Research on coastal atmospheric change and Latin dance performance based on target detection network

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Abstract
In recent years, with the progress of industrialization, human demand for natural resources has increased, China's environmental degradation, and the management and treatment of volatile organic pollutants, etc., will not only become the cause of ozone pollution, but also have a huge impact on human health. In response to this problem, China issued the "Twelfth Five-Year Plan on Air Pollution Prevention and Management in Major Regions" in 2012, which for the first time clearly pointed out the policy on the management of volatile organic pollutants and the strengthening of corporate production, and management of volatile organic pollutants during transportation. Increase the use of low-volatile organic solvents, reduce the use of high-volatile organic solvents, promote the management of organic waste gas pollution, and strengthen the recovery and utilization of organic waste gas. Establish a monitoring system for volatile organic pollutants in major industries and improve the emission standards for volatile organic pollutants. Latin dance is a dance sport introduced to China in 1980, and now China holds Latin dance competitions every year. From an aesthetic point of view, Latin dance is a kind of artistic performance. Skilled Latin dance dancers during the performance can bring wonderful beauty to the audience and stimulate people's love for this dance movement. Based on the summary of the related content of Latin dance art performance, this article further analyzes the current situation and development trend of Latin dance art performance, hoping to provide some valuable reference materials to promote the development of Latin dance art in China. Through survey methods such as questionnaire surveys and expert interview methods, the artistic performance of Latin dance is investigated.

Keywords Target detection; · Coastal atmosphere; · Latin dance; · Performing arts research

Introduction
In recent years, China's atmospheric environmental quality has received attention. In the past, soot pollution has not been effectively managed, and the compound pollution characterized by ozone (O3) and acid rain has become more and more serious. With the rapid development of the industry, energy consumption and automobile production and sales have begun to show a rapid growth trend, and secondary pollution has intensified (Farag et al. 1996). In particular, the concentration of ozone near the surface has been increasing in recent years, and it is the main pollutant second only to particulate matter (PM2.5). Ozone near the surface is one of the most important components of photochemical smog. Due to the development of industries and the impact of human activities, the emissions of nitrogen oxides (NOx) and CO in the lower atmosphere have increased year by year, and the impact of O3 on the environment has also increased (Felicisimo et al. 2012). According to the “Twelfth Five-Year Plan for the Prevention and Management of Air Pollution in Major Regions” issued by the Chinese Ministry of Environmental Protection, management measures must be implemented for NOx and volatile organic compounds (VOC) that have a major impact on PM2.5 and O3. Therefore, it is necessary to manage the concentration of ozone pollutants in the air, and it is very important to propose effective preventive measures to protect public health (Friedman et al. 2000). The research on urban air pollution has a long history. In 1940, photochemical smog first appeared in Los Angeles, and VOC research began to develop.
After years of development and evolution, Latin dance has finally become a new form of dance performance, interpreting the charm of dance (Golkarian et al. 2018). In order to understand the essence of art and pursue the charm of music, most dancers embark on a new journey of dance performance and research (Hamdan and Khozyem 2018). The art of dance was born in people’s lives, but it is more exciting than what life presents. For the national standard dancers, artistic performance dance is still a new topic. Performing dance needs to reshape the image, use body movements to transfer from the inside to the outside, intelligent structure and ingenious production, as well as the use of movements to complete the storyline and themes, highlighting the artistic connotation (Issawi and Anonymous 1978). In addition, Latin art performance dance does not rely on simple routines of body movement combinations, but a comprehensive stage performance form that combines stage choreography, lighting, costumes, and props (Khidr 1997). The dance works are based on specific themes and story lines, showing elegance, beauty, and sincerity. Latin art performance dance is a new form of art performance based on a rich traditional movement that gives dance new vitality and creativity (Kim et al. 2019). It is now loved by more and more people and has become an important branch of the current art field.

**Materials and methods**

**Data source**

As can be seen from Table 1, the satellite can realize data transmission every 16 days. The sensor is equipped with Land Imager (OLI) and Thermal Infrared (TIRS). The sensor has two thermal infrared bands, among which the visible light band resolution transmitted by the Land Imager (OLI) sensor is 30m. The bandwidth resolution of the thermal infrared (TIRS) sensor is 100m. The map projection method of remote sensing image is UTM-WGS84. The thermal infrared band data of Landsat 8 was used throughout the experiment, and the data provided were consistent with the spatial resolution after resampling and the resolution of the visible and near infrared bands. On the other hand, since the data is radiation correction and terrain correction, the experiment only needs geometric accuracy correction. The survey object is centered on four major cities in a certain area, including surrounding cities.

