Earliest historical records of typhoons in China

Kin-sheun Louie and Kam-biu Liu

Based on an original survey and a critical evaluation of the Chinese historical and scientific literature, this paper ascertains that by as early as the fifth century AD, the typhoon had been recognized by the people of southern China as a distinct meteorological phenomenon. A specific term,  

ju or jufeng, was accordingly coined, with rather accurate specifications given to it. A typhoon that struck the coastal city of Mizhou in Shandong Province of northern China in AD 816 is the earliest recorded tropical cyclone landfall in China, and perhaps also in the world. The typhoon as a weather phenomenon was frequently mentioned, described, and discussed in many works, including history books, poems and government documents, in the ninth century AD. Such a societal understanding of typhoons made an accurate report of typhoon landfall in AD 816 possible. Another typhoon that struck Qingyuan County in central Guangdong Province in AD 819 was encountered by a leading scholar who described it in his poem. This is the second earliest typhoon landfall recorded in China.

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Introduction

Along with geological proxy evidence, historical documentary records are a major source of information for reconstructing a long-term history of tropical cyclone activity that extends beyond the period of instrumental observation. However, the length of the documentary record and the quality of these historical data vary from region to region. Among the five land and sea regions affected by tropical cyclones (North Atlantic, Northeast Pacific, South Pacific, Northwest Pacific, Bay of Bengal), three are in the New World. In North America including Mexico and the Caribbean, no record of Atlantic or Pacific hurricanes exists before the Columbian contact. Neither does any documentary record of Australian cyclones exist before the arrival of Europeans. In the Old World, historical records are poorly preserved in the Indian civilization. Thus, the earliest historical records of tropical cyclones in the world are expected to occur in China, where the documentary history spans about the last 3500 years. A recent study using Fang Zhi (semi-official local gazette, also known as local gazetteer) has yielded a 1025-year record of typhoon landfalls for the Guangdong Province of southern China that starts in AD 975. Is the typhoon that struck Guangzhou in AD 975 the earliest recorded typhoon landfall in China? How did societal understanding of the typhoon as a weather phenomenon originate, evolve, and disseminate before the second millennium AD? In this paper, we attempt to document the earliest knowledge of typhoons in Chinese historical records based on an original survey and critical evaluation of the Chinese historical and scientific literature.
**Jufeng: earliest terminology and definition**

Tropical cyclones occurring in the Northwest Pacific basin are called typhoons. However, the character tai or the term taifeng, the modern Chinese character/term for typhoon, only began to appear in Chinese historical literature from the eighteenth century. The first Chinese language dictionary which included tai and taifeng was Guo Yu Ci Dian (National Language Dictionary), published in 1937. Prior to the appearance of tai and taifeng, the character ju or the term jufeng was used solely in Chinese literature to refer to tropical cyclones (typhoons) as a weather phenomenon (Figure 1). According to our survey of Chinese historical literature, the term ju appeared for the first time in a book entitled Nanyue Zhi (Records of the South) written by Shen Huai-yuan in the mid-fifth century AD. Shen was a government official in the Song Kingdom of Nan–Bei (North–South) dynasty period. He was exiled to Guangzhou in AD 453 and lived there for more than a decade. The book Nanyue Zhi was written as an account of his knowledge and observations of Guangdong ('Nanyue' or Southern Yue being the general name for this region at that time). This book, originally containing five chapters (juan), was lost after Yuan Dynasty (AD 1279–1368). Fortunately, because it is an important early work that documents the culture and geography of the Guangdong region, it has been widely quoted by other contemporaneous or subsequent books. Thus, excerpts of it have survived in the body of Chinese historical literature.

![Figure 1. Chinese character tai (left) and ju (right).](image)

The fragment of Nanyue Zhi mentioning jufeng can first be found in a large book entitled Bei Tang Shu Cao (Book Records of the Northern Hall), an encyclopedic type of reference work compiled by Yu Shi-nan of Tang Dynasty in the beginning of the seventh century AD. A longer version of the same fragment is quoted in another book entitled Tai Ping Yu Lan (Tai-ping Reign-period Imperial Encyclopaedia), a voluminous work compiled by Li Fang et al. between AD 977 and 984 under the auspice of Emperor Tai Zong of Northern Song Dynasty. This fragment is found within the section on ‘wind’ in the book (Figure 2). The following is our translation of this written record.

Many jufeng [typhoons] occur around Xi’an. Ju is a wind [or storm] that comes in all four directions. Another meaning for jufeng is that it is a scary wind [authors’ note: the Chinese characters for ‘ju’ and ‘scary’ are homophones]. It frequently occurs in the 6th and 7th months [authors’ note: 6th and 7th month of the Chinese lunar calendar is roughly equivalent to July and August according to the Gregorian calendar]. Before it comes, roosters and dogs are silent for three days. Major ones [storms] may last up to seven days. Minor ones last one or two days. They are called heifeng [black storms/winds] in foreign countries.

This record provides significant information about the status of societal understanding about the typhoon as a meteorological phenomenon in China during the middle of the fifth century AD. Four points need to be noted and further elaborated.

