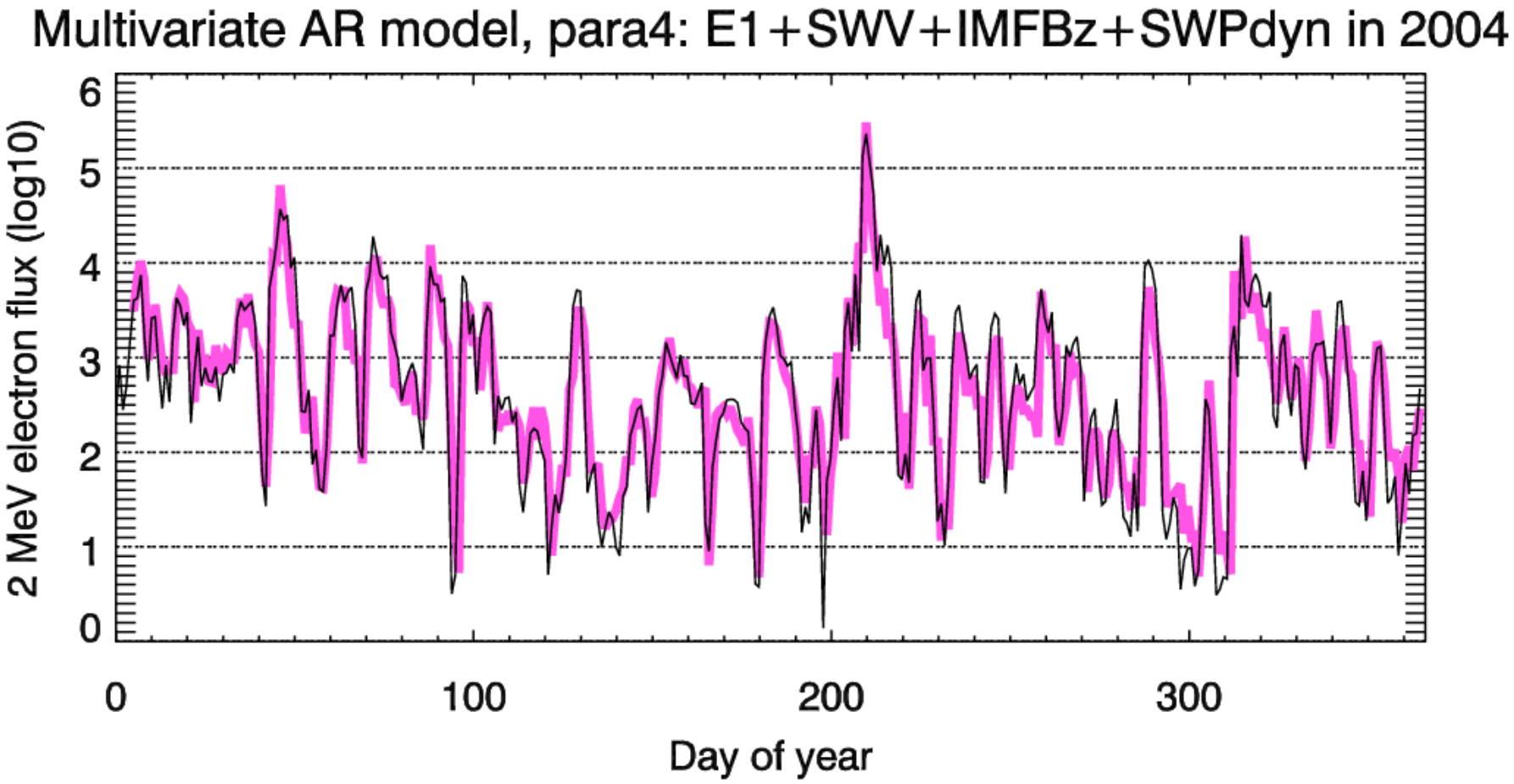
More than 11 million files



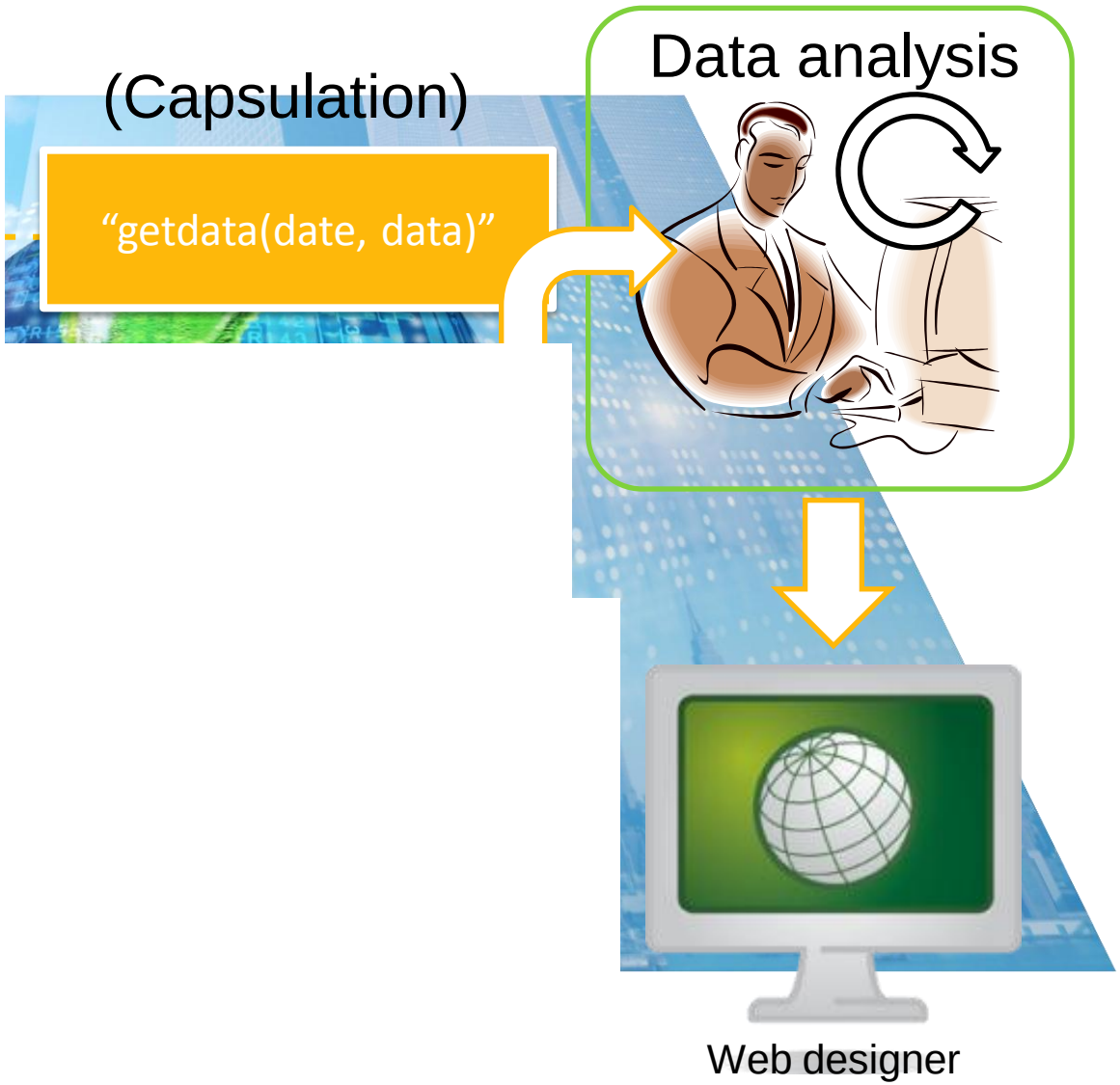
More than 12 tera bytes

Multivariate AR Prediction (Input: + dyn. P, IMF Bz)

