World Data System
Asia–Oceania Conference 2019

Programme and Abstracts

7–8 May 2019

Institute of Geographic Sciences and Natural Resources Research,

Chinese Academy of Sciences, Beijing, China

Convener and host:

World Data System of the International Science Council

Supporters:

Bureau of International Cooperation, Chinese Academy of Sciences
National Institute of Information and Communications Technology, Japan

Organizer:

Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences (IGSNRR, CAS: http://www.igsnrr.cas.cn/)

Co-organizers:

World Data System China
World Data Center for Renewable Resources and Environment
Global Change Research Data Publishing & Repository
Chinese Astronomical Data Center
Chinese Space Science Data Center
World Data Center for Geophysics, Beijing
Cold and Arid Regions Science Data Center at Lanzhou (CARD)
WFCC - MIRCEN World Data Centre for Microorganisms
World Data Center - Oceanography, Tianjin
National Earth System Science Data Sharing Infrastructure of China

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Z. Zou, National Space Science Center, Chinese Academy of Science

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A. K. Sinha, Indian Institute of Geomagnetism
B. Muslim, National Institute of Aeronautics and Space, Indonesia
T. Iyemori, Kyoto, Kyoto University
Y. Murayama, National Institute of Information and Communications Technology
M. H. Jusoh, University of Technology, Malaysia
J. Ahmad, Disaster Preparedness Mitigation & Management, Asian Institute of Technology, Thailand
M. F. Lagmay, University of the Philippines
P. Kenpankho, King Mongkut's Institute of Technology, Thailand
S. Harrison, WDS Scientific Committee
R. Edmunds, WDS International Programme Office

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C. Liu, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences
X. Li, Institute of Tibetan Plateau Research, Chinese Academy of Sciences
C. Cui, National Astronomical Observatories, Chinese Academy of Sciences
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Y. Ran, Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences
X. Zhao, Institute of Geology and Geophysics, Chinese Academy of Sciences
K. Bu, Northeast Institute of Geography and Agroecology, Chinese Academy of Sciences
Z. Ji, National Space Science Center, Chinese Academy of Science
L. Wu, Institute of Microbiology, Chinese Academy of Science
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Y. Wang, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences
J. Ma, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences
Z. Wang, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences

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World Data System Asia–Oceania Conference 2019

Dates: 7 (TUE)–8 (WED) May 2019
Place: IGSNRR, Beijing, China

Scope

The World Data System (WDS) is an Interdisciplinary Body of the International Science Council (ISC; formerly ICSU) created by its 29th General Assembly in 2008. Its predecessor, the World Data Center (WDC) system, was founded in 1957. The mission of WDS is to support the long-term vision of ISC; to provide long-term management of and full and open access to scientific data, data services, products and information; to promote compliance with mutually agreed data standards and practices. WDS provides mechanisms for promoting and improving data access among all disciplines in the Natural and Social Sciences and the Humanities, and has adopt a set of Data Sharing Principles to support its objectives.

At the WDS Asia–Oceania Conference 2017 held in Kyoto, Japan, we reached a common understanding that continuation of our effort is important to build a collaborative network of data repositories in developing regions. Along this line, the WDS Asia–Oceania Conference 2019 will be held on 7–8 May 2019 in Beijing, China. This Conference is hosted by the Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Science. The main objectives of the 2019 Conference are:

(1) Strengthen collaboration in the Asia-Oceania region to reinforce WDS-oriented activities

(2) Introduce advanced technologies to data management

(3) Push the cooperation of inter-operational computing or interoperability in WDS community

(4) Build and expand WDS community in the Asia-Oceania region

(5) Exchange experience on successful WDS trustworthy data-repositories certification and membership application

(6) Promote WDS-oriented activities in support of ICSU-led projects in the Asia-Oceania region.

Venue

The WDS Asia–Oceania Conference 2019 will be held at the Conference Room C602, Institute of Geographic Sciences and Natural Resources Research (IGSNRR), CAS. The address of the Institution is 1 Datun Rd, Chaoyang Qu, Beijing.

Conference Website

http://www.wds-china.org/meeting201905.html

Conference Schedule

Date	AM		PM	Evening
7 May (TUE)	Registration	Opening Talks Keynote Talks Session 1. International Collaboration on Data	Session 2. Data for Geophysics and Space Science Session 3. Development of Data-sharing System	IGSNRR Reception
8 May (WED)	Session 4. Marine and Polar Data Session 5. Data Processing and Evaluation		Session 6. WDS Forum Session 7. Summary and Future Plan	

Conference Contact

Prof Juanle Wang, World Data Center for Renewable Resources and Environment, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences. Email: wangjl@igsnrr.ac.cn.

Ms Yuelei Yuan, World Data Center for Renewable Resources and Environment, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences. Email: yuanyl@lreis.ac.cn. Tel: +86 13693170987.

Programme

WDS Asia–Oceania Conference 2019; Beijing, China			
7 MAY (TUE) **Venue: C602, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences**			
	08:00-09:00	Registration	
Opening Session		**Co-chairs: Xiaohan Liao and Takashi Watanabe**	
	09:00-09:30	Opening Talk: Vice director of IGSNRR, CAS	X. Liao
		Welcome Talks by Collaborative Organizations: Chinese Academy of Sciences National Science & Technology Infrastructure Center of China	 S. Wang R. Wang
		Background and Scope of the Conference	G. Li and T. Watanabe
		Logistics of the Conference	J. Wang
Keynote Talks		**Chair: G. Li**	
	09:30-10:10	1: Role of WDS in the Open-science Era	S. Harrison[1,2], [1]*World Data System Scientific Committee* , [2]*Centre for Past Climate Change at the University of Reading*
		2: National Data Center Development Progress in China	R. Wang, *National Science & Technology Infrastructure Center of China*
	10:10-10:30	Coffee break and group photo	
Session 1. International Collaboration on Data (Moderators: J. Ma and Y. Murayama)			
S1-1	10:30-10:50	Opportunities and Challenges of Big Data in Engineering	P. Li, *World Federation of Engineering Organizations – Committee on Engineering for Innovative Technologies*
S1-2	10:50-11:10	WDS China Data Centers Activities and Progresses	J. Wang[1*], and K. Bu[2], [1]*Institute of Geographic Sciences and Natural Resources Research, CAS*, [2]*Northeast Institute of Geography and Agroecology, CAS*
S1-3	11:10-11:30	Trends of Open Science and Research Data Management in Japan and its Policy Implementation	Y. Murayama, *National Institute of Information and Communications Technology*
S1-4	11:30-11:50	A framework for Domain Data Protocols: An European initiative to improve Data Management Plans	I. G. Dillo[*], and P. Doorn, *Data Archiving and Networked Services (DANS)*
S1-5	11:50-12:10	How does the WDS support Early Career Researchers and Scientists?	A. Frémand[1*], S. Delgado-Arias[2], I. Pyshnograiev[3] and L. Wu[4], [1]*UK Polar Data Center, British Antarctic Survey,* [2]*Science Systems and Applications, Inc., NASA Goddard Space Flight Center,* [3]*WDC-Ukraine, Igor Sikorsky Kyiv Polytechnic Institute,* [4]*Institute of Microbiology, Chinese Academy of Sciences*
S1-6	12:10-12:30	CODATA Activities and Progresses	J. Li, *Computer Network information Center, CAS*
	12:30-14:00	Lunch	
Session 2. Data for Geophysics and Space Science (Moderators: Z. Zou and T. Iyemori)			
S2-1	14:00-14:20	How to effectively use Australian Space Weather Services World Data Centre data and software.	K. Wang, *Space Weather Services, Bureau of Meteorology, Australia*
S2-2	14:20-14:40	Sustainable development capability of China's Space Science Center	Q. Xu[*], Y. Yuan, Z. Zou, J. Tong, Z. Ji, and X. Hu, *National Space Science Data Center, CAS*
S2-3	14:40-15:00	Recent Activities of WDC for Ionosphere and Space	T. Tsugawa, *National Institute of*

		Weather	*Information and Communications Technology*
S2-4	15:00-15:20	Thai GNSS and Space Weather Information Data Center	P. Kenpankho, *King Mongkut's Institute of Technology*
	15:20-15:40	Coffee break and poster view	
Session 3. Development of Data-sharing System (Moderators: X. Zhao and A. Sinha)			
S3-1	15:40-16:00	Application of Resource Scheduling Technology in National Space Science Center	Q. Yu, *National Space Science Center, CAS*
S3-2	16:00-16:20	Data Processing Method of Space Science Satellite Based on Multi-layer Information Joint Index	B. Li*, T. Shi, X. Sun, X. Yang, and Y. Hu, *Key Laboratory of Technology in Geo-spatial Information Processing and Application System, CAS*
S3-3	16:20-16:40	Advanced tools for research on upper atmosphere and their future Perspective	Y. Tanaka[1,2,3*], N. Umemura[4], A. Shinbori[4], S. Abe[5], S. UeNo[6], and M. Nose[7], *[1]Polar Environment Data Science Center, Joint Support-Center for Data Science Research, ROIS, [2]National Institute of Polar Research, [3]The Graduate University for Advanced Studies, [4]Institute for Space-Earth Environmental Research, Nagoya Univ., [5]International Center for Space Weather Science and Education, Kyushu Univ., [6]Kwasan and Hida Observatories, Kyoto Univ., [7]Data Analysis Center for Geomagnetism and Space Magnetism, Kyoto Univ.*
S3-4	16:40-17:00	Multicolor Photometry and Parameterization of Stars	O. Y. Malkov[1*], and Z. Gang[2], *[1]Centre for Astronomical Data, Institute of Astronomy, Russian Academy of Sciences, [2]National Astronomical Observatories, CAS*
S3-5	17:00-17:20	Integrating earth observation resources for data sharing in National Earth Observation Science Data Center	L. Zhang*, G. Li, and J. Li, *Institute of Remote Sensing and Digital Earth, CAS*
S3-6	17:20-17:40	An international scientific program was approved on the collaboration of big data infrastructure of space-born carbon observing data research	G. Li[1,2*], J. Zhao[1,3], L. Zhang[1,3], Y. Liu[4], and Z. Huang[5], *[1]Key Lab. of Digital Earth Science, Inst. of Remote Sensing and Digital Earth, CAS, [2]Hainan Key Lab. of Earth Observation, [3]Univ. of Chinese Academy of Sciences, [4]Key Lab. of Middle Atmosphere and Global Environment Observation, Inst. of Atmospheric Physics, CAS, [5]Department of Computer Science and Technology, Tsinghua Univ.*
	18:00-19:30	IGSNRR Reception (Venue: C602, Institute of Geographic Sciences and Natural Resources Research, CAS).	
8 MAY (WED) **Venue: C602, Institute of Geographic Sciences and Natural Resources Research, CAS**			
Session 4. Marine and Polar Data (Moderators: X. Li and A. Kadokura)			
S4-1	09:00-09:20	A big data center for the third pole	X. Pan[1], X. Li[1,2*], X. Guo[1], X. Niu[1], and X. Yang[1], *[1]Observation and big data center of three poles, Institute of Tibetan Plateau Research, CAS, [2]Northwest Institute of Eco-Environment and Resources, CAS*
S4-2	09:20-09:40	Establishment and Application of Marine Scientific Data Sharing Service System of China	Y. Wang*, X. Jiang, L. Kang, and Y. Fu, *National Marine Data and Information Service,*

