



2023

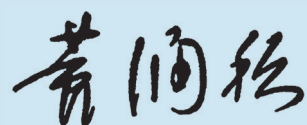
**Report on the State of the
Ecology and Environment in China**

**Ministry of Ecology and Environment,
People's Republic of China**




The 2023 Report on the State of the Ecology and Environment in China is hereby released in accordance with the Environmental Protection Law of the People's Republic of China.

Minister of Ecology and Environment,
People's Republic of China




May 24, 2024





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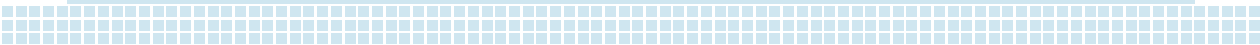


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Summary

The year 2023 was the first year for the comprehensive implementation of the spirit of the 20th National Congress of the Communist Party of China (CPC), and also a milestone in the history of ecological and environmental protection. In the face of the grave and complex situation of ecological and environmental protection, the Ministry of Ecology and Environment, together with relevant departments and local governments, followed the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era and especially Xi Jinping Thought on Ecological Civilization, comprehensively implemented the guiding principles of the 20th CPC National Congress, the Second Plenary Session of the 20th CPC National Congress, and the spirit of the National Conference on Ecological and Environmental Protection. Ministry of Ecology and Environment, earnestly fulfilling its duties and responsibilities, pushed forward high-standard protection of ecology and environment in tandem the high-quality economic development in the drive to build a beautiful China. As a result, China's ecological and environmental governance achieved new progresses, and the overall ecological and environmental quality kept improving steadily in China.

The ambient air quality across the country has been steadily improving. The concentration of fine particulate matter (PM_{2.5}) in cities at the prefecture level and above was 30 $\mu\text{g}/\text{m}^3$, 3 $\mu\text{g}/\text{m}^3$ less than the annual target. The proportion of days with excellent and good air quality was 85.5%, and the figure was 86.8% after deducting the days with abnormally high dust levels, 0.6 percentage point better than the annual target.

The quality of the surface water across the country continued to improve. The proportion of sections meeting excellent and good water quality (Grade I to III) was 89.4%, an increase of 1.5 percentage points from 2022; and the proportion of sections with water quality worse than Grade V was 0.7%, the same as that of 2022. The water quality of the main stream of the Yangtze River and the Yellow River remained stable at Grade II. The overall quality of groundwater in China remained stable, with 77.8% groundwater sites meeting water quality of Grade I to IV.

The water quality of sea areas under jurisdiction of China remained stable with an upward trend. The sea areas meeting Seawater Quality Standard Grade I accounted for 97.9% of the total sea areas under jurisdiction, an increase of 0.5 percentage point compared to that of 2022. The water quality of nearshore sea areas was getting better on the whole, with 85.0% of the total sea areas meeting excellent and good water quality (Grade I & II), up by 3.1 percentage points from 2022; and the proportion of sea areas with quality inferior to Grade IV seawater quality was 7.9%, down by 1.0 percentage point from 2022.

Nationwide, soil environmental risks were largely brought under control, and the trend of aggravating soil pollution was preliminarily curbed. The soil environment of agricultural land was generally stable, and the safe use of key construction land was guaranteed.

The natural and ecological condition was generally stable in China. The Ecological Quality Index (EQI) value was 59.6, and the ecological quality met Grade II standard, showing no significant change compared with that of 2022.

The overall quality of urban acoustic environment improved across China. In functional zones, the daytime and nighttime acoustic environment quality attainment rates were 96.1% and 87.0% respectively, up by 0.1 percentage point and 0.4 percentage point respectively compared with that of 2022.

The condition of nuclear and radiation safety generally maintained stable in China. The overall radiation environment quality across the country and that in the vicinity of key nuclear and radiation facilities were both generally good.

Special Column

Comprehensively promoting the development of a Beautiful China

In July 2023, the CPC Central Committee convened the National Conference on Ecological and Environmental Protection, which General Secretary Xi Jinping attended and delivered an important speech, giving overarching instructions on the current situation of ecological civilization, the major relationships requesting proper handling on the new journey of ecological civilization, and the strategic tasks and major initiatives to comprehensively building a beautiful China. His speech provided fundamental guidance for further strengthening ecological and environmental protection and promoting the development of a beautiful China. In December 2023, the CPC Central Committee and the State Council issued the Opinions on Comprehensively Promoting the Development of a Beautiful China, stipulating the objectives and tasks for building a beautiful China in the next five years and up to 2035.

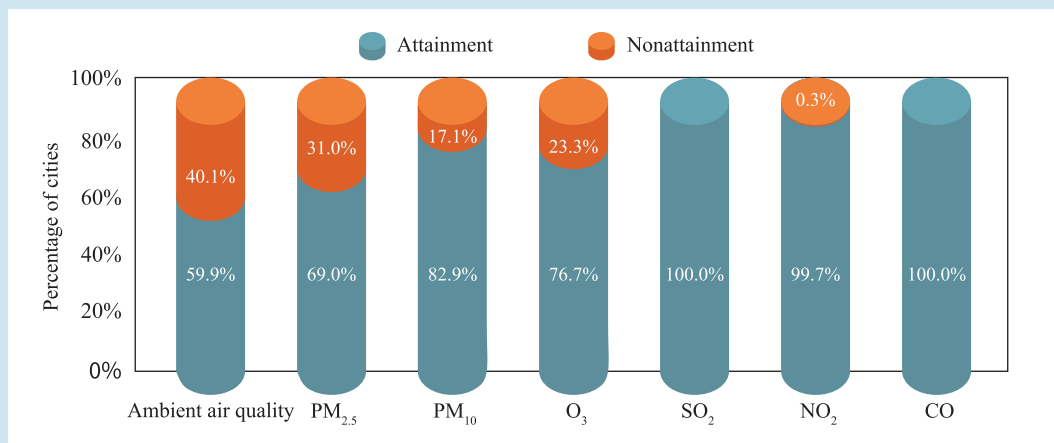
I . Atmospheric Environment

1. Ambient air quality

(1) Air quality across China*

In 2023, out of all the 339 cities at and above prefecture-level (APL cities) (hereinafter referred to as the 339 cities) across the country, 203 met national air quality standard**,

accounting for 59.9% of the total; 136 cities failed to meet national air quality standard, taking up 40.1%. Among the 339 cities, 105 cities failed to meet the standard for fine particulate matter (PM_{2.5}), accounting for 31.0%; 79 cities failed to meet the standard for ozone (O₃), accounting for 23.3%; 58 cities failed to meet the standard for inhalable particulate matter (PM₁₀), accounting for 17.1%; 1 city failed to meet the standard for nitrogen dioxide (NO₂), accounting for 0.3%; all cities met the standards for carbon monoxide (CO) and sulfur dioxide (SO₂).



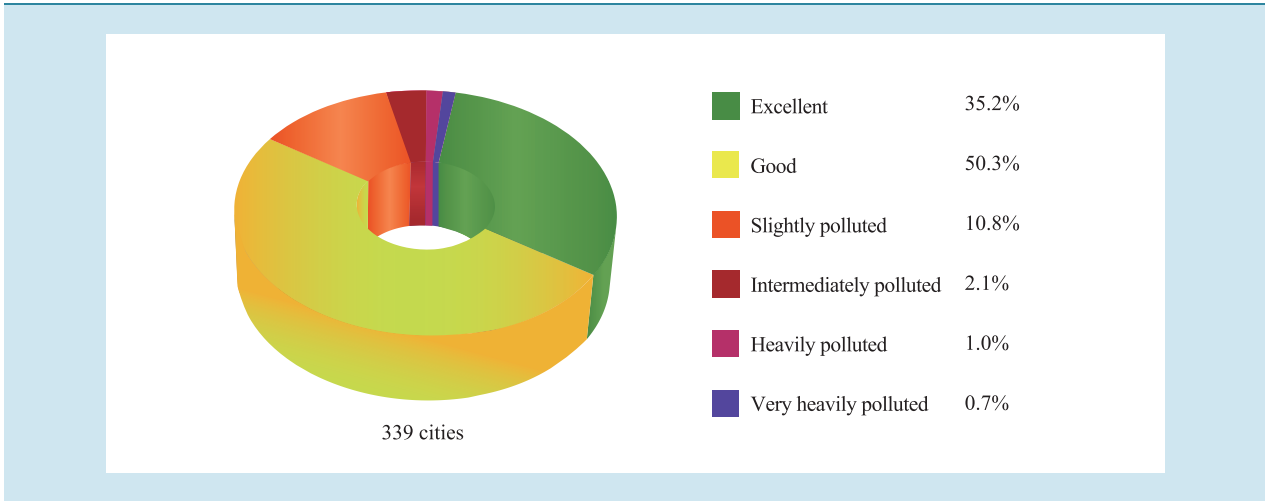
Air quality of cities across China in 2023

*During the 14th “Five-Year” Plan period, the national air quality monitoring scope includes a total of 1,734 national urban ambient air quality monitoring sites, covering 339 cities at and above prefecture-level (including municipalities, prefecture-level cities, regions, autonomous prefectures and leagues). The assessment of urban ambient air quality was based on the Ambient Air Quality Standard (GB 3095-2012) and the revision list, Technical Regulation for Ambient Air Quality Assessment (Trial) (HJ 663-2013), the Supplementary Regulation on Urban Air Quality Assessment Affected by Sandstorm Weather Process and Letter on Issues Related to Excluding the Impact of Sandstorm Weather.

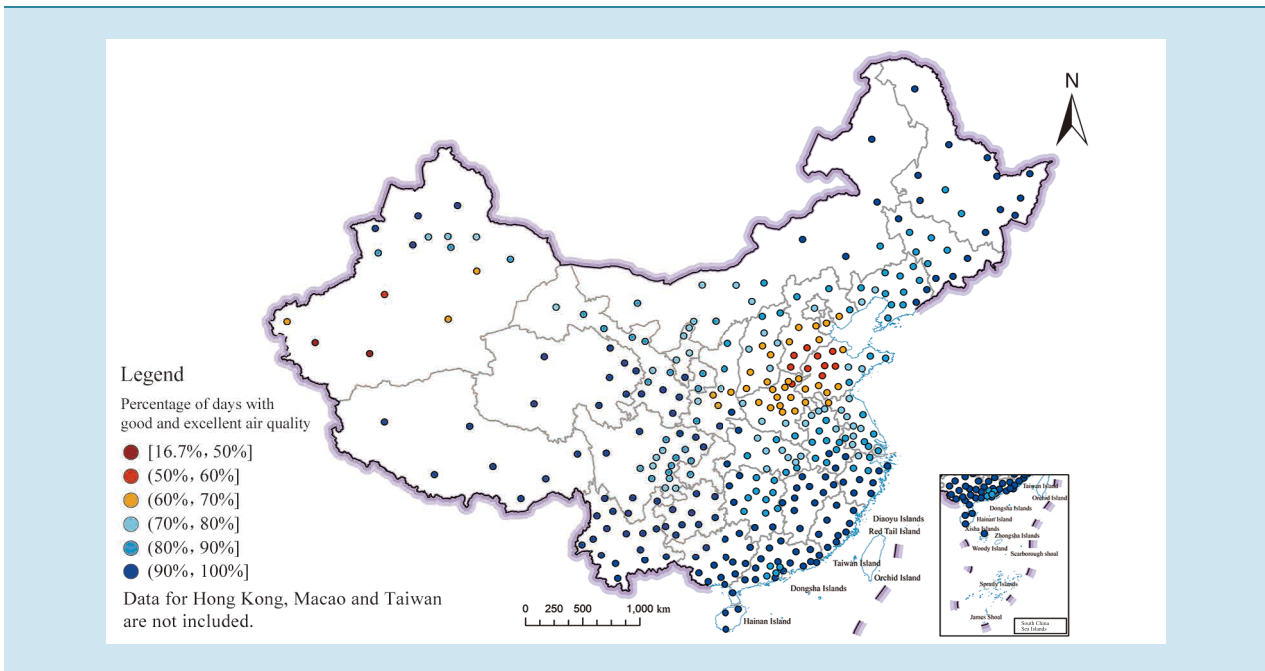
**When the concentrations of the six pollutants involved in the assessment all meet the standards, the ambient air quality is deemed to meet the standards. PM_{2.5}, PM₁₀, SO₂ and NO₂ were evaluated according to the annual average concentration, and O₃ and CO were evaluated according to the percentile concentration. According to the Technical Regulation for Ambient Air Quality Assessment (Trial) (HJ 663-2013), effective daily maximum 8-hour average concentration of O₃ and 24-hour average concentration of CO in the calendar year are ranked from small to big, then the percentile value at 90% with the daily maximum 8-hour average concentration of O₃ is compared with the daily maximum 8-hour average concentration of O₃ of national standard date to judge if O₃ concentration meets the standard; and the percentile value at 95% with the 24-hour average concentration of CO is compared with the standard 24-hour CO concentration limit to judge if CO concentration meets the standard.