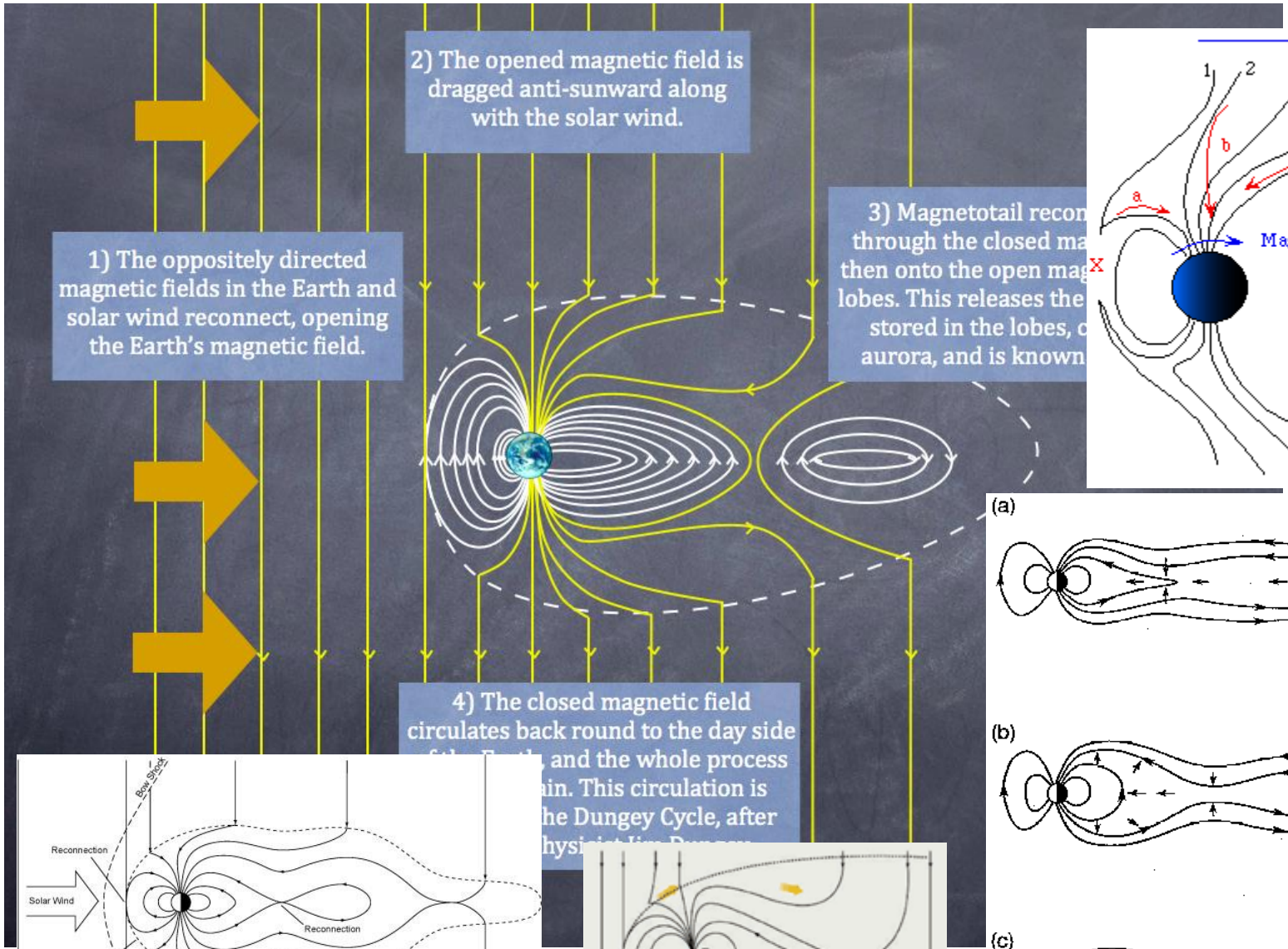
NEXT TALK

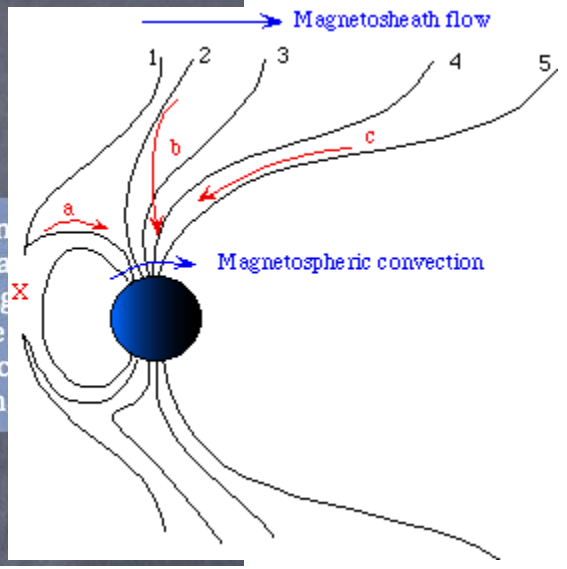


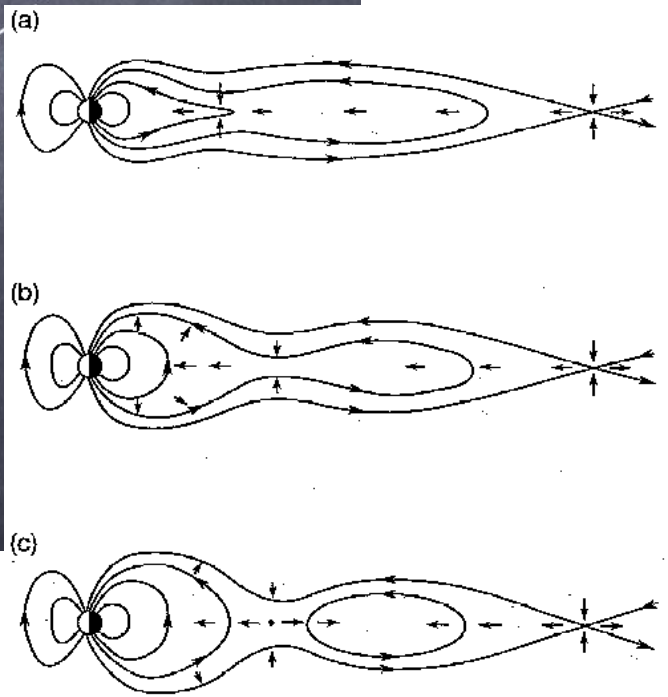
What you do is only…

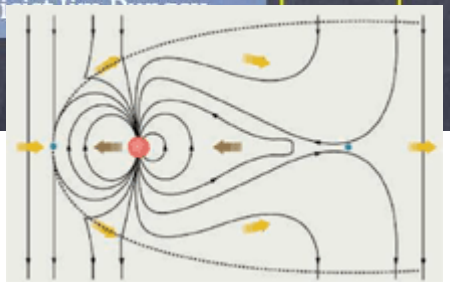


Schematic Pictures of "convection" of magnetic field lines









Simulation data size

global MHD code by K. Fukazawa

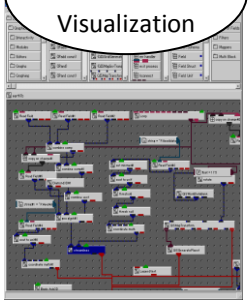
- Spatial and time resolution

  450(x) × 300(y) × 300(z)　–uniform grid (dx=0.2Re, dt=0.5sec)

SX-8
Simulation

simulation

AVS
Visualization



visualization

0.5 sec

time

E, B , ρ, ρ, V (-1GB)

E, B , ρ, ρ, V (-1GB)

E, B , ρ, ρ, V (-1GB)

E, B , ρ, ρ, V (-1GB)

E, B , ρ, ρ, V (-1GB)

E, B , ρ, ρ, V (-1GB)

3D

3D

3D

3D

3D

3D

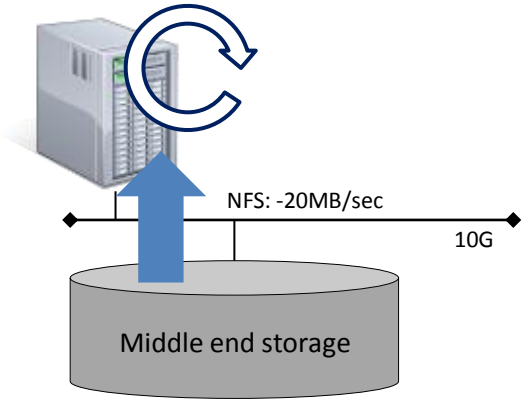
2 hours (14400 steps)

