

## **PROGRESS REPORT OF THE WORLD DATA CENTER FOR SEISMOLOGY, BEIJING**

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### **ABSTRACT**

*This paper presents in detail the project “Development and Service of World Data Center for Seismology, Beijing,” including its background, construction tasks, main results, societal effects, and perspective for future development.*

**Keywords:** World Data Center (WDC), Seismology

## **1 BACKGROUND OF THE PROJECT**

To meet the needs of and facilitate worldwide earth science research, some developed countries and international organizations have been developing analysis and application systems for the management of earth science data since the 1950s. The International Association of Science and Technology set up the World Data Center (WDC) in 1957 to standardize and internationalize the registration, storage, exchange, and use of earth science data. Many countries have participated in this and then established their own data centers for different disciplines. These discipline centers are members of the now multi-component WDC and function as national and discipline data management and service centers.

China officially joined the WDC in 1988 and established a State Coordination Commission. Nine discipline data centers were subsequently set up relevant to oceanography, meteorology, seismology, geology, geophysics, space science, astronomy, glacier and tundra, renewable resources, and environment. In 1999, the Chinese Ministry of Science and Technology integrated these nine discipline centers and founded the Earth Science Data Center, China, to promote the construction of an advanced, open, and shared platform and to support the development of science and technology as the most important productive force in society.

The construction and improvement of the World Data Center for Seismology, Beijing, is part of the project “Construction and Improvement of Earth Sciences Data Center, China,” funded by the Ministry of Science and Technology, China, and the China Earthquake Administration. The effort is jointly undertaken by the Institute of Earthquake Science, the Institute of Geophysics, and the China Earthquake Network Center of China Earthquake Administration. In accordance with overall requirements, the project has carried out earthquake

science data collection and integration as well as construction of the main database, improvement of distributed networks for data sharing, and the introduction of international data sources and navigation. So far, much progress has been made in basic information service for research and innovation, hazard mitigation, and the sustainable development of national economy.

## **2 CONSTRUCTION CONTENT**

The concrete goals of this project are to adjust and process various kinds of data and information collected from a wide range of sources concerning historic and present strong earthquakes; to construct a relatively complete and comprehensive earthquake database and service system for basic scientific research and society; and to make the WDC for Seismology, Beijing, a core system in the framework system of China Data Center of Earth Science. Based on the above goals, the project has carried out four tasks, including drafting and updating criteria for sharing earthquake data; surveying and updating global earthquake science data resources; integrating and sharing via the Internet the main seismic database; improving the metadata and index database; and improving the seismic data navigation system.

## **3 PROGRESS AND MAIN RESULTS**

### **3.1 Drafting and updating seismic data sharing criteria**

As a member of the WDC family, WDC for Seismology, Beijing, follows the general principles stated in the GUIDE TO THE WORLD DATA CENTER SYSTEMS [1]. It has been taking an active part in formulating specifications for earthquake-related data management and sharing. According to the WDC technical standards for seismic data systems, we have carried out a study on the classification criteria for seismic data and drafted:

- Categories and codes for earthquake-related data,
- Guidelines for seismic metadata compilation,
- Construction guidelines for seismic databases, and
- Compilation guidelines for a seismic data dictionary.

These detailed standards give a basic classification of earthquake-related data and define unified criteria for collecting data.

### **3.2 Surveying and updating global seismic data resources**

We have consulted and visited many international websites related to seismic data and classified them as international or comprehensive websites, national websites, regional or department websites, and so on. The diversity of the global seismic data resources has been further enriched and improved. Website service index in Chinese is also provided.

### **3.3 Integrating and updating the main database**

We have constructed 18 main databases of which 11 databases are integrated basic databases, 2 are station databases, and others are newly developed. The integrated basic databases include:

- China micro-earthquake catalogue,
- China regional seismic phase database,
- China network earthquake catalogue,
- China seismic network bulletins,
- China historical earthquake catalogue,
- Global strong earthquake catalogue,
- Strong earthquake fast report catalogue,
- China earthquake precursor observation database, and
- China Seismic event catalogue, etc.

The station databases include:

- China seismic station database and
- The international seismic station database.

Newly constructed databases are:

- China strong earthquake digital dataset globally recorded,
- Dataset of China earthquake source parameters, and
- Dataset of isoseismic maps of disastrous earthquakes.

We have also constructed a catalogue database that can automatically acquire data from the USGS of the United States and Sweden.

### **3.4 Construction of navigation system**

Using Linux, we have developed a comprehensive seismic information management subsystem and an information service navigation subsystem using the Oracle management system and XML language. A basic operation platform has also been constructed using a distributed database system. Through the Internet, the WDC for Seismology website (in Chinese and English) connects with various databases already established, navigates through the main seismic data resources at home and abroad and provides user services. The Web link for WDC for Seismology, Beijing, has been set up and linked to the Internet (URL: <http://www-wdcfs.seis.ac.cn>). The current operating Home Page has both a Chinese version and an English version. The Internet service is opened 24 hours a day and seven days a week.

### **3.5 Seismic data service**

The WDC for Seismology, Beijing, supports all aspects of seismological research, including its role in geophysical science by providing to scientists and engineers a useful data sorting and distribution tool on seismology and other geophysical data. We have been providing Internet data service for earth scientists from the China Earthquake Administration, the Chinese Academy of Science, the China University of Science and Technology, and other institutions. According to incomplete statistics, the website has an annual rate of 50

thousand visits and 40 thousand clicks. This project was highly praised by the WDC appraisal panel in July, 1995. It concluded that, “the data provided by WDC for Seismology, Beijing, has great significance for geophysical research community, and it is qualified to be a member of World Data Center.”

#### **4 PERSPECTIVE**

An important opportunity emerged when in 2003 the China Earthquake Administration became a testing organization for science data sharing assigned by the Ministry of Science and Technology, China. Since the work of WDC for Seismology, Beijing, has been integrated into that of the national science data sharing effort, the databases, standards and data classification criteria, and websites developed by this project provide key support for earthquake science data sharing on a large scale. As part of the World Data Center, WDC for Seismology, Beijing, also serves as a window for exhibiting basic data research progress and exchange with the outside world. It is hoped that an earthquake science data center covering the whole country and connected with the whole world will be established and will have increasing impact worldwide in providing better service for basic research in earth, environment and space sciences.

#### **5 CONCLUSION**

Over a period of three years and supported by the China Earthquake Administration and the Ministry of Science and Technology, China, the WDC for Seismology has been partly established. The WDC finished drafting the initial data sharing standard, developing some of the main databases and setting up a website to provide seismic data service.

#### **6 REFERENCE**

[1] Guide to the WORLD DATA CENTER SYSTEM (1996) Issued by the Secretariat of the ICSU Panel on World Data Centers.