Across China, the average percentage of days of the 339 cities meeting ambient air quality standard* ranged between

16.7%~100%, with an average rate of 85.5%** (the figure was 86.8% after deducting the days with abnormally high



Percentage of days of various ambient air quality standards of cities across China in 2023



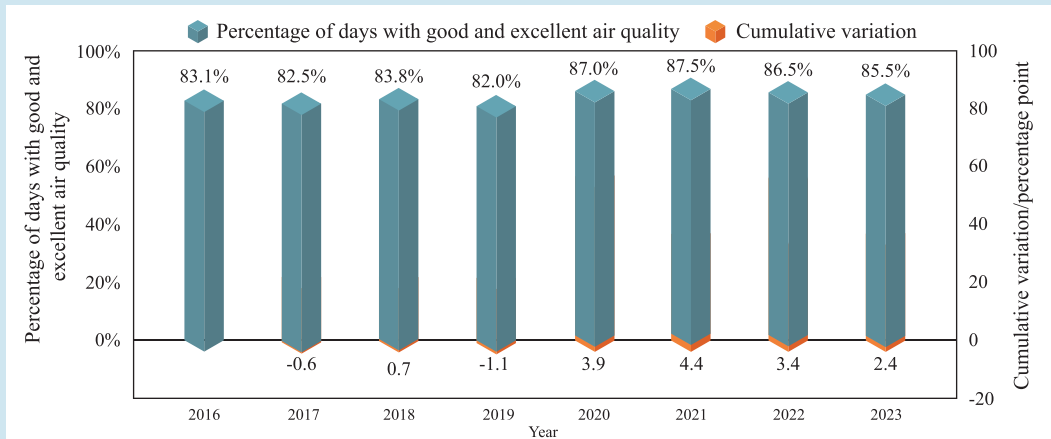
Percentage of days with good and excellent ambient air quality of cities across China in 2023

*It refers to the number of days with air quality index (AQI) ranging from 0~100, also referred to as attainment days.

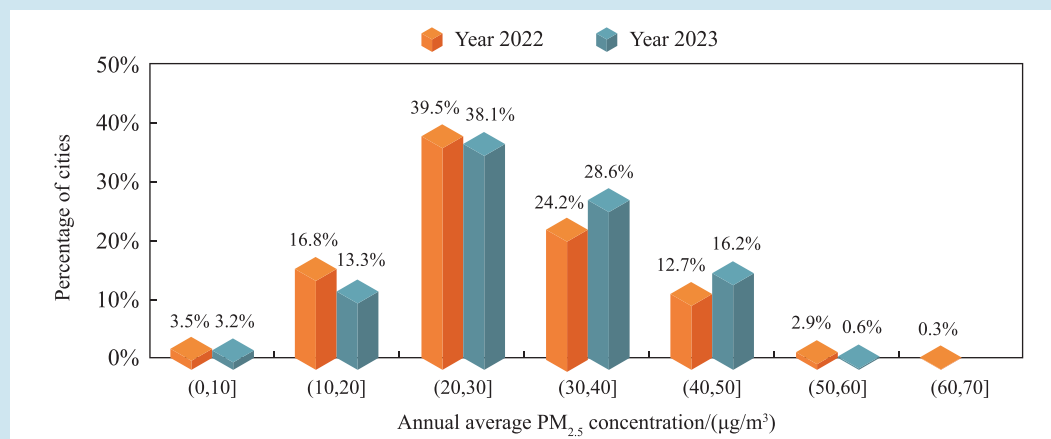
**All calculations of proportions in this Report are the quantity of a certain item divided by the total number. The rounding of values is based on the Rules of Rounding off for Numerical Value and Expression and Judgment of Limiting Values (GB/T 8170-2008). Therefore, it is possible that the combined proportion of two or more categories is not equal to the sum of the proportions of each category, that the sum of the proportions of all categories is not equal to 100%, or that the sum of the percentage changes is not equal to 0.

dust levels). The ratio of average number of days failing to meet the standard* took up 14.5% (days failing to meet the standard due to sand-dust weather took up 3.3%, and days with heavy pollution and above took up 0.8%), among which,

the number of days with O₃, PM_{2.5}, PM₁₀, and NO₂ as the primary pollutant** took up 40.1%, 35.5%, 24.3%, and 0.2% respectively. There was no occurrence of nonattainment days with SO₂ and CO as the primary pollutant.



Proportion of days with good and excellent ambient air quality and cumulative changes in cities across China from 2016 to 2023



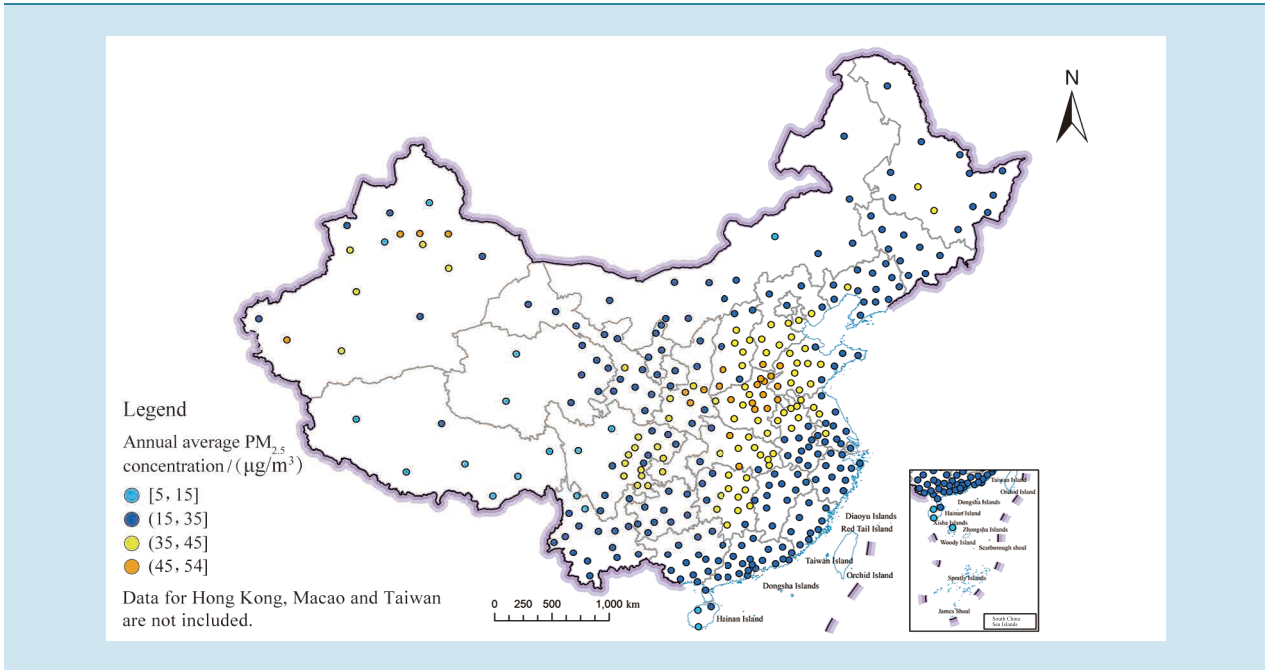
Annual average PM_{2.5} concentration in cities across China in 2023 and interannual variation

*The amount of nonattainment days refers to the number of days with AQI > 100. Among them, AQI within the range of 101~150 indicates slight pollution, 151~200 indicates intermediate pollution, 201~300 indicates heavy pollution and > 300 very heavy pollution.

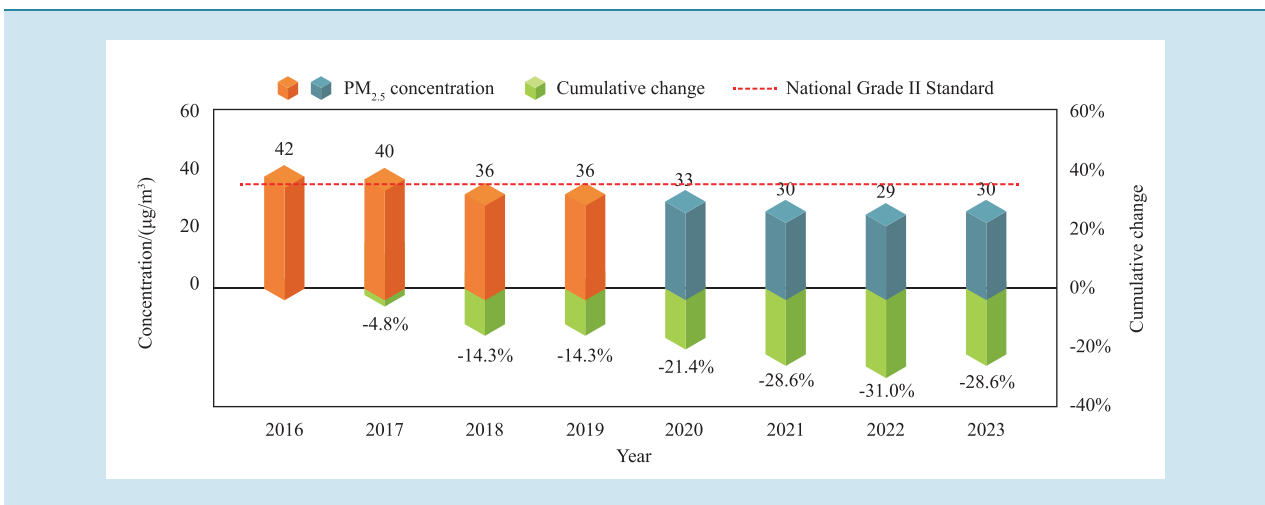
**When AQI > 50, the pollutant with the biggest individual AQI is the primary pollutant. The primary pollutants may contain two or more pollutants at the same time, so the sum of the percentage of days may exceed 100%.

From 2016 to 2023*, the proportion of days with good and excellent ambient air quality in cities across China rose from 83.1% to 85.5%, an increase of 2.4 percentage points.

The annual average concentration of PM_{2.5} in the 339 cities nationwide ranged from 5 to 54 µg/m³, with an average figure of 30 µg/m³, an increase of 3.4% from 2022.



Annual average PM_{2.5} concentration in cities across China in 2023

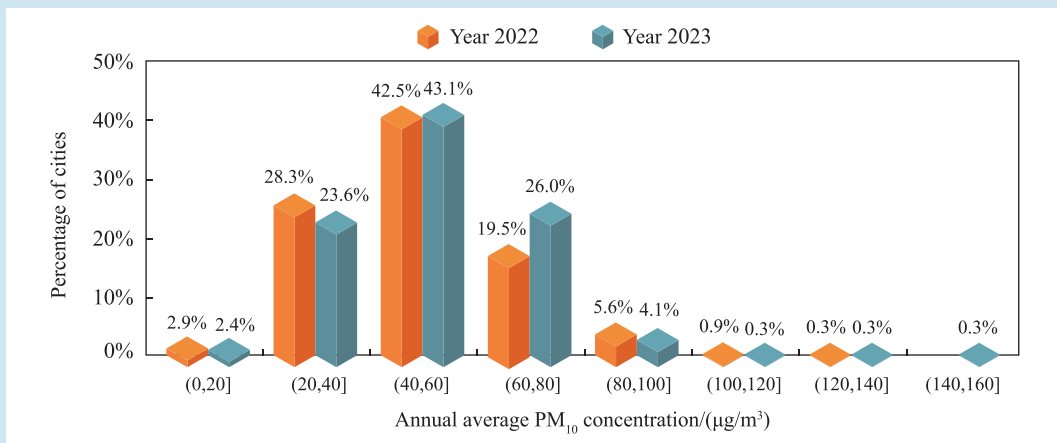


Average PM_{2.5} concentrations and cumulative changes in cities across China from 2016 to 2023

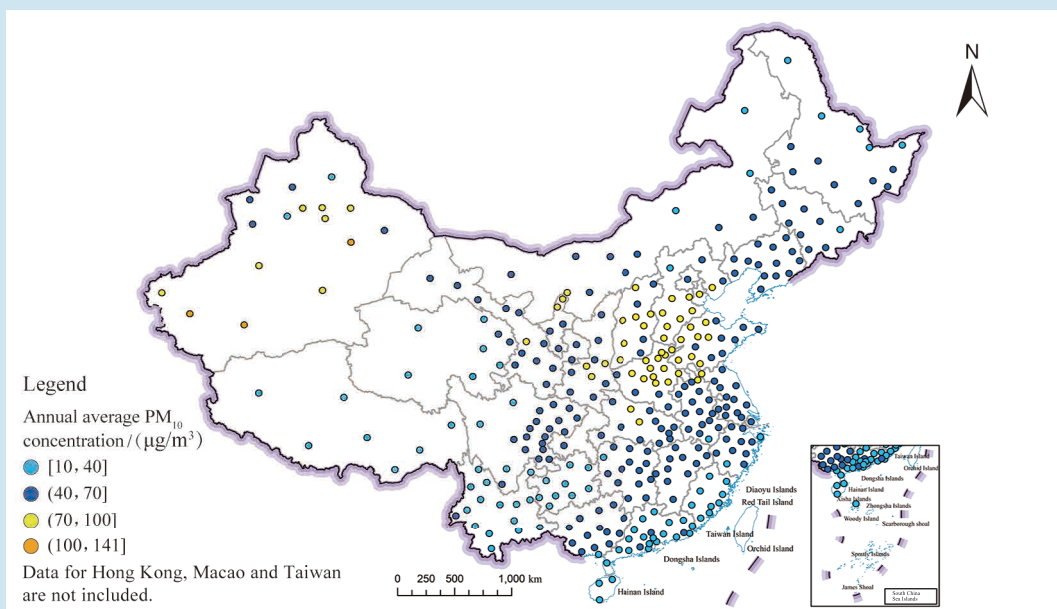
*All data are real-time data.