S4-3	09:40-10:00	ODINWESTPAC Marine Data Sharing System helps to accelerate Digital Belt and Road Program	L. Kang, X. Jiang, Y. Wang*, and Y. Fu, *National Marine Data and Information Service*
S4-4	10:00-10:20	Activities of Polar Environment Data Science Center	A. Kadokura, *Polar Environment Data Science Center, Joint Support-Center for Data Science Research, Research Organization of Information and Systems*
S4-5	10:20-10:40	Data and metadata sharing among AFoPS countries	M. Kanao, *Polar Environment Data Science Center, Joint Support-Center for Data Science Research, Research Organization of Information and Systems*
	10:40-11:00	Coffee break and poster view	
Session 5. Data Processing and Evaluation (Moderators: C. Liu and B. Tsydypov)			
S5-1	11:00-11:20	GCdataPR Five Year Performance Assessment Using the Data Impact Score (*DIS*) Methodology	C. Liu*, Y. Zhang, R. Shi, and J. Ma, *Institute of Geographic Sciences and Natural Resources Research, CAS*
S5-2	11:20-11:40	An overview of Data Journals	F. Liu[1,2,3*], and P. Lin[3], [1]*School of Information, Nanjing Univ.*, [2]*Department of Library, Information and Archive, School of Economics and Management, Univ. of Chinese Academy of Sciences*, [3]*Editorial Office of Data Intelligence, National Science of Library, CAS*
S5-3	11:40-12:00	A survey of research datasets in a university	T. Iyemori[1*], T. Kawaguchi[1], S. Kajita[2], T. Aoki[2], T. Motoki[2], and E. Amano[3], [1]*Unit of Academic Data Innovation, Kyoto Univ.*, [2]*Academic Center for Computing and Media Studies, Kyoto Univ.*, [3]*Research Administration Office, Kyoto Univ.*
S5-4	12:00-12:20	The Application of Big Social Data: Using Social Media to Mine and Analyze Public Sentiment during a Disaster	X. Han[1,2], and J. Wang[1*], [1]*State Key Lab. of Resources and Environmental Information System, Institute of Geographic Sciences and Natural Resources Research, CAS*, [2]*Univ. of Chinese Academy of Sciences*,
	12:20-14:00	Lunch	
Session 6. WDS Forum (Moderators: R. Edmunds and K. Payne)			
S6-1	14:00-14:15	Action Plan of WDS International Technology Office	K. Payne, *WDS International Technology Office*
S6-2	14:15-14:30	Building Trust in Scientific Data – CoreTrustSeal Certification & the World Data System	R. Edmunds, *WDS International Programme Office*
S6-3	14:30-14:45	DANS Certification Efforts: A Use Case	I. G. Dillo, *Data Archiving and Networked Services (DANS)*
S6-4	14:45-15:00	CoreTrustSeal Certification Experience Sharing	D. Fan, and C. Cui*, *National Astronomical Observatories, CAS*
S6-5	15:00-15:15	Understanding and Practice in the CoreTrustSeal Certification of WDC-RRE	J. Wang, *Institute of Geographic Sciences and Natural Resources Research, CAS*
S6-6	15:15-15:30	The Australian Data Archive as a Case study for CoreTrustSeal and World Data Systems in Australasia	H. Leasor*, and S. McEachren, *Australian Data Archive, CSRM, Australian National University*
	15:30-16:00	Q&A and Discussion	
	16:00-16:20	Coffee break, Certification Help Desk, Poster view	
Session 7. Summary and Future Plan			
	16:20-16:50	1. SOC Summary 2. LOC Summary 3. Future Plan for WDS A–O Regional Cooperation	X. Liao, G. Li, T. Watanabe, and J. Wang

Poster Presentations		
P01	Big remote sensing application: forest type and land cover classification based on machine learning algorithm and Google Earth Engine cloud platform	K. Cheng[1,2], and J. Wang[1*], *[1]Institute of Geographic Sciences and Resources Research, CAS, [2]University of Chinese Academy of Sciences*
P02	User's Scientific Data Retrieval System Using Behavior Based on the Model of TPB	J. Liu[1], J. Wang[2*], G. Zhou[1], G. Zhang[1], Y. Cu[1], and J. Liu[1], *[1]Agricultural Information Institute, Chinese Academy of Agricultural Sciences, [2]Key Laboratory of Agricultural Big Data, Ministry of Agriculture and Rural*
P03	Construction and Service of Marine Professional Knowledge	L. Song[*], S. Cao, R. Cai, and X. Jiang, *National Marine Data and Information Service, CAS*
P04	Promotion of WDS-led Activities in the Asia-Oceania Area; an Introduction of the WDS Asia-Oceania Conference, 2019	T. Watanabe[1*], Xi Lao[2], and J. Wang[2], *[1]WDS International Programme Office, [2]Institute of Geographic Sciences and Natural Resources Research, CAS*
P05	Data-led Multi-disciplinary Study on the Earth's Environment and its Relationship to Socio-Economic Activities in 18th-19th Centuries	T. Watanabe, *WDS International Programme Office*
P06	Geomagnetic data acquisition and its usage for space weather research on MAGDAS project	S. Abe[1*], A. Yoshikawa[1], T. Uozumi[1], and A. Fujimoto[2], *[1]International Center for Space Weather Science and Education, Kyushu Univ., [2]Department of Systems Design and Informatics, Kyushu Inst. of Technology*
P07	Application of research data to university educations and social scientific scenes	N. Umemura[1*], Y. Tanaka[2,3,4], S. Abe[5], Y. Saito[3,] S. Nakano[6], A. Shinbori[1], and Y. Minamiyama[3], *[1]Institute for Space-Earth Environmental Research, Nagoya Univ., [2]Polar Environment Data Science Center, Joint Support-Center for Data Science Research, ROIS, [3]National Institute of Polar Research, [4]The Graduate University for Advanced Studies, [5]International Center for Space Weather Science and Education, Kyushu Univ., [6]The Institute of Statistical Mathematics, Research Organization of Information and Systems,*
P08	A permafrost stability distribution map over the Third pole	Y. Ran[1*], and X. Li[2], *[1]Cold and Arid Regions Environmental and Engineering Research Institute, CAS, [2]Institute of Tibetan Plateau Research, CAS*
P09	CAsDC Overview	L. Mi[*], C. Cui, and B. He, *National Astronomical Observatories, CAS*
P10	IGY (International Geophysical Year 1957-1958) on Stamps – Remembering the Origin of WDS	C. Liu, Institute of Geographical Sciences and Natural Resources Research, CAS
P11	Antarctic Treaty on Stamps – Celebrating the 60th anniversary of the Antarctic Treaty	C. Liu, Institute of Geographical Sciences and Natural Resources Research, CAS
P12	CHINARE 1-35 on Stamps	C. Liu, Institute of Geographical Sciences and Natural Resources Research, CAS

Information for Presenters

To Oral Presenters	
1	The allocated time for each presentation includes time for questions and comments. 15 minutes for presentation, 5 minutes for questions and discussion.
2	You may use your own PC for your presentation, but you should test the connection in advance.
3	A PDF file of each presentation will be published on the Conference website, but only with the permission of the authors. Please edit your presentation, as necessary, before submitting the final version for upload.

To Poster Presenters	
1	The size of a poster should be less than H 118.9 cm and W 84.1 cm (standard A0 size)

2	Time of Exhibition: From the morning of 7 May to the afternoon of 8 May.
3	The official Poster Session will take place after a session in which you may give a short presentation of your poster. However, it is highly recommend to be present at your poster during the breaks.
4	A PDF file of your poster will be published on the Conference website, but only with the permission of the authors. Please edit your poster, as necessary, before submitting the final version for upload.

Local Information

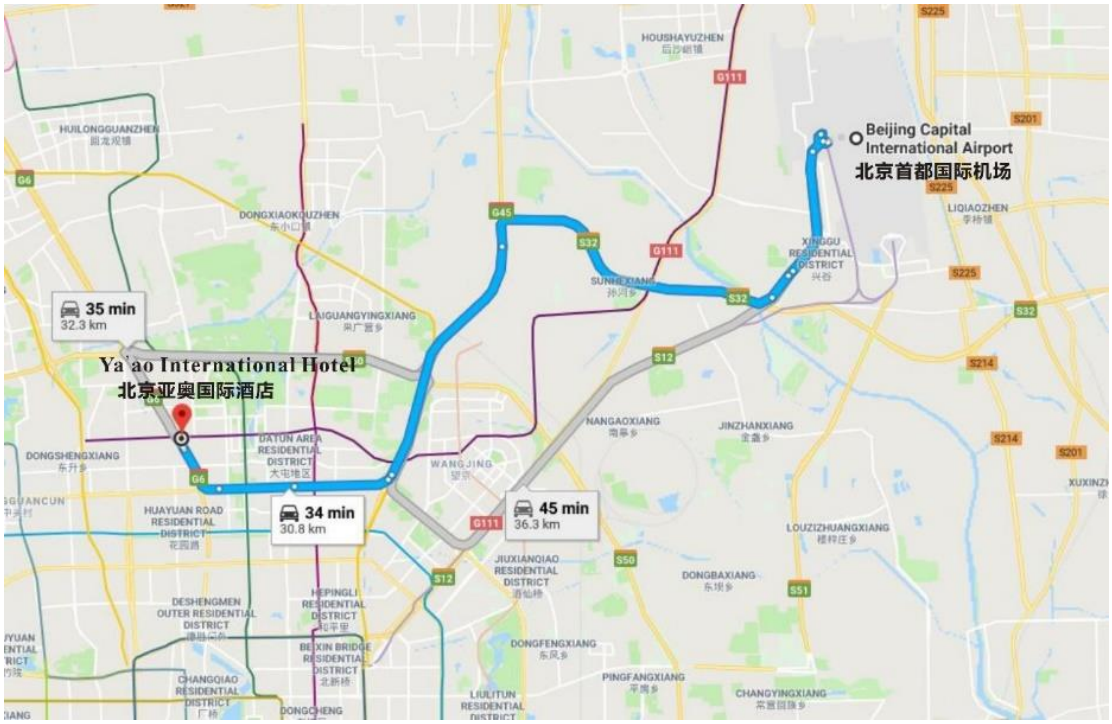
How to get to the Conference Venue and the Beijing Ya'ao International Hotel

From Airport to Hotel (从机场到酒店)

The distance from Beijing Capital International Airport to Ya'ao International Hotel is about 31 kilometers.
从北京首都国际机场到北京亚奥国际酒店的距离是 31 公里。

① By taxi (出租车)

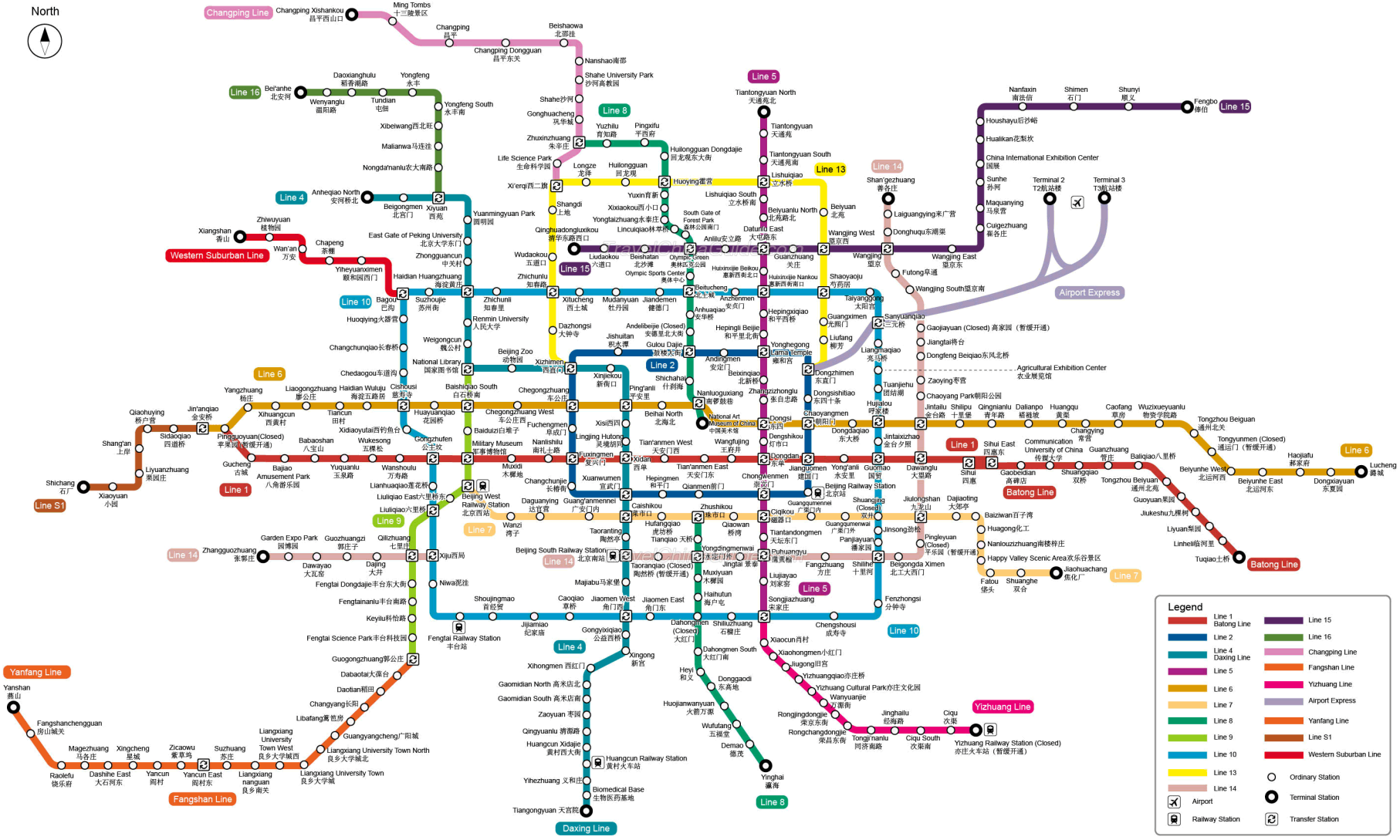
It's very convenient to take a taxi. It takes 34 minutes to drive and costs about 100 RMB.
乘坐出租车很方便，需要 34 分钟车程，花费约 100 元。

