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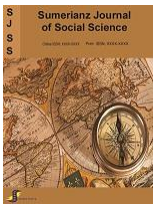

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The Origin of Eight Trigrams: Explaining the Mechanism of Soil Response to Temperature Change

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Abstract

The Eight Trigrams has held a high position in the Eastern culture, but its origin of has been a mystery for thousands of years, thus it has not yet entered the scientific system. This research reveals the possible origin of the Eight Trigrams and the purpose of drawing the hexagrams. Research has shown that due to changes in the solar radiation there exist annual and diurnal soil temperature variable zones (STVZs). The heat conducts and interactions between the double-layer also form two different statuses of warming and cooling. In this paper the hydrometeorological factors such as temperature, relative humidity, absolute humidity and earth-air pressure were monitored or calculated in the STVZs. If the anural/diurnal STVZ is divided into three levels, and we associate soil cooling processes (Yin) with "--" and warming processes (Yang) with "—". It is not hard to find that the distribution of soil status in soil profile at different times and locations clearly reflects the soil response to temperature change and reveals movement mechanism of earth-air and water. Furthermore, this model can be seen to be the source of the Eight Trigrams in the Yi-jing. The double-layer structure of the soil constitutes the foundation of the double trigrams. The Yin and Yang processes both form the primary driving force for phreatic water moves upward. Fu Xi invented the method of hou-qi, in which the monitoring of earth-air pressure in the closed system and applying Yin-Yang to draw Eight Trigrams and analysis of spatiotemporal status changes in the soil, which was then used to enact a calendar used as a guide to time for farming usage. The Yin-Yang and Eight Trigrams perfectly explain the response of earth-air to solar terms and mechanisms of water vertical cycle on daily/yearly timescales.

Keywords: Eight trigrams (八卦); Earth-air; Hou-qi (候气); Hexagrams.

1. Introduction

In many ways, the water cycle is the most important of the Earth's material cycles (Li *et al.*, 2011; Zhang *et al.*, 2007). However, the study of the vertical circulation of water is not particularly advanced (Bittelli *et al.*, 2008; Jin *et al.*, 2013; Kamai and Assouline, 2018; Shah *et al.*, 2010) The present authors have used precipitation-simulation experiments (Li *et al.*, 2010), isolation experiments(Li *et al.*, 2013), and precipitation-recycling experiments (Li *et al.*, 2016) to rule out the possibility that soil water comes from precipitation and verified phreatic evaporation exists in the extremely arid area in Dunhuang Mogao Grottoes, China. The greenhouse-air conditioner method was used to monitor the quantity and characteristics of phreatic evaporation on daily and yearly scales (Bittelli *et al.*, 2008; Kamai and Assouline, 2018) Later, the earth-air pulsation was found (Li, 2018)and the power source and potential pressure of pulsation was revealed (Li and Zhan, 2018). Experiment shown that the potential air pressure fluctuations of about 120–190 hPa in the closed system over the daily/yearly temperature range of 5–40 °C. Water vapor is the main component of earth-air and it contributes about 32% to the variation of earth-air pressure (Li and Zhan, 2018). Our research also shown that the movement of earth-air has a significant impact on the evaporation of water, increasing the rate of phreatic evaporation by three orders of magnitude (Li *et al.*, 2021). However, the spatial-temporal changes of earth-air and water movement in soil vertical profile are not clear.

The air inside the vadose zone referred to as earth-air (Jin *et al.*, 2013; Li *et al.*, 2010). In ancient China, the earth-air monitor was named "hou-qi" (候气, waiting for the earth-air to arrive), which used to enact a calendar (Wang, 2016). Indeed, the earth-air is one of word that is still familiar to Chinese people. Unfortunately, the monitoring methods used to validate hou-qi have been lost. The rough method is that the bamboo pipes of different lengths were buried and sealed in soil. When the air pressure reached to a certain threshold, the membrane that seals the pipe would break open. Thus, when the seasons changed, the membranes break according to their burial depth and this could be used to enact a calendar (Wang, 2016) However, the hou-qi is regarded as pseudoscience in the *Science and Civilization in China* (Needham, 1962), and current scholars believe that hou-qi is the biggest hoax in the history of Chinese science and technology for two thousand years (Li *et al.*, 2017; Li and Zhan, 2018; Li *et al.*, 2021).