From 2016 to 2023, the average $PM_{2.5}$ concentration in cities across China decreased from $42 \mu\text{g}/\text{m}^3$ to $30 \mu\text{g}/\text{m}^3$, down by 28.6%.

The annual average concentration of PM_{10} in the 339 cities nationwide ranged from 10 to $141 \mu\text{g}/\text{m}^3$, with an average figure of $53 \mu\text{g}/\text{m}^3$, an increase of 3.9% over 2022.



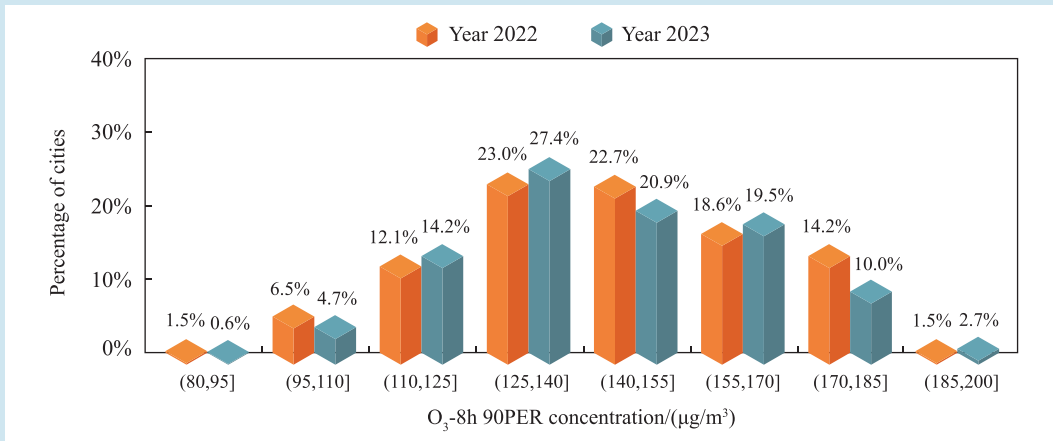
Annual average PM_{10} concentration in cities across China in 2023 and interannual variation



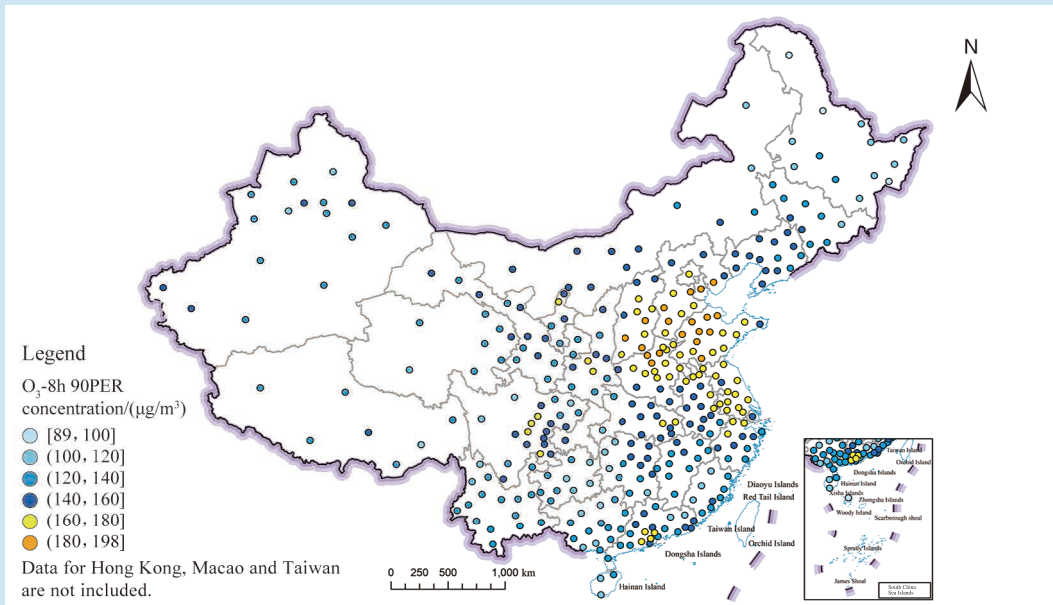
Annual average PM_{10} concentration in cities across China in 2023

Of the 339 cities nationwide, the 90th percentile of the daily maximum 8-hour average concentration of O₃ ranged

from 89 to 198 μg/m³, with an average of 144 μg/m³, a decrease of 0.7% from 2022.



O₃-8h 90PER concentration in cities across China in 2023 and interannual variation

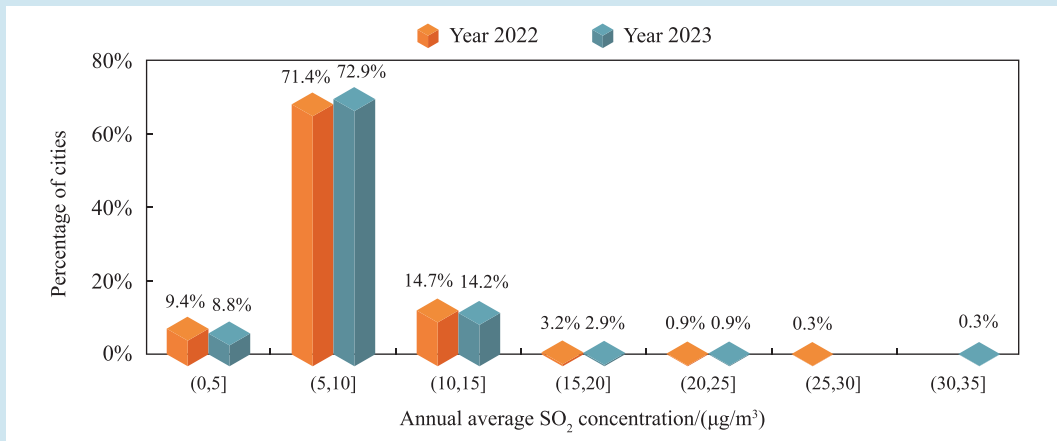


O₃-8h 90PER concentration in cities across China in 2023

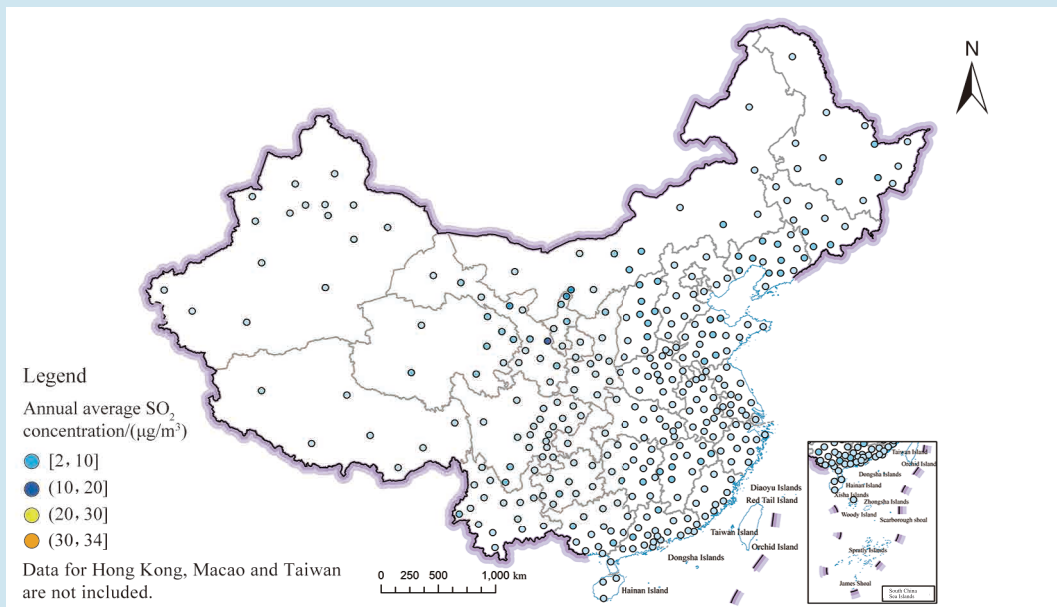
The annual average concentration of SO₂ in the 339 cities nationwide ranged from 2 to 34 μg/m³, with an average of 9

μg/m³, which was the same as that of 2022.

The annual average concentration of NO₂ in the 339 cities

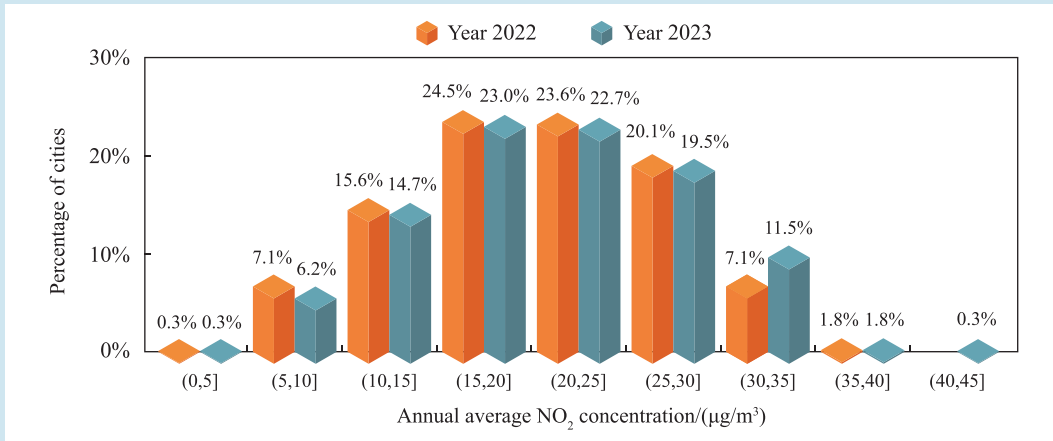


Annual average SO₂ concentration in cities across China in 2023 and interannual variation

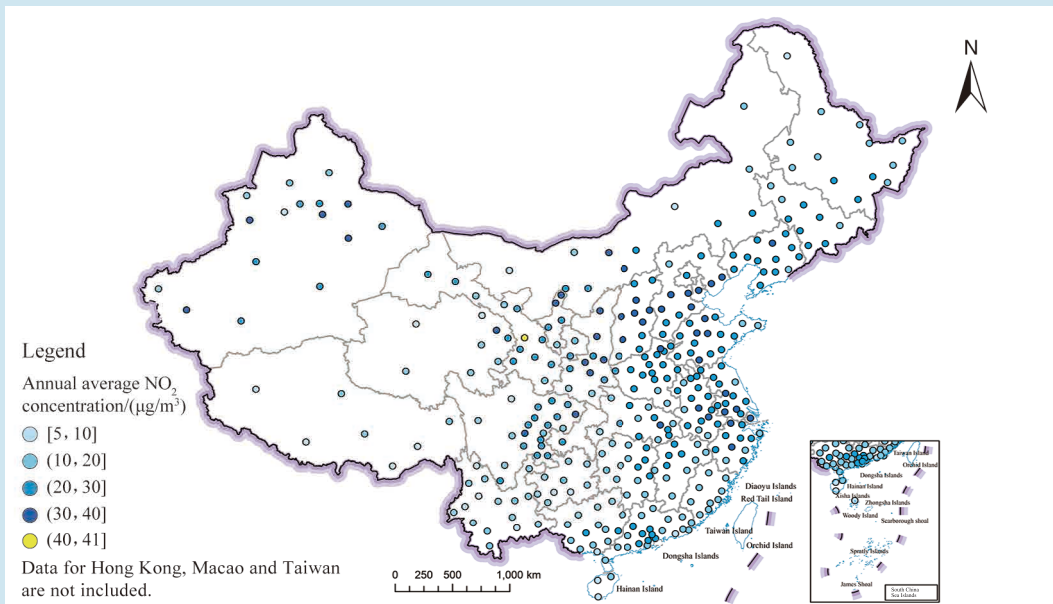


Annual average SO₂ concentration in cities across China in 2023

nationwide ranged from 5 to 41 $\mu\text{g}/\text{m}^3$, with an average of 22 $\mu\text{g}/\text{m}^3$, an increase of 4.8% over 2022.



Annual average NO₂ concentration in cities across China in 2023 and interannual variation



Annual average NO₂ concentration in cities across China in 2023

(2) Key regions

Beijing-Tianjin-Hebei and surrounding areas* In 2023, the ratio of the number of days of “2+26” cities in Beijing-Tianjin-Hebei and surrounding areas meeting air quality standard fell within the range of 54.5% ~ 76.7% with the average rate of 63.1%, down by 3.6 percentage points compared with that of 2022. The average number of nonattainment days accounted for 36.9% of the total (the average number of nonattainment days due to sand-dust weather accounted for 5.3%), 26.9%, 6.4%, 2.4% and 1.2% of which was of slight pollution, intermediate pollution, heavy pollution and very heavy pollution respectively. The share of heavy pollution days and above increased by 1.4 percentage points from 2022.

