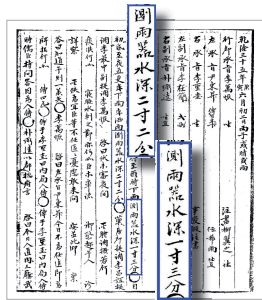


Records of Rainfall Measurement

There are approximately 400 years of rainfall records, measured by a traditional Korean rain gauge called Cheugugi, found in various historical documents including the Joseon Wangjo Silok (Veritable Records of the Joseon Dynasty), the Seungjeongwon ilgi (Diaries of the Royal Secretariat), and the Gaksa deungnok (Archives of Provincial Government Offices). You can also find some records that include not only yearly statistics obtained from rainfall measurements but also monthly rainfall amounts compared to the previous year.

Howard Bluestein, a renowned meteorologist, noted in his widely used meteorology textbook that “the use of the rain gauge in Korea around 1440” was one of the most important historical events in synoptic meteorology worldwide.



測雨器 水深 1寸 3分

Water level in the Cheugugi (26 mm)

測雨器 水深 2寸 2分

Water level in the Cheugugi (44 mm)

◀ Diaries of the Royal Secretariat
On June, 2, 1770 (46th year of King Yeongjo's reign)
(Courtesy of Kyujanggak Institute for Korean Studies, Seoul University)

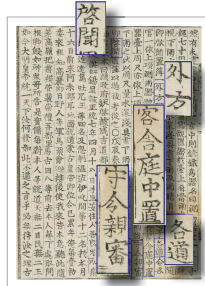
Table 1.1. Important events in the history of synoptic meteorology

ca. 1440	Rain gauge used in Korea
ca. 1595	First thermometer (Galileo)
1643	Invention of mercury barometer (Torricelli)
1650	Cloud motion determined by trigonometry
1654	First “satisfactory” thermometer introduced

* Howard Bluestein, *Synoptic-Dynamic Meteorology in Midlatitudes*, Oxford University Press, 1992.

Commencement of Rainfall Measurement System in 1442

The invention of Cheugugi led to the establishment of a nationwide rainfall measurement network, enabling the measurement of water levels in Seoul's Cheonggye stream and the Han River. The systematic rainfall observation network was built in 1442, the 24th year of the reign of King Sejong, including 14 stations in palaces and provincial offices, as well as 334 stations in counties, districts, and towns all across the country. Whenever it rained, the governor of every town would observe the situation and report it to the king in written form, known as Gyemun. In addition, the rainfall measurements had a significant impact on influenced the national policies of the Joseon Dynasty, as documented in the Veritable Records of the Joseon Dynasty.



... sent rain gauges and rulers to every province and in each town ... ordered them to measure the water levels and report them in written form ...

◀ Volume 96 of the Veritable Records of King Sejong
On May 8, 1442 (24th year of King Sejong's reign)

Daedongyeojido (Territorial Map of the Great East) (left)
Veritable Records of King Sejong (right)
(Courtesy of Kyujanggak Institute for Korean Studies, Seoul University)

Rain Gauge of Chungcheong Provincial Office, Gongju

公州 忠清監營 測雨器

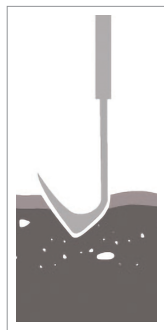
Rain gauge, Cheugugi

The first rain gauge invented in Korea, at a time when the method for scientifically measuring rainfall had not been developed anywhere in the world.

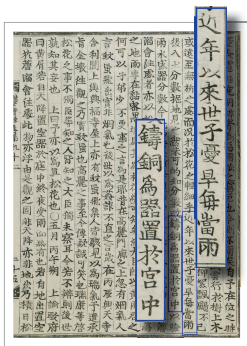


The Invention of Cheugugi

In the agricultural era, crop yields heavily relied on the amount and timing of rainfall. In 1441, there were repeated occurrences of both extremely heavy rains and droughts, as recorded in the Veritable Records of King Sejong. The Wootaek method, which measured rainfall using a Korean farming tool called a homi or plow, was not accurate due to differences in soil properties and the tools used for measurement. Thus, it was challenging to determine rainfall precisely with Wootaek alone. To solve this issue, Crown Prince Yi Hyang (later known as King Munjong) invented Cheugugi in 1441, the 23rd year of the reign of King Sejong. Cheugugi was created about 220 years before the Western rain gauge was invented, marking the beginning of a new era in agricultural meteorology. This invention eventually led to the establishment of Invention Day in present-day Korea, on May 19.



Wootaek



Veritable Records of King Sejong
(Courtesy of Kyujanggak Institute for Korean Studies, Seoul University)

The crown prince was deeply concerned about the drought ... crafted a barrel using copper ...

▲ Volume 96 of the Veritable Records of King Sejong
April 29, 1441 (the 23rd year of King Sejong's reign)

The Only Existing Cheugugi

The Cheugugi from the Chungcheong Provincial Office in Gongju, which is registered as a national treasure in Korea, is the only surviving Cheugugi. It features an inscription on the outer surface, which includes details such as its production date (1837, the 3rd year of Heonjong's reign), height, diameter, and weight. These specifications perfectly align with the Cheugugi described in the Veritable Records of King Sejong. The rainfall measurement system, which gauged and reported rainfall to the King, originated during King Sejong's reign. However, it was disrupted by the Imjin War (Japan's Invasion) and the Byeongja War (Qing Empire's Invasion), only to be reinstated during the reign of King Yeongjo.

Cheugugi stands as an invaluable artifact that verifies the inventions recorded in numerous documents and demonstrates their practical implementation.

▼ Cheugugi Separated into Three Parts and engraved letters



(Center) 錦營 測雨器 高一尺五寸 經七寸 道光丁酉製 重十一斤
Geumyeong Cheugugi is 32 cm in height, 15 cm in diameter, 6.2 kg in weight, and was made in 1837, the 3rd year of King Heonjong's reign.

(Right) 入番 通引 及唱 使令 次知

The person in charge is Tongin, Guepchang, or Saryeong (junior officials).

Rain Gauge Pedestal, Cheugudae

Cheugudae is a pedestal made of granite or marble designed to support the Cheugugi. Only five Cheugudae remain today, all of which were created during the Joseon Dynasty. The Cheugudae from the Gyeongsang Provincial Office in Daegu, registered as Korea's National Treasure, and the Cheugudae from the Gwansanggam (Bureau of Astronomy), registered as Korea's Treasure, are currently exhibited at the National Meteorological Museum of Korea.



▲ Rain Gauge Pedestal of Gyeongsang Provincial Office, Daegu
Production year: 1770
National Treasure
Height: 46 cm

The inscription 測雨臺 (Cheugudae) and 乾隆庚寅五月造 (Made in May 1770) is engraved on the front and back of this Cheugudae, respectively. These inscriptions align with historical records stating that the king ordered the production of the rain gauge in May 1770, the 46th year of King Yeongjo's reign.



▲ Rain Gauge Pedestal of Gwansanggam (Bureau of Astronomy)
Production year: 1441 (estimated)
Treasure
Height: 88 cm

It is estimated that the Cheugudae from the Gwansanggam (Bureau of Astronomy) was produced during the early years of the Joseon Dynasty, based on the Veritable Records of King Sejong, which mentioned the installation of Cheugugi at Seoungwan (former name of Gwansanggam) in 1441, the 23rd year of King Sejong's reign.