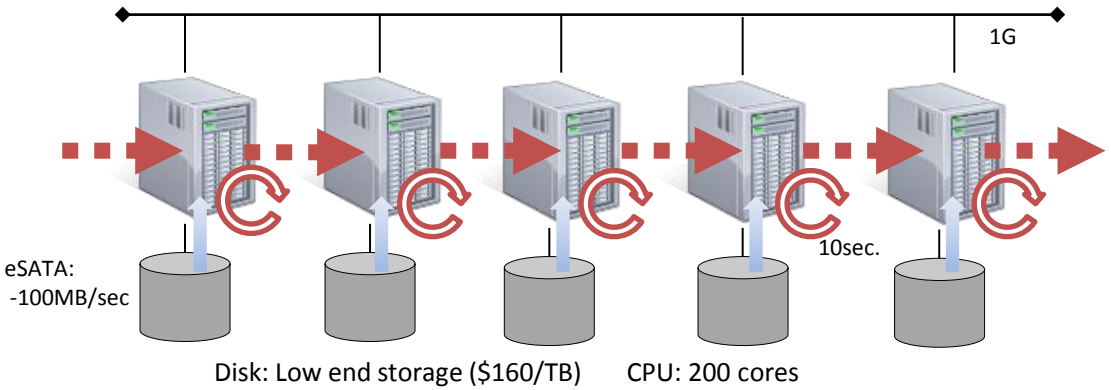
15TB

Distributed Storage/ Parallel Visualization（data size: 15TB）

NICT ScienceCloud

Traditional Method (36 days)	Parallel Visualization (2 days)
Data Read Time (I/O Time) 20MB/sec -> 1.5 million sec. -> 18 days	Data Read Time (I/O Time) 100MB/sec x 200 cores -> 1500 sec. -> 30 min.
Data Processing Time 14400 steps x Tracing time (10 sec.) -> 14 thousands sec. -> 2 days	Data Processing Time 14400 steps x Chasing time (10 sec.) -> 14 thousands sec. -> 2 days
Visualization Time 14400 steps x120sec -> 16 days	Visualization Time 14400 steps x 120sec./200 cores -> 4 hours





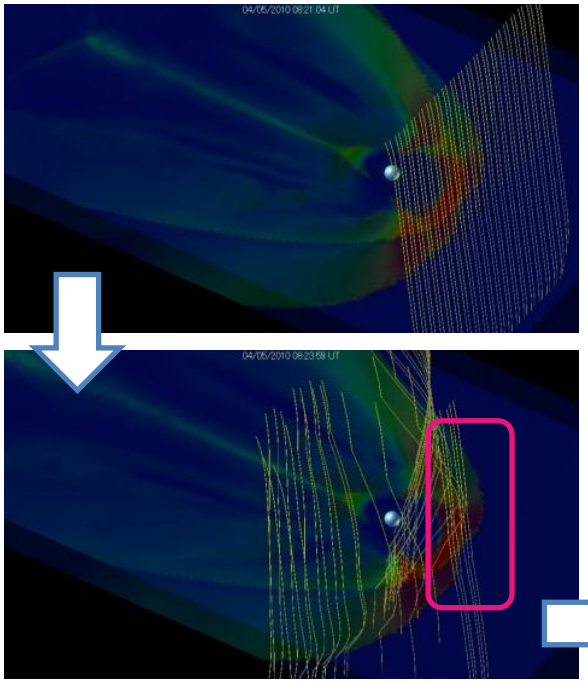
Disk: Low end storage ($160/TB)　CPU: 200 cores

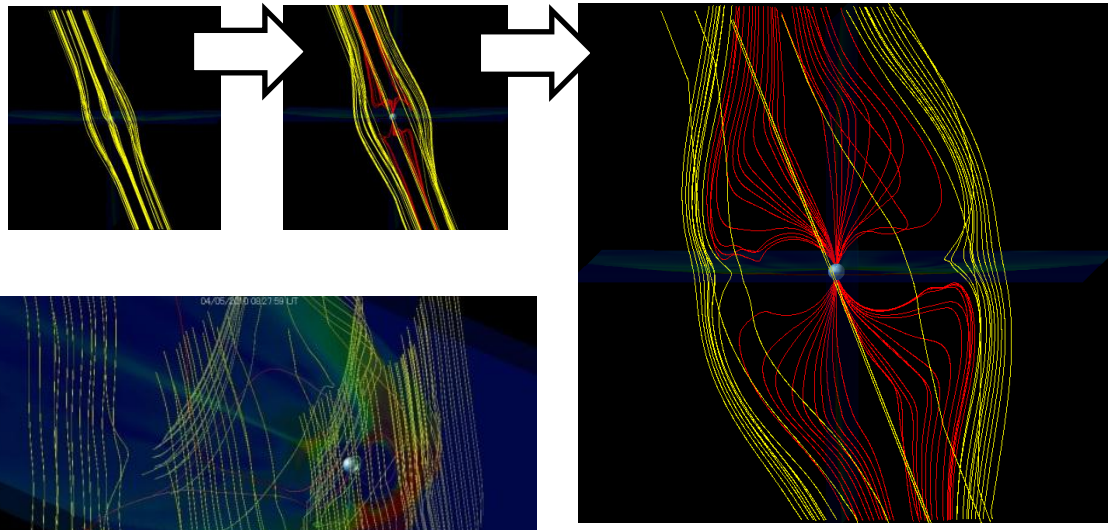
Super High Time-Resolution Visualization: Milk Crown Visualization

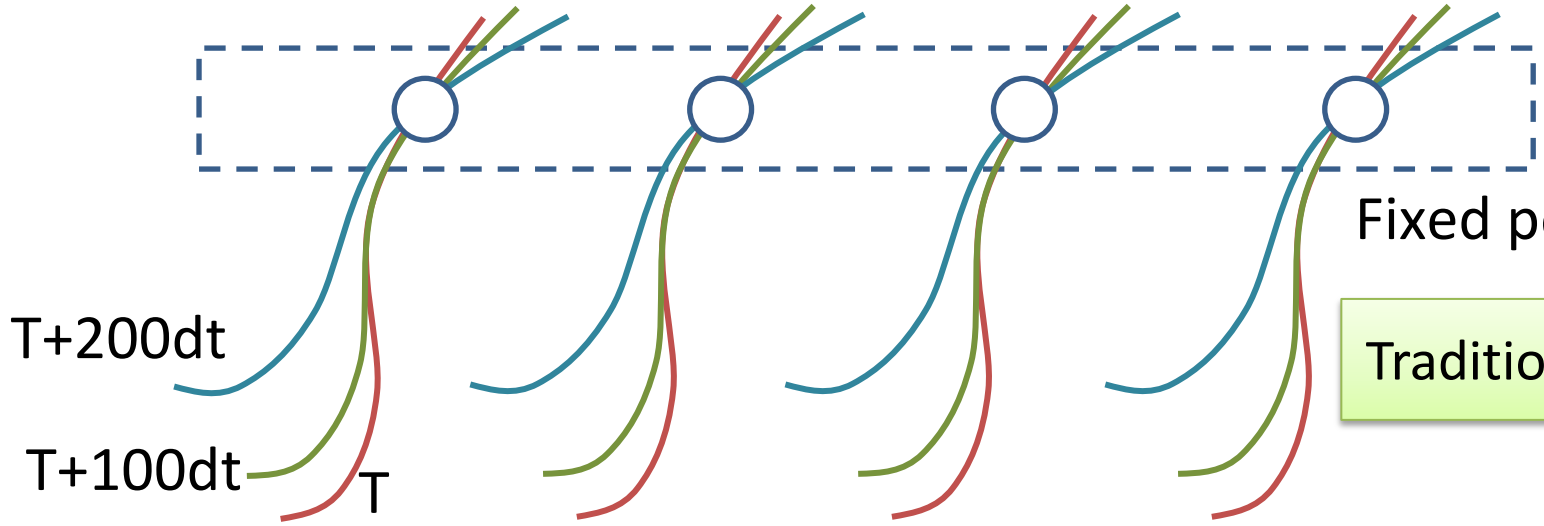
- time resolution: 60 sec. (not shown herein)
- frozen-in broken

- time resolution: 0.6 sec. (7,000 files)
- frozen-in for one reconnection event

- time resolution: 0.06 sec. (70,000 files)
- reconnection captured!