![Table 1](image)

| Sensor type | Band name                          | Resolution | Wavelength range |
|-------------|------------------------------------|------------|------------------|
| OL1         | 1 COASTAL/AEROSOL Coastal Band     | 30         | 0.4-0.5          |
|             | 2 Blue band                        | 30         | 0.4-0.5          |
|             | 3 Green green band                 | 30         | 0.5-0.6          |
|             | 4 Red red band                     | 30         | 0.6-0.8          |
|             | 5 NIR near infrared band           | 30         | 0.8-0.9          |
|             | 6 SWIR 1 Short infrared band 1     | 15         | 1.5-1.6          |
|             | 7 SWIR 2 Short infrared band 2     | 15         | 2.1-2.3          |
|             | 8 PAN panchromatic band            | 15         | 0.5-0.6          |
|             | 9 Cirrus Cirrus Band               | 30         | 1.3-1.5          |
| TIRS        | 10 TIR 1 Thermal infrared band 1   | 100        | 10.6-11.9        |
|             | 11 TIR 2 Thermal infrared band 1   | 100        | 11.6-12.5        |

As shown in Fig. 1, Faster R-CNN is an algorithm based on regional feature extraction. In the first stage, a region proposal network (RPN) is used to generate a large number of anchor boxes. These anchor boxes are then merged into a single candidate region. The candidate region is then passed to a RoI pooling layer, which pools the features from the region of interest. The pooled features are then passed to a classifier, which predicts the class of the region. The classifier is followed by a bounding box regressor, which predicts the location of the object within the region. The bounding box regressor is followed by a confidence score, which indicates the confidence of the prediction.

![Fig. 1](image)
The classification of the human body's subjective most comfortable feeling temperature grade

| Comfort feeling       | Comfort level | Comfort zone (°C) |
|-----------------------|--------------|-------------------|
| Extremely uncomfortable| Level 4      | 32-Cz<Tg          |
| Uncomfortable         | Level 2, Level 3, Level -2, Level -3, Level -4, Level -5 | 25-Cz<Tg≤32-Cz, 20-Cz<Tg≤13-Cz |
| Comfort               | -1 level, level 0, level 1 | 13-Cz<Tg≤25-Cz    |

The comfort level is evaluated as 0.

As shown in Table 2, Cz=22.7-Ts represents the deviation of the human body and the most subjectively comfortable feeling temperature of the human body under ideal conditions. Generally speaking, Cz is less than 2°C. The high temperature area has a small span and is divided into 4 levels. The low temperature part has a large span and is divided into 5 levels. The comfort level is evaluated as 0.

In the loss function, the classification loss function $L_{cls}$ is defined as:

$$L_{cls}(P_i, t_i) = -\log[P_i \cdot L_{reg}(t_i, t_i^*)]$$

(2)

The regression loss function $L_{reg}$ is defined as:

$$L_{reg} = R(t_i - t_i^*)$$

(3)

where $R$ is the smoothL1 loss, and its loss function is defined as:

$$\text{smoothL1}(x) = \left\{ \begin{array}{ll} 0.5x^2 & \text{if} |x| < 1, \\ x & \text{otherwise} \end{array} \right.$$ (4)

In the regression process, the 4 parameters of the candidate frame coordinates are calculated as follows:

$$t_x = (x-x_a)/w_a; t_y = (y-y_a)/h_a; t_w = \log(w/w_a); t_h = \log(h/h_a)$$

(5)$(X,y,w,h)$ represents the coordinate information of the prediction frame; $(x_a,y_a,w_a,h_a)$ represents the coordinate information of the candidate frame; $(\tilde{x}, \tilde{y}, \tilde{w}, \tilde{h})$ represents the coordinate information of the target frame.

The Faster R-CNN algorithm is a typical algorithm based on candidate regions. The algorithm proposes a region suggestion network, which can use the entire picture as the input of the network, generate a shared feature map, and propose the setting of anchor points.

### Calculation of comfort degree of coastal gas

As shown in Table 2, Cz=22.7-Ts represents the deviation between the subjectively most comfortable feeling temperature of the human body and the most subjectively comfortable feeling temperature of the human body under ideal conditions. Generally speaking, Cz is less than 2°C. The high temperature area has a small span and is divided into 4 levels. The low temperature part has a large span and is divided into 5 levels. The comfort level is evaluated as 0.

It can be seen from Table 3 that the temperature image of the study area is divided into five levels with ±0.5std and ±1std as the division points. The specific division method is shown in the table. In the process of exploring the influence of the distribution of the urban thermal field in Dalian on the comfort of the human body, it is necessary to use the above methods to calculate the results for the study of this article.

### Calculation of VOCs distribution in coastal atmosphere

Principal component analysis is a statistical method that includes 3 steps: decomposition of singular values, selection of
dimensions, and rotation. First, standardize the data, as shown in formula (6):

\[ Z_{ik} = \frac{c_{ik} - c_i}{\sigma_i} (i = 1, 2, 3, \cdots; m; k = 1, 2, 3, \cdots, n) \]  

Here, the normalized concentration value (dimensionless) is the concentration of compound I at the k-th observation value. The basic formula of the PCA method is as follows:

\[ Z_{ik} = \sum_{j=1}^{p} W_{ij} P_{jk} (i = 1, 2, 3, \cdots; m; k = 1, 2, 3, \cdots, n) \]  

Here \( W_{ij} \) is the factor load (no dimension), which represents the correlation coefficient between compound I and factor j obtained by principal component analysis. For details of the PCA model, please refer to the literature. This study uses the PCA analysis module of SPSS software to perform principal component analysis on the mass concentration of each component of VOC in a certain area, and determine the source of VOC based on the calculated component coefficient and the load value of each coefficient.

