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Yingkou Centennial Observing Station—History and Its Observation Data

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Abstract: Yingkou Meteorological Station was recognized as one of the first-batch centennial observing stations at the 69th Session of the Executive Council of the World Meteorological Organization (WMO). The Yingkou Centennial Meteorological Exhibition Hall was launched in 2020. The museum collected a series of history recordeds about the station, includes the meteorological activities in different periods, as earlier as Qing Dynasty, a hundred of years ago. The dataset on Images of Yingkou Long-term Meteorological Station Museum is the collection of the 37 images recording the history of the station. The images are archived in .jpg and .png data formats with the data size of 161.95 MB.

Keywords: Centennial Observing Station; Yingkou Weather Station; Exhibition Hall; history; museum; WMO

Dataset Availability Statement:

The dataset supporting this paper was published and is accessible through the *Digital Journal of Global Change Data Repository* at: https://doi.org/10.3974/geodb.2020.04.18.V1.

1 Introduction

At the 69th session of the Executive Council of the World Meteorological Organization, Yingkou Weather Station was recorgnized as one of 60 world's first-batch centennial observing stations[1]. It is an important carrier of the connotation and culture of Yingkou city.

2 Metadata of the Dataset

The metadata of the "Images of Yingkou Long-term Meteorological Station Museum"[2] is summarized in Table 1. It includes the dataset full name, short name, authors, year of the dataset, data format, data size, data files, data publisher, and data sharing policy, etc.

3 Centennial History of Yingkou Weather Station

3.1 The Earliest Meteorological Observation in Yingkou

Yingkou, a coastal city surrounded by river and sea, is the earliest modern meteorological

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[2] Wu, Y., Liu, S. Images of Yingkou Long-term Meteorological Station Museum [J/DB/OL]. *Digital Journal of Global Change Data Repository*, 2020. https://doi.org/10.3974/geodb.2020.04.18.V1.

observation city in Northeast China. Its meteorological observation history can be traced back to the beginning of its port opening. In 1858, the Qing Dynasty was forced to sign the unequal Tianjin Treaty with Britain, which stipulated that ten more areas such as Newchwang and Dengzhou should be opened as treaty ports. At that time, Mr. Meadows, the first British consul, came to Newchwang. When he saw that the river was seriously blocked, he thought it was not suitable for ships to go through, so he decided to change the treaty port from Newchwang to Yingkou, which was called Mogouying, and set up a consulate for the reason that "Newchwang is far away from seaport and berthing is inconvenient". In May 1861, Yingkou opened its port to the outside world instead of Newchwang, becoming the first foreign treaty port in Northeast China. Because of the Sino-British Tianjin Treaty could not be amended, Newchwang mentioned in foreign affairs was actually referred to as Yingkou.

The Yingkou port opened the gate of Yingkou to the world, and then the meteorological observation of Yingkou began accordingly. In 1861, Mr. Meadows, who was the first British Consul in Newchwang (Yingkou), installed the Fahrenheit thermometer on the outer wall of the consulate to observe the temperature, and recorded the highest and lowest temperature of each month from 1861 to 1865 in the summary of his trade report to British government.

Table 1 Metadata summary of the "Images of Yingkou Long-term Meteorological Station Museum"

Items	Description
Dataset full name	Images of Yingkou Long-term Meteorological Station Museum
Dataset short name	ImagesYingkouMeteoStationMuseum
Authors	Wu, Y., Yingkou Meteorological Bureau, Liaoning province, 404991630@qq.com Liu, S., Yingkou Daily, Liaoning province, stai@163.com
Geographical region	Yingkou, Liaoning province
Data format	.jpg, .png
Data size	162 MB
Data files	1 folder, 37 historical photos
Data publisher	Global Change Research Data Publishing & Repository, http://www.geodoi.ac.cn
Address	No. 11A, Datun Road, Chaoyang District, Beijing 100101, China
Data sharing policy	***Data*** from the Global Change Research Data Publishing &Repository includes metadata, datasets (in the *Digital Journal of Global Change Data Repository*), and publications (in the *Journal of Global Change Data & Discovery*). ***Data*** sharing policy includes: (1) ***Data*** are openly available and can be free downloaded via the Internet; (2) End users are encouraged to use ***Data*** subject to citation; (3) Users, who are by definition also value-added service providers, are welcome to redistribute ***Data*** subject to written permission from the GCdataPR Editorial Office and the issuance of a ***Data*** redistribution license; and (4) If ***Data*** are used to compile new datasets, the 'ten per cent principal' should be followed such that ***Data*** records utilized should not surpass 10% of the new dataset contents, while sources should be clearly noted in suitable places in the new dataset[3]
Communication and searchable system	DOI, DCI, CSCD, WDS/ISC, GEOSS, China GEOSS, Crossref

