Data Service at the World Data Center for Geomagnetism, Kyoto

T. Iyemori, M. Takeda, M. Nose and Y. Odagi

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World Data Center for Geomagnetism, Kyoto
Graduate School of Science, Kyoto University
Kyoto 606-8502, Japan
http://swdcwww.kugi.kyoto-u.ac.jp/index.html

1. History of WDC for Geomagnetism, Kyoto

1957-1958 **"WDC-C2 for Geomagnetism"** was established (as a very small section of the Library) -- Only one librarian + volunteers (i.e., scientists at Kyoto Univ.)

1977 **"Data Analysis Center for Geomagnetism and Space Magnetism"** was established to operate the WDC-C2 for Geomagnetism --- One associate professor + one research associate)

1978- "WDC C2 for Geomagnetism Data Catalogue" **with computer editing**

1980- Derivation of **"Auroral Electrojet" indices** in Kyoto

1882 A post for technical officer added

1986- Derivation of the "Dst" index in Kyoto

1987- Construction of **“Solar Terrestrial Physics” database**

1988 Connect to **SPAN** (Space Physics Analysis Network; NASA)

1990- Derivation of **“ASY/SYM” indices**

1995- **WWW service** from WDC, Kyoto

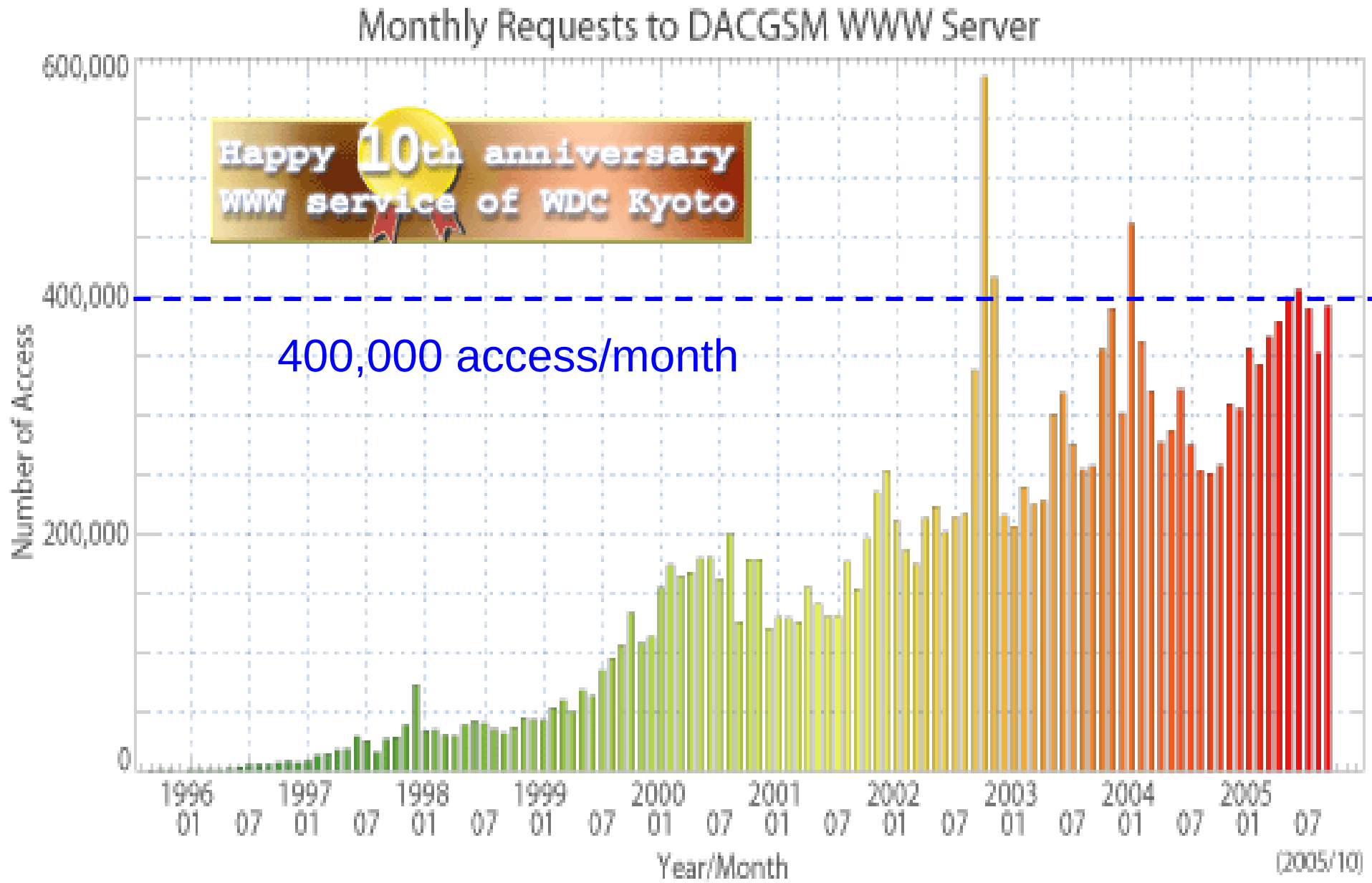
1996- **Near-real time** Dst and AE service

