

Meteorological Instruments of 15th century in Korea

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Meteorological devices such as the rain measuring instrument, watermark, and wind anemoscope were invented in the 15th century in Korea(Jeon, 1974). The rain measuring instrument, called *Chugugi*, was devised in 1441 (the 23rd year of the reign of King Sejong) to measure rainfall quantitatively. The *Chugugi* was divided into three parts and used a scale called *Chuchok*. King Sejong established the first rain gauge network (at every district office) over the Korean peninsula. The pedestal (46x37x37cm) for the rain measuring instrument was built in May 1770 and was placed at Daegu (Wada, 1910) in the 1900's. Recently it was moved and placed at the Korea Meteorological Administration (KMA) headquarters in Seoul (Fig. 1).



Fig. 1. Original *Chugugi* displayed at the Korea Meteorological Administration.

There were 5 kinds of rain gauge made of iron and their 11 pedestals made of granite or marble(Wada, 1910). However, at present only one rain gauge and 5 pedestals are remained in Korea. The data of rainfall observed by rain gauge in Seoul was studied by Jung *et al.*(2001). Futhermore, the new rain data set measured in Gonju (Chungcheong province) was found recently by Kim Sangwon.

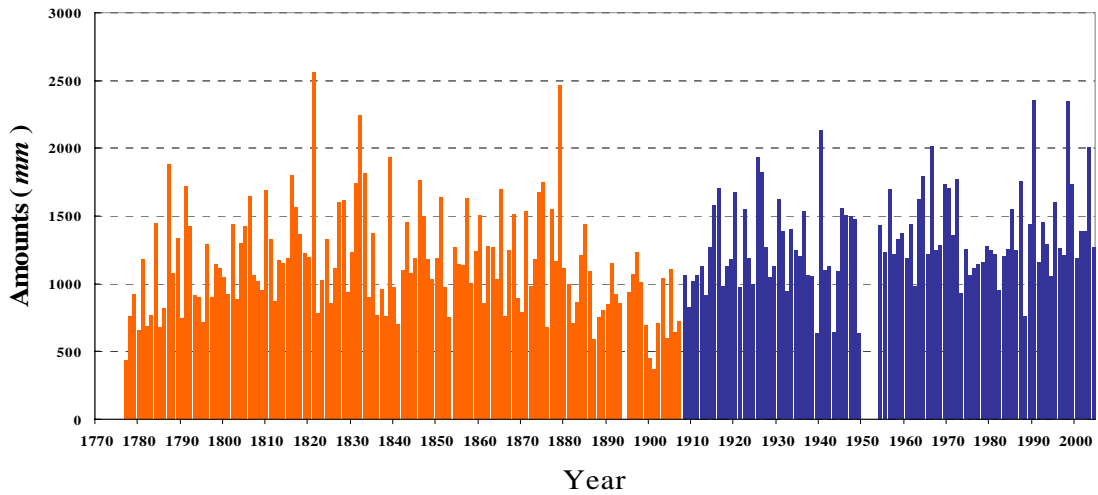


Fig. 2. The annual precipitation amounts observed in Seoul from 1776 to 2003.

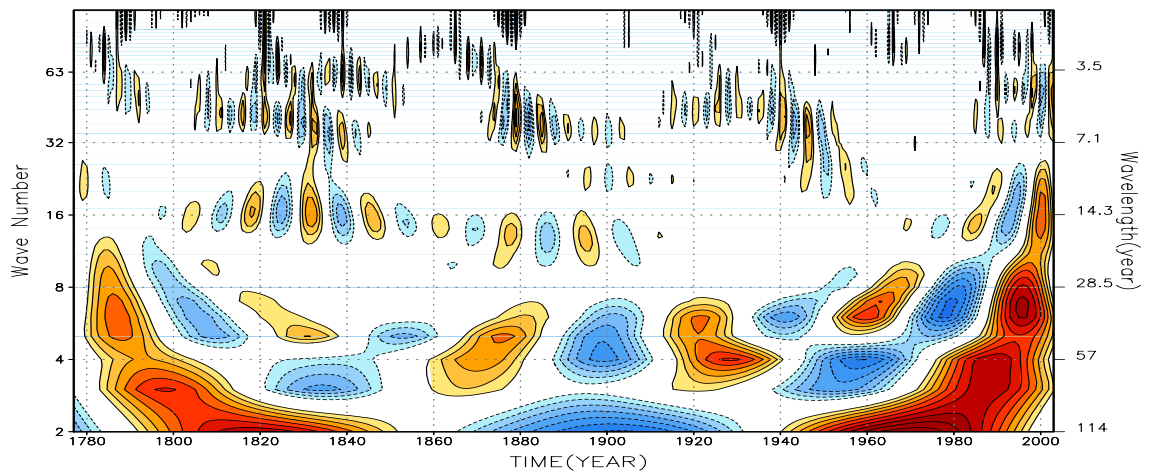


Fig. 3. The wavelet analysis indicating the multi decadal variability of precipitation for last 200 years in Seoul, Korea.

