

WDC ACTIVITIES IN JAPAN, 2008

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ABSTRACT

This paper briefly reviews the activities of the International Council for Science (ICSU) World Data Centers (WDCs) in Japan at a time of great change in the data and information structures of the ICSU – the creation of the World Data System (WDS) in 2009. Seven WDCs are currently operating in Japan: the WDC for Airglow, the WDC for Cosmic Rays, the WDC for Geomagnetism, Kyoto, the WDC for Ionosphere, the WDC for Solar Radio Emission, and the WDC for Space Science Satellites. Although these WDCs are highly active, a long-term support system must be established to ensure the stewardship and provision of quality-assessed data and data services to the international science community.

Keywords: ICSU, WDC, WDS, World Data Center, Japan

1 INTRODUCTION

The original World Data Center (WDC) system was created in the International Geophysical Year (IGY) era (1957-1958) by the Special Committee for the IGY (CSAGI) to archive and distribute data collected through observational programs planned in the era. The first group of WDCs was established in the United States (WDC-A), Russia (WDC-B), Europe (WDC-C1), and the Asia-Oceanic region (WDC-C2). In the IGY era, the WDC for Airglow, the WDC for Cosmic Rays, the WDC for Geomagnetism, the WDC for Ionosphere, and the WDC for Nuclear Radiation were created in Japan as C2 centers. In the 1960s, the WDC for Solar Radio Emissions and the WDC for Solar-Terrestrial Activity (renamed the WDC for Space Science Satellites) were created. In the 1980s, the WDC for Aurora was founded as the 8th WDC in Japan. The WDC for Nuclear Radiation, which was operated by the Japanese Meteorological Agency, was closed in 2007. A list of current WDCs in Japan is given in Table 1.

Table 1. Current World Data Centers in Japan (2008)

WDC for	Host Institution	Web Site
Airglow	National Institute of Polar Research	http://solarwww.mtk.nao.ac.jp/wdc.html
Aurora	National Astronomical Observatory	http://polaris.nipr.ac.jp/~aurora/
Cosmic Rays	Solar-Terrestrial Environment Laboratory, Nagoya University	http://www.env.sci.ibaraki.ac.jp/database/html/WDCR/english.html
Geomagnetism, Kyoto	Data Analysis Center for Geomagnetism and Space Magnetism, Kyoto University	http://wdc.kugi.kyoto-u.ac.jp/index.html
Ionosphere	National Institute of Information and Communications Technology	http://wdc.nict.go.jp/index_eng.html
Solar Radio Emission	National Astronomical Observatory	http://solar.nro.nao.ac.jp/norp/index.html
Scientific Satellites	Institute of Space and Astronautical Science	http://www.darts.isas.jaxa.jp/index.html.en

The International Council for Science (ICSU) has decided to create the World Data System (WDS) in 2009 by combining the data and information structures of the WDC (World Data Center) and the FAGS (Federation of Astronomical and Geophysical Data-Analysis Services). Seven WDCs in Japan, mentioned above, are supposed to be incorporated within the WDS. In this paper, the current activities of each WDC in Japan are summarized briefly at this special time of remarkable change in the data and information structures of the ICSU.

2 CURRENT STATUS OF WORLD DATA CENTERS IN JAPAN

In this section, the current activities of the seven WDCs in Japan are summarized to help those who want to use the databases maintained by these centers.

2.1 WDC for Airglow

Home Page: <http://solarwww.mtk.nao.ac.jp/wdc.html>

Operated by: the National Astronomical Observatory

Summary of Data Held: Observations of airglow are performed using emission lines such as the 5577 Angstrom (green) and the 6300 Angstrom (red) lines of neutral oxygen and the sodium D-line (5890-5896 Angstrom). Airglow observations in Japan started in the IGY period (1957-1958) and have been continued since then with upgraded instruments.

Data Products, Publications, and Catalogs: The following data are available on the web: (1) 5577, 5893, and 6300 Angstrom data (hourly values, 1979-1994) and (2) 5577, 5893, and 6300 Angstrom data (one-minute values, 1979-1990).