Our investigations reveal that the mechanism responsible for the diurnal earth-air pulsation (Li, 2018) and

phreatic evaporation characteristics are mainly affected by temperature in the diurnal soil temperature variable zone (STVZ) (Bittelli *et al.*, 2008; Li *et al.*, 2010; Li *et al.*, 2013). Similarly, the annual earth-air pulsation and phreatic evaporation characteristics are affected by temperature in the annual STVZ (Jin *et al.*, 2013; Li *et al.*, 2010; Li *et al.*, 2013). The earth-air pulsation and evaporation activity on daily and yearly timescales is interaction on the whole, and they have self-similar fractal characteristics on daily and yearly timescales (Li *et al.*, 2021). Fundamentally, the variation in the incident solar radiation on yearly and daily timescales results in the annual and diurnal periodic fluctuations in soil temperature. In the Sun-Earth system, the Earth's rotation is responsible for the observed diurnal temperature variation (about 1.0 m depth), and the revolution of the Earth and its tilted rotational plane relative to the Sun leads to the temperatures in Earth exhibiting regular seasonal changes (about 15–30 m depth) (Zhang *et al.*, 2007). Due to their relatively complex nature, the mechanisms were studied and reported separately for the daily (Li *et al.*, 2014) and yearly timescales (Li *et al.*, 2017). It is difficult to describe the mechanisms operating and thus we are concerned that readers may not fully understand the details of the processes involved.

The Yi-jing (also known as the "Classic of changes", or "I Ching") is one of the oldest Chinese Classics texts (I Ching). It is a mysterious book, mainly constructed of Eight Trigrams, and was created in the early Neolithic period. For close to two thousand years, this book was recognized by both Confucians and Taoists as the foundation of the origin of the Chinese civilization. At the same time, it is also thought to be a book of divination (I Ching), and Zheng believed it to be a book about a calendar (Zheng, 1994). However, with the development of modern science, the Eight Trigrams have already become regarded as gossip or cliché, or even a pronoun for superstitious or nonsensical material.

In this article we apply a stratification method using with "**--**" and warming processes with "**—**" to show and re-explain the spatiotemporal distribution of soil status and the mechanisms operating of earth-air and water on the different timescales. In so doing, we reveal the connection between the mechanism responsible for water vertical cycle and the Eight Trigrams, which thus reveals the origin of the Eight Trigrams.

2. Study Area and Methods Used

This study is based on the phreatic evaporation occurring in the Dunhuang Mogao Grottoes region. The area is more precisely located in the Eurasian hinterland (40°02'14" N, 94°47'38" E) (Li *et al.*, 2015). This is an extremely arid area, the annual precipitation is 42.2 mm, the potential evaporation is 4,347.9 mm and the sunshine rate is 71%. The solar radiation intensity can reach 1.1 kW/m^2, and the mean annual temperature is 11.3 °C. The climate is very dry, the annual average relative humidity is 31%. The soil water content is 1.0–1.5%. Besides water vapor in the soil, moisture is also present as combined water. Under the action of changing temperature, the decomposition/combination of soil combined water/air leads to an expansion/contraction of the air pressure in soil (Jin *et al.*, 2013; Li *et al.*, 2010). This is the root cause of the earth-air pulsation and evaporation (Li, 2018).

In this study, we divide the diurnal and annual STVZs into upper, middle, and lower layers, respectively. We mark the process where soil absorbs heat, soil warming, soil water decomposing, absolute humidity (AH) and water vapor pressure increasing, air expansion and pressurization as "**—**"; and the soil losing heat, soil temperature dropping, soil absorbing moisture, AH and water vapor pressure dropping, air contracting and pressure decreasing process marked as "**--**". This is done on a daily and yearly timescale, and the results analyzed integrally to elucidate the hydrometeorological factors changes within the soil as a whole.

In order to find the spatiotemporal distribution of the soil hydrometeorological factors, we must first know the temperature and relative humidity (RH) in the soil on daily and yearly timescales. During 2009–2015, buried HOBO micro temperature and RH meters were used to monitor the diurnal (50 cm) and annual STVZs (6.0 m) (Li *et al.*, 2017). We selected depths of 10, 20, and 40 cm to represent the upper, middle, and lower layers of the diurnal STVZ, respectively, from the monitored 10, 20, 30, and 40 cm. Also, HOBO meters were buried every 50 cm in the 0.5–6.0 cm range to record the soil temperature and RH regularly (every 30 minutes). Accordingly, the AH and vapor pressure were increasing/decreasing were also calculated by Buck equations (Buck, 1981).