First, Xi’an was a county situated roughly in the south of today’s Guangzhou City (Figure 3). Chinese historical records show that Xi’an was established as a county at about AD 425 and was abolished about a century later. Since the text preceding the above excerpt is now lost, we do not know why Shen specifically mentioned Xi’an County.
Second, the term *jufeng* was in fact coined before the fifth century AD in the vernacular of the Guangdong region. When Shen Huai-yuan recorded it, he was already not sure of the real origin of the term. He, therefore, put down the two possible meanings. Since then, *ju* or *jufeng* meaning “wind (or storm) coming in all four directions” was generally adopted to refer to the weather phenomenon of typhoons whereas the one meaning scary wind/storm was abandoned. The written Chinese character *ju* of this meaning is a specifically created one. It consists of two elements, the substantive element referring to ‘wind’ and the phonetic element referring to the pronunciation *ju* (Figure 4). Thus, this term has a history of some 1500 years.

Third, the paragraph quoted above provides a brief yet accurate and elegant description of a typhoon. It could well be the world’s earliest scientific definition of this weather phenomenon. Within the paragraph, “wind/storm that comes in all four directions” is the core statement for it differentiates typhoon from other types of windstorm. Before and after the arrival of the vortex, the direction of the wind obviously changes, thus giving people the impression that wind comes in all four directions. The Chinese expression implies the existence of a whirlwind or revolving circulation. Since then, all Chinese dictionaries refer to this statement as the definition of the term *ju* or *jufeng*. To say that “it frequently occurs in the 6th and 7th months” is also basically accurate because in the Guangdong region, this is the period in which typhoon landfalls occur most frequently. The two statements relating to the duration of typhoon strikes (“Major ones may last up to seven days. Minor ones last one or two days.”) are also generally accurate. The above descriptions capture very well the essential features of...
typhoons. The statement “before it comes, roosters and dogs are silent for three days”, should probably be interpreted in a more flexible manner. It purports that people at that time observed that before a typhoon strike, some anomalous natural or biological phenomena could be seen due to the change in atmospheric pressure. The statement, thus, represents the people’s concern about the atmospheric hazard of typhoon and their efforts to find ways to forecast its occurrence. Taken as a whole, this paragraph is a rather accurate description of a typhoon, including its timing and place of occurrence, the wind directions, and its duration.
Fourth, some elaboration can be made to the statement that this kind of storm is called *heifeng* (black storm/wind) in foreign countries. The statement is in fact a well-informed one. Here, ‘foreign countries’ naturally refer to countries in South or Southeast Asia with which the ancient Chinese had contact through trade and voyage since about the beginning of the first millennium AD. There are evidences that among these countries, the term *heifeng* was probably employed to refer to a typhoon or tropical cyclone at that time. There are at least two such evidences. First, a Chinese monk called Fa Xian recorded an occurrence of *heifeng* in his book *Fo Guo Ji* (*Records of Buddhist Countries*). Fa Xian made a pilgrimage trip to ancient India in AD 399. He traveled by land through Central Asia to India and stayed there and then in Sri Lanka for 14 years. For the return voyage, he took the sea route to come back to China and wrote the book *Fo Guo Ji* in AD 416 to narrate his travel and observations. Detailed information on his return trip can be found in the last section of the book and is particularly relevant to our topic of study. Fa Xian was aboard a large ship capable of carrying 200 passengers. He first went to Sri Lanka from today’s Bangladesh in AD 409 and stayed there for two years. In AD 411, he departed from Sri Lanka and the departure date was, according to our estimation based on the details given in Fa Xian’s book, around August or September. The destination was Guangzhou in southern China. During this voyage, Fa Xian encountered two storms and the terms he used to describe them were significantly different. First, a storm occurred two days after the departure from Sri Lanka and Fa Xian employed the term *dafeng*, a general term meaning ‘strong wind’ or ‘strong storm’ to describe it. The storm lasted 13 days and caused leakage of water into the ship. The ship eventually arrived at an island and repair work was carried out. Judging from the duration of the storm, it may well be associated with the summer monsoon or other tropical disturbances. After the repair work, the ship resumed its voyage and arrived in today’s Sumatra after navigating some 90 days. Fa Xian stayed there for about five months, apparently for the sake of waiting for adequate monsoon wind in order to depart for Guangzhou. Then, the ship departed again from Sumatra, on the sixteenth day of the fourth lunar month (i.e. May 12 AD 412), a date Fa Xian accurately recorded in his book. The trip from Sumatra to Guangzhou would normally take, according to Fa Xian, 50 days. A little more than a month after its departure, the ship encountered a storm. This time, Fa Xian employed the term *heifeng* (black wind/storm) to describe it. The storm was a very powerful one and the ship could not reach Guangzhou and eventually was blown or drifted, after another 80–90 days, to today’s Shandong Province. This is the first evidence showing that the term *heifeng* was used in this region.

The second source of evidence comes from Buddhist scriptures of ancient India. Many such scriptures are translated into Chinese and the term *heifeng* can be found in them. Here, we are not able to undertake a comprehensive survey of this enormous body of literature and can only give an example. In the Buddhist scripture entitled *Saddharma Pundarika Sutra* (the Chinese title being *Fa Hua Jing* or *Miao Fa Lian Hua Jing*) which was translated into Chinese at the beginning of the fifth century AD, there is the following passage in chapter 25:

> If there are hundreds, thousands, myriads, kotis of beings, who in search of gold, silver, lapis lazuli, moon-stones, agate, coral, amber, pearls, and other treasures, go out on the

\[\text{Figure 4. The Chinese character } \text{ju} \text{ (left, ancient name for typhoon) consists of the substantive element ‘wind’ (middle, pronounced as } \text{feng} \text{) and the phonetic element (right, pronounced as } \text{ju}.]
ocean, and if a black gale blows their ships adrift upon the land of the Rakshasa-demons, and if amongst them there be even a single person who calls the name of the Bodhisattva Regarder-of-the-Cries-of-the-World, all those people will be delivered from the woes of the Rakshasas. It is for this cause that he is named Regarder-of-the-Cries-of-the-World.[18]

Both pieces of evidence cited above appeared before Shen Huai-yan’s *Nanyue Zhi*. Therefore we conjecture that the term *heifeng* probably originated from ancient India and was used in South and Southeast Asia prior to the coining of the term *ju* or *jufeng*. However, we are not able to find an explicit citation or definition of the term in non-Chinese historical literature. On the other hand, in China, once the character *ju* and the term *jufeng* were coined, they perpetuated and totally replaced the term *heifeng* in Chinese language, with clear specifications given to them in Shen’s *Nanyue Zhi*.

**The first typhoon landfall recorded in China**

Although the term *ju* or *jufeng* first appeared in as early as the mid-fifth century AD, our investigation shows that some 400 years elapsed before the first unequivocal typhoon landfall was recorded in Chinese history. The specifications in *Nanyue Zhi* indicated that the weather phenomenon of typhoon, which was already known to the local population of Guangdong, began to be recognized by the educated class and a specific term was accordingly coined on the basis of the vernacular language. However, time was still needed for this new knowledge to be sufficiently digested by and propagated among the intellectuals. Moreover, China, until the Northern Song Dynasty (AD 960–1127), was basically an inland country. The coastal regions were relatively less developed. The educated class and the government officials thus were not sensitive and did not pay special attention to the coastal weather phenomenon of a typhoon landfall. In this regard, it is notable that during a rather long period in early Chinese history, we can find descriptions such as “strong storm driving sea surge” (*da feng yu jia hai chao*) among the records of natural disasters. For example, in the tenth year of the Tian-bao reign-period (AD 751), ‘violent rainstorm driving sea surge occurred in Guangling Province and several thousand vessels, big and small, sank at the estuary of Yangtze River’.[19] It is quite likely that such descriptions in fact referred to typhoon landfalls even though the term *ju* or *jufeng* was not specifically used.[20] A gap of knowledge still lingered.

The first typhoon strike officially registered in Chinese history occurred in the eleventh year of the Yuan-he reign-period of Emperor Xian Zong of Tang Dynasty, that is AD 816. The relevant piece of information can be found in chapter 15 of *Jiu Tang Shu (Old History of Tang Dynasty)*, as follows.

Day *wu-shen* of the eighth [lunar] month [of the eleventh year of the Yuan-he reign-period], Rongzhou reported that *jufeng* occurred and seawater damaged the city wall.

Although very brief, this piece of information contains a number of details that require special interpretative efforts.

First, this piece of information is inserted in the official history book in a rather obscure manner. In the official history books of ancient China, events of natural disaster or unusual natural phenomena are grouped in the section called *Wu Xing Zhi (Five Elements Chapter)*.[21] Therefore, researchers usually resort to it to retrieve the concerned information. For that reason, the typhoon landfall that occurred in the tenth lunar month of the eighth year of the Kai-bao reign-period (AD 975) in Guangzhou and recorded in *Wu Xing Zhi of Song Shi (History of Song Dynasty)* is commonly regarded as the first typhoon landfall officially registered in Chinese history.[22] However, the
above-cited piece of information of AD 816 is contained in a chapter within the section Ben Ji (Chronicles of the Emperors) in Jiu Tang Shu, which usually narrates the activities of the emperors. Thus, it is easily overlooked and cannot be easily retrieved.

Second, this piece of information contains an error concerning the place of occurrence. During Tang Dynasty, Rongzhou was an inland locality situated in today’s Guangxi Province and was about 300 km away from the sea (Figure 3). Therefore, it was simply impossible to have Rongzhou’s city wall damaged by seawater. Fortunately, information contained in another official history book of Tang Dynasty, Xin Tang Shu (New History of Tang Dynasty) can be used to verify this entry. In chapter 36 of Xin Tang Shu, which is also the third sub-chapter of Wu Xing Zhi, the following statement can be found:

6th lunar month [of the 11th year of the Yuan-he reign-period], strong rainstorm at Mizhou, sea surged, city wall damaged.

Mizhou is today’s Gaomi City, a coastal locality in Shandong Province (Figure 3). In Chinese writing, ‘rong’ and ‘mi’ are two characters that look alike (Figure 5). In the Tang Dynasty, printing was not yet invented and all documents were hand-written. Therefore, we believe that Mizhou was mistakenly written and registered as Rongzhou in Jiu Tang Shu. In other words, the first recorded typhoon landfall in China in fact occurred in AD 816 in Mizhou, that is today’s Gaomi City in Shandong Province.

Xin Tang Shu was compiled between AD 1044 and 1066 and is generally regarded as a more rigorous version compared with Jiu Tang Shu. This error can thus be rectified.