In 1871, Dr. James Watson, the Medical Officer of Shanhai New Customs (Yingkou Customs) quoted Mr Meadows's report and added to his own temperature observations data in his first medical report "The medical report of Newchwang port, for the half-year ending on 31 March 1871" to the Chief Revenue Secretary. This report by Dr. James Watson confirmed once again that Mr. Meadows had been observing temperatures since 1861. Therefore, it can be inferred that, as early as 1861, the first meteorological observation project appeared in Yingkou, which was about temperature change observation. The history of meteorological

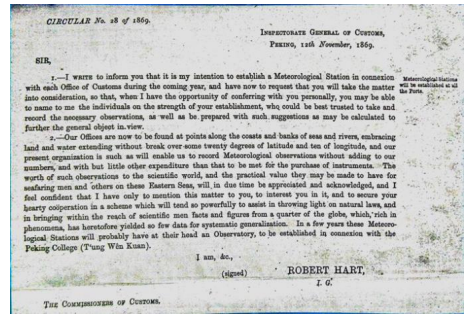
observation in Yingkou can be traced back to nearly 160 years ago. Meadows's observation also made Yingkou become the city with the earliest meteorological observation record in Northeast China.

3.2 The Establishment and Development of Yingkou Customs Weather-observing Station

In 1864, the government of Qing Dynasty set up "Shanhai New Customs" (Figure 1) in Yingkou, which was subordinated to the General Taxation Office and also known as "Foreign Pass" and "East Customs". The British Jas Mackey acted as the first Acting Tax Supervisor of the Customs. At the same time, in the west of Yingkou, there was another Customs directly managed by the Qing Dynasty, called "West Customs".

Due to the strong dependence of sailing on the weather, Mr. Hurd (British), the Chief Commissioner of the Qing Dynasty Customs, issued the No. 28 Circular in 1869 (Figure 2), required to establish the weather-observing stations over the coastal regions in China, in order to obtain meteorological data for ensuring the safety of shipping[4]. Since 1870, customs stations at all ports and major lighthouses have been established one by one, and meteorological observation has been included in one of the customs' five basic maritime services. The establishment of the customs observation network system is of great value to understanding, forecasting and studying the weather and climate in China and East Asia, and plays a very important role in ensuring the shipping safety.

Figure 1 Shanhai New Customs



CIRCULAR No. 28 of 1869.

INSPECTORATE GENERAL OF CUSTOMS,
PEKING, 12th November, 1869.

SIR,

1.—I HAVE to inform you that it is my intention to establish a Meteorological Station in connexion with each Office of Customs during the coming year, and have now to request that you will take the matter into consideration, so that, when I have the opportunity of conferring with you personally, you may be able to name to me the individuals on the strength of your establishment, who could be best trusted to take and record the necessary observations, as well as be prepared with such suggestions as may be calculated to further the general object in view.

Meteorological Stations will be established at all the Ports.

2.—Our Offices are now to be found at points along the coasts and banks of seas and rivers, embracing land and water extending without break over some twenty degrees of latitude and ten of longitude, and our present organization is such as will enable us to record Meteorological observations without adding to our numbers, and with but little other expenditure than that to be met for the purchase of instruments. The worth of such observations to the scientific world, and the practical value they may be made to have for seafaring men and others on these Eastern Seas, will in due time be appreciated and acknowledged, and I feel confident that I have only to mention this matter to you, to interest you in it, and to secure your hearty coöperation in a scheme which will tend so powerfully to assist in throwing light on natural laws, and in bringing within the reach of scientific men facts and figures from a quarter of the globe, which, rich in phenomena, has heretofore yielded so few data for systematic generalization. In a few years these Meteorological Stations will probably have at their head an Observatory, to be established in connexion with the Peking College (T'ung Wên Kuan).

I am, &c.,
(signed) ROBERT HART,
I. G.

THE COMMISSIONERS OF CUSTOMS.

Figure 2 No. 28 Customs Circular

In February 1880, Newchwang (Yingkou) built a customs weather-observing station in the customs yard (Figure 3) near the Liaohe river. The existing monthly record of meteorological observation, which is kept in the Archives of China Meteorological Administration, began in March 1890 and ended in May 1932. In October 1882, in order to ensure and serve coastal meteorological work more effectively, Hurd (British), the Chief Commissioner of the Qing Dynasty Customs, ordered all customs weather-observing stations to transmit meteorological observations to the Zikawei Observatory in Shanghai. Since then, Newchwang (Yingkou) Customs Weather-observing Station and the Zikawei Observatory established a cooperative relationship, providing meteorological data for its weather forecast. The frequency of Customs meteorological observations was also increased to eight times, six times or at least four times a day.

Due to the occupation of Japanese, the meteorological observation of Yingkou Customs ended in May 1932. On June 27, 1932, Yingkou Customs was taken over by the Japanese puppet authorities. On September 25, the general Taxation Department closed all the customs in the three northeastern provinces, and Yingkou Customs that under the jurisdiction of

the Customs of the Republic of China was officially closed[5].

