Research on coastline climate environment and student psychology in coastal cities based on artificial intelligence

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Abstract
Today, most students in coastal cities in China were born after the 1990s. They have been spoiled by the older generation since they were young. They grew up under the protection of their parents. Most of them are flowers in the greenhouse. Now, they have entered the university, carrying the double expectations of society and family. All these pressures, such as learning knowledge, improving skills, etc., come and make them feel confused. Strong self-esteem, personal resistance, and more or less selfish combination of these factors have a huge impact on the psychology of students in coastal cities. In view of the current situation, this article expounds the importance of mental health education for students in coastal cities, clarifies the current problems and causes of mental health in colleges and universities, and puts forward countermeasures and suggestions to solve these problems. The corresponding drop in seawater temperature is an important thermodynamic index that affects coastal climate. This paper selects the environmental climate data of a given coast at 21 locations on a given coast from 1972 to 2020, combines the intermediate data of ERA, and uses a comprehensive analysis method to study the climatic characteristics of sea fog on a given coast. Two dates in ERA-Interim and ICOADS were used to compare and analyze the spatial distribution of coastal sea temperature field from 1984 to 2018 and the temporal and spatial distribution characteristics of coastal marine climate environment. Based on artificial intelligence algorithms, this article successfully optimized the original prediction model and effectively improved the prediction accuracy of the model. The final forecasting model can not only be applied to forecasting, but also because after improving it, it can make efficient and highly accurate forecasts based on a wide range of economic and other fields of data.

Keywords Artificial intelligence · Climate environment · Coastline · Student psychology

Introduction
The coastal area is not only one of the most important maritime transportation hubs in China, but also one of the most economically developed regions in China, and has made outstanding contributions to the development of the world economy (Santos et al. 2010). At the same time, a certain coastal area borders a certain coast and is close to the Northwest Pacific. This is also a sensitive area where marine meteorological disasters often occur in China (Sen 1968). Sea fog is one of the largest marine meteorological disasters in coastal areas. The appearance of sea fog will reduce the horizontal visibility of coastal and offshore areas, affect maritime navigation, fisheries, platform operations, and military operations, and also hinder roads and air transportation in coastal areas, and even human daily activities (Schu 1979). Therefore, there is an urgent need to conduct marine mist research in specific coastal areas. The influence of the ocean on the atmosphere is mainly manifested in the changes in the temperature and humidity characteristics of the atmospheric boundary layer, and the temperature difference between the ocean and the air is an important parameter that characterizes the exchange characteristics of the air-ocean interface (Schu 1986; Schu et al. 2002). The discussion of ocean change and temperature difference has become one of the most important directions in the study of ocean mist.
Specific coasts are one of the most famous tropical continental marginal seas in the world. It is located between the largest continent on the earth and the ocean, and it is an important maritime hub connecting two oceans and three continents. A certain coast has a huge body of water with a large area, with an average water depth of 1212 m. This is the area where matter and energy exchange is most intensive in the Earth’s surface system. Therefore, it is necessary to study the sea temperature difference in a given coastal area (Skaggs and Irmak 2012).

However, when predicting artificial intelligence, it turns out that exponential smoothing also has some disadvantages. Compared with other forecasting methods, the parameters selected during forecasting exponential smoothing have a greater impact on forecasting accuracy, and it is difficult to select appropriate parameters. Under normal circumstances, relatively suitable parameters will be manually selected based on experience or data characteristics. However, this usually does not cause small random errors (Sneyers 1990). This article uses three artificial intelligence algorithms to optimize the four exponential smoothing methods and choose the best parameters to avoid unexpected errors. All twelve optimization models can be used for correct prediction, and we can obtain prediction results with higher prediction accuracy (Sobhani et al. 2017). This article first explains four exponential smoothing models. The calculation results show that these exponential smoothing models can greatly improve the prediction accuracy if the optimal parameters are used. Therefore, this article uses three artificial intelligence algorithms to optimize the parameters of the exponential smoothing model, which leads to twelve optimization models (Stigter 2007). The simulation calculation results show that these optimized models have higher prediction accuracy than the original exponential smoothing models using manually selected parameters. The results of this paper include prediction models that combine artificial intelligence algorithms and exponential smoothing models (Tait and Zheng 2003).

Materials and methods

Data selection

The monthly foggy day data of 21 stations on a specific coast provided by the Meteorological Bureau of a specific eastern province, retrieval time: March 1972 to February 2020, selected stations along the specific coast from west to east: A (59754), B (59750), C (59658), D (59650), E (59656), F (59664), G (59663), H (59673), I (59478), J (59487).