Third, an explanation is needed with regard to the discrepancy in the time of occurrence of the typhoon landfall recorded in the two official history books. In Jiu Tang Shu, the date given is day wu-shen of the 8th lunar month of the eleventh year of the Yuan-he reign-period, that is 6 September, AD 816. In Xin Tang Shu, it is the sixth lunar month of the same year, that is between June 29 and July 28 in AD 816. Our judgement is that the typhoon landfall did occur in the sixth lunar month but the concerned report reached the capital Chang’an (today’s Xi’an City in Shaanxi Province) and was presented to Emperor Xian Zong on day wu-shen of the eighth lunar month. Two pieces of evidence support our judgement. First, the version of Jiu Tang Shu contains the word ‘reported’ and the text conveys the message that a certain happening was thus reported to the emperor, whereas in the version of Xin Tang Shu, the text explicitly purported to narrate an incident. The word ‘reported’ is an important clue for our interpretation. Attention should also be paid to the different orientation of the two history books. Jiu Tang Shu is strong in citing directly the original documents whereas Xin Tang Shu is renowned for stating the events in a succinct manner and for being prudent, or even conservative, in selecting the relevant evidence. That Xin Tang Shu chose a traditional expression to present the typhoon landfall of AD 816 is therefore not surprising. Similar discrepancies between the occurrence of an event and the reporting of it to the central administration can also be found in Chinese historical works, in particular during the last two dynasties (Ming and Qing) for which original local reports and archives at the central government are still preserved, thus making it possible to conduct careful comparisons.

On the basis of the above analysis, we can thus ascertain that the first typhoon landfall recorded in Chinese history is the one which occurred in the sixth lunar month of the eleventh year of the Yuan-he reign-period in Mizhou, that is between June 29 and July 28.
in AD 816 in today’s Gaomi City, Shandong Province. This is probably also the first recorded tropical cyclone landfall in the world.

However, one disturbing fact lingers. The record in Xin Tang Shu employs the traditional description of 'strong rainstorm, sea surge' and does not use the term ju or jufeng. So how can we ensure that the level of societal knowledge about typhoons at that time allowed an accurate reporting of a typhoon occurrence? We thus undertook a survey of the contemporaneous writings in the ninth century AD and our findings indicate that the educated class and the officialdom at that time should have acquired a rather solid understanding of the phenomenon of typhoon, thus permitting a local administrator to accurately recognize a typhoon landfall and to report it.[25] In the process of searching into the large body of concerned literature, we also discovered another typhoon landfall accurately registered in poetry.

Societal knowledge about typhoons in the ninth century AD

The writings in Tang Dynasty (AD 618–907) containing information about typhoon, in particular those appearing around the ninth century AD, can be classified into two broad categories. The first is composed of the works in which a typhoon is regarded as an exotic event of the coastal areas deserving to be recorded and introduced to the people of other regions. The second is composed of general works in which the typhoon is already included as part of the established knowledge.

In the first category, three books can be identified. The first is entitled Tou Huang Za Lu (Miscellaneous Jottings Far From Home), written in about AD 830 by Fang Qian-li who served as a junior government official in the Guangdong region for some time. It contains the following statement: “jufeng meaning wind (storm) coming from all four directions occurs in the provinces in Lingnan region”. [26] The second book is entitled Lingnan Yi Wu Zhi (Record of the Strange Things South of the Passes) written by Meng Guan in the early ninth century AD. We have not been able to find a copy of the book but Needham states that an analysis of the typhoon was found in Meng’s book and that there is also mention of a kind of lingfeng (‘preparatory wind’) that occurred before the arrival of the typhoon.[27] We are unable to ascertain the meaning of lingfeng. The third book is entitled Ling Biao Lu Yi (Southern Ways of Men and Things) written in about AD 890 by Liu Xun, a government official in Guangzhou for some time.[28] The relevant paragraphs are as follows.

In Nanhai [authors' note: Nanhai is another general name for Guangdong region] among summer and autumn, clouds sometimes appear to be gloomy but with light like rainbow and about six to seven zhang long [authors' note: one zhang at that time equals approximately three meters]. After a while jufeng [typhoon] will occur. Such appearance is thus called jumu [source of typhoon]. But if there is thunder, then jufeng will not occur. Sailors always watch this so as to take the necessary precaution . . .

In Nanzhong [authors' note: Nanzhong is another name for Guangdong region] among summer and autumn, there are many disastrous storms. People there call them ju [typhoon]. It can destroy houses and trees and is terrible. It can even blow away roof tiles like flying butterflies. There may be no typhoon for two to three years. There may be two to three typhoons in two consecutive years. It is linked to whether the governance is in good or in poor shape. When a typhoon occurs, it begins at the moment wu [i.e. noon] and lasts till the moment you [i.e. 5 to 7 p.m.] and it certainly will stop at mid-night. This conforms to the old saying that storm will not last until next morning . . .

[the phenomenon of] ta chao [overlapping tides]: Guangzhou is about 200 li [authors' note: one li equals approximately 300 meters] from the sea. In the 8th [lunar] month every year,
highest tides arrive. In autumn many typhoons also occur. When a typhoon arrives before the tide goes down, the waves overflow onto the shore. Houses are thus flooded, crops washed away and vessels capsized. This is called *ta chao* in Nanzhong. It may occur once every ten or more years and is also linked to the luck of time. It is popularly called *hai chao* [sea surge] or *man tian* [seawater reaching the sky].