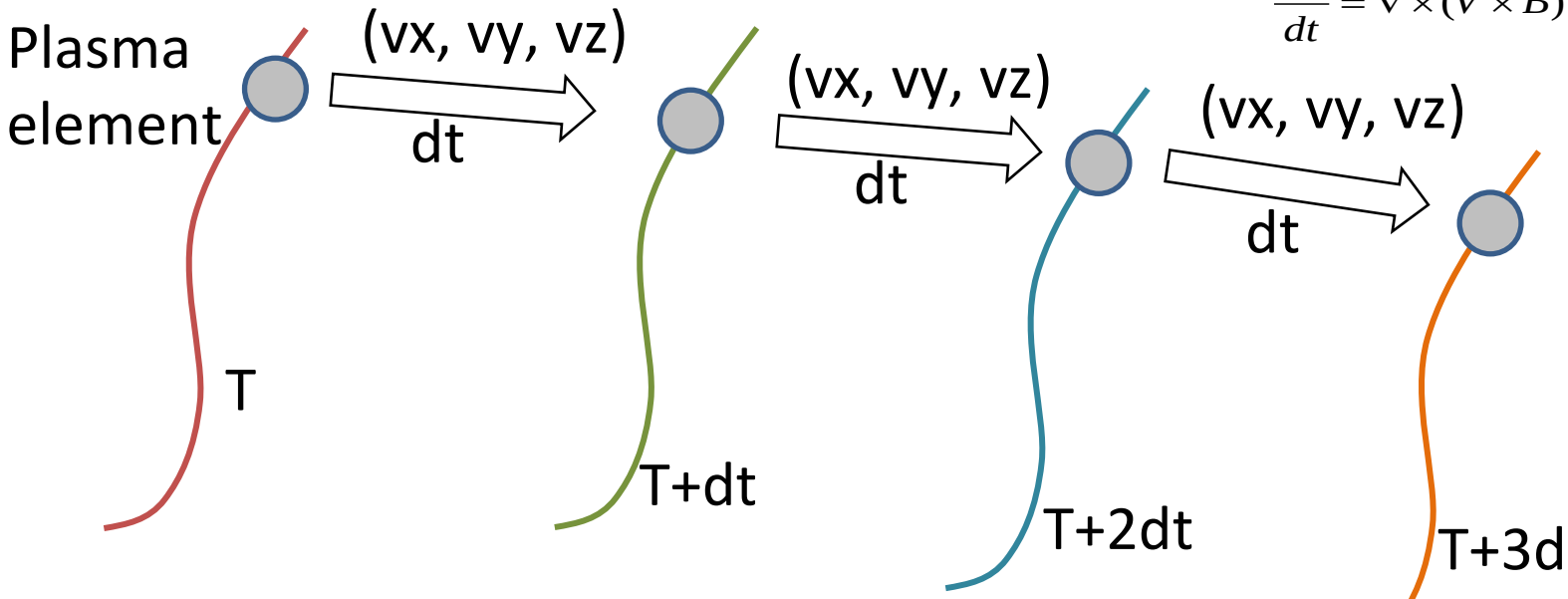




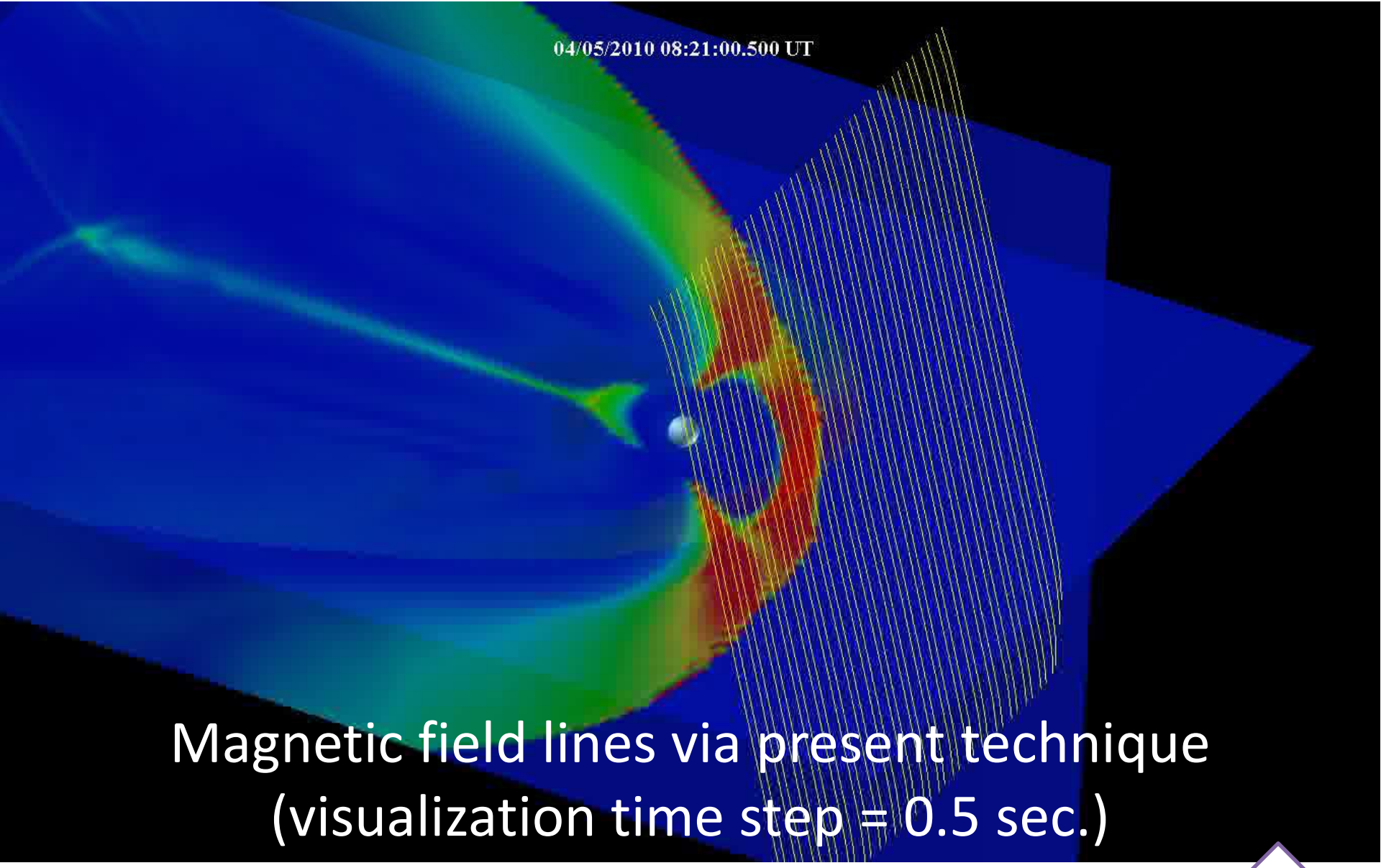
Traditional Method

"Frozen-in theory"

$$\frac{d\vec{B}}{dt} = \nabla \times (\vec{V} \times \vec{B}) + \frac{\eta}{\mu_0} \nabla^2 \vec{B}$$



Present Technique -Tracing (needs to store all time-step data)



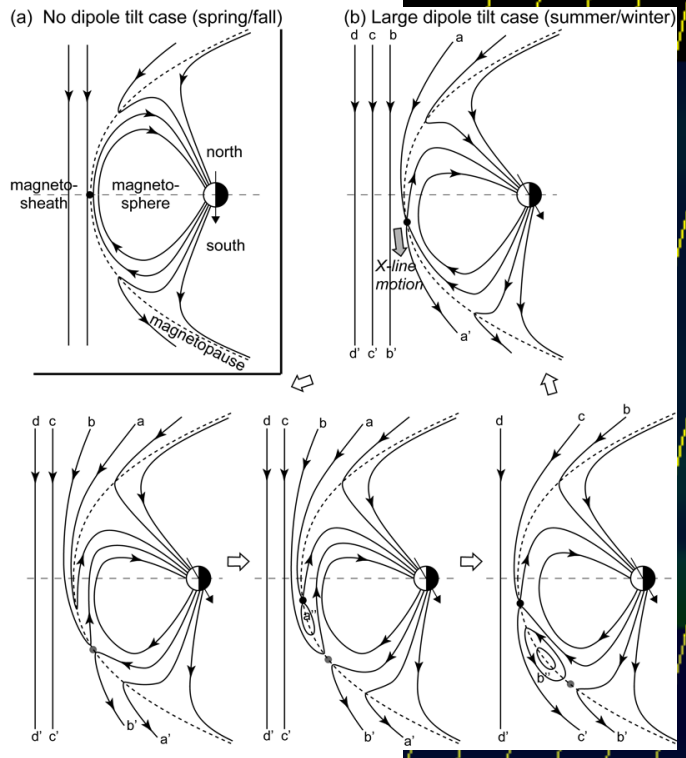
Magnetic field lines via present technique
(visualization time step = 0.5 sec.)