2000 A post for professor added

2003- Conversion of analogue magnetogram to digital image file

2005- Collaboration to Graduate School of Science as a chair of “Informatics on natural electromagnetic environment”

Number of Access to WDC for Geomagnetism, Kyoto



2. Transition from Analogue to Digital data

Data acquisition → Transfer → Archive → Dissemination

IGY (International Geophysical Year: 1957-1958) – 1960s

Analogue recording by mail Microfilms by mail

1970 -- 1980s

Digital recording Telephone (satellite link) Magnetic tapes by mail (computer networks)

1990s -- 2006

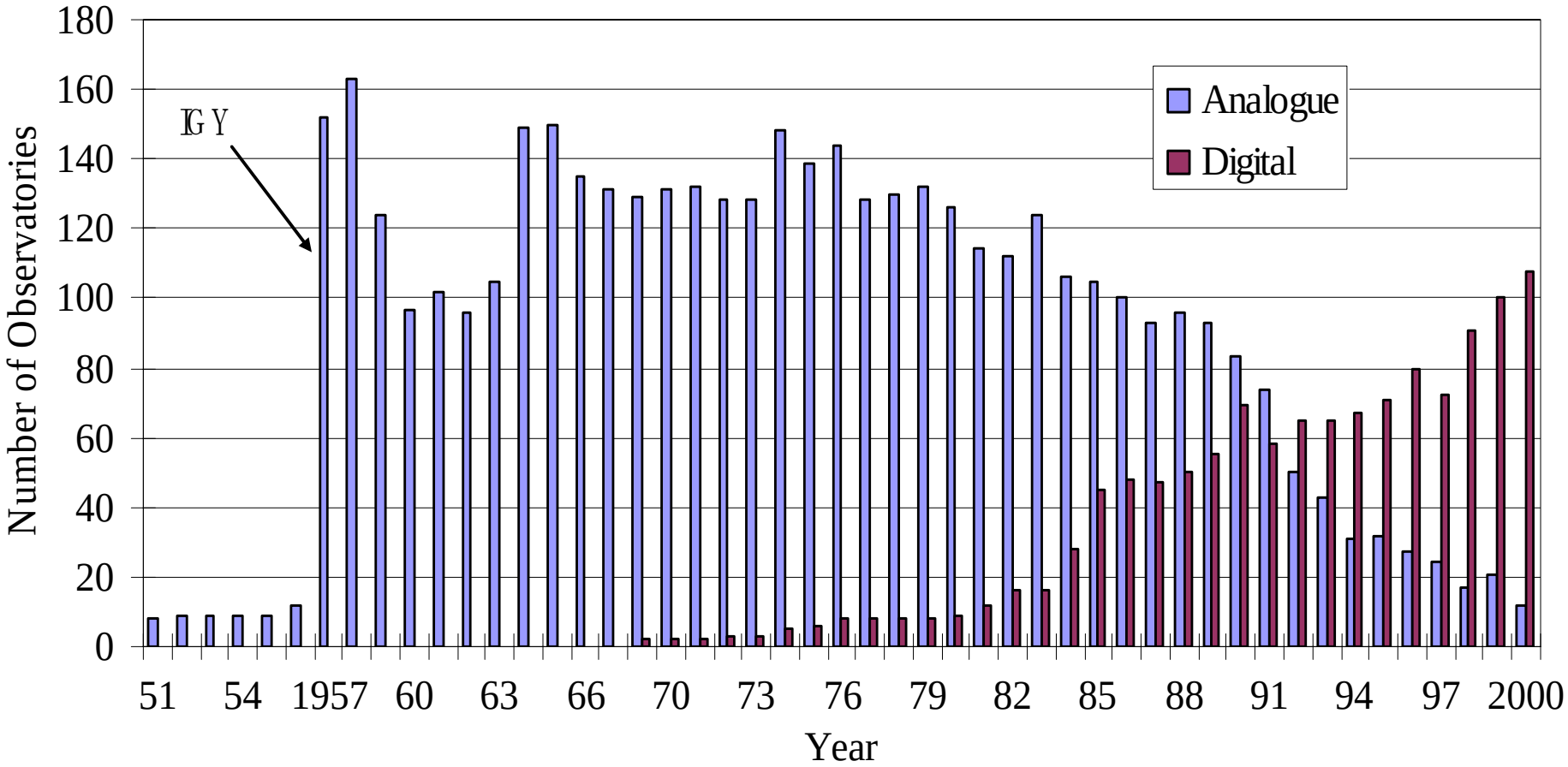
Digital memory Internet (satellite link) Disks WWW