The soil air pressure (P) is calculated by the theory of closed system using a fitting formula in a specially experiment (Li, 2018),

$$P = at + b \quad (1)$$

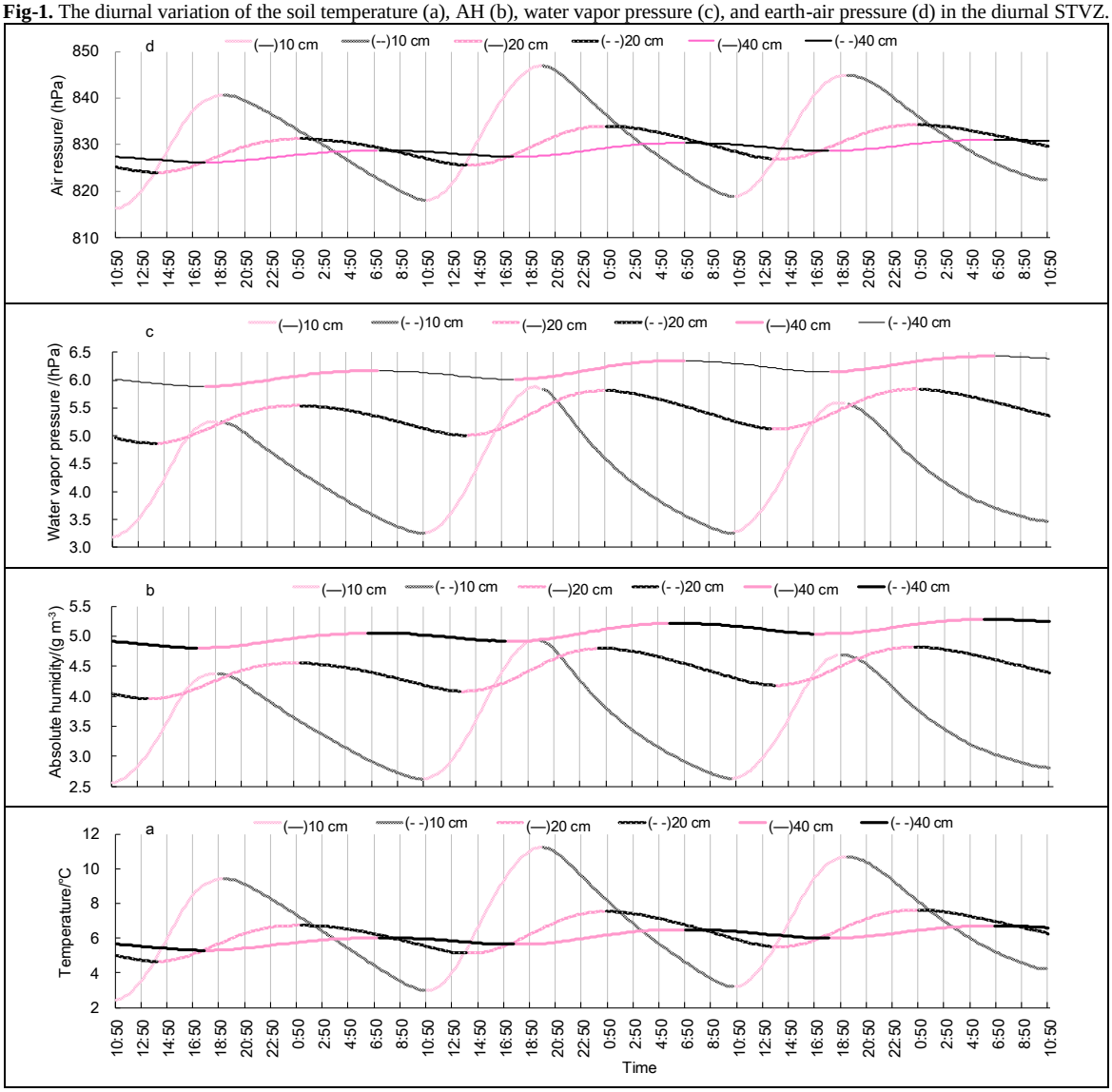
where t is the temperature (°C), a is a coefficient associated with the properties of the soil, and b is the atmospheric pressure in closed soil. Here, we select the saline soil found in the Gobi for which the water content is 5.5%, a = 3.4949 hPa/°C, and b = 807.66 hPa to calculate the air pressure (R^2 = 0.9881, p = 0.01) (Li, 2018).