Research methods

In this paper, the analysis method of the synthetic physical quantity field is used to analyze the nature of the physical quantity change field of the foggy day in the East China Sea. The specific method is as follows: in a given month, record the field of the monthly physical quantity of a given element of a given ocean air in a given coastal area as C(m × n), that is, formula (1):

\[
C = \begin{bmatrix}
C_{11} & C_{12} & \cdots & C_{1n-1} & C_{1n} \\
C_{21} & C_{22} & \cdots & C_{2n-1} & C_{2n} \\
\vdots & \vdots & \ddots & \vdots & \vdots \\
C_{m-11} & C_{m-12} & \cdots & C_{m-1n-1} & C_{m-1n} \\
C_{m1} & C_{m2} & \cdots & C_{mn-1} & C_{mn}
\end{bmatrix}
\]

(1)

In order to obtain the average value of formula (1) by column, a compound field of the climatic physical size of a specific element in the ocean atmosphere in a specific month can be obtained, namely formula (2):

\[
C' = \begin{bmatrix}
c_1 \\
c_2 \\
\vdots \\
c_n
\end{bmatrix}
\]

(2)

If the number of sea fog days in the z-th sea area in a given month exceeds several years, the average monthly physical size field of this ocean air element in the coastal area will be recorded as Az(m × n), which is formula (3):

\[
A_z = \begin{bmatrix}
da_{\Xi 11} & a_{\Xi 12} & \cdots & a_{\Xi 1n-1} & a_{\Xi 1n} \\
da_{\Xi 21} & a_{\Xi 22} & \cdots & a_{\Xi 2n-1} & a_{\Xi 2n} \\
\vdots & \vdots & \ddots & \vdots & \vdots \\
da_{\Xi m-11} & a_{\Xi m-12} & \cdots & a_{\Xi m-1n-1} & a_{\Xi m-1n} \\
da_{\Xi m1} & a_{\Xi m2} & \cdots & a_{\Xi mn-1} & a_{\Xi mn}
\end{bmatrix}
\]

(3)

If the number of foggy days in the z-th sea area of the month shown is greater than a, by averaging the equation (3) on the column, the composite field A's of a certain ocean element in the coastal area can be determined as the equation (4):

\[
A_z' = \begin{bmatrix}
d\hat{a}_{\Xi 1} \\
d\hat{a}_{\Xi 2} \\
\vdots \\
d\hat{a}_{\Xi n}
\end{bmatrix}
\]

(4)

In the same way, if the number of days of sea fog in the z-th area of the ocean in the specified month is relatively small, the field of the average monthly physical size of a certain ocean element in the coastal area is expressed as Bz(m × n), which is the formula (5):

\[
R_z = \begin{bmatrix}
b_{11} & b_{12} & \cdots & b_{1n-1} & b_{1n} \\
b_{21} & b_{22} & \cdots & b_{2n-1} & b_{2n} \\
\vdots & \vdots & \ddots & \vdots & \vdots \\
b_{m-11} & b_{m-12} & \cdots & b_{m-1n-1} & b_{m-1n} \\
b_{m1} & b_{m2} & \cdots & b_{mn-1} & b_{mn}
\end{bmatrix}
\]

(5)
Research design

This article explores the challenges faced by the mental health education of students in coastal cities in China and uses research techniques such as literature collection and data analysis to investigate the current mental health education of students in coastal cities in China, as well as the current mental health status, and explores some effective methods and ways of teaching students’ mental health in coastal cities (Thom and Show 1958).

First, it systematically explained the importance of mental health education for the growth of students in coastal cities, ideological and political education, and explained the importance of university education, which can provide and contribute to the sustainable and healthy development of mental health.

Secondly, it systematically explained and analyzed the problems and reasons of the students’ mental health education in coastal cities. The mental health education of students in coastal cities is a process of rational understanding and thinking. At the same time, only after finding the problem and the cause, can the correct medicine be prescribed for a specific purpose and double the result with half the effort.

Third, through analysis, we will further develop countermeasures and methods to improve the mental health education of students in coastal cities and provide some valuable suggestions for university psychological teachers and other related personnel.

Results

The prediction results of artificial intelligence algorithms

The prediction results of the exponential smoothing model

First, an exponential smoothing model with manually selected parameters is used to make predictions. Table 1 lists all four calculated finger model values.

Table 1 shows that the prediction accuracy of the damping model is higher than other prediction models. More importantly, the table clearly shows that the same model with different parameters gives very different prediction results. Any parameter selection is a critical process and will greatly affect the accuracy of the final prediction.

Compare the prediction accuracy of the original smoothing model and the optimized exponential smoothing model

Table 2 shows the prediction results of GA-HOLT model, SA-HOLT model, PSO-HOLT model, and HOLT model.

Table 3 summarizes the predicted values of the damped HOLT model and the corresponding optimized model. As shown in Table 3, the optimized damped HOLT model has higher prediction accuracy than the damped HOLT model, and it is difficult to select the parameters that can provide the best prediction results.

Pegels model and its optimization model numerical simulation calculation results

Table 4 below shows the prediction results of the Pegels model and its optimized model.