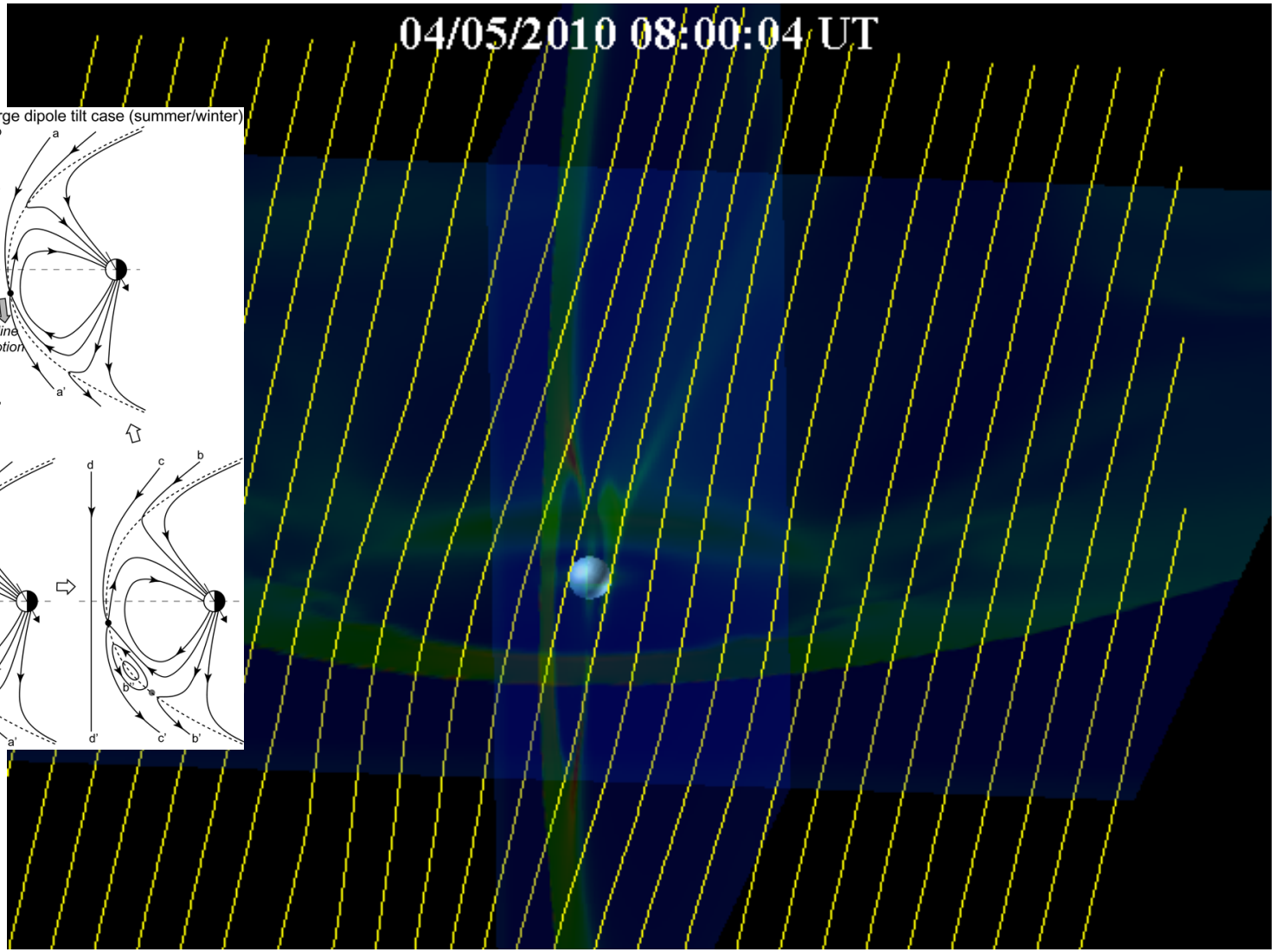
Global 3D MHD simulation

64bit 3D player developed by NICT

“Crown-milk view” of reconnections at the dayside magnetosphere

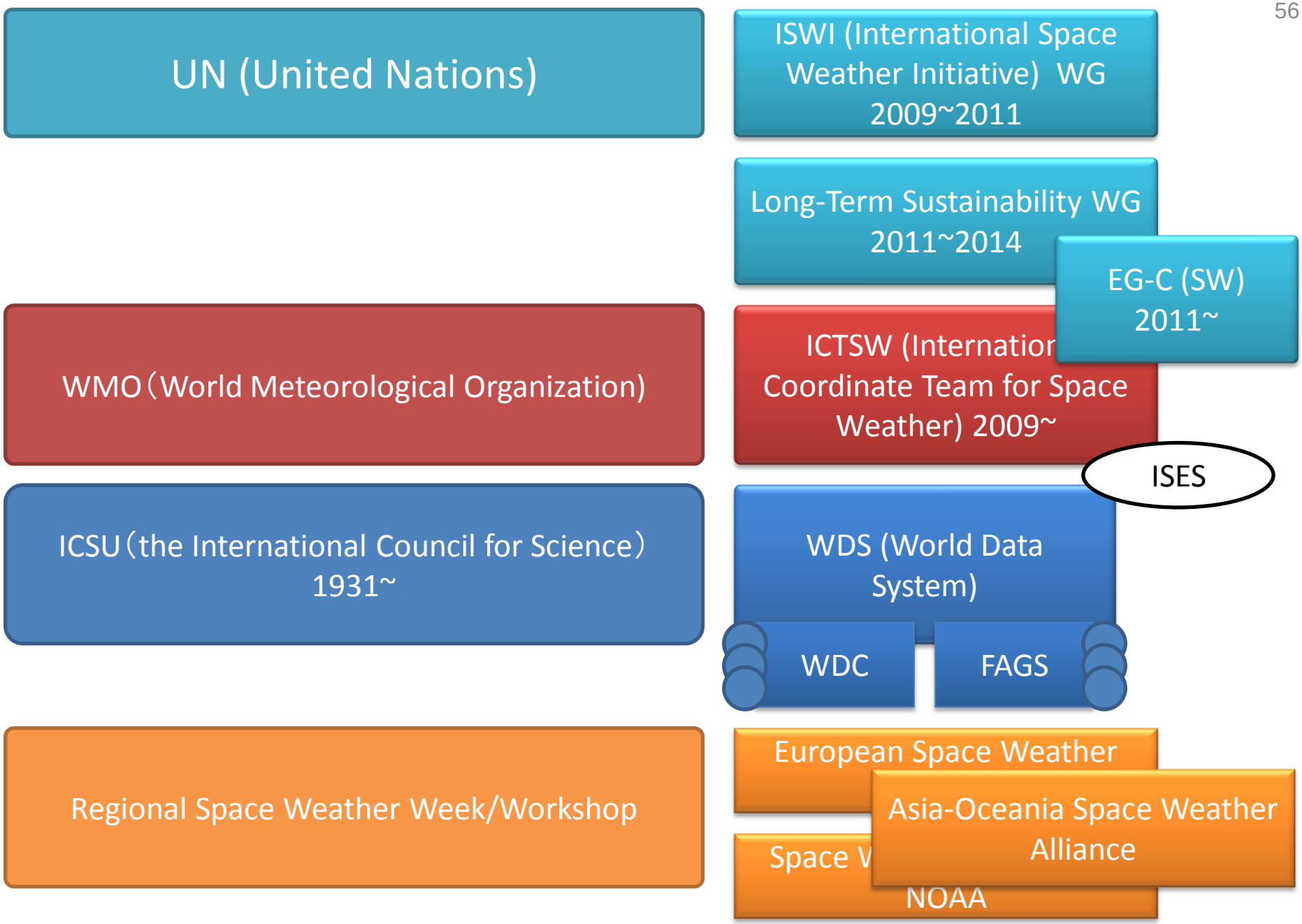
the first successful visualization of dayside reconnection!!