3. Results and Analysis

3.1. The Spatiotemporal Distribution of Status on Daily Timescale

We choose representative temperature, AH, water vapor pressure and air pressure data recorded in the soil corresponding to sunny weather, as shown in Fig. 1. In the figure, we mark the process in which the soil temperature is increasing in red (denoting **—**), indicating that the soil water is decomposing, AH and water vapor pressure increasing, and air expansion and pressurization due to warming coupling effects. The cooling process is marked in black (denoting **--**), indicating that the soil is absorbing moisture, AH and water vapor pressure decreasing, air contracting and air pressure decreasing too. These are colored red/black, as shown in Figs. 1a, 1b, 1c and 1d.

Fig-1. The diurnal variation of the soil temperature (a), AH (b), water vapor pressure (c), and earth-air pressure (d) in the diurnal STVZ.



In Fig. 1, sunrise occurred at 8:00. At this time, the heat received at the surface begins to be conducted to the lower layers. Thus, the temperature at the 10 cm point starts to rise from 10:50, and AH, water vapor pressure and air pressure changes as same as temperature. However, at this time, the lower layers of the soil are still in a state of temperature reduction. This is because the temperature/heat conduction process takes time. According to long-term monitoring results, under normal conditions, the heat from the surface is conducted to the lowest layer (i.e. the point where the daily fluctuations disappear) after a delay of about 12 hours.

We converted the changes of hydrometeorological factors into the status (phase). The vertical distribution from top to bottom in accordance with the spatial and temporal status is listed in Table 1.

Table-1. The soil status of each layer in the diurnal STVZ

Time	10:50–14:20	14:20–17:50	17:50–19:10	19:10–1:10	1:10–7:10	7:10–10:50
Duration (h)	3.50	3.50	1.33	6.00	6.00	3.67
Phase	䷒	䷊	䷋	䷓	䷡	䷢

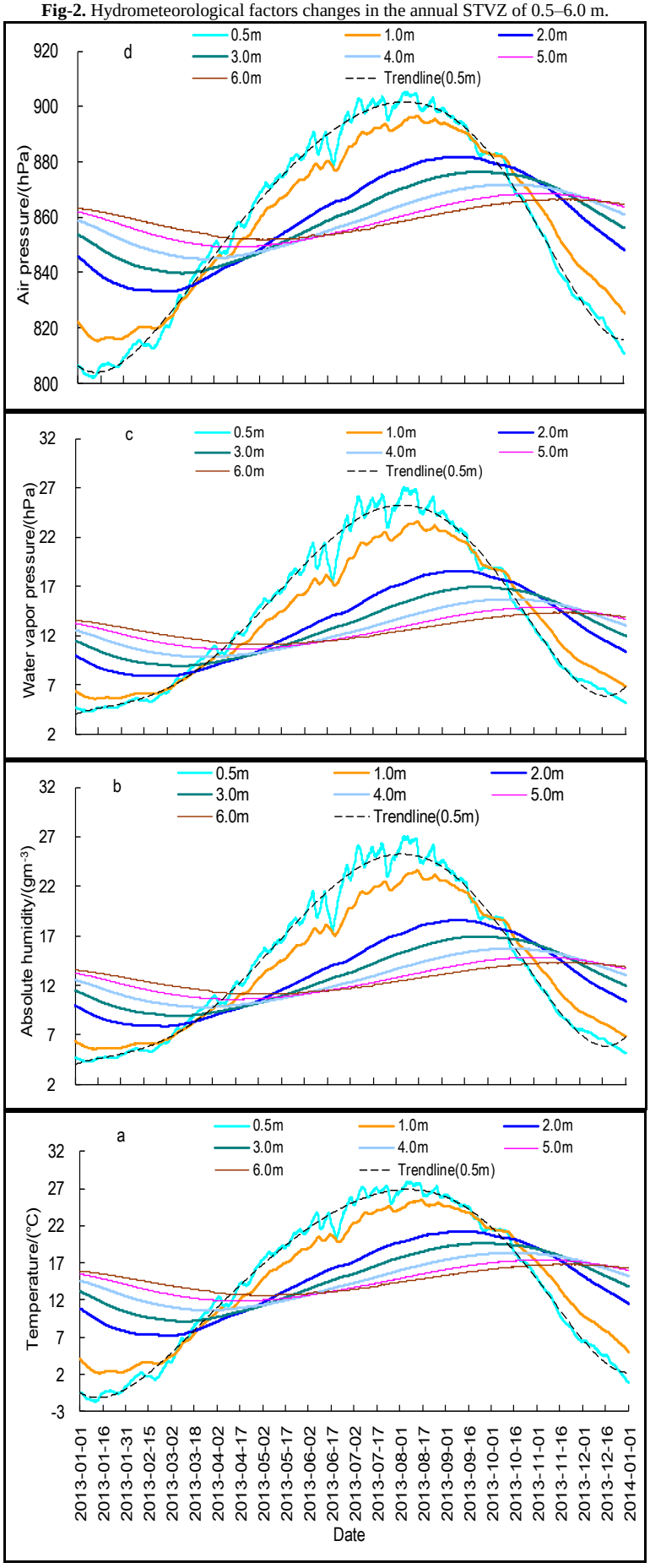
Table 1 gives the diurnal cycle of status variation in the vertical direction. The phase undergoes continuous changes alternately as in Fig. 1. The durations of each phase are different however. These change with the solar altitude or season. As the hysteresis time is not more than 12 h in the lower layer, there are commonly no phases corresponding to ䷒ and ䷊ under representative sunny weather. If there are abrupt changes in weather conditions, e.g. a rapid heating occur in ䷢ process, can there also appear a short-term phase corresponding to ䷋. Conversely, an abrupt cooling in ䷊ process could produce a ䷢ phase.