Table 5 shows the prediction results of the damped Pegels model and its optimized model.

Analysis of coastline climate and environment results

Analysis of sea fog characteristics

As shown in Fig. 1, the four stations with the highest total number of sea fog days are station A (894 days), station B (1480 days), station C (1212 days), and station D (1206 days). Usually, on a certain coast, ocean fog mainly occurs in the west.

As shown in Fig. 2a, in the western part of the coast in January, the number of sea fog days at stations A, B, C, and D4 is more than 100 days per year, of which station B is the
largest (228 days); at stations E and G2, each year, there are 50
to 100 days of sea fog; station F has the least number of sea
fog days (40 days) each year. As shown in Fig. 2b, in February
on the west side of the coast, the number of sea fog days at
stations A, B, C, D, and G5 is more than 100 days per year, of
which station B is the largest (321 days) and station C is the
second (301 days); the number of days with lake fog at sta-
tions E and F2 is 50 to 100 days, and the number of days with
lake fog at station F is the smallest (55 days). As shown in Fig.
2c, in March on the west of a specific coast, except for station
F (44 days), the number of days with sea fog at other stations
in a year is greater than 100 days, of which station B is the
largest station (394 days). Next is station C (379 days). As
shown in Fig. 2d, in April on the west of a specific coast,
except for station F (44 days), the number of days with sea fog at
other stations is greater than 50 days each year. Station
C is the largest station (193 days), followed by station B (167
days). As shown in Fig. 2e, with the exception of D (68 days),
the number of foggy days in the remaining May in the west of
the coast is less than 50 days. Site E is the smallest (6 days),
followed by site F (10 days). As shown in Fig. 2f, in the
western part of the coast in November, with the exception of
station D (110 days) and station B (81 days), the cumulative
number of days with sea fog at other stations was less than 50
days. As shown in Fig. 2g, in the western part of the coast in
December, with the exception of station B (139 days), station
D (121 days) and station A (100 days), the number of days of
sea fog occurrence is less than 100 days for the remaining
stations.

Analysis of the deviation field of the physical quantity
of multiple air-sea elements

SST deviation field analysis As shown in Fig. 3, in February,
when the number of ocean fog days on the west side of a given
coast exceeds many years, the SST anomaly field on the coast

| Table 2 | Results of prediction model and optimization model
| --- | --- |
| Model | Parameter $\alpha$ | Parameter $\gamma$ | MSE value |
| --- | --- | --- | --- |
| Holt model | 0.1 | 0.1 | 19.91557 |
| Holt model | 0.2 | 0.2 | 12.78258 |
| Holt model | 0.3 | 0.3 | 8.31675 |
| Holt model | 0.4 | 0.4 | 5.95586 |
| Holt model | 0.5 | 0.5 | 4.59573 |
| Holt model | 0.6 | 0.6 | 3.09105 |
| Holt model | 0.7 | 0.7 | 3.65368 |
| Holt model | 0.8 | 0.8 | 3.70771 |
| Holt model | 0.9 | 0.9 | 4.15748 |
| GA-Holt model | 0.999 | 0.014 | 3.03310 |
| SA-Holt model | 0.999 | 0.014 | 3.03310 |
| PSO-Holt model | 0.999 | 0.014 | 3.03310 |

| Table 3 | Damped HOLT model and optimized damped HOLT model
| --- | --- |
| Model | Parameter $\alpha$ | Parameter $\gamma$ | Parameter $\phi$ | MSE value |
| --- | --- | --- | --- | --- |
| Damped Holt model | 0.1 | 0.1 | 0.1 | 21.43234 |
| Damped Holt model | 0.2 | 0.2 | 0.2 | 11.73840 |
| Damped Holt model | 0.3 | 0.3 | 0.3 | 7.46490 |
| Damped Holt model | 0.4 | 0.4 | 0.4 | 5.16829 |
| Damped Holt model | 0.5 | 0.5 | 0.5 | 3.86843 |
| Damped Holt model | 0.6 | 0.6 | 0.6 | 3.20291 |
| Damped Holt model | 0.7 | 0.7 | 0.7 | 2.99987 |
| Damped Holt model | 0.8 | 0.8 | 0.8 | 3.18298 |
| Damped Holt model | 0.9 | 0.9 | 0.9 | 3.82017 |
| GA-Damped-Holt model | 0.749 | 0.997 | 0.473 | 2.91831 |
| SA-Damped-Holt model | 0.747 | 0.988 | 0.482 | 2.91815 |
| PSO-Damped-Holt model | 0.749 | 0.999 | 0.472 | 2.91830 |