Among the above quotations, the last one, by Liu Xun, is the most important. Although it contains some inaccurate points (such as the frequency and duration of a typhoon), it, nonetheless, highlights the relationship between typhoons and sea surges as well as the damage the sea surge can cause in a typhoon strike. The fact that a number of different names are given to describe sea surge (*ta chao, hai chao, man tian*) indicates that people at that time and in that region knew very well the important role sea surge played in a typhoon landfall. These terms also imply the destructive force of a sea surge. The paragraph furthermore reveals that people at that time were used to watching clouds as a means of forecasting typhoon. A similar approach of using clouds as precursory signs to forecast the coming of tropical cyclones was used by Benito Vines at about the end of the tenth century AD.[29] A related term, *jumu* (source of typhoon), was accordingly invented. It represented people's attempt to detect the formation of a typhoon by observing clouds and rainbows. Finally, it is notable that at that time the Chinese seemed to be particularly concerned about the frequency of typhoon strikes. There were, thus, various observations or estimations of the number of typhoons occurring in a given period of time. Nevertheless, for our analysis, what is particularly important is that writings such as the ones quoted above served to propagate the knowledge of typhoons and to draw the attention of the educated class to this exotic coastal weather phenomenon.

The second category of writings containing information about typhoons in about the ninth century AD consists of books, poems, and government documents written by eminent scholars or officials. They mentioned typhoons in their works not as an exotic phenomena that deserved to be reported, but rather as part of the established knowledge of the intellectual community. Eighteen items of this nature can be found and they can be divided into three source types: a history book, 16 poems, and a report written to the emperor.

The first source consists of a book entitled *Guo Shi Bu* (Supplements to the History of Tang Dynasty, also known as *Tang Guo Shi Bu*) written by Li Zhao in the early ninth century AD. The book contains 308 items of information that Li purposely collected for the sake of compiling a complete history of Tang Dynasty. Li himself was an official of a senior rank in the central government. Among the 308 items, there is an entry about *jufeng*:

> People in Nanhai say that a sea wind [or sea storm] coming from all four directions is called *jufeng*. Before a *jufeng* arrives, there are many rainbows and this is called *jumu* [source of typhoon]. However it only occurs once every thirty to fifty years.[30]

Li’s book is an important historical work. It contains very significant details relating to social and cultural events of that period. The reason why he included an entry of typhoon in the book was probably because he considered it an important phenomenon in southern China that should be recorded.

The second source consists of 16 poems in which *ju, jufeng*, or the related term *jumu* was mentioned. The essential details are given in Table 1.

Several points need to be elaborated in relation to the details contained in the table. First, among the ten poets, most were natives of northern inland China. Thus, they were unlikely to have had direct encounter with typhoon but could have learned of it through studying or through communication with others. Second, only a few of them had the
<table>
<thead>
<tr>
<th>Name of poet</th>
<th>Native of (name of province, location in China)</th>
<th>Relation/contact with southern coastal region</th>
<th>Title of poem (year of writing, if known)</th>
<th>How typhoon is mentioned in the poem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Song Zhi–wen (AD 7–712)</td>
<td>Henan or Shanxi (northern inland)</td>
<td>Visited northern Guangdong and eastern Zhejiang.</td>
<td>Zao Fa Shaozhou (Leaving Shaozhou in the Morning)¹</td>
<td>The term <em>ju</em> is mentioned, as a weather phenomenon of Guangdong</td>
</tr>
<tr>
<td>Gu Kuang (AD 727–820)</td>
<td>Jiangsu (eastern coast)</td>
<td>Traveled in eastern coast of China</td>
<td>Song Cong Xiong Shi Xin Luo (Sending a Cousin off on a Diplomatic Mission to Xin Luo)²</td>
<td>The term <em>jufeng</em> is mentioned, as something the cousin might come across in the sea on his way to Xin Luo.</td>
</tr>
<tr>
<td>Li Shen (AD 772–846)</td>
<td>Jiangsu (eastern coast)</td>
<td>Posted to Guangdong and Jiangsu for sometime.</td>
<td>Yu Ling Jiao Zhi Huang Zou Di Gaoyao (Traversing the Mountain, Staying in the Wilderness and Arriving at Gaoyao)³</td>
<td>Typhoon is not mentioned directly in the poem but there is the following explanatory note given by the author to a line mentioning rainbow: “In the south, rainbow can be seen in all seasons. If it appears very often, there may be <em>jufeng</em>.”</td>
</tr>
</tbody>
</table>
Han Yu  
(AD 768–824)  
Henan  
(northern inland)  
Spent part of his childhood in Guangdong; posted to Guangdong twice and stayed there for about 3 years; thus should know the weather phenomena of the south very well.

(1) Xian Zhai You Huai (Personal Emotions at the County Lodge) (804 AD)

(2) Fu Jiangling Tu Zhong Ji Zeng San Xue Shi (A Poem to Three Scholars on my Way to Jiangling) (AD 805)

(3) Shannan Zheng Xiang Gong Fan Yuan Wai Chou Da (A Poem Presented to Gentlemen Zheng and Fan of Shannan) (AD 814)

(4) Long Li (A Minor Official at Long) (AD 819)

(5) Zeng Bie Yuan Shi-ba Xie Lu (Farewell to Mr Yuan Shi-ba, with Resounding Rhythm) (AD 819)

The term *ju* is mentioned, as part of the horrifying climate of the south.

The term *ju* is mentioned, as a terrible weather phenomenon of the south.

The term *ju* is mentioned, as a natural event of extreme strength.