The non-carcinogenic risk is the Hazard Index (HI), which compares the intake of exposure after inhalation with the reference dose. The exposure concentration (EC) is calculated as follows:

\[ EC = (CA \times ET \times EF \times ED) / AT \]  

Non-carcinogenic risk hazard quotient (Hazard quotients, HQ):

\[ HQ = EC / (R_{fc} \times 1000) \]  

The Hazard Index (HI) is the sum of the hazard quotients of various compounds:

\[ HI = \sum HQ \]  

The exposure risk assessment of radioactive materials is mainly based on the risk value (RISK). The risk value refers to the reference intake concentration of the compound, expressed by the actual exposure concentration multiplied by the carcinogenic risk per inhalation unit:

\[ R = EC \times IUR \]  

It can be seen from Table 4 that the health risk assessment uses a certain method to quantify the impact of harmful substances on the human body and the environment, and uses the degree of risk as an evaluation index to quantify the environmental pollution risk to the human body. In 1983, the National Academy of Sciences proposed a health risk assessment, which is a “four-stage method” of specific dangerous goods, dosage effect evaluation, exposure evaluation, and risk characteristic analysis. This method is widely used and is internationally recognized as a health risk assessment method.

Results

Spatio-temporal analysis of coastal comfort level

From Table 5, many research results show that the most comfortable environmental temperature felt by the human body is between 18-25°C. The normal body temperature of a healthy human body fluctuates between 36-37.5°C, and the optimal comfortable temperature of a healthy naked human body calculated by the golden section method is about 22.7°C. However, due to the influence of seasons and geographical space, the comfortable temperature of the human body will change accordingly. Therefore, the time and space correction

| Month    | Ts | Month    | Ts | Month    | Ts | Month    | Ts |
|----------|----|----------|----|----------|----|----------|----|
| January  | 20 | April    | 21 | July     | -- | October  | 21 |
| February | 21 | May      | 21 | August   | -- | November | 22 |
| March    | 21 | June     | 21 | September | -- | December | 23 |
is made for the comfortable temperature $T_s$ of healthy naked human body in Dalian.

As shown in Fig. 2, the most suitable wind speed for human body comfort is $2\text{m/s}$ and humidity is $70\%$. This paper uses the wind speed and humidity as a quantification and uses the optimal comfort algorithm to calculate the spring, summer, autumn and winter of 2015 and 2019. The comfort of the human body in the four districts of Dalian during the season, and after dividing according to the classification standard, the corresponding urban heat in the four districts of Dalian in the four seasons of 2015 and 2019 in spring, summer, autumn and winter is calculated. Field conditions.

As shown in Fig. 3, the temperature, humidity, and wind speed images of the heating field for somatosensory comfort are used in this study using the inverted surface temperature results. The wind speed is $2\text{m/s}$ and the humidity is $70\%$. Under the premise that the surface temperature does not change, a quantitative analysis of wind speed and humidity is carried out, and the influence of wind speed and humidity on the comfort of the human body is discussed in addition to the temperature value of the thermal field.

It can be seen from Fig. 4 that with the wind speed of $2\text{m/s}$ as the standard, on the basis of constant wind speed, combined with thermal field research to analyze the effect of humidity on body comfort. The picture is a scatter plot of humidity-body comfort during the 5-year period from 2015 to 2019. Divided by four seasons, we can clearly see the relationship between humidity and body comfort when the wind speed is the standard value in different seasons. The surface temperature in the figure is used as the reference standard for body comfort. From 2015 to 2019, the average winter body temperature is $-0.004^\circ\text{C}$ and the average surface temperature is $0.004^\circ\text{C}$.
5.532°C. The body temperature values are all below zero. From the surface heat temperature data, it can be seen that the winter temperature change trend is not obvious, and the body temperature is uniform. Lower than the surface temperature, the humidity in the winter of 2018 is as high as 85%, so the body temperature is the lowest value of -2.76°C. The average value of spring somatosensory temperature is 13.364°C and the average value of surface temperature is 18.6°C, and the average value of both is between 10-20°C. From the surface heat temperature data, it can be seen that the temperature in spring has an overall upward trend, and the values of somatosensory temperature are all low. In terms of surface temperature, the lowest humidity value in the spring of 2015 is 38% compared to the other four years. Therefore, the corresponding body temperature and surface temperature are the lowest values in the past five years. For the remaining four years from 2016 to 2019, the spring data humidity both are between 60% and 70%, which are within the comfortable humidity range of the human body, so the body temperature fluctuates little.

It can be seen from Fig. 5 that the humidity is 70% as the standard, and on the basis of constant humidity, combined with thermal field research to analyze the effect of wind speed on body comfort. The picture is a scatter plot of wind speed versus body comfort during the 5 years from 2015 to 2019. According to the four seasons, we can clearly see the relationship between wind speed changes and body comfort when humidity is the standard value in different seasons. The surface temperature is used as the reference standard for body comfort in the figure. From 2015 to 2019, the average winter temperature is -0.004°C and the average surface temperature is 5.532°C. The values of the body temperature are all below zero.