3.2. The Spatiotemporal Distribution of Status on Yearly Timescale

The temperature in the annual STVZ monitoring results is as shown in Fig. 2a. The corresponding AH, vapor pressure and air pressure changes are as shown in Fig. 2b, 2c and 2d, respectively. The annual changes similar to the

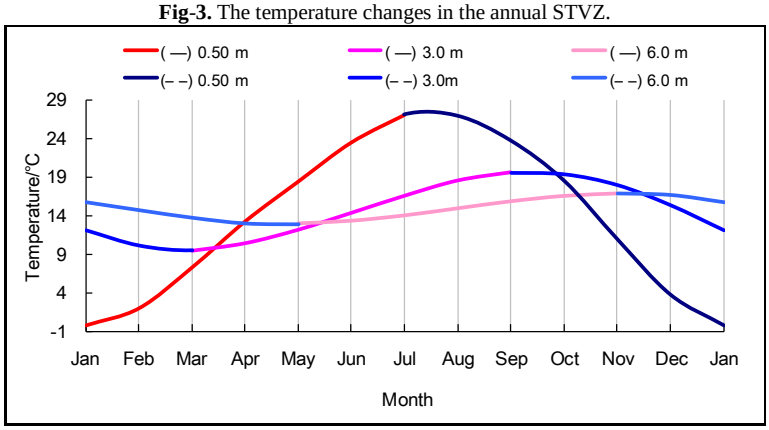
diurnal changes (Fig. 1), and so the details analysis is not shown.

Fig-2. Hydrometeorological factors changes in the annual STVZ of 0.5–6.0 m.



We use the 0.5, 3.0, and 6.0 m average monthly data to represent the upper, middle, and lower layers of the multi-year average temperature in the annual STVZ, respectively. The temperature changes in the annual STVZ are as shown in Fig. 3.

Fig-3. The temperature changes in the annual STVZ.



In Fig. 3, starting from January, the solar radiation intensity is gradually enhanced and the weather becomes warmer. Heat in the shallow soil is gradually conducted downwards and the 0.5 m layer begins heating up from January until the end of July, so the AH, water vapor pressure increased owing to soil released water molecule, and the air pressure also increased. Besides effect of released water vapor, air thermal expansion makes the largest contribution (about 55%) to the air pressurization, and the smallest contribution (about 13%) is from soil adsorbed gases (Li, 2018). Then, the temperature starts to fall, dropping until January next year. The AH, water vapor pressure and air pressure also dropping. The 3.0 m depth soil begins to heat up in early March until the end of August, then it is in a state of cooling until early March of the following year. The AH, water vapor pressure and air pressure changes as same as temperature. For the 6.0 m layer, the soil is heating up from May to November (from November to May of the following year, the soil is cooling). Each layer operates in a continuous cycle. The corresponding changes of AH, water vapor pressure and air pressure as same as the temperature changes show in Fig. 3.

Like we did for the diurnal changes, we transform the changes of factors in Fig. 3 into the activity of the hydrometeorological status (vertically, from top to bottom). This generates the spatiotemporal distribution changes listed in Table 2.

Table-2. The soil status in each layer in the annual STVZ.