The term *ju* is noted, as a terrible thing at Chaozhou, eastern Guangdong, the place to which Han Yu was going. In section six of the poem, Han mentioned that he encountered a *jufeng* at Shashan, Qingyuan County. (See discussion below)

Bai Ju-yi  
(AD 772–846)  
Shanxi  
(northern inland)  
Posted for several years to Hangzhou and Suzhou, eastern coast of China; thus should know the weather phenomena of the south.

(1) Song Ke Chun You Lingnan (Sending a Friend off for a trip to Lingnan in Spring) (818 AD)

The term *jumu* (source of typhoon) is mentioned, as one of the items of the Lingnan region that Bai knew of. Bai provided an explanatory note to *jumu*, as follows, “*jumu* is like broken rainbow. It can be seen before strong wind (or storm) begins”.

Continued overleaf
<table>
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<tr>
<th>Name of poet (year of birth/death)</th>
<th>Native of (name of province, location in China)</th>
<th>Relation/contact with southern coastal region</th>
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<tbody>
<tr>
<td>Liu Zong-yuan (AD 772–819)</td>
<td>Shanxi (northern inland)</td>
<td>Lived in Suzhou during childhood, posted to Yongzhou (Hunan) and to Liuzhou (Guangxi) for about 15 years; thus should know the weather phenomena of the south.</td>
<td>(2) <em>Song Ke Nan Qian</em> (Sending a Friend off to the South) (AD 821)(^{10})</td>
<td>The term <em>jufeng</em> is mentioned, as a terrible thing of the south.</td>
</tr>
<tr>
<td>Liu Yu-xi (AD 772–842)</td>
<td>Jiangsu (eastern coast)</td>
<td>Posted to Suzhou and southern Guangdong for sometime; should know the climate of southern China.</td>
<td><em>Lingnan Jiang Xing</em> (A trip to the River in Lingnan) (ca. AD 815)(^{11})</td>
<td>The term <em>jumu</em> is mentioned, as a phenomenon of the south.</td>
</tr>
<tr>
<td>Yuan Zhen (AD 779–831)</td>
<td>Henan (northern inland)</td>
<td>Posted to Zhejiang for about 10 years; thus might know the climate of the south.</td>
<td>(1) <em>Song Cui Shi Yu Zhi Lingnan Er Shi Yun</em> (Sending Official Cui off to Lingnan, a Poem with twenty Rhythm) (ca. AD 810)(^{12})</td>
<td>“<em>Jumu</em> hanging among the clouds” is mentioned in the poem, as a phenomenon specific to the south.</td>
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<td>(2) <em>You Jiu Shi Zhang</em> (The Enjoyment of Wine Drinking, a Poem of 10 Sections) (ca. AD 810)(^{14})</td>
<td><em>Jufeng</em> is mentioned in the poem, as a salient phenomenon of the south, and is described as “crazily forceful” in the poem. <em>Jufeng</em> is mentioned twice in the poem. In section five, there is the expression “<em>jufeng</em> turning the sea upside down”. In section eight, it says that “when <em>jufeng</em> occurs, the weather becomes crazy day and night”.</td>
</tr>
<tr>
<td>Name</td>
<td>Place</td>
<td>Activity</td>
<td>Notes</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Pi Ri-xiu (AD 834–883)</td>
<td>Hubei (central China)</td>
<td>Posted to Suzhou for sometime.</td>
<td>Song Yuan Zai Shang Ren Gui Ri Ben Guo (Sending Monk Yuan Zai off for a Return Trip to Japan)(^{15})</td>
<td></td>
</tr>
<tr>
<td>Gu Yun (unknown)</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Tian Wei Heng (A Poem on the Forcefulness of the Sky-god)(^{16})</td>
<td></td>
</tr>
</tbody>
</table>

\(\text{Jumu}\) is mentioned, as something that the home-going Japanese monk might encounter during the sea trip. The poem apparently aims to describe the various phenomena of the south and \(\text{Jufeng}\) is one of such phenomena.

Notes:
2. *Ibid.*, 2956. Xin Luo was a state in today's Korean Peninsula.
opportunity to stay or travel in the coastal regions of southern China. The rest could have learned about typhoons in an indirect way. Third, among these poets, some were not well known but others were very distinguished figures in Chinese history. In particular, Han Yu, Bai Ju-yi, Liu Zong-yuan, Liu Yu-xi, and Yuan Zhen were leading intellectuals at that time as well as very senior officials in the imperial government. Fourth, the way the terms “ju,” “jufeng,” and “jumu” were mentioned shows clearly that by that time the typhoon had become part of the established vocabulary in poetry. These authors appeared to have known very well that in southern China, particularly in Guangdong, there was a specific weather phenomenon called “jufeng.” It was no longer mentioned in an exotic or novel tone.

The third source on the typhoon consists of an official document sent to the emperor. Han Yu, who was exiled by the Emperor Xian Zong to Chaohou, immediately wrote a report to the emperor after his arrival there in AD 819. In the report, he made a brief description of Chaohou, in which he mentioned “jufeng” as something that “often occurred there.” The report was read by the emperor who then made some remarks on it. Part of the report, including the sentence mentioning “jufeng,” and the emperor’s remarks were recorded verbatim in the official history books. This is an important piece of information, for it shows that the highest officials did have the opportunity to come to know the coastal weather phenomenon of typhoon in the beginning of the ninth century AD.