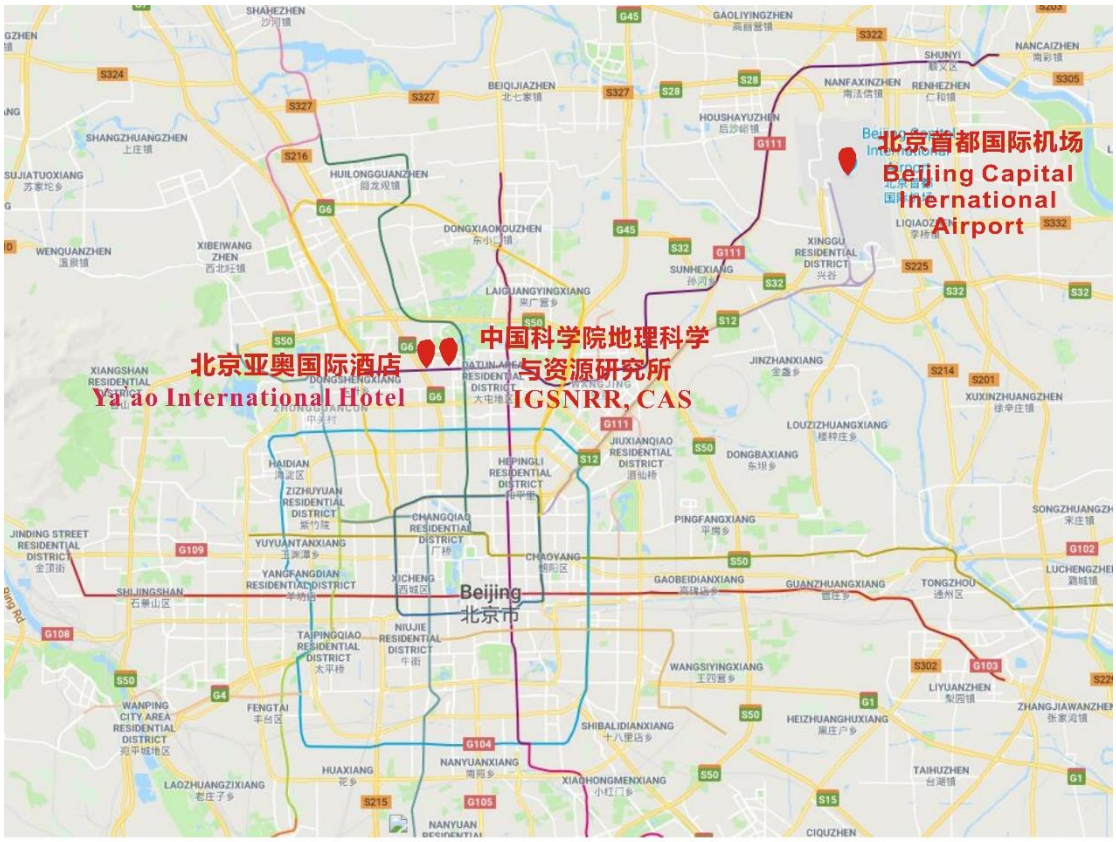


② By subway (乘地铁)

First take the airport line to Sanyuanqiao station, then take the subway Line 10, change to Line 8 at Beitucheng station, then change to Line 15 at Olympic Park Station, and go out at Beishatan station from C export. It may take one hour and 15 minutes cost about 29 RMB.
首先乘坐机场线到三元桥，乘坐地铁 10 号线到北土城站换乘 8 号线，到奥林匹克公园站换乘 15 号线，从北沙滩地铁站 C 口出。全程需要 1 个小时 15 分钟，花费 29 元。
https://www.travelchinaguide.com/cityguides/beijing/transportation/subway.htm

Beijing Subway Map





Ya'ao International Hotel Beijing ★★★★

No.1 Datun Road Beishatan. - Beijing - 100101 - Beijing - China

Ya'ao International Hotel
No.1 Datun Road, Beishatan
Chaoyang District, Beijing

③ Take Bus (乘大巴)

Take the airport bus (Shangdi, Olympic Village Line) to Beijing Ya'ao International Hotel at Terminal 3 station. It may take an hour and a half, and costs about 30 RMB.

在北京首都机场 T3 航站楼站乘坐机场大巴（上地、奥运村线）到北京亚奥国际酒店下车。全程需要 1 个小时 30 分钟，花费 30 元。

https://www.travelchinaguide.com/cityguides/beijing/transportation/airport-shuttle.htm

Hotel Information

The Beijing Ya'ao International Hotel is located along the Datun Rd, located about 1.2 km to the west of IGSNRR along the Datun Rd. The nearest subway station is 'Beishatan' on Line 8.

Tel (86) 106 487 4433

Address: No.1 Datun Road, Beishatan Chaoyang District, Beijing 100101, CHINA

An example webpage:

https://reserving.com/hotels/asia/china/beijing/beijing/best-western-ol-stadium-hotel-beijing

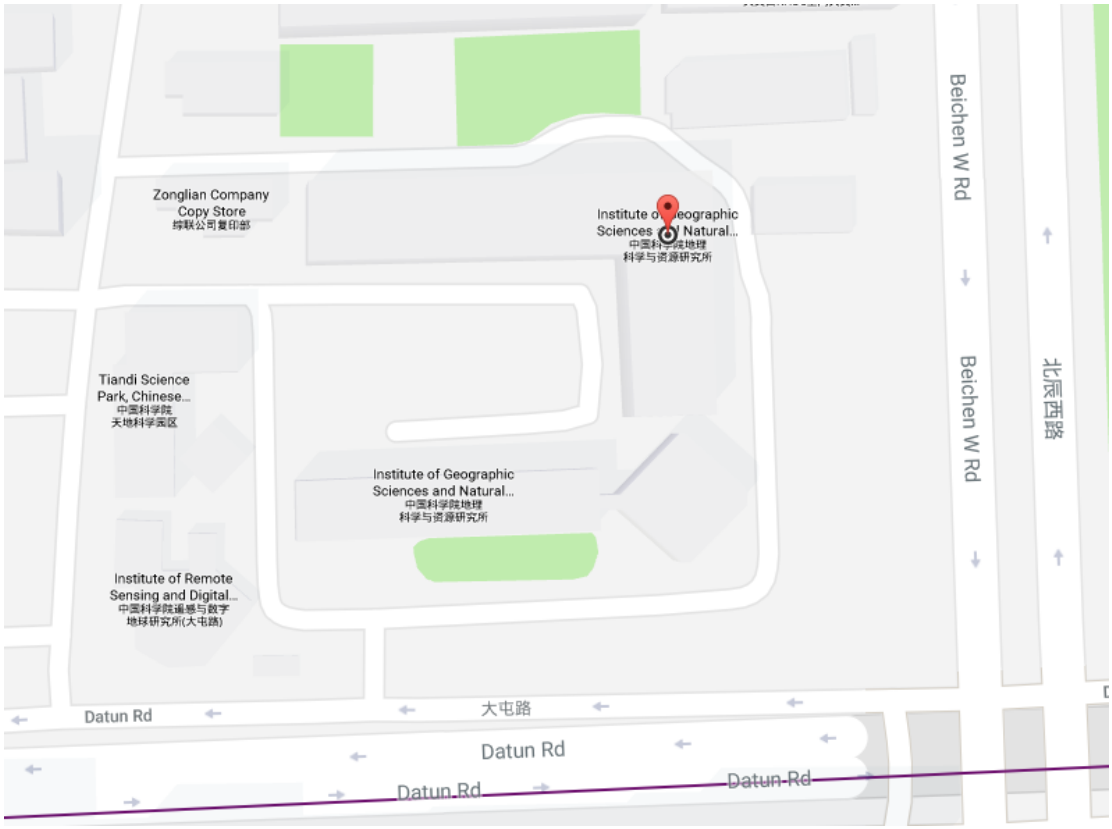
Notice

Many webpages operated by booking agencies show an incorrect location for the Ya'ao Hotel on their maps. Please confirm the correct location of the hotel as shown on the map on the Conference website. The old name of this hotel is 'Best Western OL Stadium Hotel'.

Venue

The Conference will be held at Conference Room C602, Institute of Geographic Sciences and Natural Resources Research (IGSNRR), CAS.

Address: A11 Datun Rd, Chaoyang Qu, Beijing.



From Beijing Ya'ao International Hotel to Conference Venue（（从酒店到会场）

The distance from Beijing Ya'ao International Hotel to conference venue is about 1.2 kilometers. It may take 20 minutes to walk.

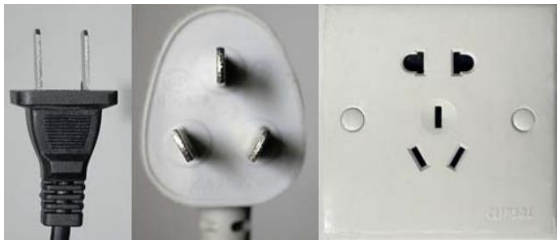
从北京亚奥国际酒店到会议地点的距离是 1.2 公里，需要步行 20 分钟。

Locations for lunch

There are many restaurants in the Xinao Shopping Center, which is 800 m from the Conference venue and about 14-min walk.

Electricity

The voltage in China is 220 V, 50 HZ and the standard socket/plug is that also common in Australia and New Zealand.



Weather

May is one of the best months to visit Beijing, since it is the transition month between its short spring and long summer. It will be neither hot nor cold; the average high will be 25℃ with a low of 15℃.

S1-1

Opportunities and Challenges of Big Data in Engineering

Pan Li [1]

[1] *World Federation of Engineering Organizations – Committee on Engineering for Innovative Technologies*

Summary. Today, Big Data is revolutionising engineering (from aircraft engineering, mechanical engineering, railway engineering, petroleum engineering, to disaster reduction) with improving the productivity, quality and efficiency in various engineering projects while decreasing related carbon emission, energy and matter consumption, and the costs. Moreover, Big Data contributes to keep academic and engineering integrity, and fight against academic fraud & plagiarism, corruptions in procurement and others. However, there are many technical challenges and ethical challenges that must be addressed to unlock the whole potential of Big Data. Despite considerable progress in recent years, data usability still needs improving. On one hand, Data capture, storage, search, transfer, analysis and visualization techniques need to be improved or even renovated. On other hand, Big Data application, in almost every field confronts us with privacy and security issues. There are also signs that data gap might be increased as new inequality between developed and developing countries, between info-rich and info-poor people. Science, technology and engineering community, as main practitioner of Big Data innovation and applications, have special responsibility of ensuring Big Data innovation and applications for the good of people by maximizing the benefits and minimizing risks.