![Fig. 3 Distribution of body comfort levels in spring, summer, autumn and winter in the main urban area of Dalian in 2019](image-url)
zero. From the surface heat temperature data, it can be seen that the winter temperature change trend is not obvious, and the body temperature is even. Lower than the surface temperature, the wind speed value is between 0m/s-2m/s, but the winter wind speed in Dalian has little effect on the comfort temperature. Even if the wind speed in the winter of 2018 is 0m/s, the surface temperature is the lowest in the past five years. The value is 3.17°C, the corresponding somatosensory temperature is also the lowest value of -2.22°C in the past 5 years.

It can be seen from Fig. 6 that summer is the most obvious season for heat sensation. There is a big difference in temperature between 2015 and 2019. The summer of 2015 is in thermal sensation as a whole, accounting for 32.05% of the

**Fig. 4** Quantitative analysis diagram between temperature and body temperature, and surface temperature

**Fig. 5** Quantitative analysis diagram between customs and body temperature, and surface temperature
total area. Feeling), the overall area is evenly distributed, followed by comfortable feeling, which accounts for 26.85% of the total area, followed by the hot feeling area ratio of 20.23%, and very few parts have a cool feeling, accounting for the largest area of the study area is 3 (hot feeling) Area I, accounting for 9.17%; in the summer of 2019, the overall area is feeling very hot, accounting for 83.26% of the total area. Area I still accounts for the largest area of the overall study area, up to 20.08%, and only a few areas are hot and hot feeling.

Table 6 The area ratio of body comfort in 2015 spring, summer, autumn and winter seasons on the thermal field

| Season | Somatosensory level | I   | II  | III | IV  | V   | VI  | VII | VIII |
|--------|---------------------|-----|-----|-----|-----|-----|-----|-----|-------|
| Winter | -2                  | 0.07| 0.01| 0.01| 0.09| 0.08| 0.07| 0.06| 0.05  |
|        | -3                  | 19.9| 8.94| 3.2 | 14.6| 8.1 | 9.4 | 15.2| 15.2  |
|        | -4                  | 0.8 | 0.9 | 1.1 | 1.3 | 1.2 | 18.5| 18.4| 14.5  |
| Spring | -1                  | 3.1 | 2.1 | 3.3 | 4.2 | 3.5 | 7.5 | 7.6 | 8.7   |
|        | -2                  | 13.2| 14.3| 14.5| 16.7| 10.5| 12.5| 12.5| 12.6  |
|        | -3                  | 0.9 | 0.7 | 0.6 | 0.3 | 0.3 | 0.6 | 0.5 | 0.3   |
|        | -4                  | 0.8 | 0.9 | 1.1 | 1.3 | 1.2 | 18.5| 18.4| 14.5  |
| Summer | 3                   | 12.3| 16.7| 18.9| 18.7| 13.6| 13.5| 17.8| 19.1  |
|        | 2                   | 0.9 | 0.7 | 0.6 | 0.3 | 0.3 | 0.6 | 0.5 | 0.3   |
|        | 1                   | 19.9| 8.94| 3.2 | 14.6| 8.1 | 9.4 | 15.2| 15.2  |
|        | 0                   | 0.8 | 0.9 | 1.1 | 1.3 | 1.2 | 18.5| 18.4| 14.5  |
|        | -1                  | 3.1 | 2.1 | 3.3 | 4.2 | 3.5 | 7.5 | 7.6 | 8.7   |
|        | -2                  | 12.3| 16.7| 18.9| 18.7| 13.6| 13.5| 17.8| 19.1  |
|        | -3                  | 0.07| 0.01| 0.01| 0.09| 0.08| 0.07| 0.06| 0.05  |
| Autumn | 3                   | 0.9 | 0.7 | 0.6 | 0.3 | 0.3 | 0.6 | 0.5 | 0.3   |
|        | 2                   | 3.1 | 2.1 | 3.3 | 4.2 | 3.5 | 7.5 | 7.6 | 8.7   |
|        | 1                   | 12.3| 16.7| 18.9| 18.7| 13.6| 13.5| 17.8| 19.1  |
|        | 0                   | 0.9 | 0.7 | 0.6 | 0.3 | 0.3 | 0.6 | 0.5 | 0.3   |
|        | -1                  | 3.1 | 2.1 | 3.3 | 4.2 | 3.5 | 7.5 | 7.6 | 8.7   |
|        | -2                  | 0.8 | 0.9 | 1.1 | 1.3 | 1.2 | 18.5| 18.4| 14.5  |
It can be seen from Table 6 that the overall warming trend in the spring of 2019 is very obvious, and the somatosensory level has changed from the cool feeling-very cold feeling stage to the cold feeling-hot feeling stage in the spring of 2015. In the spring of 2015, the overall area was cold, and the cold feeling accounted for 55.01% of the total area. The corresponding heat island grades were part of the middle zone, cold island zone and strong cold island zone, followed by the cool feeling area ratio of 42.94% corresponding to the part of the middle zone and heat island. Area and strong heat island area, where at -2 (cool feeling), I area accounted for the largest proportion of the total area of the map, with a value of 13.31%; in the spring of 2019, the overall area was in a comfortable feeling, accounting for 57.85% of the total area, which is colder than 2015. It feels that the proportion is 2.84% higher, and the area that accounts for the largest proportion of the entire map is still the I area, with a value of 15.12%.