3.3 The Yingkou Weather Station Set up by the Japanese

In 1904, the Japanese-Russian war broke out. For the needs of the war, the Japanese government approved the Central Meteorological Observatory to establish weather observing stations in Northeast China and the DPRK[6]. On August 5, 1904, the sixth interim weather station was set up in Qingniwa, Dalian, and the seventh interim weather station was set up in Yingkou (Figure 4). In the following year, the liaison office was set up in Lvshun, and the eighth interim weather station was set up in Mukden, all of which provided meteorological information for the Japanese army.

Figure 3 Shanhai Pass meteorological observation field and signal tower

The meteorological observation office in Japan was managed by the Ministry of Education, but on the establishment document of the seventh interim weather station, in addition to the signature of the Minister of Education Jiubaotianrang, there was also with the signature of the Minister of War, Sineizhengyi, which fully proved that the weather station was set up to serve the war. In September 1904, the seventh interim weather station began to make meteorological observations, and official records began in October. From then on until May 1932, there were two meteorological observation stations of the Customs and Japan in Yingkou.

According to historical records, the seventh interim weather station in Yingkou was first established at the Sanyi Temple, Yuanshen Temple street, Yingkou, on September 30, 1904. It was moved to Niujiatun on November 1, 1907, and then moved from Niujiatun to Yidingmu (Figure 5) in Xinshi street, Qingliu town, in October 25, 1909, where the old site of the Yingkou Weather Station is now located.

In October 1905, the Japanese set up the Kanto General Governor's Office in Liaoyang. In May 1906, the Kanto General Governor's office was moved from Liaoyang to Lvshun. In August 1906, it was renamed as the Kanto Governor's office, as the colonial institution of Japanese military and political rule in Northeast China. On September 1, 1906, the wartime interim weather station and station branch of the Japan Central Meteorological Station were transferred to the Kanto Prefecture, and the seventh interim weather station was renamed as Yingkou Observatory. In 1908, the Japanese government implemented the Kanto Imperial Palace Weather Station system by Royal Decree No. 273, and the Dalian Observatory was renamed as the Kanto Imperial Palace Weather Station (Figure 6), and the Yingkou and Mukden Observatory as the weather station branch. On April 12, 1919, the Kanto Imperial Palace was renamed as the Kanto Hall. Yingkou Weather Station branch was renamed as the Yingkou Weather Station branch of the Kanto Hall. On December 26, 1934, it was renamed as the Yingkou Branch of Kanto Observatory.

Figure 4 Establishment documents of the Seventh Interim Weather Station (part)

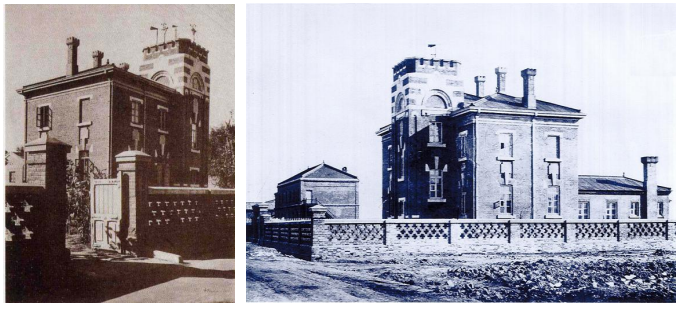


Figure 5 The old appearance of the Yingkou Branch of the Kanto Imperial Palace Weather Station (the west side of Yingkou People's Park now)

On December 1, 1937, the Japanese government implemented the so-called "abrogation of extraterritoriality", transferring the observation stations of Xinjing (Changchun), Siping street (Siping), Mukden (Shenyang), Yingkou, etc., to the "Central Observatory" of the Puppet Manchukuo, but in fact they were still controlled by the Japanese[6]. In 1945, with the surrender of Japan in the World War II, meteorological observation at the Yingkou Branch of Kanto Observatory came to an end.

After the victory of the war, the Central Weather Bureau in Northeast China received and resumed meteorological observation stations, which were Yingkou, Qingyuan, Jilin, Chengde, etc. However due to the limitation of the political situation, the relevant information of Yingkou Weather Station could not be verified. Therefore the observation records from 1945 to 1949 were extremely limited.

3.4 The Meteorological Observation of the Nan Manchu Railway in Yingkou

With the military aggression in Northeast China, Japanese also acted the economics together. In 1906, Japanese colonists established the Nan Manchu Railway Co., Ltd. (Manchu Railway for short) in Dalian. Since 1913, "Manchu Railway" has successively set up meteorological observation stations in subordinate offices and agricultural trial farms along the railway to make meteorological observation in agriculture and horticulture or to carry out meteorological observation services for coal mine, iron and steel industry[6]. The "Manchu

Railway" agriculture site was shown in Figure 7.