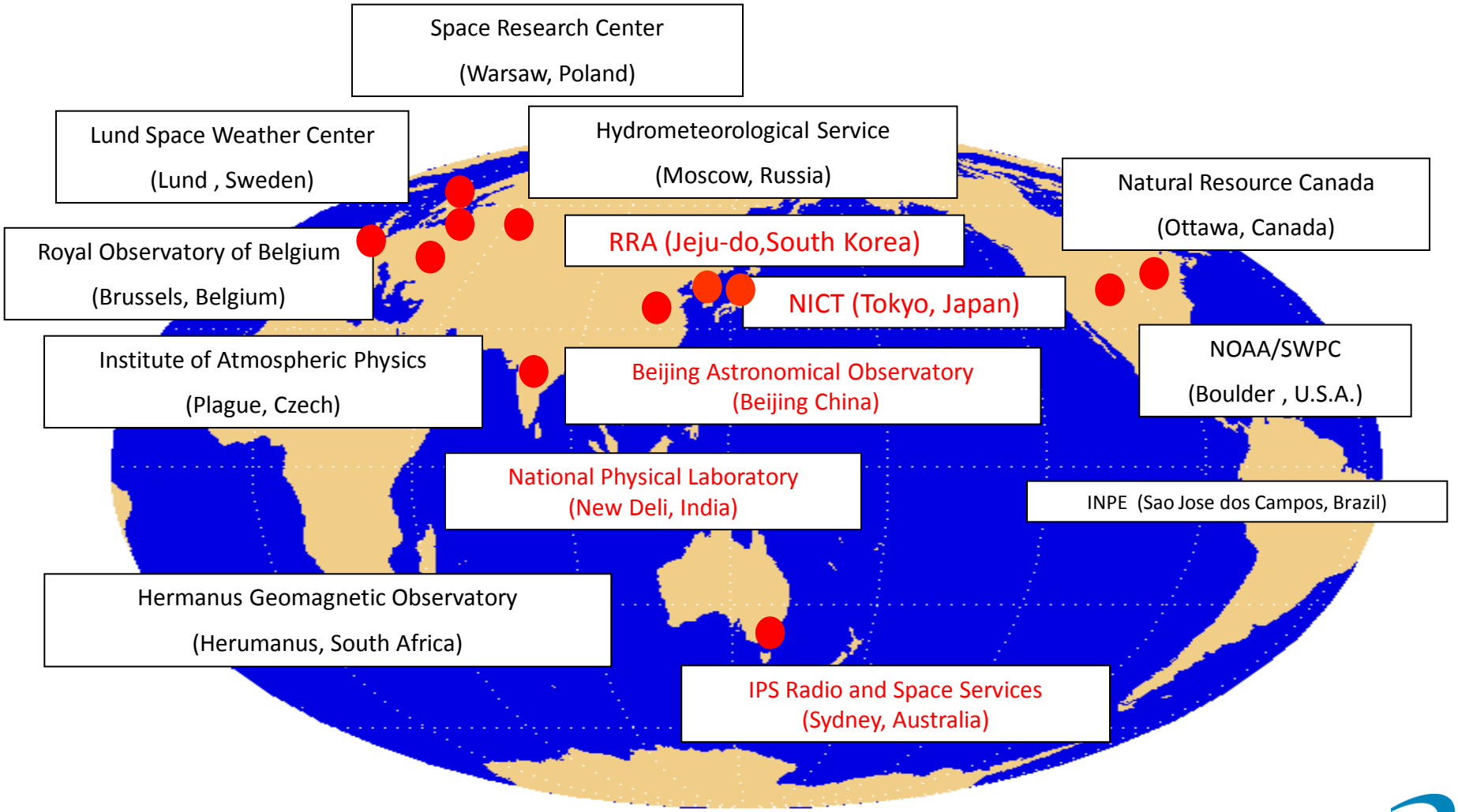
topics

- Brief introduction of NICT space weather operations and researches
- A new methodology for space weather forecasting in NICT
- AOSWA: Asia-Oceania Space Weather Alliance



International SW (operation) organizations

Space Weather Regional Warning Centers of International Space Environment Service (ISES)



AOSWA
Asia-Oceania Space Weather Alliance

Space Weather Workshop @USA

www.fin.ucar.edu/UCARVSP/spaceweather/index.php

Welcome to the Workshop's Online Registration System

The Workshop will be held April 27 - 30 at the Millennium Hotel, 1345 28th St., Boulder, CO 80302. The registration fee for the full conference is $275.00, or $100.00 per day.

Registration and Abstract deadline: Friday

Online Registration
Please note: you must first register before you can submit a

If you registered last year:

Space Weather Week @Europe

sidc.oma.be/esww7/

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LOCAL INFORMATION
SOCIAL PROGRAM
ESWW3
ESWW4
ESWW5
ESWW6

Seventh European Space Weather Week

15-19 November, 2010 - Brugge, Belgium

The seventh European Space Weather Week will take place in Brugge, Belgium, from Monday 15th November to Friday 19th November 2010.

This meeting is being jointly organised by the Belgian Solar-Terrestrial Center of Excellence (STCE), ESA, the Space Weather Working Team and the COST ES0803 communities. The local organisation is done by the STCE and the Royal Observatory of Belgium (ROB). This event will build on the advances made during previous European Space Weather Weeks and preceding ESA Space Weather Applications Workshops.
The ESWW will again adopt the central aim of bringing together diverse communities working on all aspects of space weather from key research developments through to end user needs. Recent space weather related actions in the framework of the ESA Space Situational Awareness programme and the EC's 7th Framework Programme will be a key topic, as will targeted sessions covering spacecraft environments and effects, recent advances in space weather modelling, new space weather products and tools and new observing strategies for heliospheric phenomena.

MORE NEWS

The debate:

AOSWA meetings

AOSWA
Asia-Oceania Space Weather Alliance

2010.12 - LAPAN workshop
- The first kick-off meeting between Japan, Indonesia, Australia, India, and Malaysia

2010.01.2 - SEALION workshop @Thailand
- Indonesia, Vietnam, Taiwan, USA, Brazil, Thailand, Laos, Philippine , China and Japan
- 2nd Kick-off meeting of the AOSWA

2011.04 @NOAA, USA
- Space Weather Workshop @NOAA, USA & ISES meeting 2011
- Local meeting between A-O ISES countries

2011.08 - AOGS @Taiwan
- AOGS; "Collaborative Researches and Operations of Space Weather Forecasting in Asia-Oceania region"
- 3rd kick-off meeting of the AOSWA

2012.02 AOSWA 1st Workshop @Chiang Mai, Thailand
- 10 countries, 25 organizations, 77 participants!

AOSWA 1st Workshop

2012.08 AOGS2012 @Singapore
- Asia-Oceania Space Weather Alliance: AOSWA session
- AOSWA informal meeting

2013 AOSWA 2nd Workshop
- (To be fixed during the 1st workshop)

NICT

Call for Paper

The First AOSWA Workshop

The First Asia-Oceania Space Weather Alliance Workshop

AOSWA
Asia-Oceania Space Weather Alliance

22 – 24 February 2012
Imperial Mae Ping Hotel, Chiang Mai, Thailand

The Asia-Oceania Space Weather Alliance (AOSWA) is a regional forum for the development of collaboration and promotion of the space weather activities in the Asia and Oceania region.

The AOSWA 2012 in Thailand will be held during 22 – 24 February 2012, in Chiang Mai, Thailand.

The AOSWA 2012 is regional/international workshop, providing an excellent forum for researchers and operators of space weather in Asia-Oceania and other countries to present and discuss operational collaborations, data exchanges and some competitions, which leads to the development of space weather activities in the region.

Everyone, who works in space weather fields in Asia-Oceania and other regions, is encouraged to submit a paper to the workshop. New research results and operational issues are welcome. Significant discussions are expected, especially from the view of the Asia-Oceania regional collaborations.