The average concentration of ambient PM_{2.5} in cities in Beijing-Tianjin-Hebei and surrounding areas was 43 µg/m³, 2.3% lower than that of 2022; the average concentration of PM₁₀ was 75 µg/m³, 1.3% lower than that in 2022; the 90th percentile of the daily maximum 8-hour average concentration of O₃ was 181 µg/m³ on average, up by 1.1% from 2022; the average concentration of SO₂ was 9 µg/m³, down by 10.0% from 2022; the average concentration of NO₂ was 30 µg/m³, 3.4% higher than that in 2022; the 95th percentile of the 24-hour average concentration of CO was 1.3 mg/m³, the same as that of 2022.

The Yangtze River Delta** In 2023, 41 cities in the Yangtze River Delta witnessed 66.0% ~ 98.9% share for the number of ambient air quality attainment days with the average ratio of 83.7%, up by 0.7 percentage point compared with that of 2022. The average number of nonattainment days accounted for 16.3% of the total (the average number of nonattainment days due to sand-dust weather accounted for 2.1%), 13.8%, 1.6%, 0.6% and 0.3% of which was of slight pollution, intermediate pollution, heavy pollution and very heavy pollution respectively. The number of days of or inferior to heavy pollution was up by 0.7 percentage point compared with that of 2022.

The average concentration of ambient PM_{2.5} in cities in the Yangtze River Delta was 32 µg/m³, 3.2% higher than

that in 2022; the average concentration of PM₁₀ was 54 µg/m³, 3.8% higher than that in 2022; the 90th percentile of the daily maximum 8-hour average concentration of O₃ was 158 µg/m³ on average, down by 2.5% from 2022; the average concentration of SO₂ was 7 µg/m³, the same as that in 2022; the average concentration of NO₂ was 26 µg/m³, 8.3% higher than that in 2022; the 95th percentile of the 24-hour average concentration of CO was 0.9 mg/m³, the same as that of 2022.

Fenwei Plain*** In 2023, the percentage of the number of days with excellent and good air quality of 11 cities in the Fenwei Plain was within the range of 60.3% ~ 79.2% with the average rate of 67.4%, up by 2.2 percentage points compared with that of 2022. The average ratio of nonattainment days was 32.6% (the average ratio of nonattainment days due to sand-dust weather was 6.9%), 23.8% of which were of slight pollution, 4.6% of intermediate pollution, 3.0% of heavy pollution and 1.1% of very heavy pollution, and the number of days with air quality of or inferior to heavy pollution was up by 2.2 percentage points compared with that of 2022.

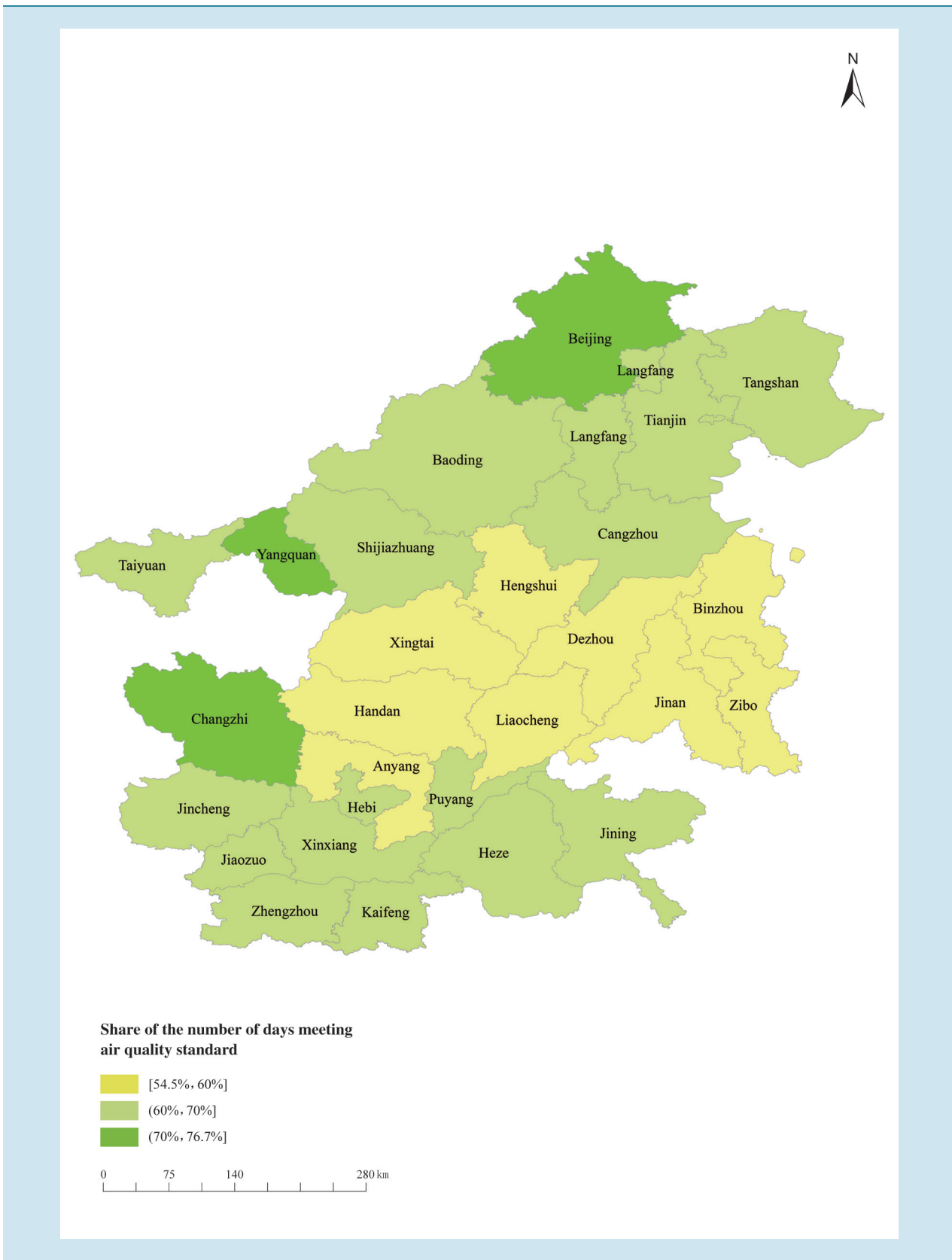
The average concentration of ambient PM_{2.5} in cities in the Fenwei Plain was 43 µg/m³, down by 6.5% from 2022; the average concentration of PM₁₀ was 78 µg/m³, 1.3% lower than that in 2022; the 90th percentile of the daily maximum 8-hour average concentration of O₃ was 167 µg/m³ on average, the same as that in 2022; the average concentration of SO₂ was 8 µg/m³, down by 11.1% from 2022; the average concentration of NO₂ was 31 µg/m³, the same as that in 2022; the 95th percentile of the 24-hour average concentration of CO was 1.3 mg/m³, the same as that in 2022.

Particulate Matter Composition In 2023, the automatic monitoring results of particulate matter compositions showed that of the ambient PM_{2.5} in cities in Beijing-Tianjin-Hebei and surrounding areas, the proportion of organic matter was 22.7%, nitrate 31.6%, sulfate 15.8%, ammonium salt 15.4%, chloride salt 3.3%, elemental carbon 2.8%, and other components 8.4%. Of the ambient PM_{2.5} in cities in the Yangtze River Delta region, the proportion of organic matter accounted for 27.8%, nitrate 27.2%, sulfate 13.3%, ammonium salt 13.2%, chloride salt 2.6%, elemental carbon 4.1%, and other components 11.8%.

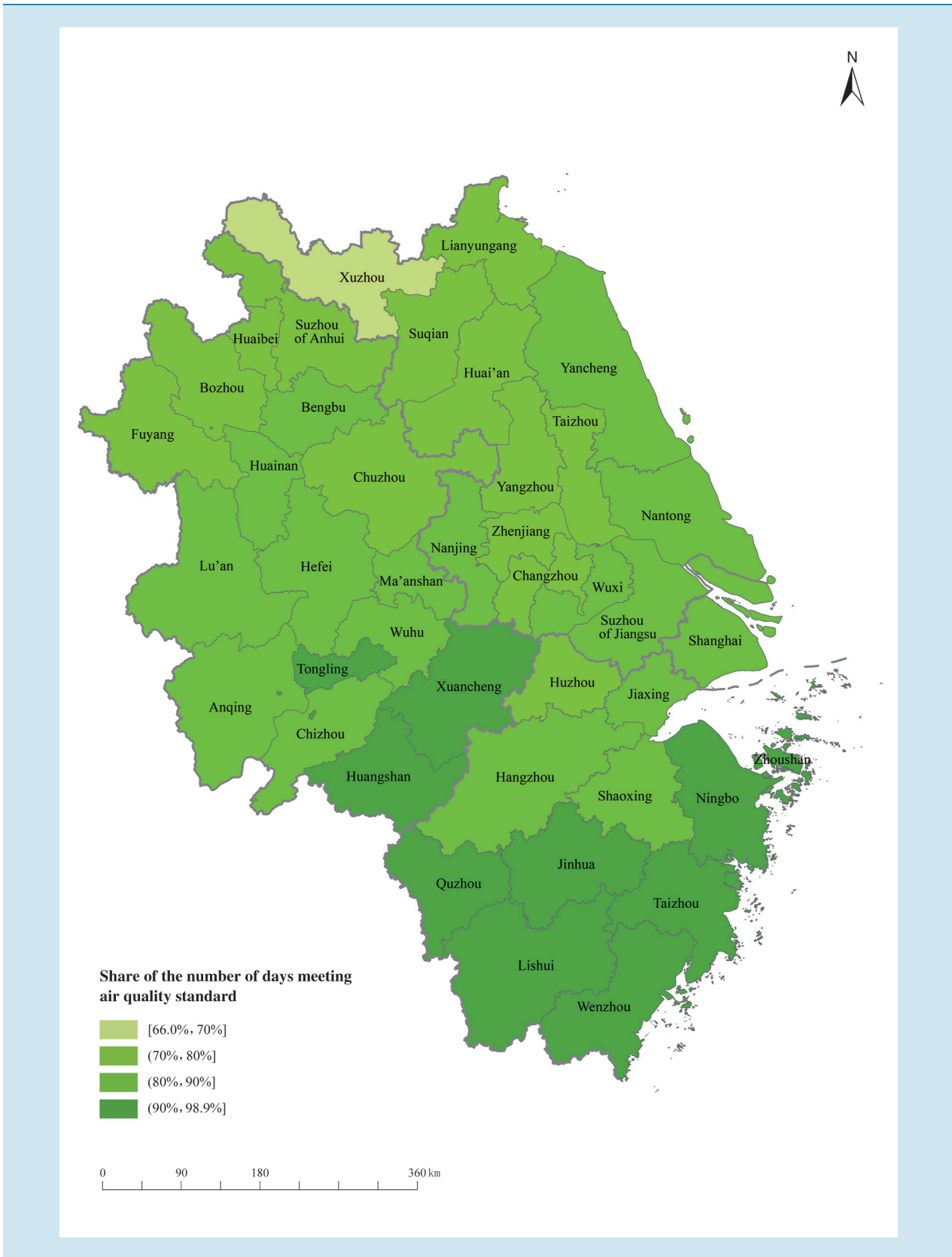
*Including Beijing Municipality, Tianjin Municipality, Shijiazhuang, Tangshan, Handan, Xingtai, Baoding, Cangzhou, Langfang and Hengshui in Hebei province, Taiyuan, Yangquan, Changzhi and Jincheng in Shanxi Province, Jinan, Zibo, Jining, Dezhou, Liaocheng, Binzhou and Heze in Shandong Province, Zhengzhou, Kaifeng, Anyang, Hebi, Xinxiang, Jiaozuo and Puyang in Henan Province, collectively referred to as the “2+26” cities, which are included in the national urban ambient air quality monitoring scope.

**Including Shanghai Municipality, Jiangsu, Zhejiang and Anhui province, the monitoring sites of which are included in the national urban ambient air quality monitoring scope.

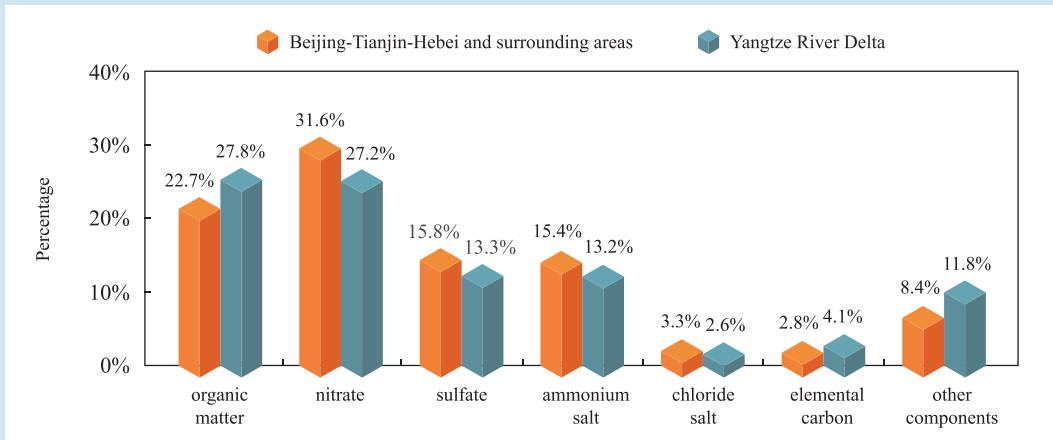
***Including Jinzhong, Yuncheng, Linfen and Lvliang in Shanxi Province, Luoyang and Sanmenxia in Henan Province, and Xi'an, Tongchuan, Baoji, Xianyang, and Weinan in Shaanxi Province, the monitoring sites of which are included in the national urban ambient air quality monitoring scope.