The web page of this WDC is shown in Figure 1.

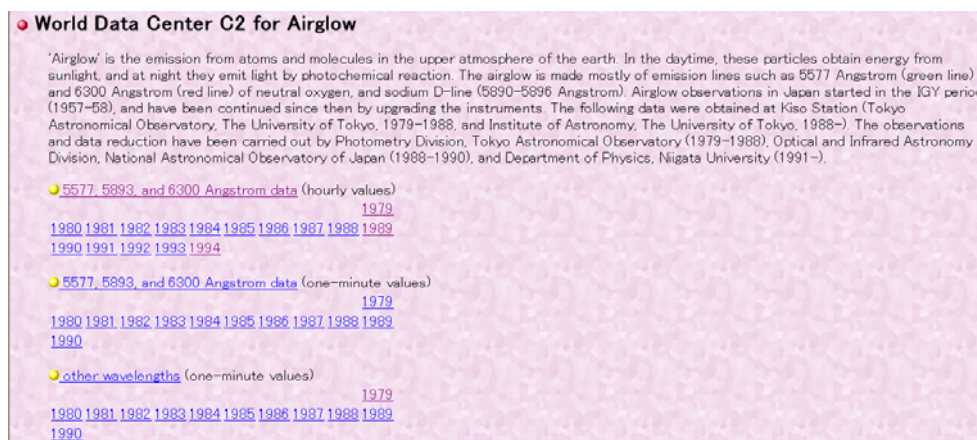


Figure 1. Web page of the WDC for Airglow

2.2 WDC for Aurora

Home page: <http://polaris.nipr.ac.jp/~aurora/>

Operated by: the National Institute of Polar Research

Summary of Data Held: Auroral and associated data obtained by Japanese Antarctic Research Expeditions since 1957.

- (1) All-sky camera images, VLF/ULF emission observations, and data obtained by television cameras, riometers, and magnetometers (examples of all-sky image taken at Syowa Base, Antarctica, are shown in Figure 2)
- (2) Auroral image and particle data obtained by satellites
- (3) Worldwide data from southern hemisphere

User Services:

- (1) Microfilm and microfiche reader-printer
- (2) Duplicating system for video data
- (3) Auroral database system for auroral data
- (4) Computer software for data analysis.

Data Products, Publications, and Catalogs: Data catalog published every two years.

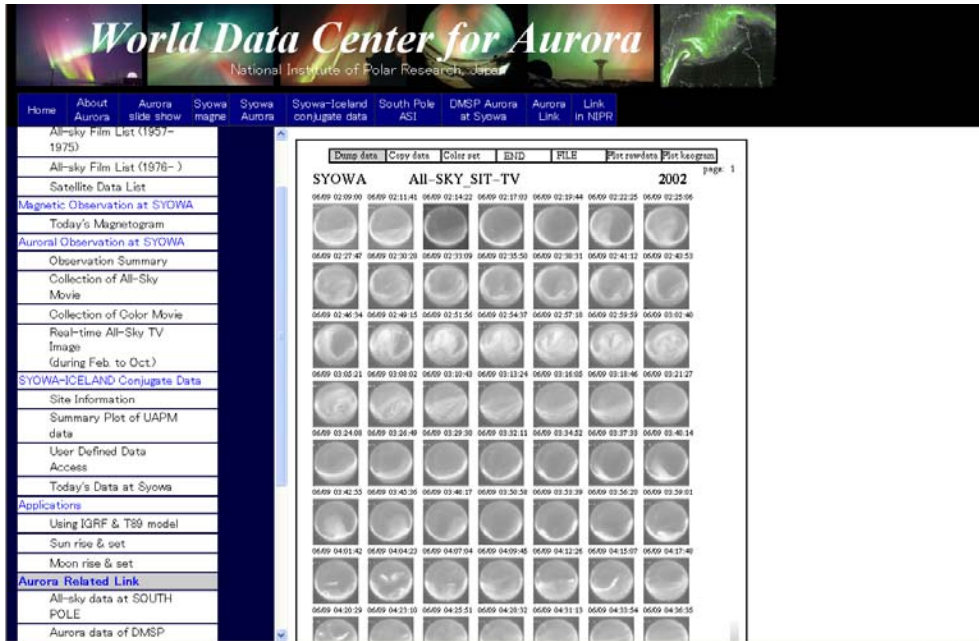


Figure 2. Web page of WDC for Aurora (all-sky TV images at Syowa, Antarctica)

