Historical data and digitization

The World Data Centre (WDC) of SWS occupies the primary role of data archiving in SWS. Prior to the introduction of digital records, SWS (formerly IPS) had accumulated and archived large volumes of historical ionospheric data on paper and film from as early as 1938. The earliest being from Canberra station, a location near Perth in Western Australia. The manually scaled ionospheric parameter data were also recorded on paper. To best preserve this data, the paper records have been keyed into digital text files and archived into the SWS near Perth in Western Australia. The manually scaled ionospheric parameter data were also recorded on paper. The ionosonde data were digitized and archived. For example, clean ionogram and magnetometer data are transmitted via emails as attachments every 5 minutes and 15 minutes respectively. Cosmic ray data are transmitted by FTP every 5 minutes.

Digital data and transmission

After 1990, digital ionosondes came into use and ionograms were recorded digitally. While development of the IPS5 series ionosonde was underway, SWS modified its analog ionosonde, the IPS 4D. As the IPS5 series ionosondes matured, they gradually replaced the 4Ds, culminating in the IPS 5D, which is the mainstay of our current ionosonde network. Before the IPS 5D was ready for deployment, SWS purchased and installed a number of CADD digital ionosondes, two of which are still working in SWS stations. In addition to ionogram data, SWS also gradually installed other digital instruments, such as magnetometers, riometers, cosmic ray monitors, solar telescopes and ionospheric scintillation monitors. Their digital data is transmitted to Sydney SWC head office via a variety of methods.

Data sharing and metadata

Data sharing is another kind of data backup and storage. Since 2005, 1757GB SWS data has been FTP downloaded by users from 104 countries. SWS has had data exchange with China and USA for the past four decades. Since January 2014, SWS has been sharing its cosmic ray data with the Neutron Monitor Database (NMDB) at the Kiel University of Germany. From 2016, SWS will share its scaled ionospheric data with the Global Ionospheric Radio Observatory (GIRO) located at the University of Massachusetts Lowell, Lowell, MA, United States. GIRO provides accurate specification of electron density in the Earth’s ionosphere at more than 60 locations in the world.

The ICSU-WDS has created the WDS Data Portal (http://www.icsu-wds.org/services/data-portal). To follow the steps of WDS and eventually link the SWS data portal to the WDS Data Portal, some of Australian Space Weather Services (ASWS) metadata files have been developed based on SPADE (The Space Physics Archive Search and Extract) Data Model. They are available under the World Data Center section of the SWS Website, (http://www.sws.bom.gov.au/World_Data_Center/ASWS). ASWS has been registered as the "Naming Authority" of Australian Space Weather Services with the SPASE registry. It has been used to create unique resource identifiers (IDs) for each resource held by the World Data Center of Space Weather Services, Bureau of Meteorology, Australia.

Acknowledgement

The author would like to thank Mr Todd King of the Institute of Geophysics & Planetary Physics, University of California, Los Angeles (UCLA) and Dr. Leonard Garcia of NASA, USA for their kind help in the development of ASWS metadata files.