| Table 4 | Prediction results of Pegels module and optimization model
| --- | --- |
| Model | Parameter $\alpha$ | Parameter $\gamma$ | MSE value |
| --- | --- | --- | --- |
| Pegels model | 0.1 | 0.1 | 20.05104 |
| Pegels model | 0.2 | 0.2 | 13.03793 |
| Pegels model | 0.3 | 0.3 | 8.48257 |
| Pegels model | 0.4 | 0.4 | 6.04343 |
| Pegels model | 0.5 | 0.5 | 4.63239 |
| Pegels model | 0.6 | 0.6 | 3.91991 |
| Pegels model | 0.7 | 0.7 | 3.67643 |
| Pegels model | 0.8 | 0.8 | 3.75392 |
| Pegels model | 0.9 | 0.9 | 4.25481 |
| GA-Pegels model | 0.999 | 0.013 | 3.03133 |
| SA-Pegels model | 0.999 | 0.013 | 3.03133 |
| PSO-Pegels model | 0.999 | 0.013 | 3.03133 |
appears in the west sea area of the coast. SST is a positive anomaly along the coast of a particular coast of China. The SST is negative anomaly on the coast or the eastern sea area of the coast. In addition, the sea surface temperature of the main sea area of the coast is mainly positive anomalies. If there are foggy days in the East China Sea on this coast for more than many years, the SST anomaly field on this coast will be similar to the distribution. At this point, sea surface temperature is mainly a positive anomaly along China’s specific coastline.

Analysis of the deviation field of the sea temperature difference

As shown in Fig. 4, in February, when the number of sea fog days west of a given coast exceeds many years, the difference in sea water temperature on that coast is similar to the number of foggy days in the east. It is distributed on a specific coastline. Because the East China Sea has had foggy days for more than many years, this line is close to the sea, and the sea temperature difference is mostly below zero. In the main offshore areas far from the coastline, the sea temperature difference is mainly positive anomaly. If the number of foggy days on the coast exceeds multiple years, the coastal flat sea temperature discontinuity field will show the sub-zero sea anomaly along the specific coast of China. In the main sea area of the coastline, the sea temperature difference is negative anomaly. Therefore, if the number of sea fog days on a given coast exceeds a few years, the distribution of sea temperature difference in the main sea area of the coast is very different from the distribution on the west of the coast. If the number of foggy days exceeds the number of years, then certain coastal and eastern ocean foggy days on a given coast. If the number of sea fog days exceeds a few years, the difference in sea temperature of adjacent coastal waters will be different, mainly negative anomalies.

Analysis of temperature deviation field

As shown in Fig. 5, when the number of days of sea fog in the west of a given coast exceeds many years, the temperature anomaly in February is distributed as follows: 2 m to 950 hPa in the lower layer of the coast, and in the coastal areas of China, the temperature is at a negative distance. In the part of the main
Fig. 2  Spatial distribution of the number of days with sea fog each month at 21 coastal sites from 1972 to 2019. a January; b February; c March; d April; e May; f November; g December
coastal sea far away from the coast, the temperature is mainly positive anomalies. In the middle and lower layers of 900–850 hPa, the temperature of the entire coastal zone, including the kelp bordering the coast of China, is definitely anomalous.

As shown in Fig. 6, in February, when the number of foggy days in the middle of the coast exceeds many years, the distribution of temperature anomalies is as follows: from the lower layer to the middle and lower layers, the temperature of the entire coast including the waters adjacent to the Chinese coast is negative anomalies.

As shown in Fig. 7, in February, when the number of foggy days in the East China Sea on the coast exceeds several years,
the distribution of temperature anomalies is as follows: in the lower plain of the entire coast A. In this coastal area of China, negative anomalies above zero temperature are mainly generated. The temperature in the coastal area of this route is mainly composed of anomalies below zero. In the middle and low layers, along the coast of China, in the west sea area of the coast, the temperature changes from a positive anomaly in the lower layer to a negative anomaly in the middle and lower layers (Trasmonte et al. 2008). On a given coast of a given coast, in the eastern part of the sea area of a given coast, the temperature always maintains a positive anomaly from the lower layer to the lower middle layer. In the main sea area

Fig. 4 Anomalous field of seawater temperature difference on sea fog days for many years. a The western sea area of the coast; b the average sea area of a given coast; c the eastern sea area of this coast.
Fig. 5  The temperature anomaly field in the West China Sea on a given coast for many years in foggy days. a 2 m; b 1000 hPa; c 950 hPa; d 900 hPa; e 850 hPa
of this coast far from the coast, the temperature is still mainly negative anomalies.

**Analysis of relative humidity deviation field** As shown in Fig. 8, in February, when the number of foggy days on the west coast of the ocean exceeds many years, the relative humidity anomalies are distributed as follows: from the low-level 1000–950 hPa north of the coast to the middle-lower level and then to the lower level 900–850 hPa, the relative humidity is generally positive abnormal. From the bottom to the middle bottom, the relative humidity is mainly determined by the negative anomaly in the southern part of the coastline. The positive RH anomaly field is effective in the map along the specific coastline of China. A 90% significance test shows that this positive abnormal change in RH is very significant in coastal areas.