Second earliest typhoon landfall in China

Among the 16 Tang poems (Table 1), special attention should be paid to Han Yu’s fifth, entitled *Farewell to Mr Yuan Shi-ba, with Resounding Rhythm*, because it is in this poem that we find mention of the second earliest typhoon landfall in China. This was a long poem of six sections. In the last section, Han mentioned that on his way to Chaohou (to which he was exiled by the Emperor), he encountered a “jufeng” at Shashan, a locality in Qingyuan County, in central Guangdong Province, about 70 km from the sea (Figure 3). This again is an important piece of information containing a vivid description of this horrifying and destructive event. The relevant lines in the poem are excerpted below.

Encountering “jufeng” at Shashan
Thunder and lightning struck hard;
I then arrived in Fuxu amid strong tidal waves [authors’ note: Fuxu was a locality in the vicinity of present-day Guangzhou City]
The scene was terrible on the shore;
Although the two bluffs looked sturdy
Wood and rock debris were flying around;
Although Tunmen seemed high [authors’ note: Tunmen was a military base near Guangzhou City]
It was submerged in the choppy water. [authors’ translation]

Historical research shows that Han left the capital Chang’an on the fourteenth day of the first lunar month of the fourteenth year of the Yuan-he reign-period (i.e. February 12 AD 819) and arrived at Chaohou on the 25th day of the fourth lunar month of the same year (i.e. May 22 AD 819). He should be in Qingyuan County at about the end of the third lunar month or the early part of the fourth lunar month (c. late April or early May). He left Qingyuan and moved southward to Guangzhou and from there he went eastward towards Chaohou. The poem quoted above confirms this route as he said that he “arrived in Fuxu amid strong tidal waves” and then reached Tunmen. He probably took a boat and sailed along the Pearl River (Zhu Jiang) from Qingyuan to Guangzhou. The
'strong tidal waves' that he encountered were probably not indicative of a true storm surge event at that location, since neither Guangzhou nor Qingyuan were situated on the coast. However, tidal waters pushed by the storm surge could have traveled up the Pearl River estuary and inundated the low-lying areas along the shores of the river. We determine that this event was indeed a typhoon landfall, as Han correctly identified. Our judgment is based on the following reasons. First, Han was generally familiar with the region of Guangdong for he spent part of his childhood there and then worked there twice. The journey to Qingyuan was the third time that he had entered Guangdong. He, thus, would not be easily misinformed about an important weather phenomenon of this region. Second, Han appears to have had a solid understanding of typhoons. This can be seen in the way he represented the typhoon in several of his poems. This weather phenomenon was not treated as something exotic or novel to him. Third, the local people in Qingyuan would have been well-acquainted with typhoons and could have informed Han of the nature of this storm when he encountered it. Therefore, these considerations have led us to conclude that this storm event described by Han Yu, which occurred in April or May of AD 819 at Qingyuan County, was the second earliest typhoon landfall recorded in Chinese history.

Conclusions

Numerous studies have demonstrated that the voluminous Chinese historical literature is a major source of paleoclimatic information. In this paper, we demonstrate that significant information about typhoon activities can be retrieved from ancient Chinese historical records. Compared to other natural disasters such as droughts, floods, or earthquakes, the typhoon is a type of phenomenon that requires certain knowledge for people to be able to correctly recognize it and differentiate it from other types of climatic catastrophes such as thunderstorms or tornados. The reporting and registration of typhoon landfalls also require that such knowledge be sufficiently propagated within the society. Our survey and critical evaluation of the Chinese historical literature show how people’s cognition and scientific knowledge of typhoons as a meteorological phenomenon evolved in the early stage.

In summary, the following milestones in the first millennium AD regarding typhoon activities and human knowledge of typhoons can be ascertained as a result of our investigation.

As early as the fifth century AD, tropical cyclones or typhoons had already been recognized by the people of southern China as a meteorological phenomenon distinct from other types of storms. A specific term, *jufeng*, had accordingly been coined by about AD 470. The earliest definition of *jufeng*—“a wind/storm that comes in all four directions”—accurately captures the essence of the cyclonic circulation around the vortex.

A typhoon that struck the coastal city of Mizhou in Shandong Province of northern China (today’s Gaomi City) in AD 816 is the earliest recorded tropical cyclone landfall in China, and perhaps also in the world.

*Jufeng* (typhoon) as a weather phenomenon was frequently mentioned, described, and discussed in many works, including poems, during the Tang Dynasty, particularly in the ninth century AD. This reflects the level of societal understanding about typhoon.

Another typhoon that struck Qingyuan County in central Guangdong in AD 819 was encountered by a leading scholar who described it in his poem. This is the second earliest typhoon landfall recorded in China.
The Chinese were aware of the essential features of typhoons, including the related storm surges, from a very early period. They paid special attention to their frequency of occurrence. Various methods, in particular the observation of clouds and rainbows, were adopted to forecast the coming of typhoons. The term *jumu* (source of typhoon) crystallized such efforts to detect the arrival of a typhoon.

In Chinese history, the unified dynasty after Tang was Song (AD 960–1279). In *Song Shi*, the official history of the dynasty, 15 incidences of typhoon strikes were recorded in the section *Wu Xing Zhi*, with rather elaborate details given to each incidence including casualties and losses. During the Song Dynasty, maritime trade with overseas countries developed rapidly. Knowledge about ocean climate thus also developed considerably due to navigation. The capital of Southern Song was today’s Hangzhou City, a location close to the sea where typhoons could make landfall. It is thus not surprising that the central imperial government paid special attention to typhoons and to the reporting and recording of them. Based on the records in *Song Shi*, we infer that typhoons had, at that time, become one of the natural disasters that local officials were required to report to the central administration. A system might also have been established to keep record of typhoon strikes. From that period typhoons became an item of natural disasters regularly recorded in Chinese official histories.