…but … availability of real-time data is still very limited

Analogue and digital data collection at WDC-Kyoto

(Number of Geomagnetic Observatories)

50 Years after IGY ➔ elrctronic Geophysical Year (eGY) 2007-2008



Analogue: Normal-run magnetograms, **Digital: 1-minute resolution data**

← Scanning from microfilmed magnetograms

Conversion from original magnetograms to image files with high-resolution digital camera →

Digital camera system

3. Real-time Data Service from WDC, Kyoto

1991.07 Quasi-real time (i.e., once an hour) service through UNIX network (STEP network inside Japan)

1995 .09 WWW service from http://swdcdb.kugi.kyoto-u.ac.jp/ start

1996.07 Near real-time data plots through GMS satellite

Real-time detection of Pi2 micro-pulsation and monitoring

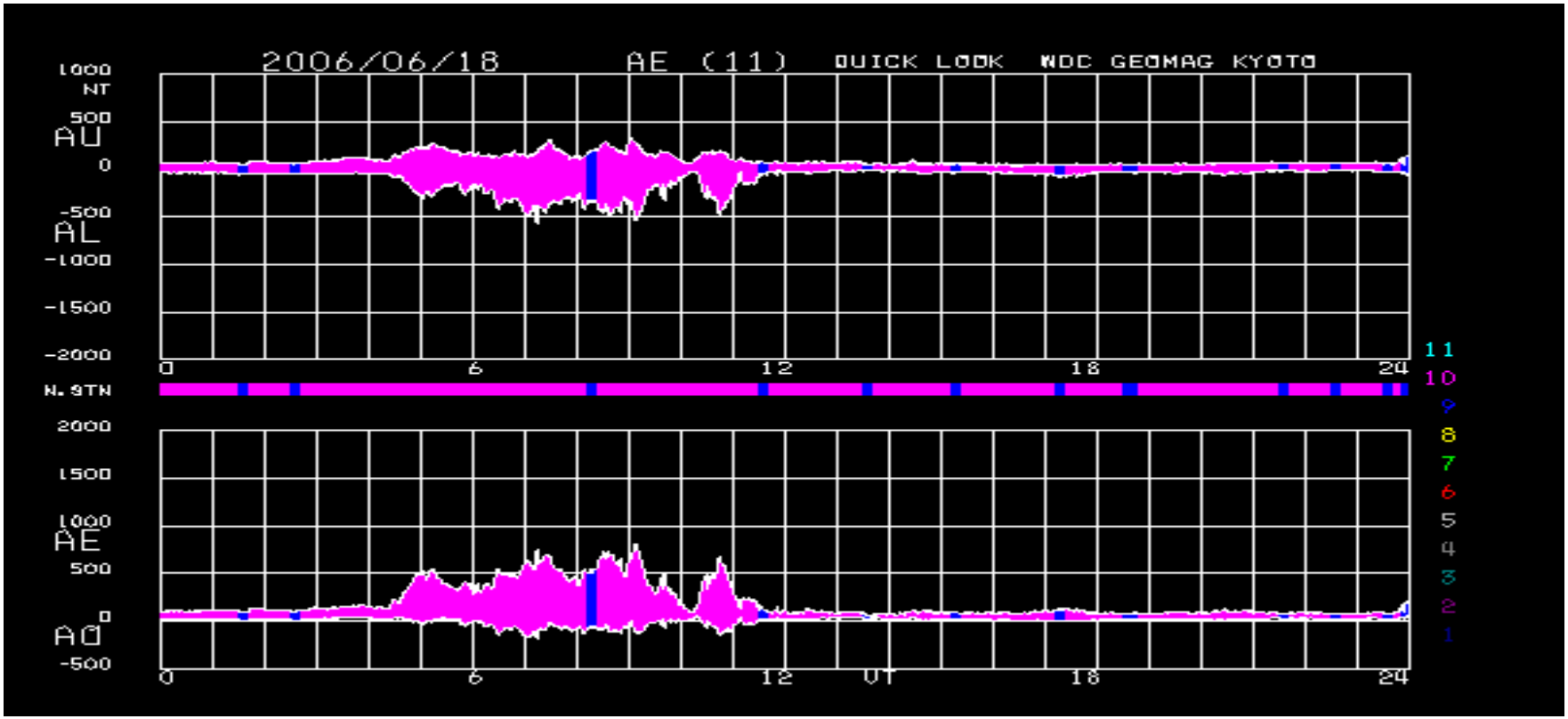
1997.03 Near real-time Dst and AE index service start