As shown in Fig. 9, in February, when the number of foggy days in the central part of the coast exceeds many years, the relative humidity anomalies are distributed as follows: the southern part of the coast ranges from low to medium, and negative anomalies are common in the lower relative humidity layer, and in the north-a certain coast. The change of the relative humidity anomaly field is more complicated. Here, we focus on the average ocean area of a particular coastline. The relative humidity of the sea area is usually low, with positive anomalies close to 0, and low-medium levels become negative anomalies.

As shown in Fig. 10, in February, when the number of foggy days in the East China Sea on the coast exceeds many years, the relative humidity anomalies are distributed as follows: the southern part of the coast is from low to medium, and in the northern part of the coast, the relative humidity is lower. Negative abnormalities are common. The relative humidity in the waters near the coast of China is a positive anomaly at low levels. At mid-to-low values, the relative humidity in the west sea area of the coast is usually positive, and the relative humidity from the Baltic Sea coast is negative anomalies.

**Analysis of water vapor flux deviation field** As shown in Fig. 11, in February, when the number of days of ocean fog on the western coast exceeds many years, the abnormality of the distribution of water vapor flow is as follows: from the southern part of a certain coastline to In from the lower layer of 1000–950 hPa to the middle and lower layer of 900—in the North Sea area with a certain coastline of 850 hPa, the abnormal water vapor flow will mainly go southward and continue to the coastline, and the direction of abnormal water vapor flow will gradually be corrected to the southwest. In the coastal zone close to the coast, the lower layer is the anomaly of water vapor flow, which is not obvious in the southwest direction, and the water vapor flow in the middle and lower layers is abnormal. Even if it crosses a specific coast to a land coast, the abnormal flow of water vapor still exists in the south.

As shown in Fig. 12, in February, when the number of foggy days in the middle of the coast exceeds many years, the water vapor flow abnormality is as follows: from the lower layer to the middle and lower layer, the water vapor flow rate remains the same, and the size of the water vapor abnormality is very small. The transmission direction of the abnormal vapor flow is only slightly adjusted. If the number of sea fog days on a given coast exceeds many years, then the anomalous field of water vapor flux over many years will be smaller than the anomalous field of water vapor on the west side of the coast.

As shown in Fig. 13, in February, when the number of foggy days in the East China Sea on a given coast exceeds several years, the abnormal distribution of water vapor flow is as follows: from the center of the coast to the center. In the North Sea area of this coast, the abnormal water vapor flow is less than the main southward transmission, and toward this coast, the transmission direction of the abnormal water vapor flow is still southwest.

**Discussion**

**Problems and causes of psychological health of students in coastal cities**

**Problems existing in current psychological health education for students in coastal cities**

According to the latest content of the moral education concept in ordinary universities in China, the mental health education and ideological and moral education of students in coastal cities must be linked and carried out separately, and they are not exactly the same. However, in some universities, mental health education and ideological and moral education are regarded as the same type of education, and certain details of the educational process are not considered. On the one hand, most mental health educators are ideological and moral educators and have no experience in mental health education or training. On the other hand, in the education process, teachers usually use ethical standards to teach students. Counseling is usually a kind of moral education (Turgay and Ercan 2006). Counselors often associate students’ psychological problems with ideological and moral problems, thus losing the true meaning of mental health education. When the counselor is faced with a problem, the counselor’s first reaction is to analyze the problem based on the students’ thinking, while the psychological analysis of the students is less. They usually use moral laws to analyze problems, but lack scientific analysis methods and attitudes. When teaching students, teachers often communicate with students in the role of father (Vega et al. 1994).
Fig. 6  The coastal temperature anomaly field and the number of foggy days for many years. a 2 m; b 1000 hPa; c 950 hPa; d 900 hPa; e 850 hPa
Fig. 7 The temperature anomaly field of the East China Sea on the coast of foggy days for many years. a 2 m; b 1000 hPa; c 950 hPa; d 900 hPa; e 850 hPa
The ultimate goal of psychological health education for students in coastal cities is to ensure the healthy development of students in study and life, with emphasis on development and prevention. Encourage students to have good psychological quality and care about their mental health. When some universities in China provide students with mental health education, most of them do not understand development, leading to stagnation (Vestal 1971). Solving students’ mental health problems is its main task, which will lead to the medicalization of education in the field of mental health, which is mainly reflected in the following aspects:

1. Most key personnel are clinical psychologists; this phenomenon is more obvious in medical schools;
2. In terms of working methods, ask the sick man’s attitude towards treatment, which will make the treatment process more negative;
3. In the education process, educators often treat students from a medical perspective. As a result, students’ mental...
health problems were classified as “obstructive mental problems.” This attitude towards work will limit the goals of mental health education;

(4) When teaching students, educators often let students participate in clinical practice in advance to make treatment more medical (Watkins 1991). The aforementioned teaching methods not only cannot solve the students’ mental health problems, but may also cause students to fear and reject psychological counseling and counseling. Mental health medical education often ignores the needs of students in coastal cities, and also loses the importance of mental health education, hindering the development of mental health education (Waylen and David 1989).