Share of the number of days meeting ambient air quality standard in cities in Beijing–Tianjin–Hebei and surrounding areas in 2023



Share of the number of days meeting ambient air quality standard in cities in the Yangtze River Delta in 2023

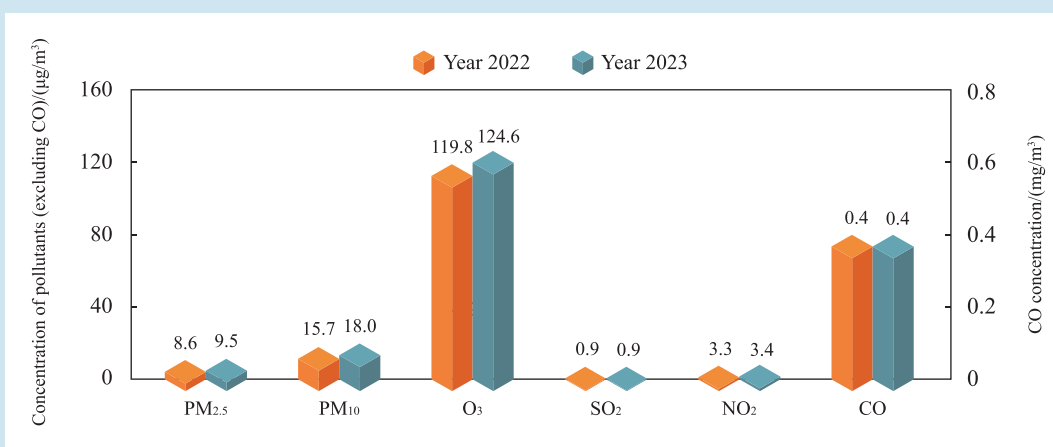


Composition of ambient particulate matter in cities in Beijing-Tianjin-Hebei and surrounding areas and the Yangtze River Delta in 2023

(3) Background monitoring sites

In 2023, the average concentration of PM_{2.5} at the background monitoring sites* across the country was 9.5 µg/m³, up by 10.5% compared with that of 2022; the average concentration of PM₁₀ was 18.0 µg/m³, up by 14.6% compared with that of 2022; the 90th percentile of the daily maximum

8-hour average concentration of O₃ was 124.6 µg/m³, up by 4.0% compared with that of 2022; the average concentration of SO₂ was 0.9 µg/m³, the same as that of 2022; the average concentration of NO₂ was 3.4 µg/m³, up by 3.0% compared with that of 2022; the 95th percentile of the 24-hour average concentration of CO was 0.4 mg/m³, the same as that of 2022.



Average concentrations of six pollutants at national background monitoring sites in 2023 and their interannual variation

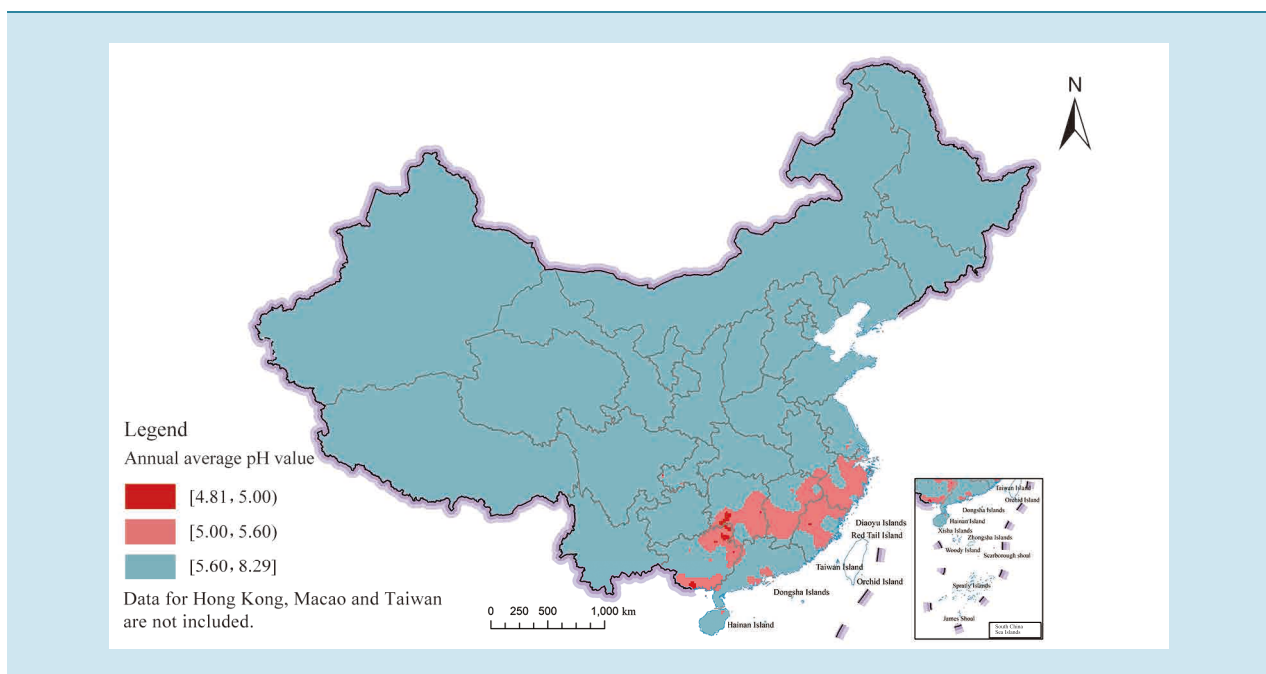
*A total of 16 national background ambient air quality monitoring sites have been set up for background monitoring of ambient air quality in Shanxi Province, Inner Mongolia Autonomous Region, Jilin Province, Fujian Province, Shandong Province, Hubei Province, Hunan Province, Guangdong Province, Hainan Province, Sichuan Province, Yunnan Province, Tibet Autonomous Region, Qinghai Province and Xinjiang Uygur Autonomous Region. In 2023, 15 background sites were monitored. The monitoring indicators include SO₂, NO₂, PM₁₀, PM_{2.5}, CO and O₃. These sites are not included in the national urban ambient air quality monitoring sites. The rounding off for data was based on the Rules of Rounding off for Numerical Value and Expression and Judgment of Limiting Values. The impact of sand-dust weather was excluded from the particulate matter data for both 2022 and 2023.

2. Acid Rain*

(1) Acid rain distribution

In 2023, the total area covered by acid rain was around 443,000 km² nationwide, taking up 4.6% of total land area of

China, down by 0.4 percentage point compared with that of 2022. Among them, the percentage of land area with relatively serious acid rain was 0.04%, and there was no serious acid rain area*. Acid rain was mainly distributed in the region south to the Yangtze River and east to Yunnan-Guizhou Plateau, mainly including most parts of Zhejiang, northern part of Fujian, central part of Jiangxi, central and eastern part of Hunan, north-eastern and southern parts of Guangxi as well as parts of Chongqing, Guangdong, Shanghai and Jiangsu.



The isoline of annual average pH value of precipitation in China in 2023

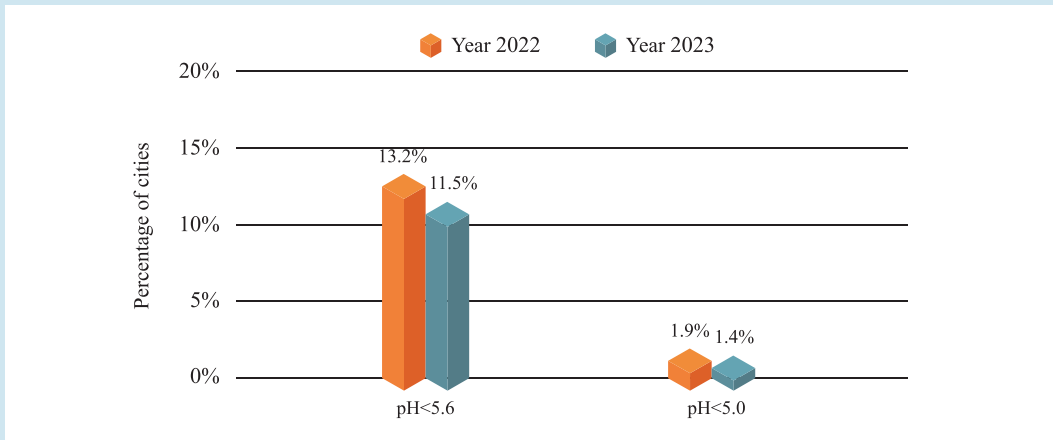
(2) Precipitation acidity

In 2023, the annual average pH value of precipitation across 504 cities (districts and counties) of the country ranged from 4.81 to 8.29, with the average value of 5.74, an increase of 0.07 compared with that of 2022. The

proportion of cities experiencing acid rain and relatively serious acid rain was 11.5% and 1.4% respectively, a decrease of 1.7 percentage points and 0.5 percentage point compared with that of 2022. There was no city experiencing serious acid rain, the same as that of 2022.

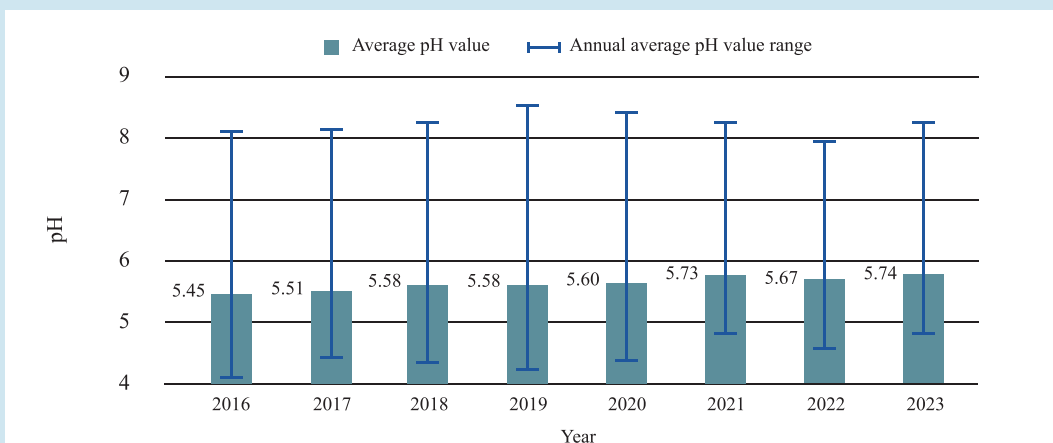
*In 2023, about 1,000 precipitation sites were monitored across 504 cities (districts and counties) (including cities at or above prefecture level and some county-level cities).

**Acid rain is defined when the precipitation pH value is below 5.6; relatively serious acid rain is defined when the pH value is below 5.0; serious acid rain is defined when the pH value is below 4.5.



Percentage of cities with different annual pH value of precipitation in 2023 nationwide and their interannual variation

From 2016 to 2023, the national average value of precipitation rose from 5.45 to 5.74, an increase of 0.29.

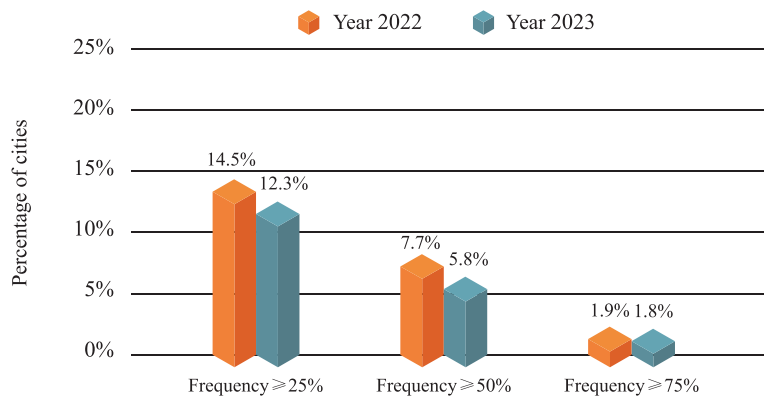


Interannual variation in average pH value of precipitation nationwide during 2016–2023

(3) Acid rain frequency

In 2023, the average acid rain frequency under precipitation monitoring across the country was 7.6%, down by 1.8 percentage points compared with that of 2022. The percentage of cities with acid rain occurrence

was 28.8%, down by 5.0 percentage points from that of 2022. The percentage of cities with acid rain frequency over 25%, 50% and 75% was 12.3%, 5.8% and 1.8% respectively, down by 2.2 percentage points, 1.9 percentage points and 0.1 percentage point from those of 2022 respectively.