Period	Jan to Mar	Mar to May	May to July	July to Sep	Sep to Nov	Nov to Jan
Duration	2 months	2 months	2 months	2 months	2 months	2 months
Phase	䷁	䷒	䷓	䷔	䷕	䷖

On a yearly timescale (Fig. 2, Table 2), the STVZ also experiences cyclical changes involving ䷁, ䷒, ䷓, ䷔, ䷕, and ䷖ phases. Also, the number of phases is only 6 in “ideal/normal” climate, short-term abrupt weather changes generally affect the phases smaller in the annual STVZ. However, under strong abrupt climate changes, the deep layer could still be affected in different degree (Fig. 2). Therefore, the annual STVZ is analogous to the diurnal STVZ, and the phases ䷗ and ䷘ usually appear in abnormal climate or geothermy.

3.3. Combined Distribution of Status on the Daily and Yearly Scales

If we arrange Table 1 as a time series running from morning to night and combine it with the corresponding annual cycle shown in Table 2, the soil spatiotemporal distribution status show in Table 3.

Table-3. Spatiotemporal distribution phases in the combined STVZs.

Period	**Time**					
	Morning	**Noon**	**Afternoon**	**Nightfall**	**Midnight**	**Small hours**
	7:10–10:50 ䷁	10:50–14:20 ䷒	14:20–17:50 ䷓	17:50–19:10 ䷔	19:10–1:10 ䷕	1:10–7:10 ䷖
Nov to Jan ䷁						
Jan to Mar ䷒						
Mar to May ䷓						
May to July ䷔						

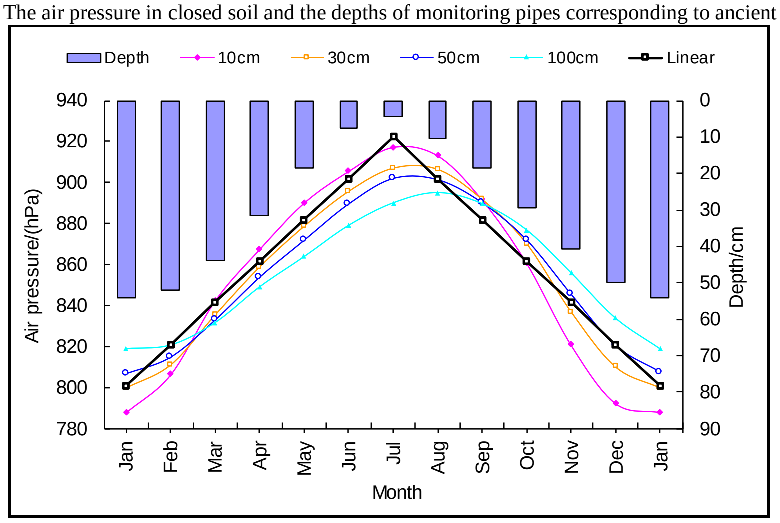
July to Sep ☱	䷒	䷨	䷼	䷉	䷹	䷵
Sep to Nov ☳	䷗	䷚	䷩	䷘	䷐	䷲

The combined Table 3 clearly reflects the most basic status changes in the whole of the STVZ, which perfectly shows the mechanism responsible for the temporal and spatial variation. For example, in ䷀ phase means that from 17:50 to 19:10 in every day in May to July, the soil warming, soil water decomposing, AH, water vapor pressure and air pressure increasing in whole STVZ; on the contrary, in ䷁ phase means that from 7:10 to10:50 in every day in November to January, the soil cooling, soil absorbing moisture and air. The AH, water vapor pressure and air pressure are decreasing in whole STVZ. Especially in other phases of heating and cooling processes interconnecting, we can clearly see the influence of water vapor and heat at adjacent layers in the rise and fall process of earth-air under the influence of atmospheric pressure fluctuations in natural soil. Here is no longer analysis the phases one by one. Surface soil's AH and volume of earth-air determined the amount of evaporation (Li *et al.*, 2021). From 11:00–19:00 in March to November, the decomposition water in the annual STVZ supports the diurnal STVZ and forms evaporation. From November to March of the next year, the whole of the soil is in a state of water recovery, and there is no evaporation (Li *et al.*, 2017).

3.4. The Basic Principles and Methods of Hou-qi

When it comes to making a calendar, the diurnal air pressure fluctuation caused by temperature is useless and a kind of interference. To overcome these problems, the ancient Chinese built palaces to shade the ground and avoid the solar radiation. Thus, they made the effects of the diurnal STVZ and diurnal temperature fluctuations effectively disappeared. The soil's surface was artificially sealed using blood and used artificial methods (such as compaction with clay and glutinous rice soup) make vertical soil impermeable. Then dug 12 holes of different depths. So, in the closed system, the soil air pressure is controlled by the temperature and humidity (Li, 2018). The air pressure shown in Fig. 4 is the closed pressure calculated using the mean monthly temperature at depths of 10, 30, 50, and 100 cm, and represents the changes occurring in soil which water content is uniform and is under shade. The change in air pressure in each layer is approximately sinusoidal.