Fig. 7 Time series of VOCs concentration and the proportion of each sampling point in a city from 2018 to 2019.

Fig. 8 The time series of meteorological elements (wind speed and direction, temperature, and humidity) and pollutants (PM2.5, O3, NO2, and VOC5) in a city from 2018 to 2019, where the VOC5 concentration is the result of sampling at the city station, meteorological elements and six parameters The concentration also comes from the city station.
Analysis of characteristics and influencing factors of coastal air VOCs pollution

As shown in Fig. 7, during this period, the main wind direction in the city was eastward. The concentration of aldehydes and ketones increased sharply on May 13, and the concentration of aromatic hydrocarbons increased sharply from July 12. Easy to find. In addition, the production time of aromatic hydrocarbons observed in Deyuan, Hugou, and Yuehaiou (July 6) was earlier than that of the city's stations (July 12). The results show that the high concentrations of these two VOCs are caused by the transportation of pollutants.

Fig. 9 The wind-induced graph of six parameters (SO2, PM2.5, CO) in a city in the autumn of 2019 (September–October)

Fig. 10 The wind rose diagram of a city in different seasons (April to October) from 2018 to 2019
Dongfeng transported VOC from L city east to the city station. As a result, the concentration of formaldehyde, ketones, and aromatic hydrocarbons increased, and the concentration of VOCs increased, which further confirmed that the aromatic hydrocarbons and aldehydes and ketones in a certain city mainly came from industrial areas. Emissions.

Figure 8 shows that the six-parameter wind pollution rose diagram of a city in autumn 2019 shows that SO2, PM2.5, CO, and NO2 have obvious pollutant transmissions from the west. District X and District Y are located in the west and southwest of a city respectively. According to the 2018/2019 provincial and municipal air quality released by the Provincial Ecological Environment Bureau, the air quality in District X and District Y is the worst and the pollution situation is severe. Xuzhou, a typical inland resource industrial city, is characterized by high consumption of energy and resources, and high emissions of air pollution sources. Moreover, particulate matter is greatly affected by the emissions from coal combustion.

It can be seen from Fig. 9 that since SO2, particulate matter, CO and NO2 have obvious pollutant transmission from the west, and as a result, the concentration of these pollutants is significantly higher in the west. It is evident that the emissions from the west are the main source of pollution.

Fig. 11 Seasonal comparison of VOCs components in urban, industrial and suburban areas of a city.

Fig. 12 Comparison of VOCs concentration between working days and weekends during the observation period in different functional areas of a city.
west, and the residence time of alkanes and acetylene in the atmosphere is longer, it is confirmed that they may come from Xuzhou and Suqian. The transmission of pollutants leads to an increase in the concentration of alkanes.

From Fig. 10, it can be seen that the air masses from Province A dominate in spring (36.86%). Following the air mass transportation in Province S and northeastern China (28.81%), some of the clean air masses from the Yellow Sea (21.61%) and from the air mass in the Inner Mongolia Autonomous Region in northern China (12.71%). In summer and autumn, clean air masses from the Yellow Sea (42.77%) dominate, followed by air masses from the eastern part of S Province (25.41%), and air masses from the southern part of J Province and the East China Sea (25.41%). Therefore, the spring is affected by the transportation of pollutants in provinces A, S, northeastern China, and northern China, and the summer and autumn are mainly affected by clean air masses, making the concentration of VOCs in the L area in spring significantly higher than in summer and autumn.

Figure 11 shows that the VOCs concentration (36.81~58.23 μg·m⁻³) of a city in the spring of 2018~2019 (April~May) was significantly higher than that of summer and autumn (June~September) (34.34~53.95 μg·m⁻³) for further exploration reasons.

It can be seen from Fig. 12 that the VOCs in the urban atmosphere mainly come from human activities. Human activities have a certain regularity, and there are certain working hours and rest periods every week. Therefore, the emission of air pollutants also reflects the weekend effect to a certain extent. In most studies, NOₓ, O₃, VOC, SO₂ and other gas pollutants have specific weekend phenomena. Moreover, the tourism industry in this city is also very developed. According to statistics, the city reached 38.06 million in 2018 and 42.07 million in 2019, an increase of 12.2% over last year, and the proportion of self-driving tourists continues to increase. Therefore, based on the concentration levels of VOCs in the atmosphere during the observation period from 2018 to 2019 in different functional areas of a certain city, a comparison chart of the concentration between weekdays and weekends was made. Both urban and industrial areas have higher working-day concentrations than suburban concentrations, and the characteristic of industrial areas is more obvious. From April to September 2018 to 2019, the working-day concentrations (32.93~59.95 μg·m⁻³) are higher than the weekend concentrations (28.57~46.31 μg·m⁻³).