2.3 WDC for Cosmic Rays

Home Page: <http://www.env.sci.ibaraki.ac.jp/database/html/WDCR/english.html>.

Operated by: the Solar-Terrestrial Environment Laboratory, Nagoya University under collaboration with the Department of Environmental Sciences, Ibaraki University.

Summary of Data Held: Cosmic-ray neutron monitor data (1-hour values corrected for atmospheric pressure) from world-wide observatories since 1953.

User Services: Data are available on most media including CD-ROM, via Internet (URL address above), and other media upon request.

Data Products, Publications, and Catalogs: CD-ROMs.

An example of figures given in the web page is shown in Figure 3 (geographical locations of stations in 1990 - 2007).

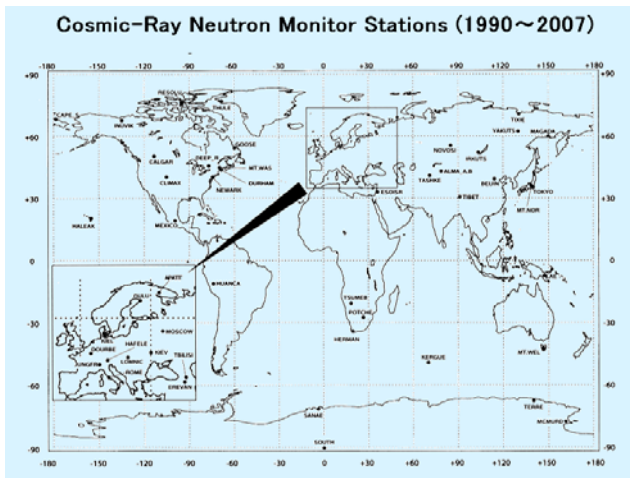


Figure 3. Geographical locations of cosmic-ray neutron stations (1990 - 2007)

2.4 WDC for Geomagnetism, Kyoto

Home Page: <http://wdc.kugi.kyoto-u.ac.jp/index.html>

Operated by: Data Analysis Center for Geomagnetism and Space Magnetism, Graduate School of Science, Kyoto University.

Summary of Data Held: Normal-run magnetograms, rapid-run magnetograms, geomagnetic hourly values, normal-run tellurigrams, rapid-run tellurigrams, Earth current hourly values, geomagnetic indices and lists of special events, and Digital data on CD-ROMs, including geomagnetic hourly, one minute and one second values and geomagnetic indices.

User Services: The WDC is open to visitors during normal working hours. Copies of the data are available upon request at the cost of copying. Facilities available include microfilm and microfiche readers, microfilm and microfiche cameras, photographic and electrostatic printers, and a computer system for data processing.

Data Products, Publications, and Catalogs: Data catalogs, data book of AE indices, provisional mid-latitude geomagnetic indices (ASY and SYM), geomagnetic data plots, and monthly tables of hourly equatorial Dst values.

Special Projects: Real-time geomagnetic data service

- (1) Near real-time Dst index derivation
- (2) Near real-time AE index derivation (an example of one-day plot of the index is shown in Figure 4)
- (3) Conversion of analogue magnetograms to digital image files
- (4) Construction of geomagnetic portal site