S1-2

WDS China Data Centers Activities and Progresses

Juanle Wang[1]*, ***Kun Bu***[2]

[1] *State Key Laboratory of Resources and Environmental Information System, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, 11A Datun Road Chaoyang District, Beijing, 100101, China*

[2] *Northeast Institute of Geography and Agroecology, Chinese Academy of Sciences, 4888 Shengbei Street, Changchun, Jilin, 130102, China*

Summary. There are 9 regular member data centers in China under the umbrella of the International Council for Science-World Data System (ICSU-WDS). They are Chinese Astronomical Data Center, WDC-Renewable Resources and Environment, WDC – Oceanography at Tianjin, World Data Centre for Microorganisms, Chinese Space Science Data Center, Cold and Arid Regions Science Data Center at Lanzhou (CARD), WDC for Geophysics at Beijing, Global Change Research Data Publishing and Repository (GCdataPR), and Fish Database of Taiwan. The presentation will give a whole picture of 8 data centers in China mainland, including the host agency, development history, main field, core data resources, special services and its domestic and international profile of each centers. Their main contributions for the international communities are summarized and highlighted.

Although WDS China data centers have made obviously progress and achievements in these years, due to the differences between subject areas and the lack of associative mechanism, WDS-China data portal and metadata exchange system has not built yet. In order to solve this problem, in this presentation, the frame of WDS China Common Clearing House was preliminarily put forward and the prototype system was built. At present the established prototype system has already applied in the Renewable Resource and Environment data center of World Data System (WDC-RRE) and part of WDS members in China.

Keywords. WDS China data centers, activities, progress, portal

S1-3

Trends of Open Science and Research Data Management in Japan and its Policy Implementation

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Summary. Open Science is increasingly an important focus, with not only open access to articles, but also with research data management (RDM) and sharing (RDS). It is another mode of modern scholarly communications and of a research ecosystem in this digital era. Open Research Data is not unrestricted disclosure of data, while in Japan it should be a strategic RDS practice with target users, beneficial for researchers and stakeholders. It emerges in parallel to establishing ICSU-WDS (2008), G8 Open Data Charter (2013), deployment of RDA (2013), etc. National guiding principle of open science was released by the Cabinet Office (March 2015). The author discusses that OS, RDS, and RDS will need to be principles for a digital infrastructure for the whole society, to support better understanding, decision making, industry and economy, and citizens' activity.

S1-4

A framework for Domain Data Protocols: An European initiative to improve Data Management Plans

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Summary. Researchers around the globe are confronted with growing research data management requirements imposed by funders and publishers. The majority of these researchers recognize the benefits of good research data management.

But there are still issues to be tackled. To date, a large variety of DMP templates exists across funders, institutions, countries and disciplines, with little alignment on how much detail is needed or useful.

There is also a lack of discipline specific guidance for researchers. They need more information on relevant standards for their field and data type. They also need examples based on good practice in their domain.

The Science Europe has formulated a framework for protocols for the collection and management of data within specified disciplinary domains and research communities. Such protocols, called Domain Data Protocols (DDPs), are defined as generally agreed-upon guidelines, or predefined, written procedural methods. One might also conceive a DDP as a 'model DMP' for a given domain.

Whereas research data management contexts and contents differ across scientific domains, the policy challenges that research organisations face are largely similar, for example in terms of technical and (within Europe) legal requirements. Therefore, Science Europe has also formulated a common set of Core DMP Requirements to be implemented by its member organisations, in order to get rid of meaningless variations from funder to funder, and from institution to institution. The DDP is to be formulated bottom-up by research communities, providing basic guidance and meaningful additions to the Core Requirements for researchers in particular research fields.

Keywords. Research data management, scientific domains, data management plans, guidelines, Science Europe.

Acknowledgment. This contribution will present the results of work that has been done by the Science Europe Working Group on Research Data:
https://www.scienceeurope.org/policy/policy-areas/research-data/

S1-5

How does WDS support Early Career Researchers and Scientists?

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Summary. The World Data System is committed to helping nurture the next generations of data stewards. Supporting Early Career Researchers and Scientists (collectively 'ECRs') is thus a key priority for the WDS Scientific Committee (SC). In recent years, the SC has implemented several initiatives to engage and champion the work of ECRs. Since 2013, for instance, the SC has recognized scientific data stewardship by exceptional early career data managers and scientists through its annual WDS Data Stewardship Award. The award highlights exceptional contributions to the improvement of scientific data stewardship by ECRs through their engagement with the scientific community, academic achievement, and innovations. The awardee earns recognition from the data community starting at SciDataCon, one of the biggest international scientific conferences addressing all aspects of data in research, where the SC presents the award and a prize to the ECR. In another commitment to empower ECRs, the SC opened a call for early career researchers in 2017 to lead and develop a WDS ECR Network to foster better communication among early career scientists in the area of data management. The network engages ECRs from around the world and encourages them to contribute to the development of 'next generation' data practices, as well as to become involved in WDS endeavors. Alice Frémand, Co-chair of the WDS ECR Network and representative of the Network to the Scientific Committee, will share her experience and insights about the support WDS provides to ECRs. She will also discuss opportunities to join and develop the WDS ECR Network to advance the role that ECRs play in future data sharing and data stewardship.

Keywords. Early Career Researchers, Network, WDS, data management

S2-1

How to effectively use Australian Space Weather Services World Data Centre data and software

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Summary. The Australian Bureau of Meteorology (BoM) Space Weather Services (SWS) World Data System (WDC) delivers near real-time data and archived historical data, metadata and software products. After continuous development of several decades, SWS currently collects data from 21 observation stations within the Australasian region and in Antarctica. SWS archives nine different types of space weather data: ionogram, magnetometer, riometer, cosmic ray, solar spectrograph, solar radio, solar images, GNSS and ionospheric scintillation data. The routine data collected flow into the Australian Space Forecast Centre (ASFC) in near real time and then are archived in the SWS WDC. They all are visualized online in the SWS website and downloadable from FTP server. The WDC also provides two kinds of software tools: Ionospheric Viewers and Solar Viewers. The Australasian and Antarctic region is very important for observing, monitoring and detecting space weather. It covers about one eighth of the whole earth surface, between Indian Ocean and Middle Pacific Ocean of the south hemisphere. The data collected in this broad region is irreplaceable in regional and global ionospheric mapping, HF forecasting and other various applications of space weather research and forecasting. This paper will present how to effectively use the SWS WDC data and software.

Keywords. space weather, ionospheric, geophysical, solar, GNSS.

Acknowledgment. We are deeply grateful to the colleagues who have made contributions to Antarctic stations establishment and maintenance in the past decades. We are also particularly thankful to Australian Antarctic Division (AAD), Geoscience Australia (GA), New Zealand Antarctic Programme (NZAP), The University of Newcastle of Australia, The University of Canterbury of New Zealand, and The International Centre for Space Weather Science and Education (ICSWSE) of Japan.

S2-2

Sustainable development capability of China's Space Science Center

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Summary. The development of space science has shown obvious characteristics of big science and quantitative research. Scientific innovation and strategic guarantee increasingly depend on massive, systematic, integrated and highly reliable science data. With the implementation of major space science projects and infrastructures such as Space Science Priority Projects, Lunar and Deep Space Exploration, Meridian Project, International Meridian Circle Science Project, China's space-ground integrated, multi-dimensional space observation system has been preliminarily built. High-precision, high-accuracy and all-day autonomous space science data resource system is forming in China's Space Science Data Center (CSSDC). In the big data era, with the sustainable capability development, CSSDC aims to achieve the integrity, systematization and standardization of space science data in China, to ensure long-term availability, permanent security and open sharing of data, to develop a support platform for big data application and research, to mine the maximum value of data, eventually contribute to China's space science innovation research and application development. Here, we will elaborate that CSSDC has unique advantages and capability for sustainable development in the aspects of mechanism and system guarantee, stable access to data resources, cross-talent gathering, technological innovation and application, as well as value-added service benefits. In the future, CSSDC will serve as a national role with big data innovation influence to promote cross-integration analysis and deep mining applications of space science data, and to drive efficiently knowledge discovery and discipline innovation.

Keywords. Sustainable development; Space science data; Data innovation

S2-3

Recent Activities of WDC for Ionosphere and Space Weather

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Summary. Japan has contributed to space weather researches for nearly a century. Work on space weather research began in 1915 at the Hiraiso branch (known as the Hiraiso Solar Observatory, National Institute of Information and Communications Technology (NICT) and closed in 2016). Ionospheric research for stable radio telecommunications started before World War II, and radio wave propagation forecasting service began in the 1940s. Routine ionospheric observation by ionosondes has been conducted in Japan and Antarctica since 1957, which is the International Geophysical Year (IGY). NICT has been operating a space weather forecasting service as one of the Regional Warning Centers of International Space Environment Service (ISES) since 1989. NICT had hosted and operated the WDC for Ionosphere since 1957 and have been operating the WDC for Ionosphere and Space Weather (WDC-ISW) under the auspices of the World Data System since 2012.

NICT archives data and information on ionosphere and space weather and makes them available to the public. Published data are used by a wide range of users including public organizations and research institutes. Ionosonde data including realtime data of ionosonde and GNSS-TEC observations in Japan, handwritten ionospheric observation record including ionograms during 1936–1954, monthly report of ionospheric data in Japan, and yearly report of ionospheric data in the Antarctica are available on the website of WDC-ISW (http://wdc.nict.go.jp/IONO/wdc/). Recently, we have added two new contents. One is a feature database of our new solar flare prediction model using deep neural networks, named Deep Flare Net (DeFN). This database has been released for the purpose of scientific research on solar flare predictions using machine-learning algorithms and can be used for training and testing datasets. Another new content is the archive of space weather forecast data for 20 years from 1978 to 1998. The archive includes handwritten records of the solar activity as a related document of the warning issuance concerning radio wave propagation (later space weather).

In this presentation, we will introduce recent activities of and new contents of WDC-ISW.

Keywords. Space weather, ionosphere, solar flare, data archive, digitizing

S2-4

Thai GNSS and Space Weather Information Data Center

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Summary. Thai GNSS and Space Weather Information Data Center is hosted at King Mongkut's Institute of Technology Ladkrabang (KMITL) at http://iono-gnss.kmitl.ac.th/. We aim to create the database of GPS data and ionospheric parameters in the Thailand location. The data-oriented activities at Thai Space Weather Information Data Center are from a number of ionospheric monitoring networks such as ionosondes, all-sky imager, magnetometer as well as GNSS receivers in various locations of Thailand such as Chiangmai, Chumphon, Bangkok and Phuket. Other GPS networks and ionosonde stations exist, whereby each network is owned and operated independently. For example, the Department of Land has 11 stations, the Royal Thai Navy owns three ionosonde stations, the Thai Meteorological Department houses 5–7 GPS receivers and the Aeronautical Radio of Thailand owns 3–4 GPS receivers. This activity presents the current status of GNSS and ionospheric monitoring networks and the efforts to create a GNSS and ionopheric database in Thailand. These data are important for the study of the Ionophere, Troposphere, GPS/GNSS technology, Geodesy and applications on the aeronautical navigation, satellite communication, earthquake study among others. In our plan, the data center with collaboration among various universities and agencies is being foreseen.

Keywords. Thai Space Weather, Ionosphere, GNSS, GPS

Acknowledgment. I would like to thank you to the Communication, Signal Processing and Storage Research Group (CSSRG), Department of Telecommunication Engineering, Faculty of Engineering, King Mongkut's Institute of Technology Ladkrabang, for maintaining the Thai GNSS and Space Weather Information Data Center.