Possible Topics of Presentation

1. Ionospheric Variations and Their Effect on Radio Propagation
2. Geospace Variations – Causes and Effects
3. Present status and future plan of operation, service, and modeling of space weather

Important dates

1. **Abstract Submission:** 20 Dec. 2011 – 4 Jan. 2012
2. **Registration:** 20 Dec. 2011 – 16 Jan. 2012

For more information / Contact

Web site: http://aoswa.nict.go.jp
Email address: sw-project-office@ml.nict.go.jp

Committee Chair:
TBD, Japan

Co-Committee Chair:
TBD, Thailand

General Committee:
Dr. Ken T. Murata (NICT, Japan)
Dr. Phil Wilkinson (IPS, Australia)
Dr. Huaning Wang (NAOC, China)
Dr. Rupesh M. Das (NPL, India)
Dr. Bae Seok-Hee (RRA, Korea)

Program and Organizing Committee:
Dr. Ken T. Murata (NICT, Japan)
Dr. Dave Neudegg (IPS, Australia)
Dr. Huaning Wang (NAOC, China)
Dr. Siqing Liu (NAOC, China)
Dr. Xiaoxin Zhang (NAOC, China)
Dr. A. K. Upadhayaya (NPL, India)
Dr. Bae Seok-Hee (RRA, Korea)
Dr. Shinichi Watari (NICT, Japan)
Dr. Tsutomu Nagatsuma (NICT, Japan)
Dr. Takuya Tsugawa (NICT, Japan)
M. Shikatani (NICT, Japan)
Dr. Takashi Maruyama (NICT, Japan)

Local Organizing Committee:
Dr. Tsutomu Nagatsuma (NICT, Japan)
Dr. Masayuki Fujise (NICT, Japan)
Dr. Akachai Sang-In(CMU, Thailand)
Dr. Suttichai Premrudeepreechachan (CMU, Thailand)
Dr. Tharadol Komolmis (CMU, Thailand)
Dr. Ukrit Mankong (CMU, Thailand)

NICT National Institute of Information and Communications Technology

Australian Government
IPS Radio and Space Services

NAOC 中国科学院国家天文台
NATIONAL ASTRONOMICAL OBSERVATORIES ,CHINESE ACADEMY OF SCIENCES

राष्ट्रीय भौतिक प्रयोगशाला
National Physical Laboratory

RRA NATIONAL RADIO RESEARCH AGENCY

AOSWA 1st Workshop

77 participants from 25 organizations of 10 countries

Australia, China, (India), Indonesia, Japan, Malaysia, Philippines, South Korea, Thailand, and Vietnam


航空写真
交通状況
ロシア
フィンランド
スウェーデン
ノルウェー
イギリス
ポーランド
ドイツ
ウクライナ
フランス
イタリア
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カザフスタン
モンゴル
中国
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アメリカ合衆国
メキシコ
アルジェリア
リビア
エジプト
サウジアラビア
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チャド
スーダン
ナイジェリア
エチオピア
ケニア
タンザニア
アンゴラ
ナミビア
ボツワナ
マダガスカル
南アフリカ
南大西洋
インド洋
インドネシア
パプア
ニューギニア
オーストラリア
ニュージーランド
南太平洋
ベネズエラ
コロンビア
ペルー
ブラジル
ボリビア
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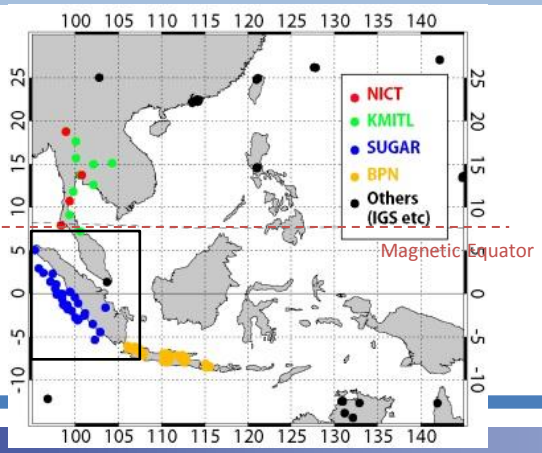
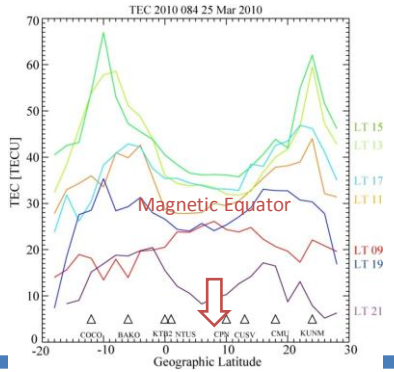

NICT
KMITL
SUGAR
BPN
Others
(IGS etc)
Magnetic Equator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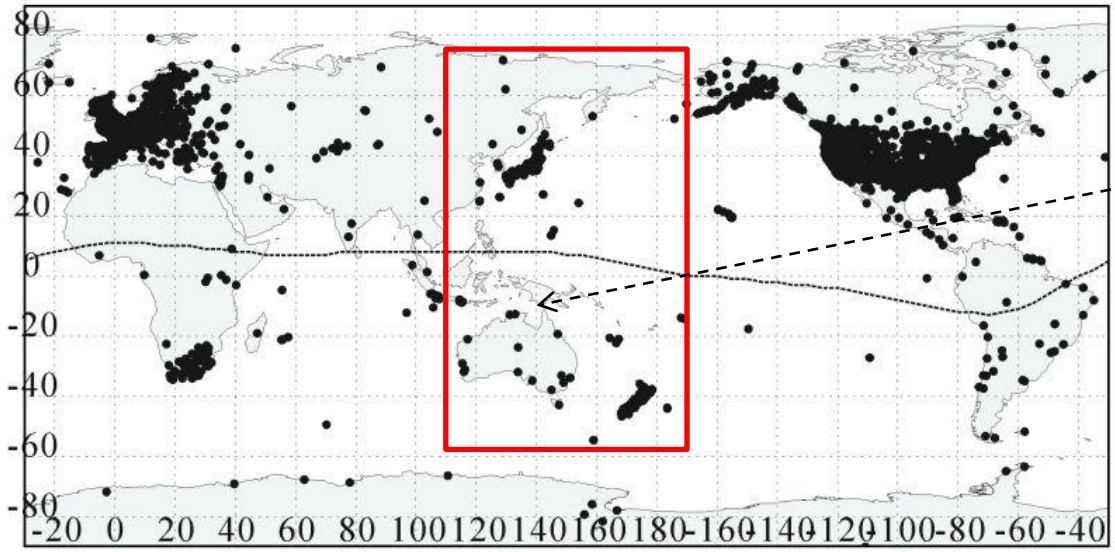
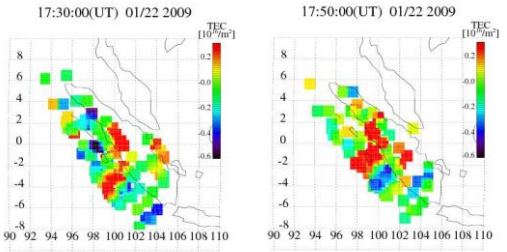
TEC [TECU]
Magnetic Equator
LT 15
LT 13
LT 17
LT 11
LT 09
LT 19
LT 21
Geographic Latitude



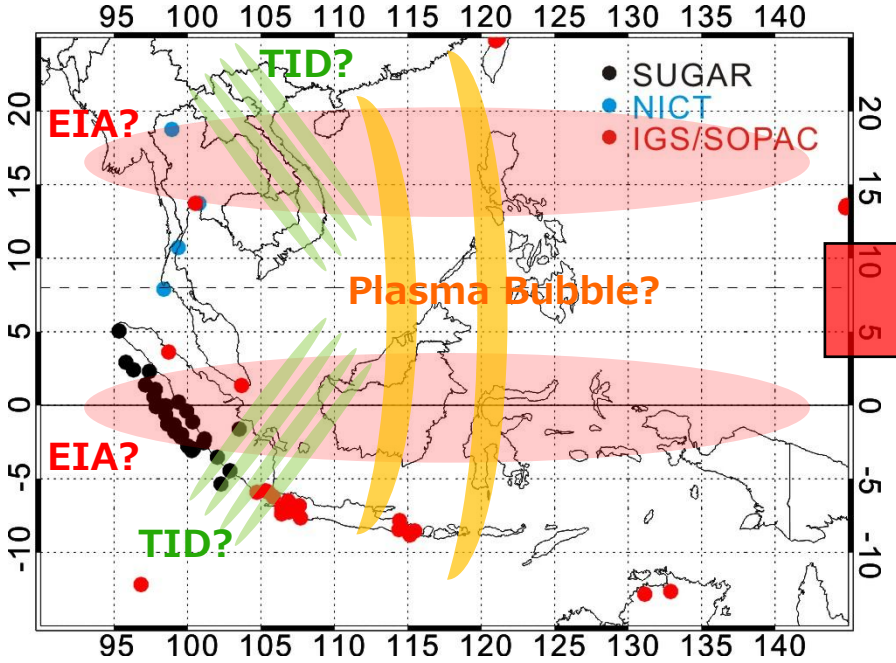
GPS receivers all over the world 5000 receiver data available online