2004.03 Real-time data service from Aso, Japan started

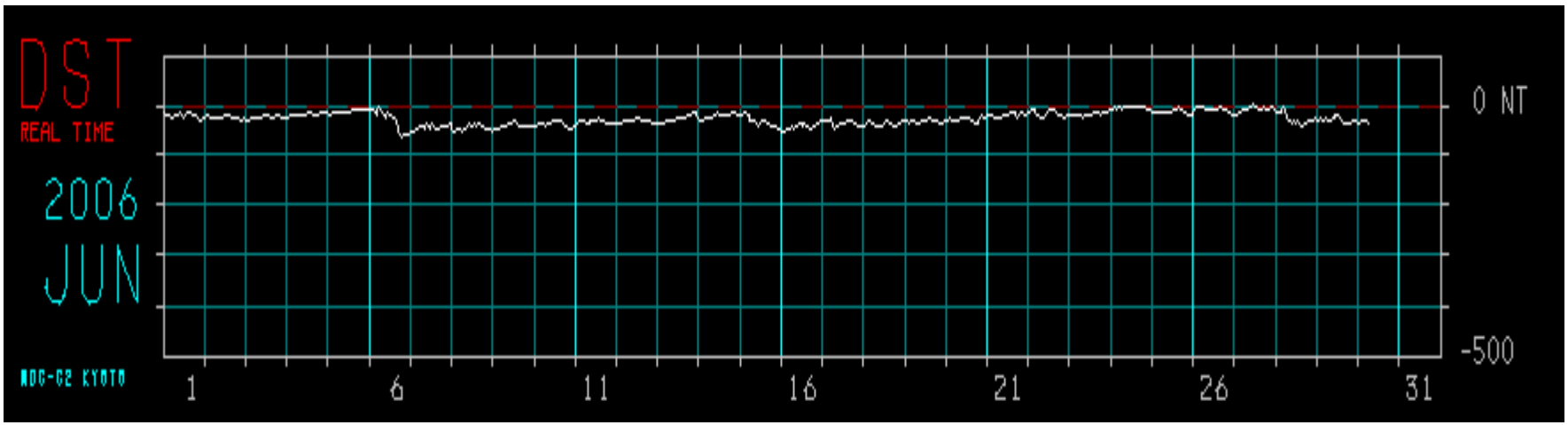
2005.05 Plot of near real-time data from Phimai, Thailand started