In April 1913, the Xiongyuecheng nursery of Manchu Railway set up in 1909 was renamed as "Xiongyuecheng Branch of Industrial Test Site of Nan Manchu Railway Co., Ltd.", and a weather-observing station was set up. On January 1, 1914, the weather began to be observed and official meteorological records were kept. The station at the Xiongyuecheng Branch of Industrial Test Site was the earliest weather station for agro-meteorological observation set up by the Nan Manchu Railway Co., Ltd. in Northeast China. In addition to providing meteorological services for agricultural and horticultural activities, it also provided meteorological observation data for the Japanese aviation operations. The configuration of the aviation meteorological office implemented by the Flight Operations Group was shown in Figure 8. On January 15, 1918, according to the regulations of the Nan Manchu Railway, "Xiongyuecheng Branch of Industrial Test Site" was renamed as "Xiongyuecheng Branch of Agricultural Test Site" (Figure 9 the office of Xiongyuecheng Branch), which was managed by the "Manchukuo" central Meteorological Observatory in 1936. After the unconditional surrender of Japan in 1945, meteorological observation was halted.

Figure 6 Dalian Kanto Imperial Palace Weather Station

After a lapse of more than 100 years, the old site is still in good condition. Today, the XiongYue National Basic Meteorological Observing Station has become one of the members of "China's Centennial Observing Station". Yingkou is the only city in China that has two centennial observing stations, which have been preserved well. The strong historical background of 100 years makes Yingkou meteorological occupy a very important position in the modern meteorological history of China.

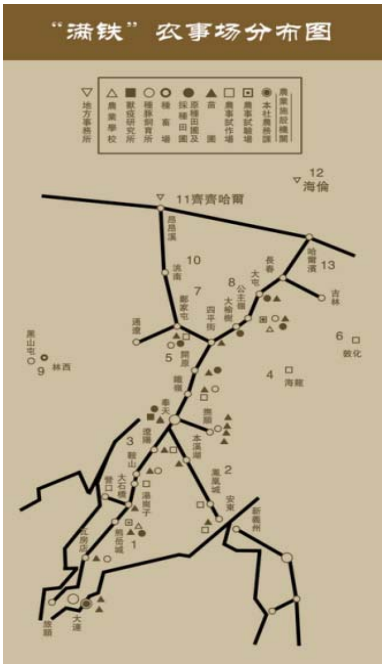


Figure 7 "Manchu Railway" agriculture site

3.5 Development of Yingkou Weather Station After the Founding of the PRC

The founding of the People's Republic of China opened a new era in the development of meteorological services in Yingkou. On February 26, 1948, Yingkou was liberated. On February 27, 1949, the Northeast Meteorological Observatory of the Northeast People's Government sent staff to Yingkou to prepare for the construction of Yingkou Weather Station at the former site. On April 1, 1949, Yingkou resumed the meteorological observation which had been sus-

pended for 5 years.

When Yingkou Weather Station was set up, the instruments and equipment were very simple. The observed weather elements included cloud, visibility, weather phenomena, pressure, temperature, humidity, wind direction and speed, precipitation, sunshine, evaporation, surface temperature and grass temperature. With the development of observation, many other elements such as snow depth, frozen soil, snow density (snow pressure) and electric line ice accumulation have been successively recorded.

At the early stage of the establishment of Yingkou Weather Station, meteorological observation was mainly made by manual observation, manual compilation and report, and observation equipment was very simple. With the progress of science and technology and the development of meteorological modernization, manual observation has gradually changed to automatic observation. In October 1999, Yingkou Weather Station took the lead in the construction of surface meteorological wire-telemetry TYPE II automatic station in the whole province, achieving a significant turning point from manual observation to automatic observation. In May 2013, the new automatic station was completed and put into use, starting the operation mode of "one main station and one standby station" of two automatic weather stations. With the continuous advancement of meteorological modernization, Yingkou Weather Station, as a pioneer of modern meteorological observation in Northeast China, has developed into an all-weather, automatic, multi-element and three-dimensional comprehensive meteorological observation station.

From the past simple observation to today's modernized and standardized observation field, Yingkou Weather Station moved three times and now it is located in the Planned area of West Battery Park, No. 119 West Bohai Avenue, West Downtown of Yingkou (Figure 10–11). From the suburbs of the city to the busy downtown, Yingkou Weather Station has witnessed the growth of Yingkou city. On August 14, 2017, the Yingkou municipal government decided to take the current site of the meteorological station as a permanent fixed station for long-term protection, which reflects the importance of environmental protection for meteorological observation.

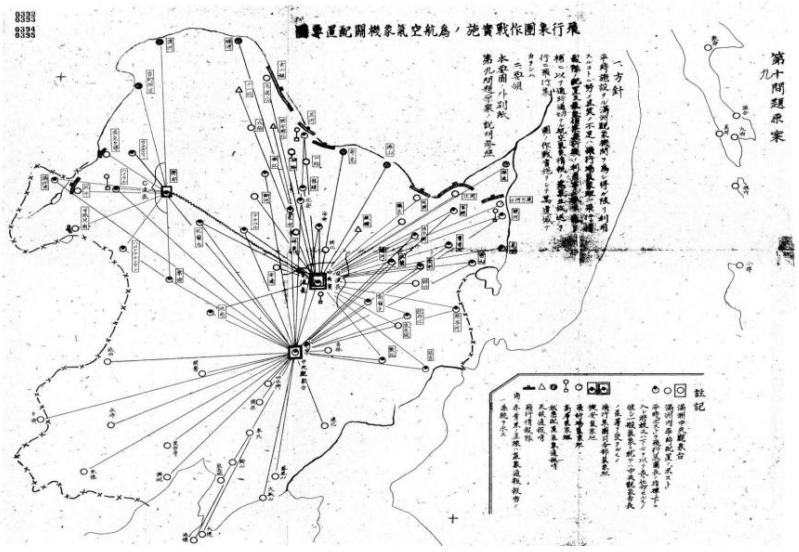


Figure 8 Flight combat group to implement aviation meteorological authority configuration