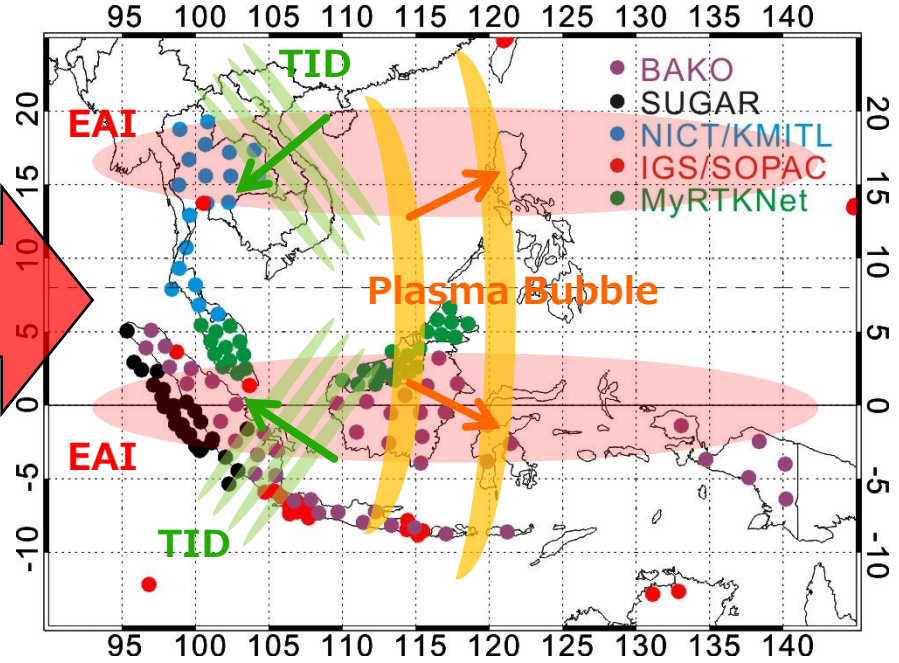
GPS-TEC at Sumatra island

Dense and wide-coverage GPS receiver network can reveal their spatial structures, propagation directions, and temporal evolutions.

Current



Near Future Plan & Vision



Associates (so far)

http://aoswa.nict.go.jp/associates.html

AOSWA
Asia-Oceania Space Weather Alliance

AOSWA mailing list
<AOSWA@ml.nict.go.jp>

Join Us!

Associetes of AOSWA

- Number of Associates 14
  (8 countries)
- Number of Mailing List Member

Australia	2
China	3
India	2
Indonesia	9
Japan	25
Malaysia	2
Philippines	1
South Korea	6
Taiwan	1
Thailand	4
USA	1
Vietnam	2
Total	58

Associates

Australia
- Ionospheric Prediction Service (IPS) / RWC Australia

China
- Center for Space Science & Applied Research (CSSAR)

India
- Radio & Atmospheric Sciences Division, National Physical Laboratory (NPL) / RWC India

Indonesia
- National Institute of Aeronautics and Space (LAPAN)

Japan
- National Institute of Information and Communications Technology
- Research Institute for Sustainable Humanosphere
- Solar-Terrestrial Environment Laboratory

Malaysia
- National Space Agency of Malaysia (ANGKASA)
- Universiti Kebangsaan Malaysia (UKM)

South Korea
- Korea Astronomy and Space Science Institute
- Korean Space Weather Center/Radio Research Agency
- Kyung Hee University

Vietnam
- Institute of Geophysics, Vietnam Academy of Science and Technology New

AOGS 2012:
Asia-Oceania Space Weather Alliance: AOSWA (ST26)
submission deadline (extended) 21 Mar 2012

Asia Oceania Geosciences Society

Session Proposal Details (ST26)

Back to my session proposal list

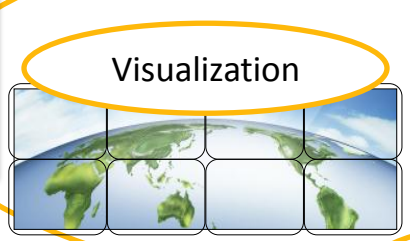
Session Proposal Status	
Status	Accepted
Review/Comments	

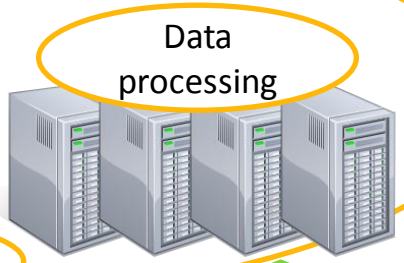
Session Proposal Details	
Section	ST - Solar & Terrestrial Sciences
Session Title	**Asia-Oceania Space Weather Alliance: AOSWA**
Session Description	The solar activity controls coupling processes from the Sun to the Earth's upper atmosphere and produces space weather phenomena. Space weather impacts human activities, such as communications, navigations, satellite operations, human activity in space, aviation, and electric power. It is expected that space weather forecasting can minimize the impacts of them. We are now in the ascending phase of 24th solar cycle. Several strong space weather phenomena will occur within several years. Recently, several countries in Asia-Oceania region have started national space weather program. Although the space weather is controlled by the global phenomena, the local and regional observation is also imporant. It is valueable to exchange information and results of space weather research and operation, to formulate international collaborations in Asia-Oceania region. This session provides a good oppotunity to discuss the recent progress of research and operational activities of space weather forecasting.
Expected Duration of Session	1/2days (12Papers)

As summary…

Data intensive approach of large-scale data

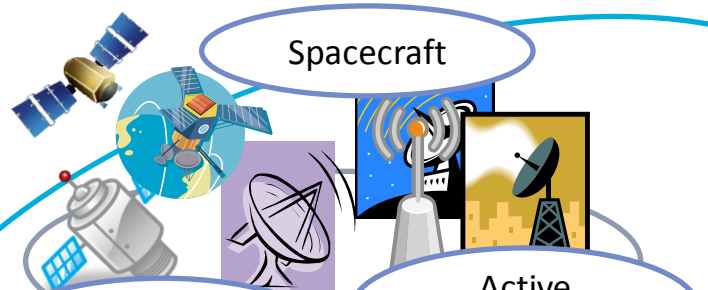
Informatics via "cloud system"

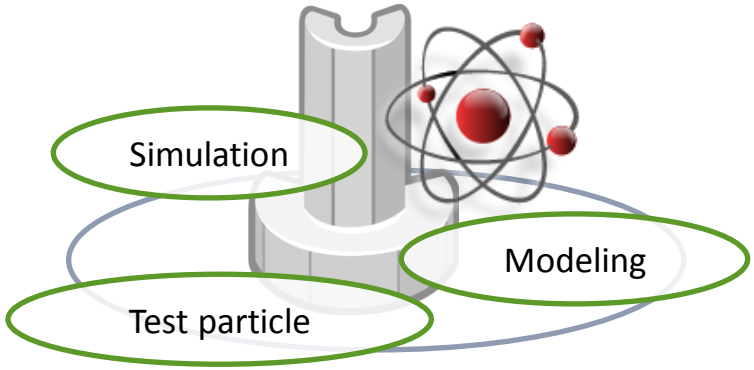




Data

Data





Observation

via Ground-based observatory and satellite

Simulation

via super computer

Invitation:
NICT Science Cloud User registration Web

http://www.seg.nict.go.jp

English site will be available on April, 2012.

Contact: ken.murata@nict.go.jp

NICT ScienceCloud

Thank you for your attention!

Weekly Space Weather News
http ://www.seg.nict.go.jp/wsw

NICT Data Download Site

http://seg-stars-s01.nict.go.jp/STARS-DLWeb