University mental health education is a professional, modern, and practical course. A survey of college students in a city found that the most unsatisfactory college course is mental health education. Most students report that the course content
is boring, relatively outdated and out of touch, partly because of the preference for mental health courses in universities. Although some universities have realized the importance of mental health education in university education, they have incorporated mental health education into their courses, have specific courses and credits, and regard mental health education as a regular course (WMO 1997). Choose a professional training mode, and then the teacher will teach in sections according to the content of the textbook. After graduation, students must pass the exam. However, due to the excessive content of textbooks, teachers must teach in the traditional way. Most lectures involve the concepts and principles of psychology and other relatively broad content, but few practical knowledge and methods in psychology are taught (WMO 2011). This teaching method seriously ignores the practicality of psychology. The result of these courses is that students can pass the exam and earn credits, but will not remember anything after the

Fig. 10 The anomalous field of relative humidity in the East China Sea on a certain coastline over many years. a 1000 hPa; b 950 hPa; c 900 hPa; d 850 hPa
Fig. 11  The anomalous field of water vapor flux in the number of foggy days in the west of a certain coast for many years. a 1000 hPa; b 950 hPa; c 900 hPa; d 850 hPa
Fig. 12 The anomalous field of land water vapor flow in foggy days for many years. a 1000 hPa; b 950 hPa; c 900 hPa; d 850 hPa
Fig. 13 The anomalous field of water vapor flow on a given coast in the East China Sea during a foggy day. a 1000 hPa; b 950 hPa; c 900 hPa; d 850 hPa
exam. All the acquired knowledge will be returned to the books, which cannot achieve the true goal of mental health education.

**Causes of problems in psychological health education for students in coastal cities**

The ideological system of mental health education in colleges and universities is relatively old and conservative, and there are also some misunderstandings. These are common problems in all universities in China. Mental health education is not pure technology and methods, but a practical and advanced educational concept. Through the understanding and research of psychological education in some colleges and universities, it is found that the relevant mental health personnel in China lack sufficient understanding of mental health education and pay insufficient attention to and research on psychological quality. Some people feel particularly obscure when talking about mental health issues, and even find that people with mental illness are very scared. This usually leads to the inability to solve mental health problems scientifically, and some patients with mental illness are unable to seek medical treatment in time due to various factors, such as the public opinion of the surrounding people. This phenomenon makes some students who are eager to seek counseling reluctant to accept counseling, and their mental health education is limited. From the perspective of each university, some administrators and educators still have many misunderstandings about the mental health education of students in coastal cities, which can cause the above-mentioned problems when conducting mental health education. Some students adopt a relatively conservative attitude and have a good impression of the students. They often take an evasive stance when encountering problems. Therefore, when students face mental health problems, they usually turn to classmates instead of school psychologists. The development of mental health education in China is relatively late, which has led to insufficient change in concepts among society, individuals, educated persons, and educators (Zhang et al. 2000). Therefore, China is conducting mental health education for students in coastal cities.

Due to the development and reform of higher education in China, mental health education for students in coastal cities has been paid more attention, but there are not many universities. Currently, most universities provide mental health education, but lack some guarantees. This often leads to the fact that mental health education is not carried out in accordance with the established educational goals and there are problems in implementation (Zhu et al. 2013).

1. **Insufficient attention to mental health education:** Most schools have relatively low awareness of mental health education, but they are still at a low level. They believe that as long as students have a low level of awareness, nothing will happen. The mental health sector’s capital investment is unmatched by other sectors. For example, a school may invest millions of dollars in laboratories, and may even spend hundreds of thousands of dollars on gatherings. The investment in mental health education is very small, and certain basic conditions for mental health education cannot even be guaranteed. The counseling cabinets in some schools are very basic, and psychometric software is relatively backward. In this classroom environment, teachers have no choice but to follow the formality, which has led to the formalization of mental health education;

2. **Lack of experienced teachers:** according to incomplete internal statistics, the ratio of mental health teachers to students in universities is 1:5000. Even some universities do not have full-time mental health teachers. The schools are mainly composed of clinical psychologists and moralists. Although these teachers have their own professional advantages, long-term use of moral education methods to communicate with students will lead to the use of professional ethics education methods in mental health education to replace psychological counseling and provide education. Mental health and moral education health care workers face physical illnesses every day. Therefore, they pay more attention to physical symptoms during exercise. The first thing they think of is drugs that can improve mental health. Mental health teachers in some colleges and universities do not even have the necessary mental health knowledge and basic theories and can only rely on their own experience to engage in this work. The above-mentioned problems are common in some colleges and universities, and the true meaning of mental health education has been lost.