The annual precipitation amounts observed in Seoul from 1776 to 2003 is shown in Fig. 2. The precipitation data before 1907 were revised from the *Chugugi data* by Jung et al.(2001), and data after 1907 were measured by KMA using the modern rain gauge. The wavelet analysis (Fig. 3) shows the multi-decadal variability of annual precipitation in Seoul.

A watermark (*supyo*), originally a wooden type column (2.5 m high) was invented in 1441 to observe the water level in the Han River and in the *Cheonggyecheon* stream. The wooden watermark was improved using the granite type column which has a scale of 1 cheok (about 20 cm) to 10 cheok, and also has special marks indicating drought, normal, and flood levels. The six-sided granite column is 3 m high and is shaped like a fish swimming upstream in order to reduce stream friction. The original granite type column, built between the 15th and 17th century, is displayed at the Sejong Memorial Hall in Seoul.



Fig. 4. The water level of the Han River was increased up to 21 cheok and 2 chon (by Pobaek scale) by flood in 1554.



Fig. 5. The *Cheonggyecheon* where the watermark was placed in 1890 (left) and the watermark displayed at the Sejong Memorial Hall in Seoul (right).

The anemoscope (*Punggi*) was invented in the 15th century during the reign of King Sejong, by using a flag attached to a long piece of bamboo that was placed at the center-hole of the column. The eight-sided granite columns (225 cm high), made in 1770, are now preserved at the *Changgeong* Palace and *Gyeongbok* Palace in Seoul.

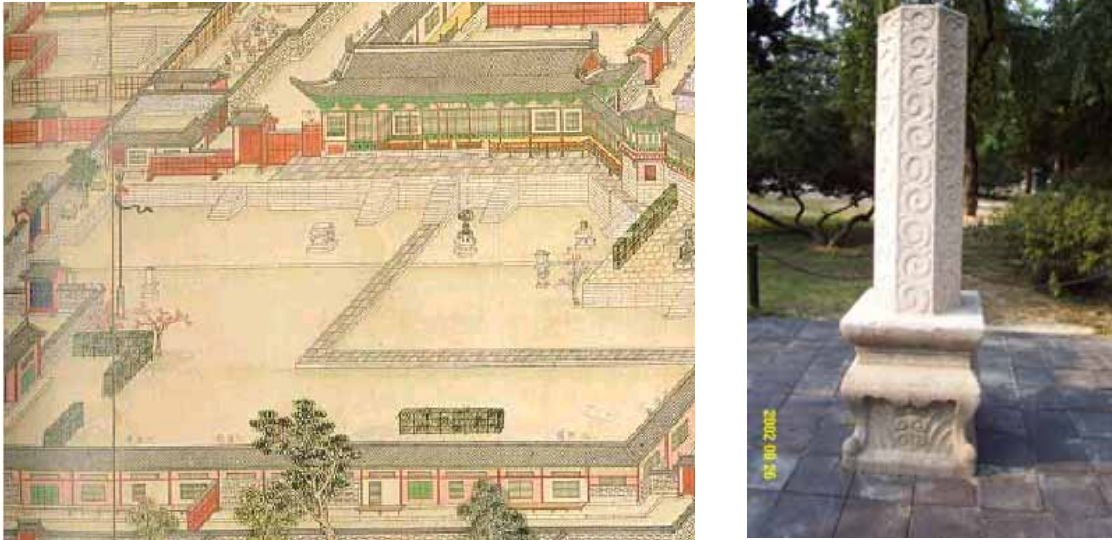


Fig. 6. A part of the *Changgeong* Palace in 18 century (left) and the eight-sided granite columns for wind flag preserved at the *Gyeongbok* Palace (right).

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* My academic background consists of a B.S. in Meteorology and an M.S. for Asian summer monsoon. My Ph.D. thesis related to the long range transport modeling of Asian Dust event obtained from Seoul National University. As a researcher at the Meteorological Research Institute since 1986, I have been involved in forecasting for the Asian Dust storm during the past 11 years. I believe that history guides and enlighten us in the sands of time.

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