S3-1

Application of Resource Scheduling Technology in National Space Science Center

Qinsi Yu

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Summary. Resource scheduling in the context of big data has always been a research hotspot in cluster computing and big data computing. With the development of big data computing, more and more big data computing models have emerged, such as batch-oriented MapReduce; database-oriented SparkSQL, Hive; graph-oriented processing Pregel. With the development of big data computing, more and more big data computing models have emerged, including batch-oriented MapReduce; database-oriented SparkSQL, Hive; graph-oriented processing Pregel. Data centers often build and deploy computing clusters for different services driven by various projects. Each of them runs on isolated hardware and computing resources are divided statically, which leads to problems of system resources fragmentation, low utilization and throughput. In addition, there are several different types of applications running on different types of servers in the data center. These applications have different business logic, operating characteristics, resource requirements and usage. If using same scheduling strategy, the performance of the applications will be seriously limited. In order to solve problems of low resource utilization and inaccurate resource allocation, we using a two level resource scheduling technology based on application perception, which separates the application scheduling framework level and the resource scheduling framework level. The resource scheduling framework level is responsible for establishing data center unified resource pool. The resource pool performs unified management and scheduling on all resources, and dynamically allocates resources according to the requirements of the application scheduling framework. This can prevent forming resources islands among different service systems and improves resource utilization. The application scheduling framework level is responsible for the perception of applications, parsing the type and the resource requirements of applications and allocating resources according to the personality characteristics of the application, which can greatly improve the performance of the application and the accuracy of resource allocation.

Keywords. Resource Scheduling, big data, dynamically allocate, two level resource scheduling

S3-2

Data Processing Method of Space Science Satellite Based on Multi-layer Information Joint Index

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Summary. Space science satellite is commonly used in research on natural phenomena and laws of solar-terrestrial space, interplanetary space, and physical space. Space science satellite data has some obvious features of all-weather observation, excessive volumes of data, the fast speed of counting cycles, and strict requisites of data continuity. The traditional method of two-layer count based on CCSDS protocol can no longer meet the needs to process this kind of satellite data. In this paper, a data processing method based on multi-layer information joint index is proposed. Computer simulation result verifies that this method is valid and effective. At present, the method has been successfully applied to the data processing of satellites in Space Science Pilot Project.

Keywords. Space Science Satellite; Data Processing; Multi-layer Information Joint Index tracking

Acknowledgment. Chinese Academy of Sciences Space Science Pilot Project.

S3-3

Advanced tools for research on upper atmosphere and their future Perspective

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Summary. Earth's upper atmosphere is a complex system that consists of multiple layers interacting with each other, such as magnetosphere, ionosphere, and neutral atmosphere, in which various phenomena are generated by energy inputs from the Sun (e.g., solar radiation and solar wind) and atmospheric waves propagating from the lower atmosphere. To understand these phenomena, it is necessary to comprehensively analyze various kinds of data obtained from the multiple layers. Inter-university Upper atmosphere Global Observation Network (IUGONET) project has developed some useful tools to assist comprehensive analysis and research output production. We present some examples of scientific results achieved by using such advanced tools. One of the examples concerns research on the interaction between solar wind, magnetosphere, ionosphere and neutral atmosphere. In this study, they comprehensively analyzed multi-instrument data simultaneously obtained from interplanetary space, magnetosphere, and ionosphere and mesosphere in both northern and southern hemispheres. They newly found that the polar mesosphere is affected by relativistic electron precipitation caused by the interaction with magnetospheric plasma waves during the high-speed solar wind stream. This is a successful case of comprehensive analysis of data from various regions. As regards data in Asia, Oceania and African region, there is much unused or overlooked data. We believe that making such data available in the advanced tools and filling in the data gap by international collaborations could be a breakthrough for unsolved issues in the upper atmosphere. We introduce our contribution to the development of database and tools, creation of research outcomes, and education of Japanese and foreign young researchers.

Keywords. Advanced tools, comprehensive analysis, upper atmosphere, IUGONET.

S3-4

Multicolor Photometry and Parameterization of Stars

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Summary. One of the main problems of astrophysics is the study of physical properties of stars. Stars are observed through the interstellar dust, therefore their light is dimmed and reddened. This fact complicates the parameterization and classification of stars. Parameters of a star, as well as interstellar extinction, can be obtained from its spectrum. However, to get spectral energy distribution with good dispersion and sufficient accuracy one needs to use large telescope unless the investigated object is bright enough. In our presentation we prove that multicolor photometry contained in modern large sky surveys can also effectively be used for determination of stellar parameters (spectral type and distance) and interstellar extinction. Cross-matching of objects in several sky surveys (2MASS, SDSS, GALEX, UKIDSS), conducted with Virtual Observatory tools, yields multicolor (9 to 13 bands) photometry for 10^7 to 10^9 stars. That massive amount of data is large enough to construct 3D maps of the Galactic interstellar matter and to study formation and evolution of various galactic populations at ranges of up to at least 4.5 kpc. To verify our results of parameterization we used independent sources of observational data: LAMOST for spectral classification, IRAS and DIRBE microwave data for interstellar extinction, and Gaia DR2 for parallaxes. The comparison demonstrates a good agreement with observations for stars brighter than g_{SDSS} = 19.6 mag. Thereby our procedure allows user to parameterize objects and determine interstellar extinction in the Galaxy, which is important for further galactic and extragalactic research.

Keywords. fundamental parameters of stars, interstellar extinction, photometric surveys, cross-matching, virtual observatory

Acknowledgment. This work has been supported by the CAS President's International Fellowship Initiative.

S3-5

Integrating earth observation resources for data sharing in National Earth Observation Science Data Center

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Summary. Earth observation data sharing is an essential part of the data lifecycle and plays a critical role in Earth science research. Existing industry data sharing systems are affected by restrictions in distributed resource management and tightly coupled service interoperability. These systems currently offer no support for facilitating cross-disciplinary exploration and application. The lack of a national data sharing infrastructure has led to reduced international cooperation. The National Earth Observation Science Data Center has proposed a method to address the above issues. In this research, we designed a data sharing framework, more than 29 million archived satellite metadata records and 200 TB of high-quality satellite datasets have been integrated under this framework.

Keywords. Earth Observation, data sharing, integration mechanism.

S3-6

An international scientific programme was approved on the collaboration of big data infrastructure of space-born carbon observing data research

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Summary. Cooperation on the Analysis of Carbon Satellites Data (CACSD) was a new approved International Scientific Programme by the Chinese Academy of Sciences at 2018. The space-born carbon observing is important approach for widely and timeless monitoring of CO_2 emission over our planet. Many satellites had been launched in the past ten years by the space agencies from Europe, US, Japan and China. CACSD is leaded by CAS/RADI and participated by CAS/IAP and National SuperComputer Center in Wuxi. Prof. Li Guoqing, a co-chair of DBAR Big Data Working Group, is the coordinator of this programme. The vision of CACSD aims to reform the research mode of carbon databased study and to implement a big earth data e-science platform for global carbon research. It will harvest all carbon data from missions of OCO-2, GOSAT, Tansat, Sential 5P and FY3, as well as the related analysis models. NSCC-WX provides information facilities of big data storage and Pflops computing resources together to integrate all resources as a big science platform. Sunway TaihuLight of NSCC-WX will be used for scientists around world to process massive carbon data archived, which had listed in the top of TOP 500 world fast computers for four times during 2016 to 2018. The programme will be started at 2019 with a term of 5 years. GEO, ESA, JAXA, CODATA and other international members have committed to participate in CACSD. CACSD is an implementation of DBAR data sharing principle and has been listed as one of the big data facilities of DBAR. It has opened for DBAR users and two teams have carried out research based on CACSD pilot run platform.

Keywords. CACSD, big data infrastructure, CO_2 emission, space-born

S4-1

A big data center for the third pole

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Summary. The Qinghai-Tibet Plateau is the roof of the world, the water tower of Asia, the third pole of the earth, an important ecological security barrier, a strategic resource reserve base in China, and an important protective place for the culture with Chinese characteristics. The Institute of Tibet Plateau Research of the Chinese Academy of Sciences launched the construction of the Qinghai-Tibet Plateau Scientific Data Center in 2011 to promote the storage, curation, sharing integration, analysis, and scientific visualization of scientific data on the Qinghai-Tibet Plateau. The data center joined the National Earth System Science Data Sharing Service Platform in 2012 and became one of the Data Cloud of the Chinese Academy of Sciences in 2014. It accounts for more than 80% of the national data resources for the Qinghai-Tibet Plateau and its surrounding areas and is a unique and irreplaceable data center.

The data center is based on the output of scientific research projects on the third pole, including more than 1100 datasets, involved in many disciplines such as geography, atmospheric science, cryospheric science, hydrology, ecology, geology, geophysics, natural resource science, social economy, and other fields. The total amount of data sets is over 30 TB. All data are sorted and integrated in a strict way accordance with the data standards specified by the center and the relevant data acquisition specifications. Digital Object Unique Identifier (DOI) is used to solve the problem of data identification. The data reliability (accuracy, integrity, consistency, validity, uniqueness) and availability (timeliness) are improved through strict quality control to ensure data online query and download. In the aspects of resource collection, sorting, processing, preservation and informatization, there are many standards are formulated, including the data integration scheme, metadata compilation specification, data classification and coding scheme, data quality management method, data document specification, data backup specification and data sharing specification.

50 core datasets will be selected from the 1100 datasets and will be displayed directly on the web interface of the data portal (data.tpdc.ac.cn). These 50 core datasets can be classified as datasets of Cryosphere, datasets as model driver (driving, land cover, vegetation, soil), datasets for validation (EC fluxes, soil moisture, corrected precipitation, etc. in the base year of 2015) datasets for discovery. Furthermore, with the development of big data analysis, online data analysis and model assembling & customization in the data portal will be our long-term goal.

Keywords. Data center; The Third Pole Environment; Data sharing; Digital infrastructure

S4-2

Establishment and Application of Marine Scientific Data Sharing Service System of China

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Summary. Marine scientific data is not only the basic strategic resources, but also the essential information base in understanding and exploiting ocean. Open data sharing is needed for the development of marine science itself. Open communication and discovery guarantees the capacity of marine science's self-correction and perpetual progress, and is the necessary requirement of carrying forward Marine Economic Powerful Nation Strategy and Maritime Silk Road Strategy.

In China, marine data resources system has begun to take shape, and the competence of data integrating and processing, and the sharing service is improving steadily. The benefit of marine information resources has brought with sufficient release, with the persistent exploring and trials in marine scientific data management and open sharing. With the joint support of the Ministry of Science and Technology and the Ministry of Finance of the People's Republic of China, National Marine Data and Information Service (NMDIS), that is affiliated to the Ministry of Natural Resources of the People's Republic of China, took the lead in national marine scientific data center establishment with other ocean-based scientific and research institutions and colleges and universities. This paper summarizes the establishing progress of China's Marine Scientific Data Sharing Service System from the following 5 perspectives: research of sharing policy and theory, data integration and management, sharing service platform construction, key techniques study and mechanism guarantees. How to provide information services in facing demands of accelerating the construction of Marine Economic Powerful Nation and innovation in global marine governance is also talked about in this paper.

Keywords. Data sharing service, cloud computing, virtualization technology, virtual desktop.

S4-3

ODINWESTPAC Marine Data Sharing System helps to accelerate Digital Belt and Road Program

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Summary. Ocean Data and Information Network for the Western Pacific Region (ODINWESTPAC), under the framework of International Oceanographic Data and Information Exchange (IODE), was set up primarily to provide effective capacity building framework, and to promote regional collaboration in marine data sharing. The aim of ODINWESTPAC marine data sharing system is to integrate and share marine data, and facilitate the exchange of all marine data and information together for 21 member states.

Nations alongside the Belt and Road has complex geographic conditions and diversified ecosystems, and are facing challenges of environment, ecology, and natural disasters, etc. ODINWESTPAC system is the portal to share marine data in the Western Pacific Region. The system integrates marine observation data of China, Russia, Thailand and other countries, covering more than 10 oceanographic and marine meteorological parameters, including marine temperature, salinity, pressure, wave, etc., marine environmental real-time analysis and re-analysis data, marine economic statistical bulletins, and other 72 datasets, in addition to this, 3 marine features are developed to provide knowledge-based services for regional marine communications. The system realizes the two and three dimensional visualization of marine geographic information, illustrating the change regularities and trends of temperature, salinity, ocean currents and other marine parameters.

Meanwhile, China is always devoted to expanding the bilateral cooperation. Taking the Thailand-China marine cooperation as an example, the data obtained from scientific research cruise in Andaman Sea, Gulf of Thailand will be used widely in the fields of disaster risk, climate and environment, urban scientific heritage.