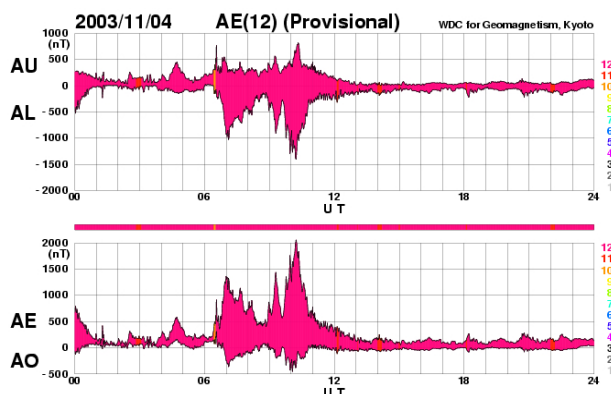


Figure 4. One-day plot of Auroral Electrojet (AE) index

2.5 WDC for Ionosphere

Home Page: http://wdc.nict.go.jp/index_eng.html

Operated by: the Space Environment Group, Applied Electromagnetic Research Center, National Institute of Information and Communications Technology (NICT).

Summary of Data Held: Ionospheric vertical soundings (ionograms of Japanese stations and 141 worldwide stations mainly since 1957), topside soundings, radio wave absorption, ionospheric drifts, ionospheric backscatter, whistlers, VLF emissions, atmospheric radio noise, and radio propagation predictions. Examples of ionograms taken at four Japanese stations are shown in Figure 5.

User Services: Microfilm and microfiche reader, printer, duplicator, and CD-ROM reader. Digital data are primary provided via the Internet.

Data Products, Publications, and Catalogs: Annual catalog, Ionospheric Data in Japan (monthly report), and Annual Catalogue of Data in World Data Center for Ionosphere.

Special Projects: South-East Asia Low-Latitude Ionospheric Network (SEALION) project.

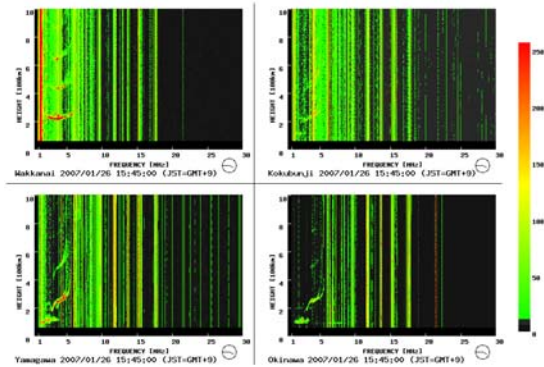


Figure 5. Ionograms obtained at four Japanese stations (Wakkanai, Kokubunji, Yamagawa, and Okinawa) on 2007/01/26.

2.6 WDC for Solar Radio Emission

Home Page: <http://solar.nro.nao.ac.jp/norp/index.html>

Operated by: Nobeyama Solar Radio Observatory, National Astronomical Observatory of Japan

Summary of Data Held: Worldwide solar radio data (collected directly and through WDC-A and WDC-B), with critical analysis and compilations giving corrected daily values. Available data include radio polarimeter records since 1957. Old data (1957-1977) are recorded on microfiches. Digital data are available for observations since 1987 to the present.

Data Products, Publications, and Catalogs: Daily total flux values at 1.0, 2.0, 3.75, 9.4 and 17 GHz since 1951 are available online. An example of data plots is shown in Figure 6. Daily time series of one-second averaged flux values since 1987 are also available online in digital format with analysis software. Published data in IAU Quarterly Bulletin of Solar Activity and the scanned images of QBSA are available online (<http://solar.nro.nao.ac.jp/qbsa/>).

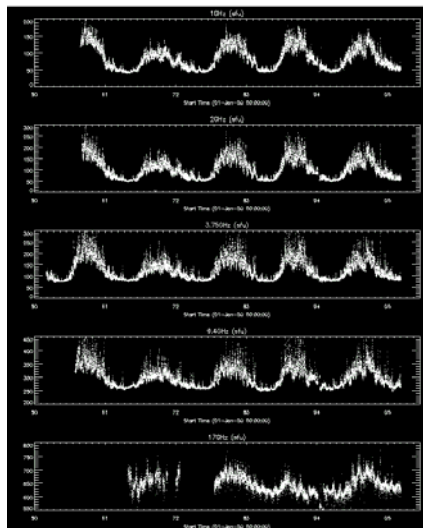


Figure 6. “Radio solar cycles” since 1951 basing on observations by Nobeyama Radio Polarimeters, Toyokawa Radio Polarimeters, and Tokyo Obs. Radio Polarimeter.