Fig-4. The air pressure in closed soil and the depths of monitoring pipes corresponding to ancient times.



By technique of controlling the depth and humidity, the pressure and time (date) can be made to have a linear relationship. For example, using the pressure at 50 cm as a reference. We can use fire to make the RH of the soil from the surface to a depth of 50 cm approximately adopt a 0 to 100% gradient distribution in advance (Li, 2018), so that we can then fine-tune the air pressure by the soil's RH. If the depths involved as shown in Fig. 4, the net result is that the air pressure and time can be made to have a linearly increasing relationship from January to July and then decline linearly from July to January. The whole of depths roughly accords with those found in traditional records (Wang, 2016). The hexagrams corresponding to each month are shown in Table 4. The traditional pattern of the hexagrams is drawn from the bottom to the top. Therefore, the hexagrams need to be turned vertically. The hexagrams are the famous pioneer-hexagrams of 12 months (12 辟卦) and consistent with the traditional ones which according to the Chinese lunar month (Wang, 2016).

Table-4. Hexagrams and names of each month after eliminating the diurnal temperature variation.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hexagram	䷗	䷒	䷊	䷡	䷪	䷀	䷫	䷠	䷋	䷓	䷖	䷁
Vertical flip	䷗	䷒	䷊	䷡	䷪	䷀	䷫	䷠	䷋	䷓	䷖	䷁
Traditional name	Fu (复)	Lin (临)	Tai (泰)	Dazhuang (大壮)	Guai (夬)	Qian (乾)	Gou (姤)	Dun (遯)	Pi (否)	Guan (观)	Bo (剥)	Kun (坤)

The phase change start from the surface, and the position of each layer is determined by time. As the thermal energy is conducted downwards, it reaches a certain depth after a certain time. At that moment, the phase changes at that position. Alternatively, the time can be determined by using the depth. The Chinese word time (㬎) was defined as a word itself — the depth to which heat was conducted in soil. It was used space to determine time.

Therefore, a bamboo membrane was used to seal the mouth of the monitoring pipe. When the pressure difference of outside and inner reached a certain critical threshold after a certain amount of time, the membrane would break open. As a result, ash placed in the upper end of the pipe would fly out and be clearly observed. This lead to the so-called "air pressure responds to the seasons by the ash flying (气应灰飞) or the expression "the time responds by sound (时以响应) in January to July (Wang, 2016). In July to January, ash should been suck in the soil. So, the air pressure undergoes orderly cyclical changes with the solar term in the soil. Thus, a calendar can be enacted by monitoring the pressure at different depths. The details of this aspect need further study. It should be noted that this is the 12-month meter-calendar (律历) and the earlier Fuxi calendar was the Jia-Calendar of 10-month (Chen, 1986; Li and Chen, 2019; Su Peiyan, 1994) This was artificially set, and as technology developed, there used to be 18 or 36 response points (Chen, 1986; Li and Chen, 2019; Su Peiyan, 1994), which later developed into 24 solar terms and 72 pentads (Wang, 2016).

4. Discussions

4.1. The Origin and Drawing Purpose of Eight Trigrams

If the readers know a little bit about eastern culture, it not hard finds that the cooling processes is named Yin and warming processes is named Yang. In this way to mark hydrometeorological factors changes under the influence of temperature variation in soil profile, it is Eight Trigrams in Yi-jing. This is origin of Eight Trigrams. On daily and yearly timescales, the STVZ experiences cyclical changes involving ☳, ☵, ☶, ☱, ☴, and ☷ phases. These are the *basic trigrams* (经卦). Table 4 collects the full set of combined trigrams, giving a total of 36 *double trigrams* (重卦). The six models piled onto six models are the 36 *hexagrams*. This is consistent with the description given by Huangdi Neijing (黄帝内经) (n.d., 2012) and the study of Xue (Li *et al.*, 2015; Zheng, 1994). The present author thinks that the six phases are the "Liufa" (六炁) (Rui, 2005) six methods (models) or six bases in"Guanzi (管子) said: Fu Xi invented six methods to meet Yin-Yang (伏羲作,造六炁以迎阴阳)" (Li *et al.*, 2014). In turn, it suggests that if the weather or climate is "normal", and there will be a good harvest in agriculture. Hence, this is origin of the Chinese proverb "Liuliu dashun (六六大顺)" which means that "everything goes smoothly and successfully under 6 and 6 doubles model". Even if the weather/climate undergoes "abnormal" changes (28 hexagrams), the situation can be dealt with under the scope of the Eight Trigrams doubled models (64 hexagrams).