It can be seen from Table 7 that the lower the atmospheric temperature, the lower the humidity and the wind speed, the higher the concentration of VOCs. High air pressure is generally stable, and it is not conducive to spreading. Due to its special geographical conditions, the Hugou sampling site is surrounded by mountains on three sides. The correlation between VOCs concentration and meteorological conditions is different from other sampling sites, which is mainly manifested by the difference in the correlation between VOCs concentration and temperature, humidity, and air pressure, which is positively correlated with temperature and humidity, and negatively correlated with air pressure, that is, around the Hugou sampling point, under normal circumstances, the higher the atmospheric temperature and humidity, the lower the wind speed, and the higher the air pressure, the higher the concentration of VOCs.

### Activity levels and key active components of VOCs in coastal atmosphere

It can be seen from Table 8 that the photochemical reaction activity of various VOCs in the atmosphere is very different,
and the contribution to the formation of O3 is also different. Therefore, analyzing the photochemical reactivity of various VOCs components in the atmosphere and finding the main active components that further contribute to the production of O3 is an important guide for the study of VOCs emission control strategies. Calculating the OFFP of VOCs in each sampling point during the observation period, the total ozone generation potential of VOCs in each sampling point is 89.9~133.08 μg·m⁻³, of which aromatic hydrocarbons contribute the most.

Starting from Fig. 13, the contribution of urban olefin OF is much higher than that of industrial areas, and the ozone generation potential of urban ethylene and propylene is significantly higher than that of industrial areas and suburbs. Ethylene and propylene are products of incomplete combustion, which are mainly related to vehicle emissions. The emissions of urban vehicles are much higher than those of industrial areas and suburbs, and the possibility of olefin production is higher than that of industrial areas and suburbs. The top 10 species are basically the same, mainly aromatic hydrocarbons (m-xylene, p-xylene, 1, 3, 5-trimethylbenzene, 1, 2, 4-trimethylbenzene and o-xylene), olefins (ethylene and propylene), and aldehydes and ketones (formaldehyde and acetaldehyde). Aromatic hydrocarbons are mainly derived from automobile and industrial emissions. The concentration and OLP of aromatic hydrocarbons in urban and industrial areas are significantly higher than those in suburban areas. The sources of aldehydes and ketones are relatively complex, including primary emissions from automobiles and industries on the one hand, and secondary products from photochemical reactions on the other. Low-molecular-weight aldehydes and ketones are the main causes of O3. Formaldehyde and acetaldehyde have a greater contribution to the city’s OFFP. Therefore, generally speaking, the production of O3 can be effectively controlled through the control of urban vehicles and industrial emissions.

It can be seen from Fig. 13 that the OFP contribution of aldehydes and ketones increased due to the higher concentration of aldehydes and ketones in April, so OFP was higher. In the remaining months, OFP in urban areas, industrial areas, and suburbs was relatively stable, with small changes. They were urban areas: 104.16~116.72 μg·m⁻³; industrial areas: 94.11~130.36 μg·m⁻³; suburbs: 71.70~96.16 μg·M⁻³, the contribution of different chemical components to OFP is relatively stable, all aromatic hydrocarbons are the largest, followed by aldehydes and ketones. From April to October 2019, the trend of changes in urban and industrial areas was relatively consistent, and OLP was significantly higher in May, July, and August than in other months.

It can be seen from Fig. 15 that the top ten species of SOA can also be seen that the top ten species in urban areas, industrial areas, and suburbs are completely the same, with slightly different rankings, including C10 (para-diethylbenzene and 1-ethyl-3-methyl). Benzene) aromatic hydrocarbon species and isoprene. The contribution of formaldehyde and acetaldehyde is higher due to their higher concentrations. The SOA contribution of m-xylene and p-xylene is the largest in the industrial zone.

As shown in Fig. 17, the ratio (E/X) of ethylbenzene (E) and xylene (X) is used to characterize the aging age of the air mass. This method has been used many times to study the photochemical consumption of VOC. From the scattering point of E/X and the maximum net increase in ozone per day (ΔO3), it can be seen that the E/X ratios of cities, industries, and suburbs are consistent, and most of them are in the range of 0.2-0.5, which is similar to ΔO3. There is no obvious relationship.

It can be seen from Fig. 18 that ozone in different functional areas of a city mainly comes from the transmission in the SE-SW direction, with little contribution from local generation, which further confirms that there is no obvious positive correlation between the ozone increase in a city and the photochemical consumption of VOCs.
Discussion

The expressive form of Latin dance performing arts

The expressive forms of Latin dance

Although Latin dance is a kind of sports. Latin dance is a kind of visual aesthetic art. To observe the artistic expression of Latin dance from an aesthetic perspective, the visual object is the body shape and graceful posture of the contestants. Based on the theoretical basis of reference and absorption of the existing research results, coupled with some research on the expressions of Latin dance artistic expression, several expressions of Latin dance artistic expression were summarized and formulated into questionnaires and surveys (Klitzsch et al. 1987).