2.7 WDC for Space Science Satellites

Home Page: <http://www.darts.isas.jaxa.jp/index.html.en>

Operated by: Center for Planning and Information Systems, Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency.

Summary of Data Held: Space science data acquired by Japanese scientific satellites and spacecraft.

User Services: The WDC operates the Data Archives and Transmission System (DARTS), which is a versatile space science data archive for astrophysics, solar physics, and solar-terrestrial physics. The portal page of DARTS is shown in Figure 7. The WDC is open to visitors during normal working hours.

Data Products, Publications, and Catalogs: Edited results have been published as solar-terrestrial activity charts (STACs) giving summary plots of selected key parameters of solar activity, solar wind conditions, and magnetospheric activities.

Data Archives and Transmission System
DARTS

Astrophysics | Solar Physics | Solar-Terrestrial Physics

▶ [FAQ](#) ▶ [Japanese](#)

▶ [Astrophysics](#)

- Akari
- Suzaku
- HALCA
- ASCA
- IRTS
- Ginga
- Tenna
- JUDO

▶ [Solar Physics](#)

- Hinode
- Yohkoh

▶ [Solar-Terrestrial Physics](#)

- Reimei
- Geotail
- Akebono
- THEMIS (mirror)
- CEF

▶ [DARTS of the Month](#)

▶ [Public Outreach](#)

▶ [Links](#)

▶ [Acknowledgements](#)

Data ARCHIVES and Transmission System (DARTS) is a versatile space science data archive for astrophysics, solar physics, and solar-terrestrial physics. DARTS primarily consists of the data acquired by Japanese scientific satellites and spacecrafts. DARTS is developed and maintained by the Center of Science-satellite Operation and Data Archive (C-SODA) at ISAS/JAXA.

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▶ **News & Announcements**

(26 Sep 2008) In Suzaku UDON, you may specify the center of the extraction region.
(17 Jul 2008) You can extract light curves and spectra with [Suzaku UDON!](#)
(27 Jun 2008) [THEMIS Data Mirror Site](#) is open.

[Old News & Announcements](#)

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▶ **DARTS of the Month**

Figure 2: Folded light-curve of the 1.6 msec pulsar PSR 1937+21 observed with ASCA. The red curve is calculated before the leap second correction in the orbit determination, and the white curve is made after the correction.

Figure 1: X-ray image around the Galactic center taken during the ASCA slew observations. The leap seconds are already taken into account in the attitude determination.

Attention! One Minute Will be 61 Seconds!

Figure 7. Portal page of the Data Archives and Transmission System (DARTS) operated by the WDC for Space Science Satellites

3 FUTURE OF THE WDC SYSTEM IN JAPAN

The ICSU has decided to create the World Data System (WDS) in 2009, combining the data and information structures of the WDC (World Data Center) System and the FAGS (Federation of Astronomical and Geophysical data-analysis Services). Details of the change can be seen in the report of the 29th ICSU General Assembly (http://www.icsu.org/3_mediacentre/INSIGHT_12_2008.html). The principal function of the WDS is to ensure the long-term stewardship and provision of quality-assessed data and data services to the international science community and other stakeholders. The majority of current WDCs and FAGS Services will be incorporated into the WDS, and non-WDC and non-FAGS organizations will be encouraged to join the new system. This change will be a remarkable opportunity to establish a data-center system in Japan to meet increasing demands for long-term and high-quality data on the basis of advanced information sciences. Since the current WDCs in Japan cover only the field of solar-terrestrial physics, creation of new centers under the WDS to cover environmental sciences (e.g. oceanography and atmospheric sciences) is highly desired.

4 ACKNOWLEDGEMENTS

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