3. **The school system is unstable and related places are chaotic:** at present, some universities have no effective mental health education mechanism. Although the objects are on the surface, the attribution is not clear enough to determine which department they belong to, which is very inconvenient for mental health personnel.

4. **Mental health education for students in coastal cities is a systematic process and requires the cooperation of teachers from other colleges and schools.** However, most colleges and universities believe that college psychology teachers should be responsible for mental health education and have nothing to do with other departments and teachers. Although some colleges and universities have established and equipped tutoring centers, the schools will have fewer doubts about this work in the future. However, due to the lack of collaboration between
the various departments of the school, this often results in a lack of educational environment to train all employees in mental health work. Because the school’s mental health network is not strong enough, this usually results in insufficient collaboration between the mental health education center and other departments, lack of effective communication between departments, and some information that cannot be communicated in time.

Countermeasures to strengthen the psychological health education of students in coastal cities

Raise awareness of the importance of mental health education

In daily life, we often say that “attitude is everything”, but attitude depends on people’s knowledge. Only by understanding one thing can we have good professional ethics. Therefore, in order to improve the quality of mental health education for students in coastal cities, the staff must first have a good understanding of mental health education. Only leaders of mental health services can raise awareness; mental health workers can raise awareness. We know that mental health education for students in coastal cities is an important part of quality education for students in coastal cities, and it also plays an important role in the ideological and political education of students in coastal cities. Therefore, it is very important to strengthen this kind of mental health education for college students in coastal cities.

High-quality talents must first have good ideological and moral qualities, and they must also have good psychological qualities in order to achieve ideological and moral qualities. For a country to stand independently among the people of the world, it needs strong will and inspiration. The same is true for a person. To become a senior talent, you need to have a noble mind and good psychological qualities. We have seen that for many successful people, in addition to having solid knowledge and strong professional skills, compared with others, they must also have good psychological qualities. Those who fail in their careers are most likely to be unable to withstand the blow of setbacks, shrink back when encountering difficulties, and unable to withstand difficult trials. Therefore, we should pay more and more attention to the mental health of students in coastal cities. Continuously strengthening the psychological health education of students in coastal cities can improve the psychological quality, political quality, and adaptability of students in coastal cities and cultivate a large number of senior talents in the society.

Good mental health is the guarantee of ideological and moral quality. The formation of good personal morality is closely related to the level of psychological factors, such as students’ understanding of social morality, emotions, attitudes, and behavioral evaluations. Psychological problems can affect a person’s outlook on the world, life, and values. The main task of school education is to strengthen the ideological and moral education of students in coastal cities and improve students’ good morals. The students in the seaside town are at an important stage in the formation of their moral character, which is also a key stage in the formation of world outlook, outlook on life and values. This is also an era of contradictions and contradictions, complicated and changeable. If you do not master their psychology, it will be difficult to truly understand their thoughts, and it will be impossible to obtain ideological and moral education related to them. Therefore, it is necessary to strengthen and improve the ideological and moral education of primary and secondary school students in coastal cities. In our work, we must always pay attention to the psychological characteristics of students in coastal cities and combine mental health education with ideological and civic education, so that the two complement each other.

Construct a scientific and reasonable mental health education framework

Mental health education for students in coastal cities is a systematic work. Therefore, in the process of work, we need to fully mobilize the strength of various departments of the school, open up different channels, use different methods, and carry out comprehensive construction from different angles.

School curricula must include mental health education to make mental health education effective for students in coastal cities, truly solve the various psychological problems faced by students in coastal cities today, and make mental health education effective. A city can provide coastal cities systematically and effectively, aiming to give full play to the role of psychological health education for students in coastal cities. Please also note:

1. Mental health education for students in coastal cities should be based on psychological theory and should include foreign teaching experience and technical equipment;
2. The main focus of the course should be to maintain a healthy attitude of the students;
3. The content of mental health education must be realistic, and the mental activities of primary school students have obvious periodic characteristics. Classes should be tailored according to the psychological characteristics of students and their personal characteristics, and group counseling meetings can be organized regularly.
College education in the field of mental health should be combined with psychological counseling services for students in coastal cities, and undertake the mission of mental health teaching for the whole school, which is also the main position of mental health teaching for students. Mental health centers in key universities in coastal cities must possess the following skills:

(1) The scope should be wide and open to all students;
(2) Specific work flow and detailed analysis of specific issues;
(3) Conduct psychological tests on students regularly to solve problems in time;
(4) For some special groups, such as teachers with mental health problems or mental disorders, teachers must make appropriate suggestions based on their own abilities. People with relatively serious mental illnesses can be referred to the medical department for treatment.