Keywords. ODINWESTPAC, the Western Pacific Region, marine data sharing, Digital Belt and Road

S4-4

Activities of Polar Environment Data Science Center

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Summary. Activities of the Polar Environment Data Science Center (PEDSC) are introduced. PEDSC has been established in the Joint Support-Center for Data Science Research (DS) of the Research Organization of Information and Systems (ROIS) in 2017. Purpose of the PEDSC is to promote collaboration with the data obtained by the research activities in the polar region, and to play a key role of the data activity in polar science to contribute to the global environment research. Current targets of the PEDSC are defined in the following seven categories (1) to construct a synthetic database for all the research fields of polar science, (2) to make the existing database systems (Science Database, ADS, IUGONET) upgraded and interoperable with each other, (3) to promote archiving, opening, and sharing of the time series digital data in each research field, (4) to promote archiving, opening, and sharing of the sample data in each research field, (5) to promote data publication through the "Polar Data Journal ", data journal of NIPR, (6) to promote collaboration with universities and other institutions in Japan and international communities, (7) to promote data science using the database and database system.

Keywords. Polar science, data science, open data, data publishing, data journal

S4-5

Data and metadata sharing among AFoPS countries

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Summary. The Polar Environmental Data Science Center (PEDSC) of the Joint Support-Center for Data Science Research (DS), the Research Organization of Information and Systems (ROIS) has a responsibility to manage the data for Japan as a National Antarctic Data Center (NADC) during the last few decades. At the International Polar Year (IPY2007-2008), a significant number of multi-disciplinary metadata/data have been compiled mainly from IPY- endorsed projects. These collected metadata have a tight collaboration with the Global Change Master Directory (GCMD), the Polar Information Commons (PIC), as well as several centers belonging to the World Data System (WDS). Among activities in polar communities of the Scientific Committee on Antarctic Research (SCAR) and the International Arctic Science Committee (IASC), tighter linkages of data sharing within the Asian Forum for Polar Sciences (AFoPS) countries should be promoted by the involved Asian countries.

Keywords. Polar Environmental Data Science Center, data sharing, polar communities, AFoPS.

Acknowledgment. The authors would like to express their appreciation to many collaborators involving polar data communities, in particular to the member of PEDSC, data committee members on SCAR, IASC, WDS, CODATA and IPY.

S5-1

GCdataPR Five Year Performance Assessment Using the Data Impact Score (*DIS*) Methodology

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Summary. The GCdataPR, Global Change Research Data Publishing & Repository, was hosted by the Institute of Geographic Sciences and Natural Resources Research (IGSNRR), Chinese Academy of Sciences (CAS) and co-supported by the Geographical Society of China (GSC), it was formally launched in June 2014, and become Regular Member of WDS in October 2016. Based on the WDS data sharing principles, the GCdataPR developed its guidelines for implementation data sharing principles in 2014, a data publishing system for both data products by online data at http://www.geodoi.ac.cn and data papers by both online and offline Journal of Global Change Data & Discovery (ISSN 2096-3645) were established. Almost 900 contributors from near 400 affiliations of 12 countries published almost 600 datasets in GCdataPR during the last 5 years. About 1.5 million visitors and 42,000 IP users from 74 countries all over the world accessed the data. Not only was the method above, the Data Impact Score (*DIS*) method was used to evaluate how the dataset in re-using. The *DIS* is based on the dataset citation and the journal impact factor, where the users' paper published. There were 167 cites of the GCdataPR data totally from 2014-2018, in which 13 for 2014, 8 for 2015, 14 for 2016, 89 for 2017, 43 for 2018. The total Data Impact Score is 344.43, in which, 29.90 for 2014, 19.97 or 2015, 73.42 for 2016, 82.41 for 2017 and 138.73 for 2018. All the datasets published at GCdataPR was assigned the DOI, and searchable by DOI and DCI (Data Citation Index) of Web of Sciences. It is also the GEOSS Data Provider and Broker, China GEO data publishing center. It was awarded the WSIS (World Summit on Information Society) Prize 2018 e-Science Champion by the United Nations in March 2018, Geneva and Innovation Award of Digital Publishing Expo 2018, Beijing, China. The GCdataPR model becomes one of the best practices both in China and developing countries for balancing data intellectual property protection and full openly available for sciences and society.

Keywords. Data Impact Score, DIS, GCdataPR, Performance, Assessment

Acknowledgment. The GCdataPR is supported by Institute of Geographic Sciences and Natural Resources Research (IGSNRR) and Communication Bureau of Chinese Academy of Sciences (CAS) and Geographical Society of China (GSC).

S5-2

An overview of Data Journals

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Summary. Theoretical and practical exploration of data publishing has a long history. In the broadest sense, any behavior or service that publishes data for use by others can be called data publishing. The concept of data publishing as described in this paper refers primarily to the behavior where data is published in journals in the form of papers. Other forms of data publishing are not covered within the scope of this discussion. Data journals are a hybrid of scientific data sharing and academic publishing. They have evolved and developed within the backdrop of the Open Science.. The benefits of data sharing have been discussed by many scholars across various disciplines. One area of interest is how to promote and truly achieve broader data sharing and reuse when there are still many real obstacles in the way. These impediments are often associated with the lack of motivation for researchers to share data. Therefore, it is an inevitable move to introduce appropriate mechanisms to encourage researchers to share data. Academic journals are an important part of the scientific communication infrastructure ecosystem , and there are many inherently favorable factors in publishing data and using open policies and promoting data sharing practices. A recent empirical study about Science journal shows that the adoption of data disclosure policies can help to improve research reproducibility . Like traditional scientific journals, Data journals can serve to evaluate the academic performance of researchers, like thus can be so as to serve to so it is considered to be an effective solution to barriers of data sharing.

A key question is “what is the current effectiveness of data journals?”, as well as “which publishers have made progress in this area?” Another useful area of inquiry to pursue is which journals can be considered data journals, and which research areas are covered? Answers to these questions will help us understand the utility of data journals to facilitate better data sharing practices. Based on a survey conducted by Candela et al. in 2014, this paper reviews a survey on the current overall development of data journals, in order to provide detailed data support for people to understand this publishing form.

There are currently 162 data journals in publication and this list is the most comprehensive enumeration of data journals available as of February 2019. In addition to giant publishing agencies such as Springer Nature and Elsevier, some small professional publishing organizations are also publishing data journals. For example, the majority of Pensoft's journals are data journals (21 in total). Additionally, the Arpha Writing Tool platform developed by Pensoft not only supports the entire workflow from online collaborative writing to paper publishing and archive, but also can support automatic creation of data papers in specific domain (biodiversity). The metadata standards are also embedded in the data paper writing template, which helps to achieve the automatic flow of data between the data paper and the data storage platform.

In addition, data journals have become influential where 102 of the 162 journals are indexed by the Web of Science. At the same time, the impact of data journals appears to be increasing. For example, Scientific Data‘s impact factor has climbed to 5.3; Data in Brief is growing rapidly in terms of number of articles, from 86 pages in 2014 to more than 9, 000 pages in 2018.

The primary intention of data journals is to facilitate data sharing. Not surprisingly most data journals adopt a complete Open Access policy. Further investigation and analysis of the historical publication records revealed that a very small number of journals which do not take the open access model have evolved from traditional journals. That is to say, data papers are a newly established category in these journals. The analysis presented in this paper show that data journals cover a wide range of subject areas, especially in the biomedical field, which may be related to the large amount of data created by this discipline as well as the demand data sharing, and the shared culture of openness.

The discussion above shows that data journals have become an important publishing form in the field of academic publishing, and they are highly valued by the publishing industry and researchers. Another question to consider in the future is whether the data published in these journals increases the visibility and dissemination, promotes the flow of data among more people, and thus plays a role in the entire knowledge re-creation system.

Keywords. Data journals, data publishing, data sharing

S5-3

A survey of research datasets in a university

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Summary. To obtain the basic information necessary for planning a research data management system in Kyoto University, we made a survey of research datasets in the campus by a simple questionnaire. Although we could get answer from only a part of faculty/institution members, some tendencies were observed. Through detailed interview for some researchers, we saw a big difference in attitude for open data depending on the field of research. We discuss the needs and difficulties in preparing a data management system in a university.

Keywords. Data management system, Research data, Survey, University.

S5-4

The Application of Big Social Data: Using Social Media to Mine and Analyze Public Sentiment during a Disaster

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Summary. Social media has been applied to all natural disaster risk-reduction phases, including pre-warning, response, and recovery. However, using it to accurately acquire and reveal public sentiment during a disaster still presents a significant challenge. To explore public sentiment in depth during a disaster, this study analysed Sina-Weibo (Weibo) texts in terms of space, time, and content related to the 2018 Shouguang flood, which caused casualties and economic losses, arousing widespread public concern in China. The temporal changes within six-hour intervals and spatial distribution on sub-district and city levels of flood-related Weibo were analysed. Based on the Latent Dirichlet Allocation (LDA) model and Random Forest (RF) algorithm, a topic extraction and classification model was built to hierarchically identify six flood-relevant topics and nine types of public sentiment responses in Weibo texts. The majority of the topics in the Shouguang flood-related Weibo were 'public sentiment', among which 'questioning the government and media' was the most commonly expressed. The trend of the variation in Weibo text numbers for different topics and sentiments over time corresponded to the different development stages of the flood. On a sub-district level, the spatial distribution of flood-relevant Weibo was mainly concentrated in the south-central and eastern parts of Shouguang, near the river and the downtown area, which have high population densities. At the city level, the Weibo texts were mainly distributed in Beijing and cities in the Shandong Province, centering in Weifang City. The results indicated that the classification model developed in this study was accurate and viable for processing social media texts during a disaster. The findings can help researchers, public servants, and officials better understand the public sentiments towards disaster events, accelerate disaster responses, and support post-disaster management.

Keywords. Social media; flood; public sentiment; disaster risk reduction; China

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S6-1

WDS International Technology Office Action Plan

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Summary. In late 2018 the World Data System International Technology Office was inaugurated. The Office was the result of a successful hosting bid by a consortium of Canadian entities: Ocean Networks Canada, which physically houses the office, the University of Waterloo's Polar Data Catalogue and the Canadian Astronomy Data Center. In this talk, the director of the ITO talks about the origin and role of the ITO, it's governance and the types of potential infrastructure projects that could support the WDS membership.

Keywords. International Technology Office, infrastructure, survey, Canada.

Acknowledgment. This section is optional and should acknowledge any financial support received from, or other significant contributions made by, people/organizations.

S6-2

Building Trust in Scientific Data – CoreTrustSeal Certification & the World Data System

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Summary. Data repositories are increasing valued as a key element of global research infrastructure, playing a central role in the long-term preservation of research data that continue to escalate in volume and diversity. Scientific integrity and norms dictate that data created and used by researchers should be managed, curated, and archived in a data repository to ensure that science is verifiable and reproducible while preserving initial investment in data collection. However, to guarantee that generated datasets remain available, useful, and meaningful into the future, research stakeholders must be able to establish the trustworthiness of a data repository. The need for trustworthiness, and in particular Trustworthy Data Repositories (TDRs), is therefore recognized as a prerequisite for efficient scientific research and data sharing. Certification, whereby a data repository's trustworthiness and sustainability is assessed through a transparent and objective procedure by an independent authority, helps data communities—producers, repositories, and consumers—to improve the quality and clarity of their practices, and to increase awareness of, and compliance with, established standards.

CoreTrustSeal is a new standards and certification authority that certifies data repositories at the core level after peer-review of applications based on a set of Core TDR Requirements—16 universal guidelines that reflect the characteristics of a TDR—developed by the World Data System of the International Science Council (WDS) and Data Seal of Approval within the framework of the Research Data Alliance. CoreTrustSeal certification is a minimally intensive process that accounts for the specific aims and context of a repository, and through the evaluation of its procedures and documentation by external professionals, gives the repository independent insights as to how it may mature and further increase its trustworthiness.

WDS, which is building worldwide 'communities of excellence' for scientific data services from wide-ranging scientific domains, requires that WDS Regular Members (data centres and data analysis services) must be CoreTrustSeal-certified. In contrast, the certification of repository networks—which vary greatly in makeup and remit—remain a WDS-only focus. WDS is, moreover, now exploring the development and provision of core-level certifications to ensure the trustworthiness of other elements of research activity.