Figure 9 The observatory office of Xiongyuecheng Branch of Industrial Test Site

Figure 10 View of the Yingkou National Basic Meteorological Observing Station

4 Re-construction of the Yingkou Weather Station in its Original Location

On 17 May 2017, at the 69th Session of the Executive Council of WMO, the Yingkou Weather Station was recognized by WMO as one of the first-batch centennial observing stations due to its over 100 years' continuous observation, over 100 years' long-sequence climatic data and over 100 years' environment protection for meteorological observation, there are 60 stations around the world received this honor, and three of them were selected in Mainland China, with the only old site left by Yingkou Weather Station.

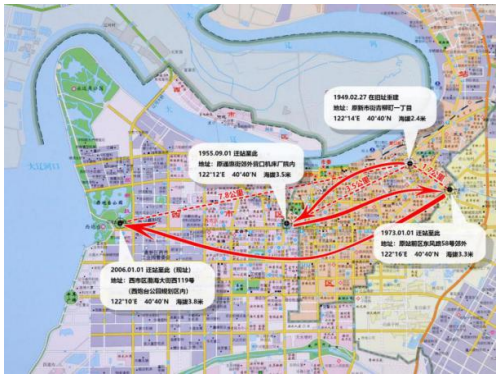


Figure 11 Relocation schematic diagram of Yingkou Weather Station

On 17 November 2017, the Yingkou municipal government approved the site of Yingkou Weather Station as the fifth-batch of municipal cultural relic protection units in Yingkou, and extended the protruding parts of the surrounding outer walls within 5 m as the protection scope.

Yingkou Weather Station was built in 1909, 112 years for now. The existing site was not known until in May 2017 when Yingkou Weather Stations was identified as a World Centennial Observing Station and reported in the news. One local history-lover posted an article in WeChat after he read the news, and he also provided the exact location and photos of the building. Upon discovering it, the meteorological department immediately applied for protection of the site.

The old building was in a state of disrepair and lack of regular maintenance, and the observation tower on the roof was demolished after the earthquake in 1975. For the above situation, with the strong support of China Meteorological Administration, Liaoning Meteorological Bureau, Yingkou Municipal Party Committee and Yingkou Municipal Government, Yingkou Meteorological Bureau began to repair the old site in August 2018, with the principle of "repairing and restoring as the original appearance". A typical station with the most historical and cultural characteristics among the centurial meteorological stations reflecting the combination with modern and current, culture and cultural relics, history and development, was built consequently. Through the renovation of the old site, the historical

features of the old building are restored, the problem of the building falling into disrepair is solved, the service life of the building is prolonged, and the old building come into availability in modern society.

In addition, a new meteorological and cultural square was built within the site to afforest the surrounding environment of the site's cultural relic protection area. The square is consist of meteorological observation field, contour landscape, hundred years of rainfall, hundred years of temperature and other meteorological themed sculptures. It has become a multi-functional cultural area integrating education, science, popularization and leisure as well as a characteristic cultural tourism landscape in the eastern part of Yingkou city.

The old site of Yingkou Weather Station (Figure 12) has witnessed the 100-year history of the meteorological development of Yingkou, and is an important part of the historical culture of Yingkou. In order to preserve the cultural heritage and play its historical role, Yingkou Centennial Meteorological Exhibition Hall (Figure 13) was re-built in the place at the old building by Yingkou Meteorological Bureau, aiming at showing the commercial culture and meteorological history development of Yingkou port, and giving full play to its carrying function of architectural history and culture as well as regional culture enhancement function.

Figure 12 The former site of Yingkou Branch of Kanto Imperial Palace Weather Station (Taken in 2017)