The main forms of expression of Latin dance art include form expression, movement expression, music expression,

Fig. 14 The top ten OFP species and their corresponding concentrations in urban areas, suburbs and industrial areas of a city
costume expression, and so on. About 95% of people chose form expression, ranking first; 133 people chose action expression, ranking second; third was music expression and costume expression, each accounting for 81% and 71%.

**Formal expressiveness**

Formal expressiveness is the regular combination of music, body lines, clothing colors, and other factors used in Latin dance, which are expressed in life in a concise and clear way, but they are expressed in a more implicit way. The form of the content. The expressive power of different Latin dance groups is different. Although there are many internal connections between different groups of competitions, the differences in performance skills caused by the differences in age and gender in the groups will eventually lead to their expressiveness (Lee 2005). The styles of Latin dance competitions and performances are very different. Different dance styles and styles will make the skills and styles different (Lee et al. 2004). The formal Latin dance competitions include women’s singles, doubles, mixed men and women, children’s elite groups, the young group and the old group have different performance methods (Liu et al. 2016). Latin dance appears in the viewer’s field of vision in complex and diverse forms, conveying a strong visual experience to the audience. Formal expressiveness plays an important role in Latin dance performances and competitions (Malekzadeh et al. 2019). In Latin dance, artistic expressiveness, formal expressiveness should be emphasized. Formal expressiveness increases the artistic form of Latin dance and enhances the attractiveness of dance aesthetics. The form expressiveness of Latin dance not only reflects the entire choreography, but the artistic expressiveness of a single movement can also reflect the unique expressiveness of Latin dance (Mirmooodi et al. 2020).

**Musical expressiveness**

Musical expressiveness is the ability of contestants to express the connotation of music by using Latin dance movements. It is an important form of expression of Latin dance art. It can play a variety of roles. Musical expressiveness is the vitality of dance performance (Moawad 2013). Music in Latin dance is not only the main way for contestants to show artistic expressiveness, but also the perfect expression of many inner subtle thoughts and emotions. Musical expressiveness is a kind of artistic expressiveness. It not only makes physical activities more flexible and rhythmic, but also makes the contestants feel emotional and emotional (Moawad et al. 2016). Different types of Latin dance have different musical time values. The music used in the rumba performance is different from other music. Latin rumba music is comfortable and soft, while the other four dances are faster-paced music (Moore and Grayson 1991). Latin dance music has its own unique characteristics. The drums will be particularly prominent in the rhythm of the music, the rhythm will be clearer, and people are full of motivation. This is the particularity of Latin dance music. Latin dance has high requirements for the performance of the contestants, which requires the contestants to have strong physical and psychological qualities, and they need to rely on the players to properly process the rhythm of the music, and coordinate the coordination between the partners and between the dance movements and the rhythm of the music. Relationship, showing a sense of the harmonious coexistence of music and dance (Naghibi and Moradi Dashtpagerdi 2016).

**Analysis of factors affecting the artistic expression of Latin dancers**

**Short training time for basic quality exercises**

Among the many training factors, the basic quality practice time is the most important but often overlooked factor. Among the 150 Latin dance teachers surveyed, about 97.94% of the teachers preferred the basic quality. Among the many factors that affect the artistic expression of the contestants, the basic quality practice time is the most important. The time of basic quality practice is the basis for cultivating the artistic expression of Latin dance, which is mainly reflected in two aspects, the basic steps of Latin dance and...
the training time of ballet body training (Naghibi et al. 2020). Especially in the age group of 6-16 years old, grasping the golden period of Latin dance training for the contestants, combined with the strengthening of the basic quality practice time, consolidates a solid foundation for the training of the artistic expression of the contestants, and is conducive to the perfection of the Latin dance contestants in the future (Natarajan and Sudheer 2019). Play and get excellent results. The artistic expression training process of Latin dance is the comprehensive understanding of the body of the contestants. It is understood that in addition to completing the Latin dance learning content of the above-mentioned professors, most Latin dance teachers are also assigned a lot of other work, participating in various learning conferences, etc. (Nourani et al. 2014). The amount of time for other learning content practice far exceeds the basic Latin dance basics. Time for quality training. The

Fig. 16 The top ten SOA species and their corresponding concentrations in urban areas, suburbs, and industrial areas of a city

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time for Latin dancers to practice basic quality is very full but not full. In the teaching, often teach the match combination to occupy a lot of time. Valuable learning time is occupied by these cumbersome things, and the cultivation of artistic expression is also affected.