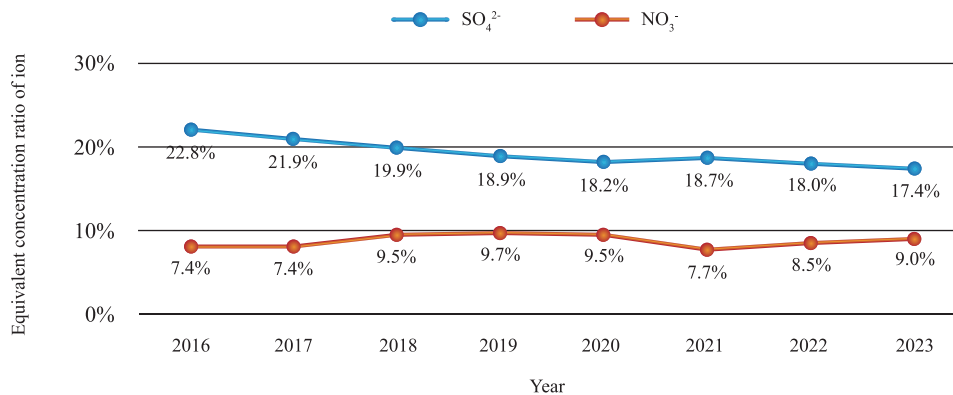
Percentage of cities with different acid rain frequency in 2023 nationwide and their interannual variation

(4) Chemical composition

In 2023, the main cations in precipitation nationwide were calcium and ammonium ions, with an ionic equivalent concentration ratio of 31.3% and 14.5% respectively. The main anion was sulfate radical, with an ionic equivalent concentration ratio of 17.4%.

From 2016 to 2023, while the proportion of equivalent

concentration of sulfate ions in precipitation generally decreased nationwide, that of nitrate ions increased. The ratios of equivalent concentration of nitrate and sulfate ions were on the rise, from 0.32 in 2016 to 0.52 in 2023, indicating that acid rain has gradually shifted from being sulfuric-acid based to a compound base of sulfuric-acid and nitric-acid in recent years.



Interannual variance of the equivalent concentration ratios of nitrate and sulfate ions in precipitation nationwide 2016–2023

Special Column**Making more progress in winning the battle against air pollution**

In 2023, the State Council issued the Action Plan for Continuous Improvement of Air Quality. Clean heating in northern China has been steadily promoted, and a total of about 2 million households employing heating by bulk coal had been renovated in the northern region. A series of key transformation projects has been rolled out and completed, in which 420 million tons of crude steel production capacity has completed the conversion to ultra-low emissions, 440 million tons of crude steel production capacity sintering pellet has been desulfurized and denitrified, material yard has been enclosed, and 85,000 outstanding problems related to VOCs have been rectified. For 6 consecutive years, the supervision and spot check of motor vehicle inspection and testing institutions have been carried out, featuring “random selection of both the inspection staff and the motor vehicle and making the inspection results public”. In 2023, 7 motor vehicle environmental emission recalls were launched involving 1.81 million vehicles. A joint prevention and control mechanism for air pollution has been established in the city cluster on the north slope of Tianshan Mountain, the Northeast China, and the city cluster in the middle reaches of the Yangtze River. All air-related enterprises have been covered in the list of emergency emission reduction for heavy pollution weather, an increase of 240,000 enterprises compared to that of 2022. Efforts have also been made to ensure good air quality during major events such as the Belt and Road Forum for International Cooperation, Hangzhou Asian Games and Paralympic Games, Chengdu FISU World University Games and the 6th China International Import Expo held in Shanghai.

Special Column**Straw incineration**

In 2023, satellite remote sensing detected a total of 14,241 straw incineration spots across the country (excluding fire points under cloud cover), mainly distributed in Heilongjiang, Jilin, Inner Mongolia, Shanxi, Hubei, Liaoning, Shandong, Henan and other provinces (autonomous regions). Among them, a total of 9,838 burning spots were in the north-eastern region of China, including Heilongjiang, Jilin, Liaoning and Chifeng, Tongliao, Hulun Buir, and Hinggan League in Inner Mongolia, accounting for 69.1% of the total number of straw burning spots in the country.

Special Column

Protection of ozone sphere

On December 18th, 2023, the Executive Meeting of the State Council reviewed and approved the Decision of the State Council on Amending the Regulations on the Management of Ozone-Depleting Substances, which came into effect on March 1st, 2024. The 2024 Hydrofluorocarbon Quota Setting and Allocation Plan has been issued and implemented, determining that the total production quota of hydrofluorocarbons (HFCs) in 2024 is 1.853 billion tons of carbon dioxide equivalent (tCO₂), the total domestic production quota is 895 million tCO₂, and the total import quota is 10 million tCO₂. As of January 2024, 1.425 billion tCO₂ of HFCs production quotas had been issued to 37 enterprises, 609 million tCO₂ of domestic production quotas had been issued, and 7 million tCO₂ of HFCs import quotas had been issued to 39 enterprises. The Recommended List of Substitutes for Ozone-Depleting Substances in China has been issued. Automatic monitoring of ozone-depleting substances (ODS) and HFCs has been continuously carried out at the Changdao atmospheric background station in Shandong, and a new atmospheric background station for ODS and HFCs was built in Wuyishan, Fujian.

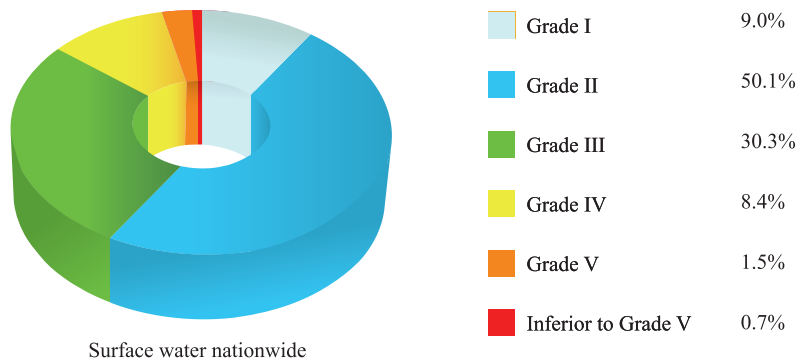
II . Freshwater Environment

1. Surface water quality

(1) Nationwide

In 2023, of the 3,632 surface water sections monitored

by the state* nationwide, those with good and excellent water quality (meeting Grade I-III water quality standard) took up 89.4%, up by 1.5 percentage points from that of 2022; and sections with water quality inferior to Grade V standard took up 0.7%, the same as that of 2022. The major pollution indicators were chemical oxygen demand (COD), total phosphorus (TP) and permanganate index (COD_{Mn}).

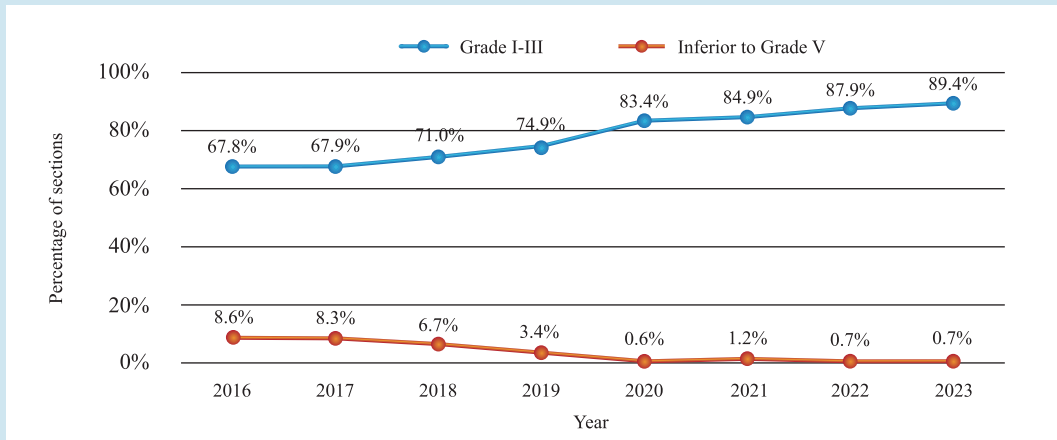


General surface water quality of China in 2023

From 2016 to 2023, the proportion of surface water sections with water quality meeting Grade I-III standard in the country rose from 67.8% to 89.4%, an increase of 21.6

percentage points; the proportion of sections that are inferior to Grade V standard fell from 8.6% to 0.7%, a decrease of 7.9 percentage points.

*During the 14th “Five-Year” Plan period, a total of 3,641 surface water sections (sites) were put under the national monitoring program for environmental quality evaluation, assessment and ranking (hereby referred to as the “surface water sections monitored by the state”). The monitoring scope covers the main streams and important tributaries, lakes and reservoirs of the ten major river basins in the country, cities at or above prefecture level, provincial and municipal boundaries of important water bodies, water function areas of important rivers and lakes in the country, etc. Among them, there are 3,293 river sections and 348 lake (reservoir) sites. The assessment of surface water quality was based on Environmental Quality Standards for Surface Water (GB 3838-2002) and the Measures on Assessment of Surface Water Quality (for trial implementation). In 2023, 3,632 surface water sections under national monitoring program were actually monitored.

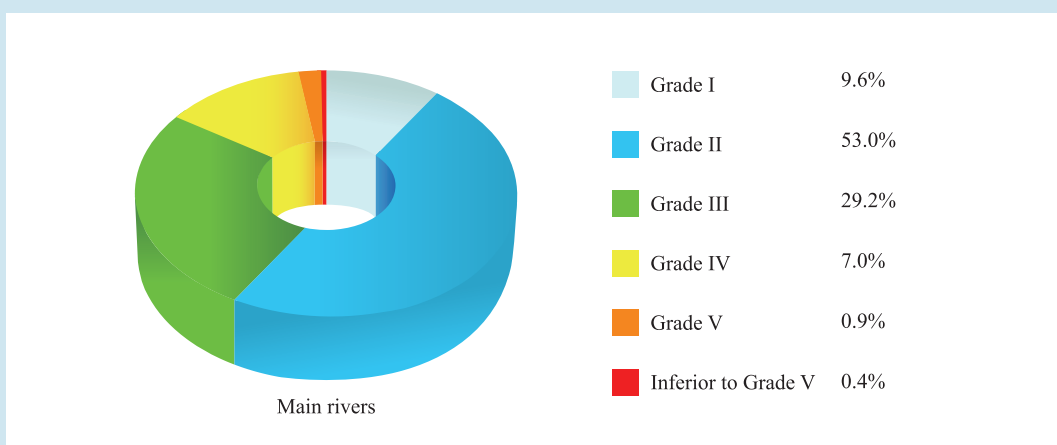


Interannual variance in the proportion of surface water sections meeting Grade I-III standard and Inferior to Grade V standard in China 2016–2023

(2) Main rivers*

Overall status In 2023, out of the 3,119 surface water sections monitored by the state in 7 major river basins of the Yangtze River, Yellow River, Pearl River, Songhua River, Huaihe River, Haihe River and Liaohe River as well

as rivers in Zhejiang and Fujian, rivers in northwestern and southwestern China, those with water quality meeting Grade I-III standard took up 91.7%, up by 1.5 percentage points from that of 2022; those inferior to Grade V standard took up 0.4%, the same as that of 2022.

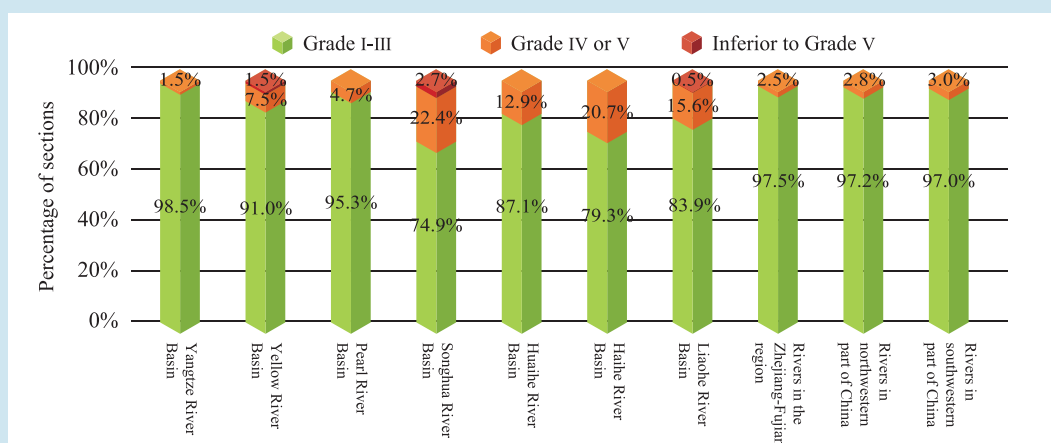


General water quality of 7 major river basins, rivers in Zhejiang and Fujian, and rivers in northwestern and southwestern China in 2023

*The surface water quality of river basins refers to the water quality of the main rivers, excluding the lakes (reservoirs) in river basins.

River basins of the Yangtze River, the Yellow River, and the Pearl River, rivers in Zhejiang and Fujian region, rivers in northwest and southwest China were of excellent quality. The

water quality of Huaihe River, Haihe River and Liaohe River was fairly good, and the Songhua River was slightly polluted.