Near-Real Time Geomagnetic Indices, AE and Dst

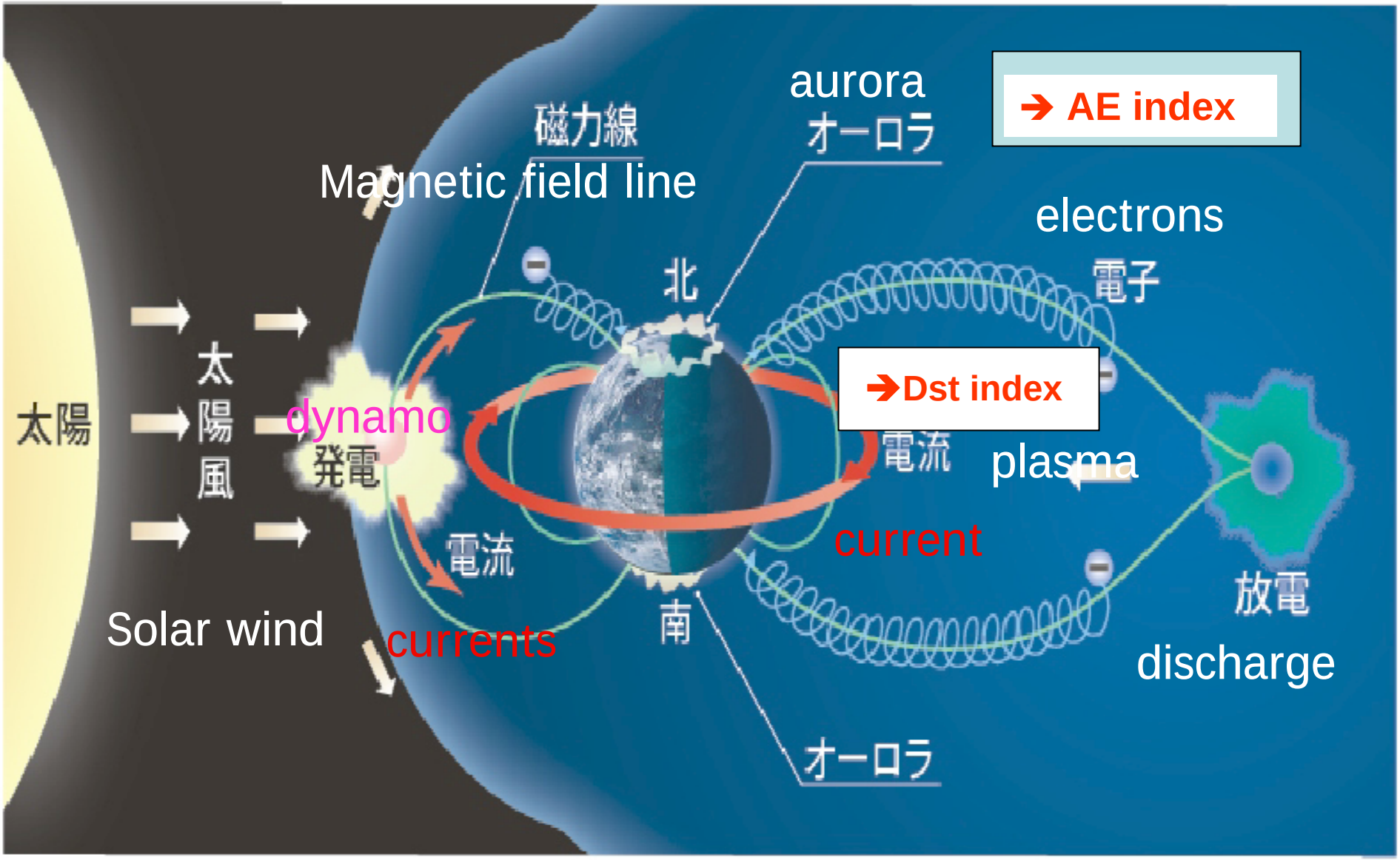
AE



Dst



Geomagnetic Indices for Monitoring of Geomagnetic Disturbances



The rules for the data use and exchange are defined by the Guide on the World Data Center System (ICSU Panel on World Data Centers, 1996). Note that information on the appropriate institution(s) is also supplied with the WDC data sets. If the data are used in publications and presentations, the data suppliers and the WDC for Geomagnetism, Kyoto must properly be acknowledged.

Commercial use and re-distribution of WDC data are, in general, not allowed. Please ask for the information of each observatory to the WDC.

The construction of this database has been supported in part (as "Solar-Terrestrial Physics Database") by grant 127008, 168069 and 178061 under the Japan Society for Promotion of Science (JSPS). We also thank many geomagnetic observatories, institutions and international organizations wh kindly supply the data to our data center.