We know that mental health education is very different from any other education. Mental health education emphasizes the principles of equality and respect and is more humane. Therefore, teachers need to respect students and carefully analyze their personality characteristics in the learning process and play a major role in learners. Therefore, the success or failure of teaching students’ mental health in coastal cities depends on whether the learners play a subjective role. In universities, students in coastal cities can create student mental health clubs. The mental health associations of primary and secondary school students in coastal cities can play a role in supporting school mental health education and, if necessary, to solve the problem of teacher shortage. Under the guidance of professional teachers, the Mental Health Club can regularly organize mental health activities among students to increase their enthusiasm for learning mental health. In class, students can share their mental health experiences and their views on mental health. This is very important for educating people’s mental health. Through these activities, mental health education can be continuously expanded in schools and communities.

The Chinese nation has a long history of 5000 years and its traditional culture is extensive and profound. Chinese traditional culture also contains a wealth of mental health knowledge, which to a certain extent has shaped the special psychological quality of the Chinese nation. Have a corresponding impact on mental health. Integrating traditional culture into mental health education plays an important leading role in educating students on mental health in coastal cities.

(1) Good interpersonal relationships: today, most students in coastal cities are children born in the “1990s”, accounting for a large proportion. On campus, students come from all over the country, with different personalities and lifestyles, which means that they encounter many obstacles in interpersonal communication. In our traditional culture, there are many concepts that can promote harmony between people and learn from talented people. For example, “three people line up, there must be my teacher Yan”, “come and not contact, indecent assault”, “do not do to others what you don’t want”, “see the virtuous and think together”, and so on. In modern society, there is still many people adhere to this motto.

(2) A positive outlook on life: loving life and happy work is one of the criteria for the mental health of students in coastal cities. In our traditional culture, there are many expressions of the idea of smiling and entertaining in life, such as “Unknown life, knowing death”, “The son does not talk strange, strength, chaos, and god”, “emphasize personnel matters, neglect destiny.”

(3) Correct understanding of suffering and failure: Chinese traditional culture advocates “similar sexuality, distant habits”, “the rich and the noble cannot be fornication, the poor and the poor cannot be moved, the mighty cannot be succumbed”, “then the heavens will succumb to the great responsibility and the human, and must first painstakingly Work your muscles and hung your skin.” These excellent traditional Chinese cultural ideas enable modern students in coastal cities to recognize setbacks and pains with a correct attitude. For modern students in coastal cities, they are usually not strong enough to adapt to society or resist pressure. Therefore, some mental disorders and diseases are very common in public life, and serious incidents may even occur. Therefore, it is necessary to use student disappointment learning in mental health education to strengthen the skills of coastal cities and implement innovative methods to release the potential of students in coastal areas. The development of coastal cities and the continuous improvement of theories of mental health in cities will enable students to learn more. Learn mental health quickly.

Conclusion

This article discusses the climatic characteristics of the coastline, as well as the temporal and spatial distribution characteristics of the drop in water temperature on the coastline. The conclusion is that there are two obvious areas in the coastal area, and there is a big difference in sea temperature in autumn. The main areas of high value are in the central and southern waters of the coast, and the second most valuable area is located in the waters of the southeast of the coast, and peaked in 2015 and 2020. In each quasi-3a season, the SST difference period on a particular coastline is very large, the quasi-period 5a in spring is significant, and the quasi-11a
fluctuation period in winter and spring is also very important. The difference in sea temperature between winter and spring is negatively correlated with the Niño3.4 index, while it is positively correlated in summer and autumn. Mental health education for students in coastal cities has a vital impact on the healthy growth and ideological and political education of students in coastal cities. To a certain extent, it can not only improve personal quality, but also ensure the safety and stability of the school, and promote the harmony and development of modern society. In the central and coastal cities, there are certain problems with students’ mental health education, such as lack of understanding of mental health education in major universities. The process is purely formal, the content is not systematic, the teaching quality is low, and the practicality is insufficient. The mental health education of students in coastal cities needs to be strengthened. First of all, we must raise the whole society’s awareness of the mental health education of students in coastal cities, strengthen the moral education of mental health of students in coastal cities, and provide a scientific and reasonable basis for the comprehensive development of mental health education. Regarding the identity, main position, main status, and traditional culture of students in coastal cities, we need to find more scientific and intelligent methods to solve the problem of mental health education for students in coastal cities, and strengthen cooperation in home teaching and use. The Internet is becoming more and more popular and can be used to train the mental health of students in coastal cities. China’s development depends on high-quality talents. The psychological quality of students in coastal cities has an extremely important impact on the development of modern society. While it is necessary to strengthen and improve the mental health education of students in coastal cities, as long as we have the courage to innovate and actively research, the mental health education of students in coastal cities will achieve better results.

**Declarations**

**Conflict of interest** The authors declare no competing interests.

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