Therefore, the trigrams can be seen as an interpretation of the natural soil Yin-yang status change in ancient times. Similarly, double trigrams (hexagrams) come from an interpretation of the natural soil status in the combined diurnal and annual STVZs. There is no doubt that the Eight Trigrams should be the earliest theoretical model, which explains the changes of soil hydrometeorological factors in soil profile more clearly than the present author did (Jin *et al.*, 2013; Kamai and Assouline, 2018). This is reason why in the Yi-jing it is written: the book cannot be written completely and clearly by words, and the meaning cannot be expressed clearly and fully by words, so the Sage (Fu Xi) designed the Trigrams to complete the meaning (书不尽言，言不尽意，圣人立象以尽意). This is the purpose of Fuxi drawing trigrams. The ancient Chinese believed that it is the earth-air generates all things. The trigrams were very important for the ancients to understand the activity state of earth-air.

4.2. The Relationship of Yin-Yang, Eight Trigrams, hou-qi, Calendars, and Yi-jing

It is well known that Fu Xi invented the Eight Trigrams. The earth-air was monitored by technique of hou-qi. Therefore, the method of hou-qi must have been invented by Fu Xi. The main purpose for the invention was to forecast weather and make a calendar which could be used to determine farming times and help with agricultural production. This, in turn, was to solve the problem of food to help the ancients survive. By having such a calendar, a person would be able to feed themselves through their own labor, get rid of the dependence and bondage of nature. The Eight Trigrams can be interpreted as relating to the mechanisms governing soil hydrometeorological factors changes and the earliest of Chinese meteorology and geophysics. The water activity itself was called the "Long" (dragon) from the Fu Xi era in China. Therefore, Yin-Yang, the Eight Trigrams, hou-qi, and calendars form a complementary theoretical and practical system. The Yi-jing is a corpus of this academic system. This is an epoch-making event and reveals the level of intelligence of the ancient people. Its importance is that it is a key indicator of

humans entering an era of civilization.

The Yi-jing, therefore, is the origin of the Chinese civilization. Its influence has been extremely far-reaching, impacting upon Chinese philosophy, politics, religion, the military, linguistics, music, and mathematics (Chang, 2020; Dai and Wang, 2013). For thousands of years, the Yi-jing was worshiped by the Chinese as "the number one in classics and the source of Great Dao". Confucius inherited and developed the Yi-jing from the aspects of social and cultural and then pioneered Confucianism. Taoists coming from the relationship between mankind and nature, inherited the idea of "Dao" in the Yi-jing, favoring its scientificness, and eventually developed Taoism. Confucianism and Taoism are arguably the products of the Yi-jing culture which has been developed for over 6000 years. This time span is so long that when these beliefs were created, the hou-qi already had already been lost (at least at the national level), and people no longer knew the relationship between hou-qi and the Yi-jing. Even so, the long-term practice of hou-qi and accumulation of the Yi-jing has long been in the blood of the Chinese people.

The Yi-jing may be referred to as the source of "the Great Dao" because the Yi-jing fundamentally reflects the rules governing the change in the solar radiation due to the Earth's revolution and rotation, i.e. it reflects ***the way*** the Earth moves around the Sun. It managed to capture the most basic information on the Sun-Earth system. It not only complies with the principles underlying the physics of the Earth, life sciences, and human social activity in the past, but also means that the Earth-human interaction must obey the same basic rules in the present and the future. Thus, it has important significance with respect to the further development of the human civilization.

5. Conclusions

Using a method of stratification of the Yin-Yang, the status of soil can be marked on daily and yearly spatiotemporal scales. This clearly reveals the soil status and mechanism responsible for earth-air and phreatic water movement. The spatiotemporal distribution of soil status perfectly matches the Eight Trigrams appearing in the Yi-jing. This paper thus reveals the origin of the Eight Trigrams of the Yi-jing. The trigrams correspond to the earth-air in space-time according to the Yin-Yang, and their main purpose was to enact a calendar using hou-qi. Fu Xi invented the Eight Trigrams of the Yi-jing and created the Chinese civilization. This period in time also marked the beginning of scientific research, and made an unparalleled contribution to the development of mankind and world culture.

Acknowledgments

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