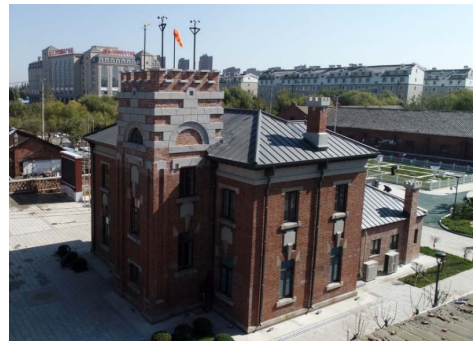


Figure 13 The restored appearance of the Yingkou Weather Station

5 Yingkou Centennial Meteorological Exhibition Hall

The Yingkou Centennial Meteorological Exhibition Hall is the first meteorological Exhibition Hall in the world with the theme of the centennial meteorological station certified by the WMO, which carries the historical memory of Yingkou and the cultural connotation of meteorological development. Yingkou Centennial Meteorological Exhibition Hall is themed by "A hundred years of history, great changes in meteorological services", and covers an area of 315.8 m^2. There are three exhibition sections, including the hundred years of meteorological development exhibition area, modern and current meteorological instruments exhibition area and multimedia interactive exhibition area, which give full play to the historical and cultural value of meteorology and the function of science popularization and education. The exhibition section of Yingkou centennial meteorological history includes three parts: Wind and rain in the century, progress of meteorological services in new China and the glory of our times. (Figure 14 shows part of the exhibition area). The whole Exhibition Hall displays

commercial and trade culture of Yingkou, centennial meteorological culture and modern meteorological science and technology culture by diversified forms, including historical pictures, exhibits, historical materials, scene restoration, multimedia demonstration, and sensory interaction.

As a special exhibition area, modern and current meteorological instruments exhibition is a unique display area in the Exhibition Hall. There are 51 exhibits, including instruments of temperature, humidity, wind, air pressure, precipitation, sunshine and other observation elements. There are 15 major exhibits consist of Japanese instruments from 1920s to 1940s, and meteorological instruments from the United States, Britain and other countries. The observation instruments of temperature, humidity, air pressure, wind direction and wind speed before the founding of the People's Republic of China have also been collected and displayed in the exhibition area.

The site of Yingkou Centennial Observing Station is not only the legacy of urban history and culture, but also the continuation of urban historical context. Its profound historical and cultural connotation not only provides precious evidence for the study of meteorological cultural history, but also has extremely important value for the study of history, carrying forward the spirit of patriotism and global climate change. In the process of cultural relics protection, Yingkou Meteorological Bureau took the opportunity of being recognized as the world centennial observing station, combined modern elements with the old building site to build the Yingkou Centennial Meteorological Exhibition Hall, and made it become a carrier of domestic meteorological culture communication and a platform for international meteorological resources exchange, with great significance for preserving the city's historical and cultural memory, enhancing the city's cultural connotation and transmitting the historical information of the development of the times.

Figure 14 Part of the exhibition areas

6 The Historical Data of Centennial Weather Records in Yingkou

Yingkou meteorological observation history includes the meteorological activities of different people or institutions in different time periods, such as the behavior of first British Consul after the opening of Yingkou port, the weather observation activities of the customs subordinated to the Qing Dynasty, the customs under the Government of the Republic China as well as the meteorological activities of Japanese invaders. The historical connotation is not only the witness of modern China being bullied by various aggressors, but also the witness of science and technology affected by the development of western countries, which is of great historical research value.

In 1861, After the opening of Yingkou, the first British Consul named Thomas Taylor Meadows carried out temperature observation and gave a table reflecting the extreme highest and lowest temperatures of each month from 1861 to 1865 in the summary of his trade report to the British government (Figure 15)[7]. Meadows believed that extreme temperatures are more of a concern for some people than average temperatures. For example, a traveler arriving in a new city could be fully prepared for local extremes. He pointed out that the chart also lacked a useful factor: the heat of the summer sun. He used Fahrenheit thermometers that hang on the consulate's outer wall because the sun could not shine on them.

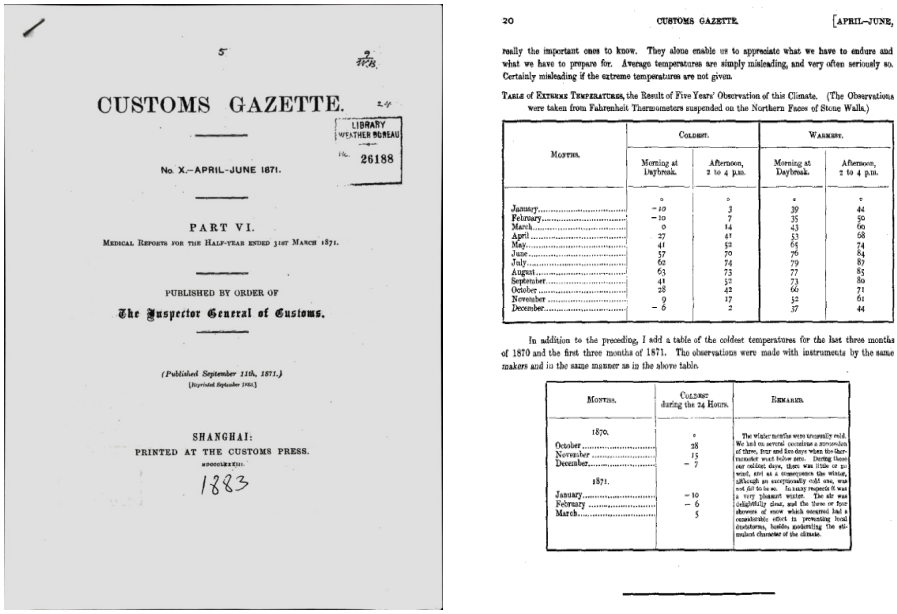
In 1871, Medical officer James Watson of Yingkou Customs quoted Mr Meadows's report in his first medical report: "The Medical Report of Newchwang port, for the half-year ending on 31 March 1871" (Figure 16) to the Chief Revenue Secretary Hurd[8]. He agreed with the intention of recording extreme temperatures, pointing out that average temperatures were indeed misleading as a reference point. In the medical report he added his own observations of the coldest temperatures in the last three months of 1870 and the first three months of 1871, using thermometers made by the same manufacturer as Mr Meadows' and taking the same observation methods. James Watson's report also was another attestation of the Meadows's temperature observations, and they have left Yingkou's earliest meteorological data together, dating back 160 years.