**Acknowledgements**

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**Notes**


[7] A succinct but useful discussion of the origin of the term ‘typhoon’ can be found in *Oxford English Dictionary*. 

[9] For the translation of the titles of the ancient Chinese books, we shall use J. Needham’s work as reference (Science and Civilization in China, Cambridge, published since 1954). Fortunately, all the ancient Chinese books that we use in this paper are mentioned in Needham’s classic work. There is, however, one modification we need to make here regarding Needham’s translation. We shall adopt the pinyin that is now commonly used in Mainland China whereas Needham used a romanization of Chinese characters (see Needham’s volume one, 1954, pp. 23–27). For example, Needham’s Imperial Dictionary of the Khang-hsi Reign-period here becomes Imperial Dictionary of the Kang-xi Reign-period.

[10] A biography of Shen can be found in Song Shu (History of Song Kingdom, official history of Song Kingdom, compiled between AD 487 and 488), chapter 82 (in Chinese).


[12] The relevant fragment is in chapter 151, under section 16, on ‘wind’.


[14] See for example the entry of ju in Kang Xi Zi Dian (Imperial Dictionary of Kang-xi Reign-period), which was compiled in about AD 1716.

[15] We are not able to ascertain whether there is any discussion of typhoon or tropical cyclone of a similar degree of sophistication in Sanskrit in ancient India prior to this date. See discussion below.


[17] This book is a very important work on the exchange between China and India at that time and on the history of ancient India. See, for example, X. L. Ji, Fa Xian, Collected Works of Ji Xian-lin (Jiangxi 1998) volume 7 (on Buddhism) 314–338 (in Chinese). There are three English translations of the book: Samuel Beal, Travels of Fah-hian and Sung-yun, Buddhist Pilgrims, from China to India (AD 400 and 518), London, 1869; James Legge, A Record of Buddhist Kingdoms, Being an Account by Chinese Monk Fa-hien of his Travels in India and Ceylon (AD 399–414), Oxford, 1886; H. A. Giles, The Travels of Fa-hsien (AD 399–414) or Record of the Buddhisit Kingdoms, Cambridge, 1923. Moreover, Fa Xian’s return voyage from India to China via Sri Lanka and Indonesia contained many elements useful for studying the weather and people’s knowledge of weather at that time. For example, Wang and Zhang used the information the book contained to study the earliest knowledge on monsoon climate. See P. K. Wang and D. Zhang, Recent studies of the reconstruction of East Asian monsoon climate of the past using historical literature of China, Journal of the Meteorological Society of Japan 70 (1992) 423–445.

[18] Translation of W. E. Soothill, The Lotus of the Wonderful Law, or The Lotus Gospel (Oxford 1930) 247. In Soothill’s translation, the term ‘black gale’ is used but it does not affect our analysis. Soothill, who was professor of Chinese at Oxford University, translated the scripture from the Chinese text. A copy of the hand-written scripture in Sanskrit was recently rediscovered in Tibet. See X. L. Ji, Preface to the hand-written copy of Saddharmapundarika-sutra in Sanskrit, Collected Works of Ji Xian-lin, op. cit., volume 7, 87–104 (in both Chinese and English).


[21] For a discussion on Wu Xing Zhi, in particular on how it represents the ancient Chinese thought on science, see J. Needham, Science and Civilization in China (vol. 2 Cambridge 1959) 242–244.

[22] See, for example, K. Lee and S. I. Hsu, Idem., Typhoon (Hong Kong 1986) and Idem., Typhoon Records from Ancient Local Gazettes of Guangdong Province (Hong Kong 1989) (in Chinese). The relevant record of typhoon landfall is in Song Shi (History of Song Dynasty, the official history of Song Dynasty compiled between AD 1343 and 1345), chapter 67 (in Chinese).


[25] Prior to the ninth century, the term *ju* can be found in two poems written during the Liang Kingdom (AD 503–557), namely Yue Jian-wu’s *Jing Chen Si Wang Mu* (*Passing by Prince Chen Si’s Tomb*) and Jiang Hong’s *Hujia Qu* (*Song of Hujia*). We shall not discuss these two poems because they were written in a period of turmoil during which China was not unified and they were somewhat obscure pieces of writing in Chinese history and literature. They did not seem to have any impact on the propagation of the knowledge of typhoons in China.


[27] Needham, *op. cit.*, volume 3, 1959, p. 477. ‘Preparatory wind’ is Needham’s translation. Volume 3 of Needham’s work is on *Mathematics and the Science of the Heavens and the Earth* (Cambridge 1959) and chapter 21 of this volume is on ‘Meteorology’ with a section on ‘Wind and the Atmosphere’. But there is no discussion of typhoons or tropical cyclones.

[28] The book *Ling Biao Lu Yi* was lost but some excerpts of it can be found in other books as quotations and thus survive until now. Some Chinese scholars collected these scattered excerpts to compile a unified version of the book. The version we now use is the one published by Guangdong People’s Press in 1983. The three paragraphs quoted here are on pages 3–4.


[38] *Song Shi* (*History of Song Dynasty*) chapter 67 (in Chinese).