On geomagnetic data | Indices | Data | Models | Miscellaneous

Indices

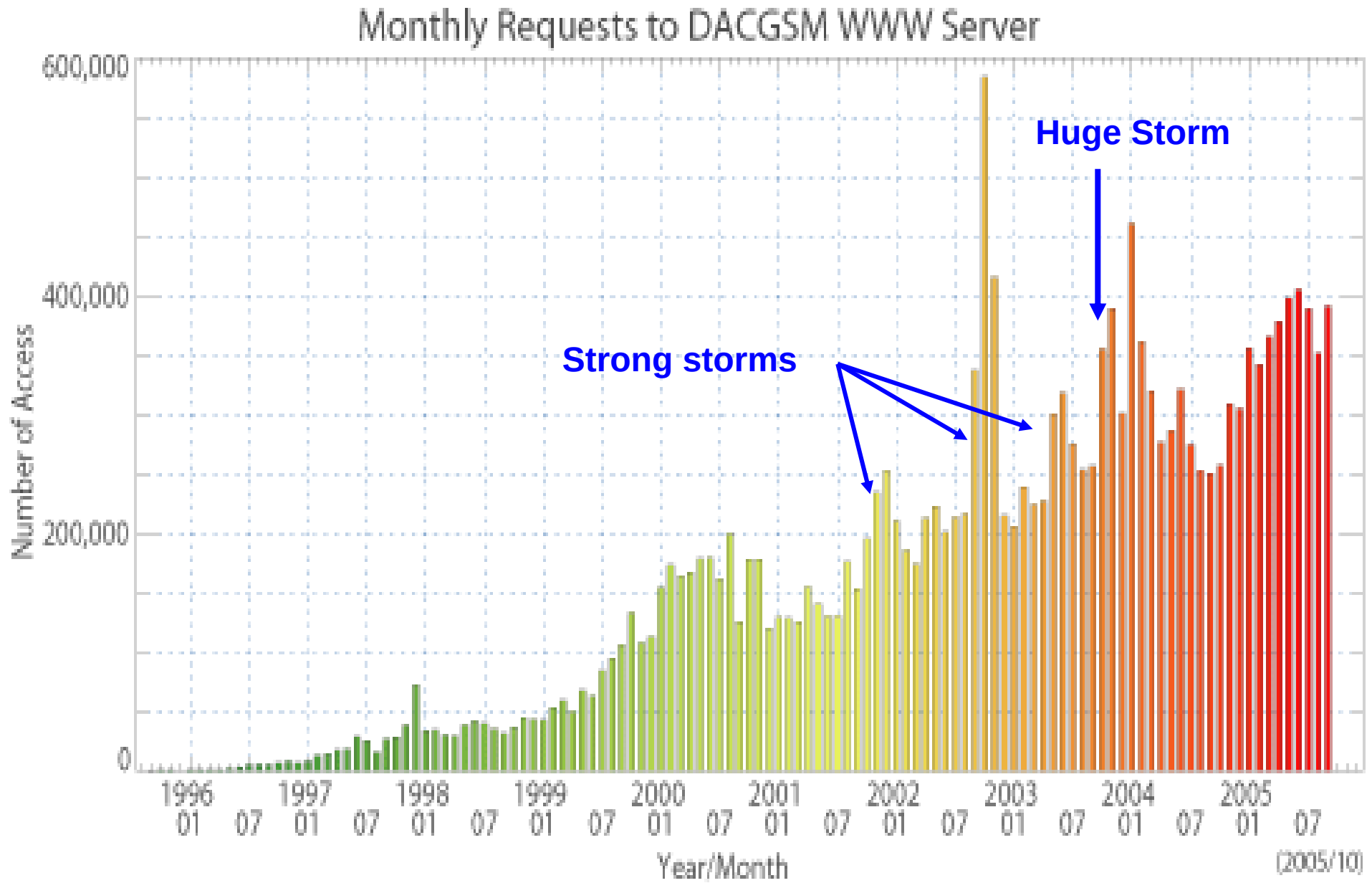
1. AE index [Since 1957]
2. Dst index [Since 1957]
3. ASY/SYM indices [Since 1981]
4. Kp index [Since 1932] (with ap and Ap)
5. The quietest and most disturbed days [Since 1932]

→ : Real-time data (quasi-)

Geomagnetic Field Data at the Observatories

- Real Time (Quick look)
  1. WDC Kyoto GEOMAG QL test page
  2. Shigaraki and Mineyama quicklook magnetogram (1 second value) (Map)
  3. Aso Real-Time Magnetogram [Plot and download 1 second and 1 minite values]
     and Phimai (Thailand) Quasi-Real-Time Magnetogram [Plot]
     (Link to page by "Elucidation of the Active Geosphere. Kyoto University Acvtive Geosphere investigations for the 21st century COE Program")
  4. Real-Time Detection of Pi2 Pulsation
  5. Huancayo (station on the magnetic equator) Real-time plot
     [Link to IGP, Peru]
- Archive
  1. Digital Data
     Geomagnetic hourly [Since 1890], 1 minute [Since 1975] and 1 second [Since 1978] values
  2. Analogue record image [Since 1924]

Number of Access to WDC for Geomagnetism, Kyoto



Necessity (or Use) of Real-Time (Geomagnetic) Data

Examples:

1. Space weather applications:

Prediction and monitoring of geomagnetic disturbances

2. (International) collaborative research: timeliness

"magnetic storms", "substorms" and related phenomena

3. Monitoring in other observations:

"EM induction", "GPS TEC", "HF-radar" etc.