Since then, Meadows's trade reports for other years had not been collected, but after many searches, we have collected a total of 54 customs medical reports from 1870 to 1910. The customs medical report was a local medical and health report written by the customs medical officers of all trading ports in the late Qing Dynasty. It contained information such as the prevalence of diseases, births and deaths of residents, climatic conditions, meteorological observation data, etc. It was collected and published by the Chinese Customs as a semi-annual magazine. Among the 54 customs medical reports collected, there were 24 medical reports in Newchwang (Yingkou) area, among which 17 medical reports were found by further searching for the chapters containing meteorological information. These meteorological data have typical charac-

Month.	Coldest.		Warmest.	
	Morning at Daybreak.	Afternoon at 2 to 4 P.M.	Morning at Daybreak.	Afternoon at 2 to 4 P.M.
January	−10°	3°	39°	44°
February	−10	7	35	50
March	0	14	43	60
April	27	41	53	68
May	41	52	65	74
June	57	70	76	84
July	62	74	79	87
August	63	73	77	85
September	41	52	73	80
October	28	42	66	71
November	7	17	52	61
December	−6	2	37	44

Figure 15 The British Consulate-General's Trade Report in Yingkou, 1865—observation data from Meadows

teristics of times and geography, and the preservation of these data is of great reference value to the study of climatic characteristics, economic development, social and cultural aspects at that time.



CUSTOMS GAZETTE.

LIBRARY WEATHER BUREAU 26188

No. X.—APRIL-JUNE 1871.

PART VI.

MEDICAL REPORTS FOR THE HALF-YEAR ENDED 31ST MARCH 1871.

PUBLISHED BY ORDER OF

The Inspector General of Customs.

(Published September 11th, 1871.)

SHANGHAI:
PRINTED AT THE CUSTOMS PRESS.

1883

20 CUSTOMS GAZETTE. [APRIL—JUNE,

really the important ones to know. They alone enable us to appreciate what we have to endure and what we have to prepare for. Average temperatures are simply misleading, and very often seriously so. Certainly misleading if the extreme temperatures are not given.

TABLE of EXTREME TEMPERATURES, the Result of Five Years' Observation of this Climate. (The Observations were taken from Fahrenheit Thermometers suspended on the Northern Faces of Stone Walls.)

MONTHS.	COLDEST.		WARMEST.	
	Morning at Daybreak.	Afternoon, 2 to 4 p.m.	Morning at Daybreak.	Afternoon, 2 to 4 p.m.
	°	°	°	°
January	−10	3	39	44
February	−10	7	35	50
March	0	14	43	60
April	27	41	53	68
May	41	53	64	74
June	57	70	76	84
July	63	74	79	87
August	63	73	77	85
September	41	52	73	80
October	28	42	66	71
November	9	17	52	61
December	−6	2	37	44

In addition to the preceding, I add a table of the coldest temperatures for the last three months of 1870 and the first three months of 1871. The observations were made with instruments by the same makers and in the same manner as in the above table.

MONTHS.	COLDEST during the 24 HOURS.	REMARKS.
1870.	°	
October	28	The winter months were unusually mild. We had on several occasions a succession of three, four and five days when the thermometer went below zero. During these cold days, there was little or no wind, and as a consequence the winter, although an exceptionally cold one, was not felt to be so. In many respects it was a very pleasant winter. The air was delightfully clear, and the three or four showers of snow which occurred had a considerable effect in preventing local disturbance, besides moistening the exuberant character of the climate.
November	15	
December	−7	
1871.		
January	−10	
February	−6	
March	5	

Figure 16 The Medical Report of Newchwang port, for the half-year ending on 31 March 1871—observation data from Meadows and Watson

In the process of collecting meteorological data, we found the China Meteorological Administration archives contain the complete historical data of temperature, pressure, and precipitation of Newchwang (Yingkou) Customs from March 1890 to May 1932 and part of the Yingkou Weather Station observations from October 1904 to April 1942. In order to keep and continue the centennial climate data, which carries one hundred years of history in Yingkou, Yingkou Meteorological Bureau supplemented and sorted out meteorological data collected from the Archives of the China Meteorological Administration and other sources. In November 2019, it completed the printing of a complete book (Figure 17) titled "Daily climate data of Yingkou for a hundred years"[9], including observations of Newchwang (Yingkou) Customs from 1890 to 1932 and observations of Yingkou Weather Station from 1904 to 2018, covering a period of 129 years.