This talk will focus on core certification of data repositories by the CoreTrustSeal and on accreditation of Members by the World Data System. It will also touch on the future of core certification of other entities within the scientific research process.

Keywords. Trustworthiness, Certification, Data Repository, Scientific Data.

S6-3

DANS Certification Efforts: A Use Case

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Summary. DANS (Data Archiving and Networked Services) is the Netherlands Institute for permanent access to digital research resources . DANS encourages researchers to make their digital research data and related outputs Findable, Accessible, Interoperable and Reusable. We provide expert advice and certified services. Our core services are: DataverseNL for short-term data management, EASY for long-term archiving, and NARCIS, the national portal for research information. By participating in (inter)national projects, networks and research, DANS contributes to continued innovation of the global scientific data infrastructure. Open if possible, protected where necessary.

DANS is an institute of the Dutch Academy KNAW and funding organization NWO. These two organizations assigned DANS the task of developing a Seal of Approval for digital data to ensure that archived data can still be found, understood and used in the future. In 2009, this national Data Seal of Approval (DSA) was transferred to an international body, the DSA Board, which managed and further developed the guidelines and the peer review process until it was superseded by the CoreTrustSeal in 2017.

In 2011, DANS obtained its first DSA. During that same year, DANS was one of the test cases of the ISO16363 standard . Two years later, DANS had to renew its DSA seal. In 2014, DANS became a Regular Member of the World Data System, and in 2016, DANS acquired the nestorSeal (a certification at the extended level formalized as the DIN 31644 standard) . Finally, in March 2018, DANS became a CoreTrustSeal-certified Trustworthy Data Repository.

DANS has put a lot of time and effort into the certification of its repository: What were the main drivers for investing so heavily in these processes? The first one is the fact that certification is an important means to build trust in the repository with clients, both depositors and users of data, partner organizations and with research funders. Secondly, and maybe even more important, is the fact that certification can be used as the proverbial ‘big stick’ to further develop and professionalize core services, workflows and the organization as a whole.

What lessons can be learnt? There are three important observations to be made:

1. Commitment at the management level is crucial to keep the certification process on the agenda and not be pushed aside by other urgent priorities. This commitment can be obtained by making certification one of the strategic targets of the organization and incorporating it into the long-term policy cycle.

2. Broad support within the organization is needed. Certification leads to lots of extra work that sometimes does not seem to deliver added value right away. This might lead to resistance within the organization. Therefore, a lot of attention should go to the internal communication of the certification project and its benefits for the organization. It is also important to apply a practical approach and to start with topics that are already on the agenda from a different perspective. There might for example be activities already planned in the framework of an externally funded project that are also beneficial to the certification goals.

3. It is recommended to use the tiered framework for certification and start at the core level with the CoreTrustSeal certification. Aiming too high immediately might discourage people, and can lead to never ending projects. The work that is done on one level feeds into the next level.
In this presentation, the author discusses the importance of certification efforts for DANS and the lessons learnt from DANS certification activities.

Keywords. Scientific Data, Trustworthy Data Repository, Repository Certification.

S6-4

CoreTrustSeal Certification Experience Sharing

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Summary. CoreTrustSeal procedure is introduced by WDS to certify or recertify its Regular Members. The CoreTrustSeal certification system is a good evaluation system. The CoreTrustSeal Data Repositories Requirements provide guidance for all the perspectives a data center should cares about, which is very helpful in improving the quality of a data center. The CAsDC is the first Asian Data Center which has passed the recertification. Some experience will be introduced in this report, as reference for other data centers which are applying or renewing their WDS Regular Membership.

Keywords. Certification, CAsDC, CoreTrustSeal

S6-5

Understanding and Practice in the CoreTrustSeal Certification of WDC-RRE

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Summary: Assessing certification is important for the scientific data management of scientific data centers. WDC - Renewable Resources and Environment (WDC-RRE) is affiliated with the Institute of Geographic Sciences and Natural Resources Research (IGSNRR), Chinese Academy of Sciences (CAS). WDC-RRE was established in 1988 and strives to be a long-term data archiving and sharing center in the resources and environmental field in China. It was originally under the ICSU World Data Center system, then after the establishment of the World Data System (WDS) certification standard in 2011, WDC-RRE applied to be—and was accepted as—one of the first Regular Members of WDS. On April 15, 2018, WDC-RRE began the renewal process for its WDS Regular membership by applying for CoreTrustSeal certification, and on February 14, 2019 it became the second CoreTrustSeal-certified Trustworthy Data Repository in China, following the Chinese Astronomical Data Center in 2018, and the first in the field of geosciences in Asia.

WDC-RRE completed the construction of its data center referring to the three categories required by the CoreTrustSeal certification mechanism, including:

(1) Organizational Infrastructure: WDC-RRE established data storage specifications and a data use statement, and stipulates the responsibilities and obligations of data submitters and users. National policy, institute guarantees, long-term stable funding sources, and technology ensure continuity of its data access. Data storage specifications and a professional team personnel review ensure that the copyright, personal privacy, and legal rights of its data are protected. WDC-RRE has high-quality staff and sufficient financial support to guarantee the long-term stable development of the data center, and its expert committees provide advice for the long-term construction of the data center.

(2) Digital Object Management: Regular inspections through a combined human–machine process ensures the integrity of WDC-RRE data. Evaluations by data center personnel, users and experts are used to check and assess the data, as well as requirements on data submitters to submit metadata that conforms to the WDC-RRE metadata standard, jointly guarantee data quality. WDC-RRE regularly checks its data formats and migrates invalid data formats to ensure data reusability. It has a data

processing handbook that refers to the OAIS technical model and is used to specify technical steps and workflow for data storage and preservation. WDC-RRE provides two optional methods for data identification, including self-defined scientific data identification and DOI identification. Its platform provides two types of online metadata search and inquiry services.

(3) Technology: WDC-RRE adopts appropriate hardware and software technologies to support data center functions. The data center ensures security through system security, network activity monitoring, data storage security and data backup.

This presentation will share our experiences of the specific process we went through for CoreTrustSeal certification.

Keywords. Scientific data management; scientific data center; WDC-RRE; CoreTrustSeal; certification.

S6-6

The Australian Data Archive as a Case Study for CoreTrustSeal and World Data Systems in Australasia

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Summary. The push for FAIR Data is a wave that is encompassing the globe and the Australian Data Archive (ADA) wants to ensure its place in this movement. The concept of trustworthy repositories is accepted as an important factor in FAIR and to ensure we could gain trust outside of our long term user base the ADA assessed the different schemes available and decided on the CoreTrustSeal. The ADA is the first archive in Australia to undertake the new CoreTrustSeal. This undertaking was done to reach many simultaneous goals. The goal of having an internationally recognized seal of trust; to evaluate our current position in order to further develop our archive policies and practices based on best standards; to implement changes to our systems to better serve our community's needs; and to broaden our network connections to other archives and repositories around the globe. This talk will describe the process the ADA undertook to prepare a self-assessment for the CoreTrustSeal and the process and benefits of the peer assessment procedure along with the benefits the ADA has found from this review and successful completion of the CoreTrustSeal and WDS membership. We will discuss the value in undertaking certification and becoming a member of the community. We will discuss changes we have implemented to the ADA post assessment.

Keywords. Archive, Trustworthy, FAIR, CoreTrustSeal, Case Study.

Acknowledgment. The CoreTrustSeal was undertaken with funding from ANDS and support from CSRM and ANU.

P-1

Big remote sensing application: forest type and land cover classification based on machine learning algorithm and Google Earth Engine cloud platform

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Summary: Remote sensing technology is one of the most important methods to extract global surface information. Along with development of spatial information technology, remote sensing has been into Big Data Era. In addition, machine learning (ML) has been widely used in various fields, and has achieved unprecedented results. When big remote sensing data encounters machine learning, the extraction of current surface coverage information becomes easier and more accurate. Herein, we conducted two studies on the application of big remote sensing big data and ML algorithms for high spatial resolution forest type and land cover type mapping. This can provide a reference for the rapid realization of high spatial resolution of surface information mapping.

Keywords: Big remote sensing data, machine learning, forest type, land cover, Google Earth Engine.

P-2

User's Scientific Data Retrieval System Using Behavior Based on the Model of TPB

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Summary. Scientific data is an important evidentiary material to support scientific research activities. The scientific data retrieval system is an important carrier for carrying and sharing scientific data. However, the current scientific data retrieval and sharing system lacks user-centered research, resulting in inefficient retrieval and sharing of search data. Based on the Theory of Planned Behavior (TPB), this study use questionnaires and structural equation model to study the contestants of the "Sharing Cup" science and technology resource sharing service innovation contest in China. The data analysis results show that the TPB model can explain and predict the user's retrieval behavior of the scientific data system. The user behavior intention is the direct determinant of the user's system usage behavior. The user's behavior intention is affected by behavioral attitude, subjective norm and perceived behavior control. Behavioral attitudes have the most significant impact on behavioral intentions. The user's behavioral attitude is the user's assessment of the degree of preference of the data retrieval system, including the user's preference for the data retrieval system interface design, operation and use, and ability to provide data. The conclusion of this study provides some support for the scientific data retrieval and sharing system to improve the efficiency of data retrieval and sharing with users as the center.

Keywords. Scientific Data, Scientific Data Retrieval, Theory of Planned Behavior (TPB)

Acknowledgment. This work was supported by a grant from Technology Innovation Project of Chinese Academy of Agricultural Sciences(Project No.CAAS-ASTIP-2016-AII), Social science fund-Scientific Data User Relevance Criteria and Use Model Empirical Study (14BTQ056),and National High-tech R&D Program of China (863 Program No.2013AA102405) and Agricultural Science.

P-3

Construction and Service of Marine Professional Knowledge

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Summary. According to the multi-source heterogeneous characteristics of marine professional knowledge, such as multi-source, multi-structure, wide range and long time, this paper design marine knowledge base system which integrate the marine science data, information products, information dynamics, books and documents, and data loading and updating. It breaks through the information resource mining technology based on the full-text information retrieval model, with knowledge extraction and service as the core, and builds a service system integrating query, retrieval, visual display, free download, online use and interface integration. The system serves all aspects of marine strategic planning, marine economic development, marine rights and interests maintenance, marine environmental protection, and marine basic research.

Keywords. Marine Professional Knowledge, Data Sharing, Marine Literature, Marine Data

P-4

Promotion of WDS-led Activities in the Asia–Oceania Area; an Introduction of the WDS Asia–Oceania Conference 2019

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Summary. The first WDS Asia–Oceania Conference was held at Kyoto University, Japan, in September 2017 (http://wdc2.kugi.kyoto-u.ac.jp/wds2017/#). In the conference, it was recognized that continuous efforts are needed to establish a network to share information and to perform bottom-up data-oriented activities under the leadership of WDS. The following items will be discussed in the WDS Asia–Oceania Conference 2019 (http://www.wds-china.org/meeting201905.html):

1. Strengthen collaboration in the Asia–Oceania region to reinforce WDS-oriented activities
2. Build and expand WDS community in the Asia–Oceania region
3. Exchange experience on successful WDS trustworthy data-repositories certification and membership application
4. Encourage former ICSU World Data Centres in China and Japan to join WDS
5. Introduce advanced technologies to data management
6. Promote WDS-oriented activities in support of ISC-led projects in the Asia–Oceania region
7. Find a funding mechanism to build the WDS Asia–Oceania Network

Keywords. World Data System, Asia, Oceania, data network

P-5

Data-led Multidisciplinary Study on the Earth's Environment and its Relationship to Socio-Economic Activities in 18th–19th Centuries

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Summary. In the Open-Science era, to assure easy multi-disciplinary usage of data is crucial. However, there still exist many problems mainly caused by differences in "culture" of individual disciplines, particularly on data. To specify the problems, a trial is performed by selecting the interval of 18th–19th Centuries to access to environmental and economic data opened on Internet. This interval is specified by several important social movements, e.g. the French Revolution and subsequent Napoleonic War, and the Industrial Revolutions in England taking place under relatively cool environment following the Little Ice Age in the preceded centuries. Very high volcanic activity was important also in discussion of environmental and socio-economic relationship. It is found that we need to pay effort to prepare well documented ready-to-use datasets expecting usages by scientists out of the field. Many old data, particularly records of commercial activities in old time, are still remained to be digitized in machine-readable formats. Special effort will be important also to manage data only available in printed materials as tables and figures, including ethical issue on reuse of these data. By this trial, it is also found that the study of this interval will be a good starting point of a potential multi-disciplinary Open-Science project of the comprehensive study of the influence of the global environmental change on the human society.