Water quality of 7 major river basins, rivers in Zhejiang and Fujian, and rivers in northwestern and southwestern China in 2023

The Yangtze River basin registered excellent water quality. In all the 1,017 surface water sections monitored by the state, 98.5% met Grade I-III standard, up by 0.4 percentage point from that of 2022; and there was no section

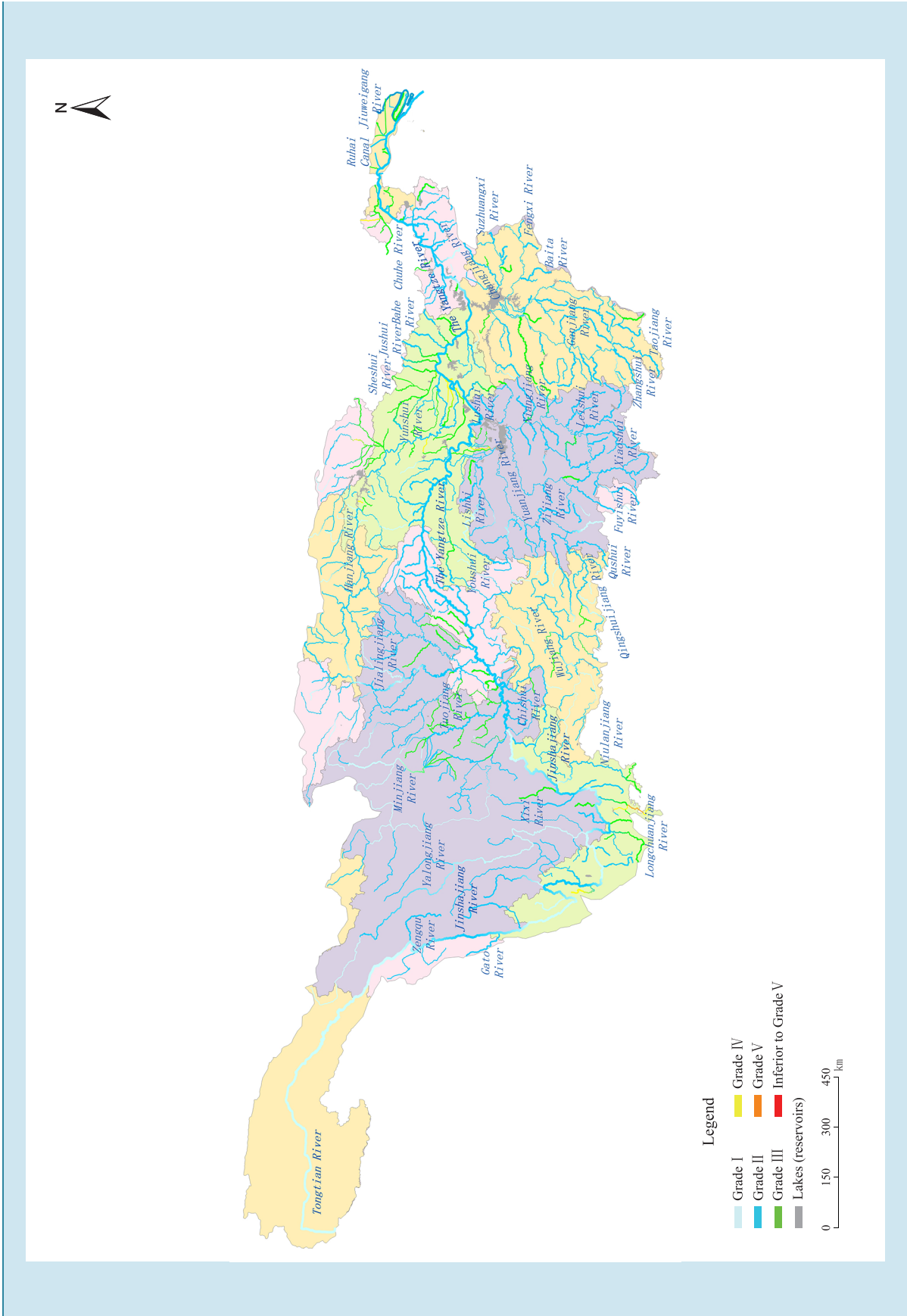
with the water quality inferior to Grade V standard, the same as that of 2022. The water quality of the mainstream and major tributaries of the Yangtze River was excellent.

Water quality of Yangtze River Basin in 2023

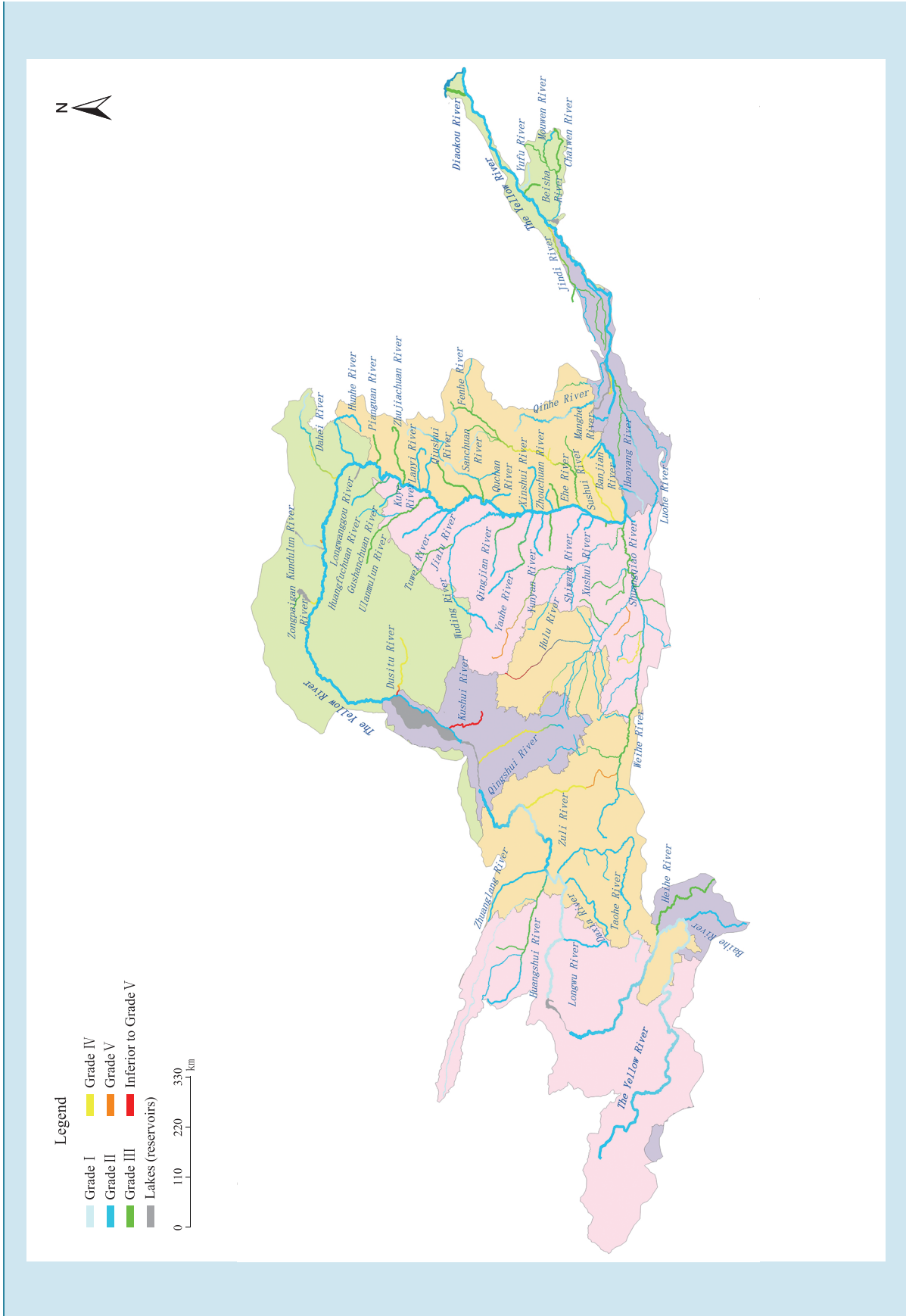
Water body	Number of sections (items)	Percentage (%)						Compared with that of 2022 (percentage points)					
		Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V	Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V
Basin	1,017	9.0	72.2	17.3	1.4	0.1	0	-2.8	2.4	0.8	-0.4	0	0
Mainstream	82	15.9	84.1	0	0	0	0	3.7	-3.7	0	0	0	0
Major tributaries	935	8.4	71.1	18.8	1.5	0.1	0	-3.4	2.9	0.8	-0.4	0	0

The Yellow River basin enjoyed excellent water quality. Out of the 266 surface water sections monitored by the state, 91.0% with water quality meeting Grade I-III standard, up by 3.5 percentage points from that of 2022; and 1.5% with water

quality inferior to Grade V standard, down by 0.8 percentage point from that of 2022. The mainstream of the Yellow River was of excellent water quality and the water quality of major tributaries was fairly good.



Water quality distribution of Yangtze River Basin in 2023



Water quality distribution of Yellow River Basin in 2023

Water quality of Yellow River Basin in 2023

Water body	Number of sections (items)	Percentage (%)						Compared with that of 2022 (percentage points)					
		Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V	Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V
Basin	266	10.2	55.6	25.2	6.0	1.5	1.5	3.0	-2.2	2.8	-2.4	-0.4	-0.8
Mainstream	42	16.7	83.3	0	0	0	0	2.7	-2.7	0	0	0	0
Major tributaries	224	8.9	50.4	29.9	7.1	1.8	1.8	3.0	-1.9	3.1	-2.9	-0.5	-0.9

The Pearl River basin was of excellent water quality. Among the 364 surface water sections monitored by the state, 95.3% with water quality meeting Grade I-III standard, up by 1.1 percentage points from that of 2022; and there was no section with water quality inferior to Grade V standard, down

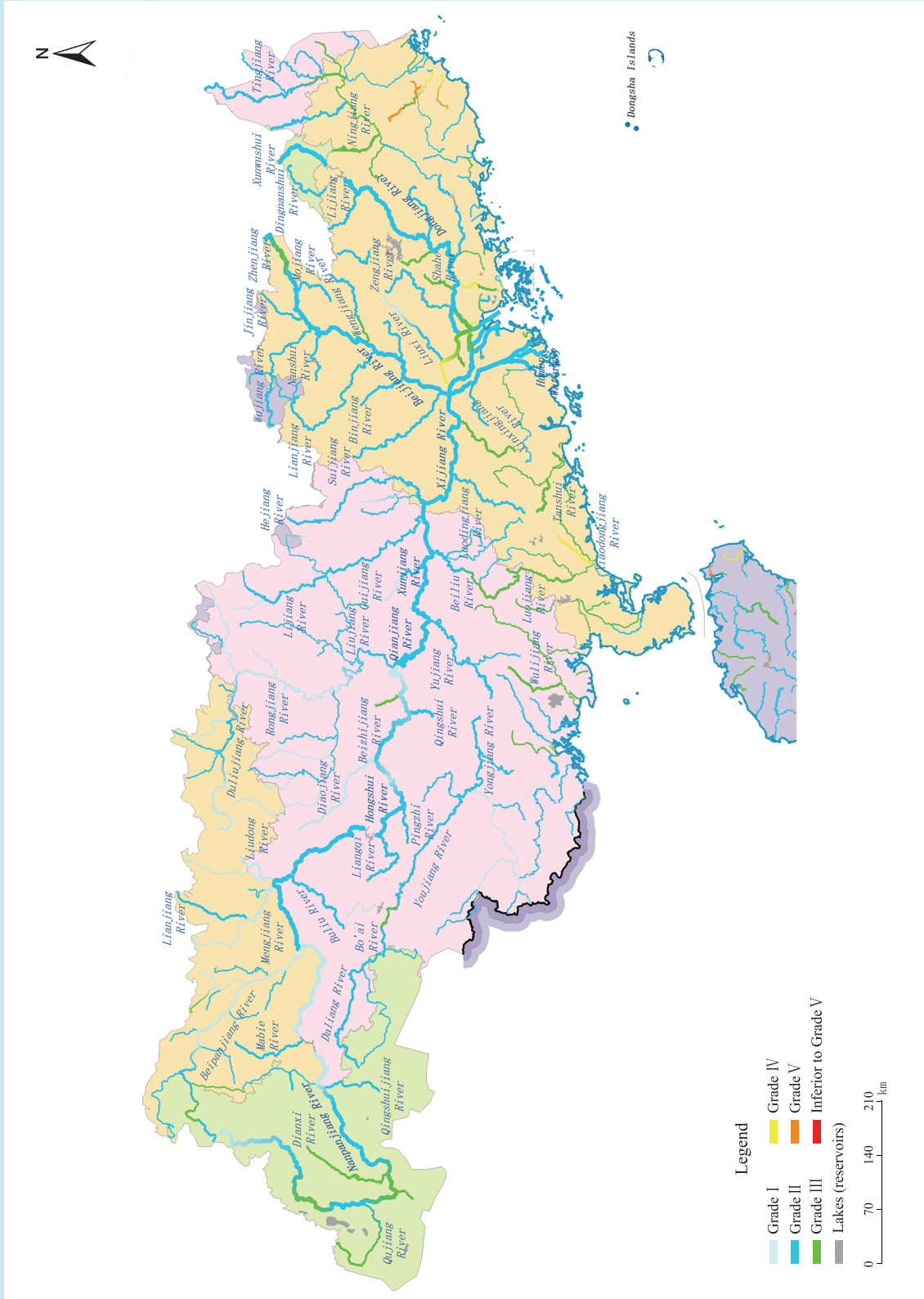
by 0.3 percentage point from that of 2022. The mainstream and major tributaries of the Pearl River, and the rivers in Hainan were all of excellent water quality; and the water quality of the coastal rivers in Guangdong and Guangxi was fairly good.