4. Education, outreach activities:

"Impression of real-time data"

5. Health check of instruments (e.g. magnetometers)

Problems (1)

Importance of International Collaboration

気象庁
Japan Meteorological Agency

Geographical Survey Institute
Government of JAPAN

(Their own missions (not academic))

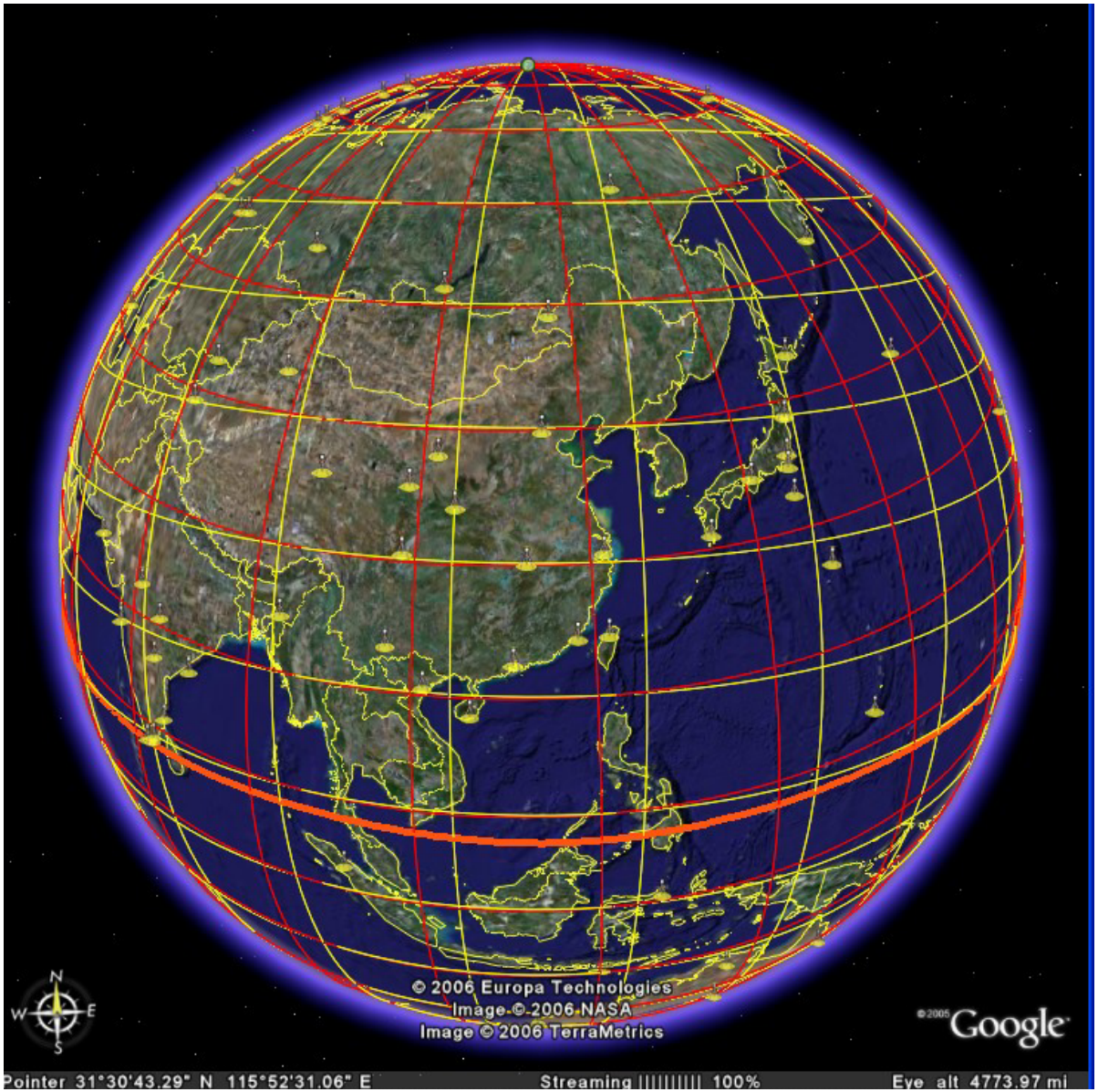
भारतीय भूचुम्बकत्व संस्थान
INDIAN INSTITUTE OF GEOMAGNETISM

BIENVENIDA
TERVETULOA
ROM
TALOFA
VELKOMMEN
ISTEN HOZTA I
VÍTEJTE
WELCOME
Добро пожаловать
WILLKOMMEN
NAMASKAR
VÍTAJTE
BEM VINDO
歡迎
WITAMY
KINH CHAO
VÄLKOMMEN
BIENVENUE

WORLD DATA CENTER
WDC
KYOTO
FOR GEOMAGNETISM

Users
(For Science)