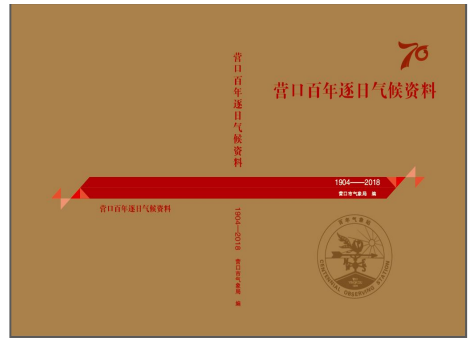


Figure 17 Daily climate data of Yingkou for a hundred years

Before 1902, Newchwang (Yingkou) Customs Weather-observing Station carried out observations from March to November every year, including air pressure, temperature, wind direction, wind speed and other weather phenomena. After 1902, a year-round observation began, including air pressure, temperature, wind direction, wind speed, precipitation, visibility, weather phenomena, sea waves, water level height and occurrence time of high water level. In addition to the daily meteorological

observation, the Newchwang (Yingkou) Customs Weather-observing Station is also responsible for the compilation and issuance of meteorological reports and the release of gale information warning tasks. The observation data of Newchwang (Yingkou) Customs Weather-observing Station are original records, with different languages and different units of measurement. In order to ensure the standardization and consistency of the data, all the details have been translated and converted by the editorial office staff.

When the seventh interim weather station of Yingkou was set up, it mainly observed air pressure, temperature, humidity, water vapor tension, wind direction, wind speed, precipitation, cloud amount, cloud shape, weather phenomena, earthquake and so on. After that, the observation of evaporation, snow depth, sunshine, surface temperature, grass temperature and other factors was gradually increased. After the observation station was moved to Yidingmu, Qingliu town, Xinshi street, the observation time was the standard time in the 120°E time zone with 22:00 being the daily boundary. Since January 1937, the observing time system of Kanto Observation Station was changed from the 120°E time zone to the 135 °E time zone. Although the observation data of Yingkou Weather Station are more nearly enough through the collection of various channels, the daily data from April to November 1937, May 1941, and from May 1942 to April 1949 were missing, and there was no similar observation to replace them as the result of war or other events. Therefore, the above data were treated as missing measurement. In order to make the data complete and continuous as possible, the editorial office staff carefully reviewed the relevant regulations, and after repeated comparison and rationality analysis, the missing daily data from January to September 1904, January to December 1910, and April to December 1923 were finally replaced by the observed data from Newchwang (Yingkou) Customs Weather-observing Station, which was 5 km away from Yingkou Weather Station.

7 Application of Observation Data from Yingkou Weather Station

From the beginning to the present, meteorology has been inextricably linked with humanity, society, economy and military affairs. In 1869, Hurd issued the Order “No. 28 Customs Circular”, which indicated the important influence of weather on ship navigation, and the establishment of the customs observation network system was of great value to the climate research and the guarantee of shipping safety.

In 1871, Mr. James Watson also described the necessity for his meteorological observations in his medical report. He believed that climate records would be helpful to correctly describe the effects of climate on the health of Europeans. For instance, with the summer months’ southwest wind, the night was cool and comfortable, and it could largely explain why disease and physical ability in this period could recover sooner, while in the extremely dry winter a healthy person tended to become nervous, allergic and unable to concentrate. If heavy rain or snow occurred at this time, this uncomfortable feeling would be greatly alleviated.

By analyzing local climate characteristics and seasonal changes, Watson studied the relationship between weather and health or disease. By comparing with the climate of European countries, he objectively evaluated the physical effects of living here, and put forward some suggestions for Europeans by observing the lifestyle of local people in response to the climate.

In the past, meteorological data may only be used in a single way, but now, with advanced meteorological observation means, numerous projects, dense network of stations and wide application, meteorological observation provides a large number of basic data for weather forecasting, major weather services and weather modification, and plays a huge role in meteorological disaster prevention and mitigation.

8 Summary

As the valuable record of global climate and ecology, as well as a continuous inheritor of human history, humanity and science, the centennial observing station is regarded as an unrepeatable and irreplaceable climate heritage. Spanning one hundred years of history, Yingkou Weather Station witnessed the development of meteorological observation and progress in modern times, created a civilization achievement of science and culture. With more than a century of observation data, it faithfully recorded the climate change in Yingkou area and accumulated precious climatic data in more than 100 years, which demonstrates its brilliant historical role and more important contemporary value in the local economic and social development[10].

Yingkou Centennial Observing Stations has undergone the baptism of wind and rain for more than 100 years. It will continue to write a glory chapter in meteorological observation, give full play to the values of scientific popularization and cultural inheritance, continue to make good services to ensure local economic and social development and the well-being of the people, and make greater contributions to the global observation system of the WMO[11].

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