**Body language performance ability**

Latin dance is a visual performance art full of emotions with body movements as the carrier, and it requires the contestants to have a wealth of relevant theoretical knowledge. Latin dance includes two training methods, sports and dance, it requires a combination of internal and external strength. It requires Latin dancers not only to have super-high muscle strength conditions, but also to have good external performance. The body language performance ability plays a key role in the process of expressing the artistic performance of the players. The players are required to have basically complete movements, accurate rhythm points, and their own understanding of the movements on the court. The head position and foot position of the body performance must conform to the performance characteristics of Latin dance, the body shape should not be too exaggerated and adult, and the movements should be proficient and fluid (Pakparvar et al. 2018). At the same time, the Latin dance body language should focus on the combination of cuteness, neatness and self-confidence. The body language performance of the contestants in the competition performance must not only reflect the player’s original agility, but also make the use of the movement strength just right. It is also an important factor influencing the artistic expression of Latin dance.

**Ways of cultivating Latin dancers’ performance and artistic performance**

**Factors of partner fit**

Latin dance has different categories in competitions and performances. The dance partner plays a vital role in the training of the contestants and the cultivation of artistic expression. There is a harmonious relationship with a tacit partner in cultivating the artistic expression of Latin dance. Very important, in Latin duet dance, the cooperation of the partners is also an indispensable factor that affects the artistic expression of Latin dance. The design of the duo’s dance moves is different from that of the single group. Special consideration should be given to the coordination of the dance partners during the choreography. Contestants with poor duo coordination should design simpler duo movements. Latin dance pairs have different coordination between the duo. In cooperation with each other, it

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**Fig. 17** Scatter plots of $\Delta O_3$ and E/X during the observation period of 2018–2019 in urban areas, industrial areas, and suburbs of a city

**Fig. 18** The ozone wind rose diagram during the observation period of 2018–2019 in urban areas, industrial areas and suburbs of a city

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is necessary to show personal style and color, and to present the characteristics of the duet dance to the audience and referees. Latin dance needs to be guided by the male partner’s force during the performance, while the woman has to passively make the position of hands and feet, and do the next step after the partner sends out the signal. Both parties need to cooperate passively and actively with each other and give way to each other. Her own dance moves are performed well, showing the unique charm and artistic expression of Latin dance. Among the factors at the partner level of Latin dancers, the most fundamental reason that affects the performance of the artistic expression of the contestants is not the lead and cooperation of the professional and technical level, the emotional exchanges between the male and female contestants, the difference in the body of the two sides, etc., but the difference between the two sides. Emotional conflict, and the mutual cooperation between the dancers symbolizes the refinement of the contestants’ artistic expressiveness and the beauty of aesthetic art.

Pay attention to the basic skills and basic quality exercises of Latin dance

The secret for Latin dancers to win in performances and competitions is the solid foundation training at school. First of all, you can use the basic ballet training method when learning the basic skills of Latin dance. On the one hand, it can enhance the upright and upright temperament of the contestant. On the other hand, it can also enhance the gentle line sense of the contestant, including exercising every part of the body, graceful curves and sports. The sensitivity. Body flexibility is the degree of movement of the head, shoulders, hands, trunk, hips, waist, and abdomen. Exercises include multi-angle head rotation exercises and rapid swing exercises, shoulder joint flexibility exercises and foot extension exercises, as well as some bounce combination training and coordination training. The waist is one of the most critical training parts in Latin dance. Usually, the flexibility of the waist is practiced by twisting the waist, carrying the waist, lowering the waist, and stretching the waist to lay a good foundation for the later Latin dance combination learning.

The secret is to enhance the practice time for each basic step. The basic steps of Latin dance are divided into different levels of difficulty. Different basic steps require different training plans for targeted training. The focus is on the soft style of hip changes to reflect the body’s line texture, such as the use of instantaneous leg strength. Lively style, while the samba is only the ankle strength and the rhythm of the knee to attract the audience and referees, the cowboy is a slightly faster musical rhythm clock to show the dynamic musical art rhythm.

Conclusion

As a major air pollutant, ozone may endanger human health and ecosystems in terrestrial areas. In Chinese cities, ozone often becomes the main air pollutant in summer. According to the analysis of air quality in a certain area in recent years, the ozone concentration in a certain area has gradually increased from 2016 to 2018. Unlike other cities in China, the annual change of ozone in a certain region has a high concentration in spring and a lower concentration in summer than in other cities in China. As a reserve force for the development of Latin dance sports, Latin dancers are also a key to the success of Latin dance education at the artistic level. With the overall increase in the country’s attention to sports and art education, the overall artistic expression of Latin dancers has been greatly improved. However, due to the influence of teachers’ teaching ability and teaching environment, as well as the lack of attention of school administrators to artistic expression, the state of cultivation of Latin dancers’ artistic expression is not optimistic. As an important part of the Latin dance competition, artistic performance not only affects the quality and results of the Latin dance competition, but also relates to the stable construction of the Latin dance team and the overall level of the development of Latin dance art education. Therefore, it is necessary to pay attention to and improve the artistic performance of Latin dance, which will become a realistic issue that cannot be ignored and must be paid attention to. While investigating and researching the current situation of Latin dancers’ artistic performance training, this paper uses five research methods including questionnaire surveys and expert interviews to investigate and analyze the influencing factors of Latin dancers’ artistic performance, and put forward corresponding countermeasures.

Declarations

Conflict of interest  The author declares no competing interests.

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