Problems (2)
Difficulty in Real-Time Data Transfer



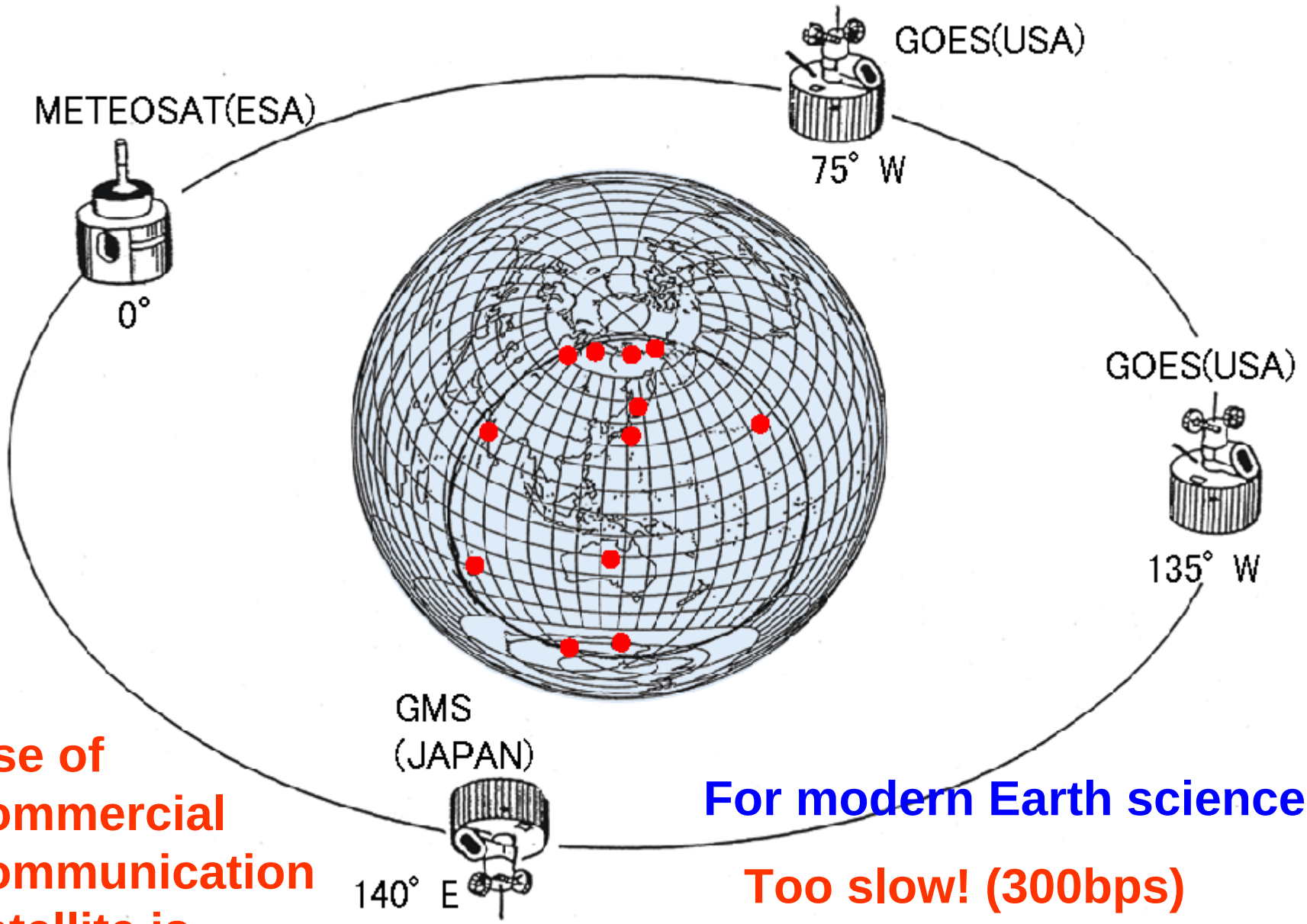
In many cases,

- No Internet

- Necessity of real-time data transfer for each institution is not very strong

- Weak govern-mental support to "academic" observation

For real-time AE and Dst indices



Use of commercial communication satellite is expensive

For modern Earth sciences:

Too slow! (300bps)

For JMA related service

Summary

1. **WDC for Geomagnetism, Kyoto has been operated at Kyoto University with a few staffs for 50 years and has been trying to introduce new IT at each era.**

2. **Data service has been changed from analogue data with postal service to digital data from web. However, we still have large amount of analogue data waiting the conversion to digital form.**

3. **Real-time data service is necessary and getting more and more important. Difficulty in real-time data transfer (collection) is one of the major problems for real-time data service.**

One of the eGY themes