Keywords. Open Data, Open Science, Environment, Economics

P-6

Geomagnetic data acquisition and its usage for space weather research on MAGDAS project

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Summary. International Center for Space Weather Science and Education (ICSWSE), Kyushu University is a research institute for conducting research and education in space weather. Our magnetometer array named as MAGDAS/CPMN (PI: Dr. A. Yoshikawa) consists of over seventy fluxgate magnetometers, one induction magnetometer, and four FM-CW radars around the world. One of our scientific interests is a structure of equatorial electrojet (EEJ). It is important to construct a dense magnetometer chain along the magnetic equator for monitoring EEJ routinely. Our instruments send data to both global server on ICSWSE and regional server on some foreign institutes via Internet in near real time. One of our results using this acquisition system is EE-index for space weather nowcast/forecast. It is also important to share these result with researchers for promoting cooperative research activities. We provide these data via several ways, in our website , IUGONET, SPEDAS, and SuperMAG in the near future. For accelerating the usage of our data, we hold data analysis hands-on with our observation works. Last fiscal year, we had a tutorial session in International Conference on Space Weather and Satellite Application 2018 at Malaysia, for handling MAGDAS and other data related our research field by IUGONET system. This activity also have the aspect of educational collaboration with foreign institute for capacity building of young researchers. We hope researchers use MAGDAS data for developing their science and data activity. In this paper, we introduce our international and collaborative activities on data in ICSWSE and MAGDAS project.

Keywords. Data acquisition, Magnetometer network, Capacity building

P-7

Application of research data to university educations and social scientific scenes

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Summary. ROIS (Research Organization of Information and Systems) has a plan to provide various kinds of research data with several universities and social scientific scenes (school educations, public lectures, science museums and so on) in 2020 as a part of its data science business, in order to promote human resource development, information utilization, mathematicians and high level informatics skill, along with the Japanese government plan Society5.0. As a first step, our preliminary project including Nagoya University and Kyushu University is now building a test platform including several scientific data (climatology data, environmental data, geology data, earth-space data, biology data and so on) managed by NIPR (National Institute of Polar Research). This platform has some unprecedented functions: data converter that convert research data from research field-dependent format to general ASCII format, and coherence-based-table that make findable similar data with statistical mathematical calculation. Such data oriented system leads to an enhancement of opportunities of scientific activities to users, and scientific implication strongly promotes mathematical activities for elucidating mechanisms which are the essence of science at the research and social scenes. In an official operation in 2020, we have a plan to expand the data we handle to more fields and more universities, assign some science coordinators, and start interactions with some educational and social scientific institutions as a joint system. Then, we will start the high-knowledge cycle, make opportunities to reach the essence of science, and aim to produce talented persons with advanced knowledge to lead the advanced information society.

Keywords. Data science, social science, information utilization, human resource development, Society 5.0.

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A permafrost stability distribution map over the Third pole

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Summary. The area of high-altitude permafrost on the Qinghai-Tibet plateau (QTP), which is also called Earth's "third pole", ranks first in the world among middle- and low-latitude regions. The degradation of sensitive "warm" permafrost on QTP has resulted in an increase in environmental fragility and related hazards. Mapping high-altitude permafrost is therefore of critical importance. Existing permafrost maps that cover the QTP typically rely on sparse air temperature data and employ continuity-based classification systems. In general, these continuity criteria are scale-dependent, inconsistent, and difficult to use in engineering planning and environmental protection applications. This study produce a new permafrost map for the 2010s associate with the thermal stability classification system derived from estimated mean annual ground temperature (MAGT) at the depth of zero annual amplitude (10–25 m) by integrating Moderate Resolution Imaging Spectroradiometer (MODIS) land surface temperatures (LSTs), Global Land Surface Satellite (GLASS) leaf area index (LAI), soil properties from SoilGrids250, highly accurate precipitation data, and in situ MAGT measurements from 175 boreholes distributed throughout the QTP through geographically weighted regression (GWR) model. The validation using extended triple collocation indicates that the uncertainty in the simulated MAGT in this study is smaller with respect to the unknown "true" MAGT at the grid scale than those of the independent in situ MAGT measurements and simulated MAGT values based on the Noah land surface model. The standard deviation of the random error is 0.2 ℃, and the squared correlation coefficient is 0.71. Inter-comparison shows that the uncertainty of the permafrost extent is smaller than those of previous permafrost maps. A pragmatic scheme based on a gap-filling algorithm was used to estimate the values of two indexes that are commonly used in permafrost mapping, namely, the mean annual land surface temperature (MAST) and surface frost number (SFN). A criterion for dividing permafrost stability type was obtained by comparing the two remote sensing-based indexes with the permafrost stability map. This new map and remote sensing-based criterion are of fundamental importance for engineering planning and design, ecosystem management, and performing the rapid, low-cost, and high-resolution monitoring of permafrost stability on the QTP and other permafrost regions in the future.

Keywords. Mountain permafrost, Qinghai-Tibet plateau, MODIS, multi-source data, geographically weighted regression.

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CAsDC Overview

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Summary. The Chinese Astronomical Data Center (CAsDC) has been developing for more than 30 years, and has important influence in Chinese astronomical community. Over the past years, CAsDC has released and managed hundreds of Terabytes of data. The data comes from nationwide distributed telescopes, and mirrors of several important international astronomical datasets. CAsDC has a relatively advanced technology platform and a relatively standardized service process. The data management process runs through the whole life cycle of scientific research, providing different levels of services for professional researchers, students and the public.

Keywords. Data management, Scientific database

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IGY (International Geophysical Year 1957-1958) on Stamps – Remembering the Origin of WDS

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Summary. The World Data System (WDS) was transformed from the World Data Centers (WDC). The WDC was established during the International Geophysical Year (IGY), 1957-1958. The IGY was recognized as the most ambitious program on human and his environment in history. More than 50,000 scientists from 67countries of the world joined the program. Although only 18 months from 1 July 1957 to 31 December 1958 as the observation period, there were 12 years in total for the program, including three phases. The first phase was the proposal and preparing phase, Professor L. V. Berkner of USA, J.A. Van Allen of USA, Sydney Chapman of UK jointly had the IGY proposal on 5 April 1950 in Maryland, then ICSU approved the proposal and following, the CSAGI (Comité Spécial de l'Année Géophysique Internationale, Special Committee for the International Geophysical Year) was established by end of 1952. 14 IGY working groups were established, they were: World Day and Communications, Meteorology, Geomagnetism, Aurora and Airglow, Ionosphere, Solar Activity, Cosmic Rays, Longitudes and Latitudes, Glaciology, Oceanography, Rockets and Satellites, Seismology, Gravity Measurements and Nuclear radiation working groups. From November 1952 to 30 June 1957, a series of earth observations were constructed in all participating countries. The Phase II of the program was from 1 July 1957 to 31 December 1958, which was the phase for observations covering almost all over the world, from tropical to polar region, from northern to southern of the earth, from land to water, from atmosphere to deep ocean. More specifically, the satellite group had been lasting to 31 December 1959. Phase III was from 1 January 1960 to 23 June 1961, including two summarizing conferences (Moscow and Copenhagen in 1960) and the Antarctic Treaty was signed in Washington D.C. of USA on 1 December 1959 by the twelve countries , it was effected on 23 June 1961. A series of innovative achievements were made by this unique program, such as the first artificial satellite launched in 1957, the WDS was established in 1957, deep-sea research during the IGY, the Antarctic Treaty was signed in 1959, the first atomic icebreaker was launched in 1959, and more. For remembering the very special event in human history, more than 30 Post Offices of the world issued stamps, first day covers, post cards on it. By integrating IGY scientific missions and stamp arts of multiple culture of the world, the IGY on stamps recorded the extraordinary event more attractive. More than 300 stamps, first day covers, post cards, which were issued by 35 countries, have been collected and archived in the Lin Chao GeomuseumThe exhibition of IGY on Stamps at the WDS OA conference aims for remembering of the origin of the WDS, not only in sciences, arts and data, but the international cooperation and the innovative event.

Keywords. IGY, Stamps, Origin, WDS, 1957-1958, Lin Chao Geomusem

Acknowledgment. The stamps collected and archived in Lin Chao Geomuseum were from about 200 contributors from world, the Lin Chao Geomuseum was the joint program by IGU (International Geographical Union), CODATA and Geographical Society of China initialed in 2001, sponsored by the National Natural Science Foundation of China.

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Antarctic Treaty on Stamps – Celebrating the 60th Anniversary of the Antarctic Treaty

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Summary. 60 years ago, 12 countries jointed the Conference on Antarctica in Washington D.C. on 15 October 1959, and these countries jointly signed the Antarctic Treaty on 1 December 1959. The countries who signed the Treaty were: Argentina, Australia, Belgium, Chile, The France Republic, Japan, New Zealand, Norway, the Union of South Africa, the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland, and the United States of America. According to the Official Website of the Secretariat of Antarctic Treaty, the total number of Parties to the Treaty is now 53. The Treaty specifically indicated that: the Antarctica shall be used for peaceful purposes only (Art. I); freedom of scientific investigation should be in Antarctica (Art. II); scientific observations and results from Antarctica shall be exchanged and made freely available (Art. III); all areas of Antarctica, including all stations, installations and equipment within those areas … shall be open at all times to inspection " (Art. VII), all of these articles make the Antarctic research openly available. About 300 stamps and covers issued by 21 countries of the world were collected and archived in Lin Chao Geomuseum. The exhibition of the Antarctic Treaty on Stamps aims to celebrate the 60th anniversary of the Antarctic Treaty, one of the most important achievements of IGY, the International Geophysical Year.

Keywords. Antarctic Treaty; the 60th anniversary; Stamps; IGY; Lin Chao Geomuseum

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CHINARE 1-35 on Stamps

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Summary. China is one of the most active countries of the world in the most recent yeas, who involved in the Antarctic research, although China initialed it later than many other countries. Since 1984-1985, the first Antarctic Exploration Team of China, called the CHINARE 1, successful established the Great Wall Station at 62°12'9 " S,58°57'52 " W, 10m asl, on 20 Feb. 1985, the first Antarctic Station by China, 35 China Antarctic Exploration Teams were made and four stations were established in Antarctic. Besides the Great Wall Station, the Zhongshan Station at 69 °22'24.76"S, 76 °22'14.28"E on 26 Feb. 1989, the Kunlun Station at 80°25'01 " S,77°06'58 " E, 4090m on January 27, 2009, the Taishan Station at 76°58′E , 73°51′S , 2621 asl, on 3 January 2014 were established separately. And one more station, the fifth Antarctic Station by China, located at the Ross Sea is started to construction on 2 Feb. 2018, which could be finished in 2022. The stamps culture for the CHINARE was started from the Great Wall Station in 1985, the first Antarctic Post Office of China was established temporary. After then, the stamps, covers for remember each of the special scientific events were made. The Lin Chao Geomuseum collected and archived about 300 stamps, covers and postcards which recorded the history from the CHINARE 1 in 1984 to CHINARE 35 in 2018. The exhibition of the CHINARE 1-35 aims to remembering the historical steps how China' progress in Antarctic exploration and scientific research.

Keywords. CHIARE, Antarctic Exploration; China; Stamps; Lin Chao Geomuseum

Acknowledgment. The stamps collected and archived in Lin Chao Geomuseum were from about 200 contributors from world, the Lin Chao Geomuseum was the joint program by IGU (International Geographical Union), CODATA and Geographical Society of China initialed in 2001, sponsored by the National Natural Science Foundation of China. Most of the stamps on CHINARE 1-35 were from the scientists and exploration team members, who joined the CHINARE teams. Special thanks to the National Polar Research Center of China and the Polar Philatelic Association of China for the collections.