Water quality of Pearl River Basin in 2023

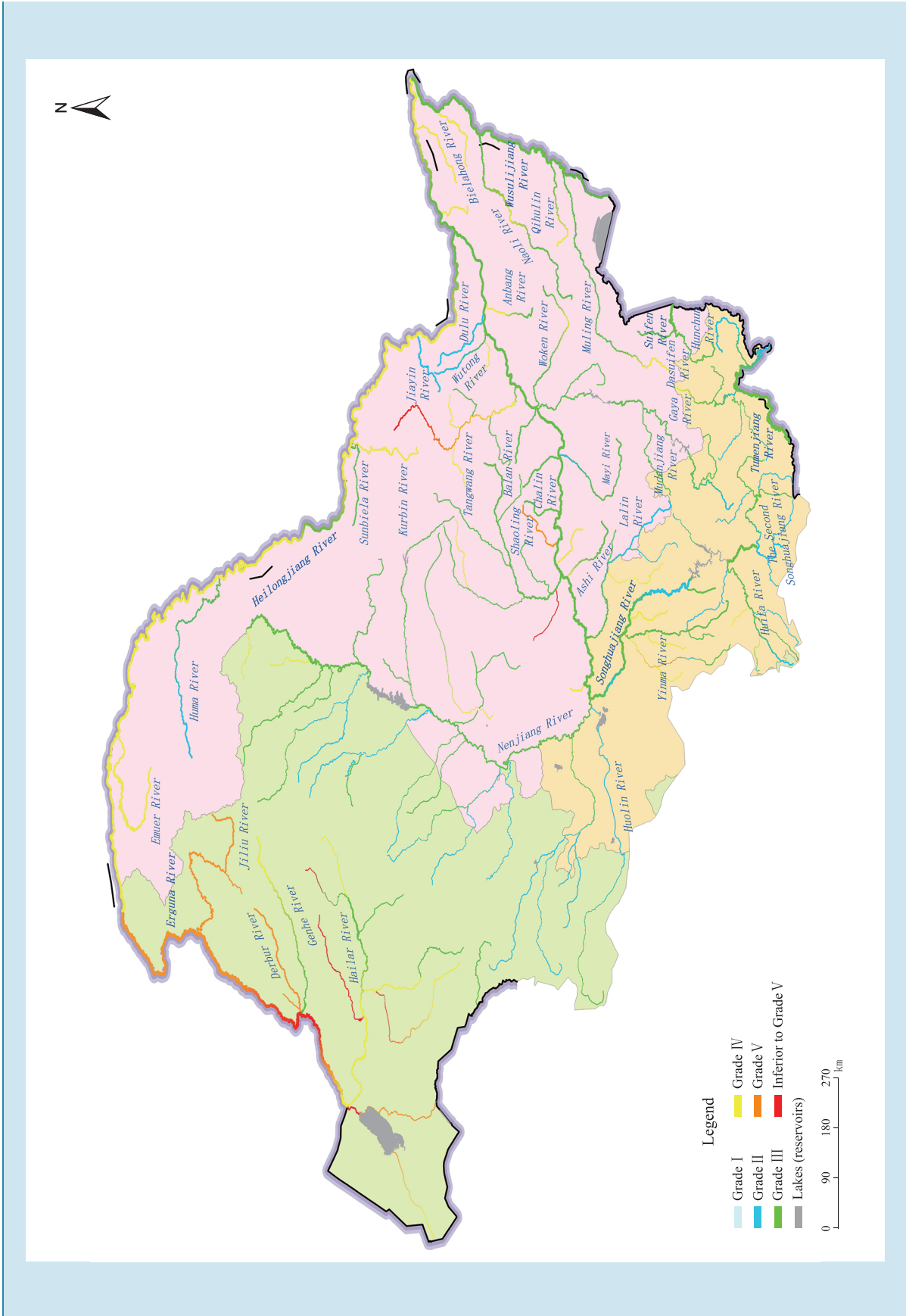
Water body	Number of sections (items)	Percentage (%)						Compared with that of 2022 (percentage points)					
		Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V	Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V
Basin	364	12.1	63.5	19.8	3.6	1.1	0	1.7	0	-0.5	-1.3	0.6	-0.3
Mainstream	62	9.7	77.4	11.3	1.6	0	0	0	6.4	-3.2	-3.2	0	0
Major tributaries	180	20.6	66.1	11.1	2.2	0	0	3.4	-2.2	0.5	-1.7	0	0
Coastal rivers in Guangdong and Guangxi	79	0	44.3	45.6	6.3	3.8	0	0	0	-1.2	0	1.3	0
Rivers in Hainan	43	2.3	67.4	20.9	7.0	2.3	0	0	0	0	0	2.3	-2.3

The Songhua River basin was slightly polluted. The major pollution indicators were COD, COD_{Mn} and TP. Among the 255 surface water sections monitored by the state, 74.9% with water quality meeting Grade I-III standard, up by 4.4 percentage points from that of 2022; and 2.7% with water quality inferior to Grade V standard, up by 0.7 percentage

point from that of 2022. The mainstream of the Songhua River basin and waters of Tumen River were of excellent water quality; the major tributaries of the Songhua River basin and Suifen River were of fairly good water quality; and waters of Heilongjiang River and Wusuli River were slightly polluted.



Water quality distribution of Pearl River Basin in 2023



Water quality distribution of Songhua River Basin in 2023

Water quality of Songhua River Basin in 2023

Water body	Number of sections (items)	Percentage (%)						Compared with that of 2022 (percentage points)					
		Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V	Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V
Basin	255	0	22.0	52.9	18.4	3.9	2.7	0	1.9	2.5	-5.2	0	0.7
Mainstream	20	0	20.0	80.0	0	0	0	0	5.0	-5.0	0	0	0
Major tributaries	155	0	29.0	52.9	14.8	1.9	1.3	0	0.6	1.3	-1.3	-1.3	0.7
Waters of Heilongjiang	45	0	4.4	26.7	42.2	15.6	11.1	0	4.4	6.7	-17.8	4.5	2.2
Waters of Wusuli River	15	0	0	73.3	26.7	0	0	0	0	6.6	-6.6	0	0
Waters of Tumen River	15	0	33.3	60.0	6.7	0	0	0	4.7	-4.3	-0.4	0	0
Waters of Suifen River	5	0	0	100	0	0	0	0	0	40.0	-40.0	0	0

The **Huaihe River basin** was fairly good in water quality. Of the 341 surface water sections monitored by the state, 87.1% with water quality meeting Grade I-III standard, up by 2.6 percentage points from that of 2022; and no section with water quality was inferior to Grade V standard, the same

as that of 2022. The mainstream of Huaihe River and Yishu-Si waters were of excellent water quality; major tributaries of Huaihe River were of good water quality; and the rivers flowing into sea in Shandong Peninsula were slightly polluted.

Water quality of Huaihe River Basin in 2023

Water body	Number of sections (items)	Percentage (%)						Compared with that of 2022 (percentage points)					
		Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V	Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V
Basin	341	0.9	20.5	65.7	12.3	0.6	0	0.6	-2.7	4.7	-2.7	0	0
Mainstream	13	0	61.5	38.5	0	0	0	0	15.3	-15.3	0	0	0
Major tributaries	182	1.6	18.1	65.9	13.2	1.1	0	1.1	-5.5	8.2	-3.8	0	0
Waters of the Yishu-Si water system	99	0	19.2	74.7	6.1	0	0	0	-3.2	3.3	0	0	0
Waters of rivers flowing into sea in Shandong Peninsula	47	0	21.3	53.2	25.5	0	0	0	4.6	-1.0	-3.7	0	0

The Haihe River basin was slightly polluted. Of the 246 surface water sections monitored by the state, 79.3% with water quality meeting Grade I-III standard, up by 4.5 percentage points from that of 2022; and no water section with water quality inferior to Grade V standard, the same as that of 2022. Of the 3 sections of the mainstream of the Haihe River, the water quality of Sanchakou and Haijin Bridge

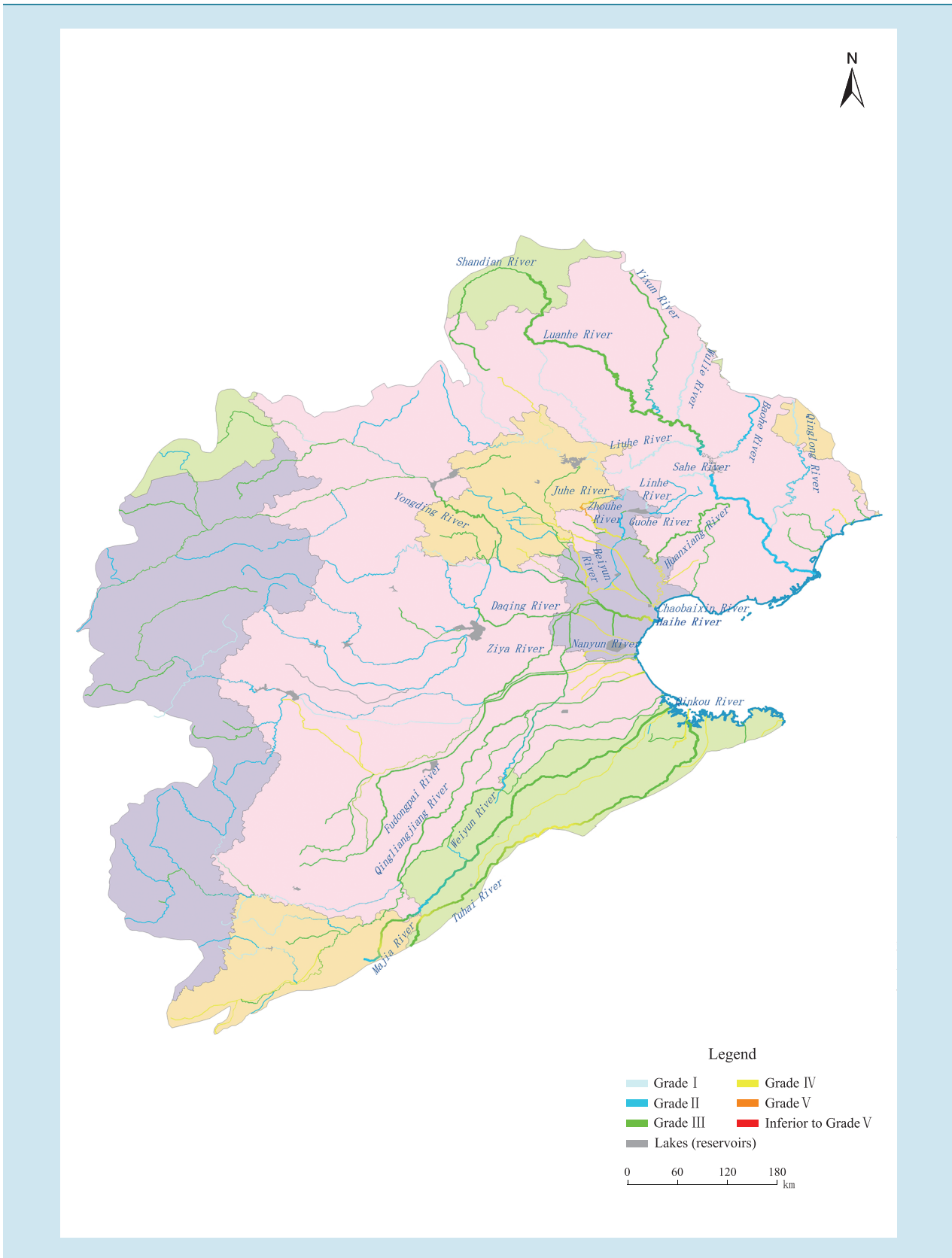
met Grade III standard, and that of Haihe River tidal gate met Grade IV standard. The waters of Luanhe River were of excellent quality. The water quality of major tributaries, and waters in east Hebei and coastal areas were of fairly good quality and that of the Tuhai River-Majia River was slightly polluted.

Water quality of Haihe River Basin in 2023

Water body	Number of sections (items)	Percentage (%)						Compared with that of 2022 (percentage points)					
		Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V	Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V
Basin	246	12.2	27.2	39.8	20.3	0.4	0	-0.4	-2.9	7.7	-4.1	-0.4	0
Mainstream	3	0	0	66.7	33.3	0	0	0	0	0	0	0	0
Major tributaries	193	11.9	29.0	38.3	20.2	0.5	0	-1.1	-2.1	6.2	-3.1	0	0
Waters of Luanhe River	21	33.3	33.3	33.3	0	0	0	9.5	-14.3	4.7	0	0	0
Waters in east Hebei and coastal areas	7	0	14.3	71.4	14.3	0	0	0	-14.3	14.3	0	0	0
Waters of Tuhai River-Majia River	22	0	13.6	45.5	40.9	0	0	-4.5	4.5	22.8	-18.2	-4.5	0

The Liaohe River basin was fairly good in water quality. Of the 192 surface water sections monitored by the state, 83.9% with water quality meeting Grade I-III standard, down by 0.6 percentage point from that of 2022; and 0.5% with water quality inferior to Grade V standard, up by 0.5

percentage point from that of 2022. The waters of Dalinghe River, Yalu River, and the coastal rivers in eastern and western Liaoning were of excellent quality. The waters of the mainstream and Daliaohe River were of fairly good quality, and major tributaries of Liaohe River were slightly polluted.



Water quality distribution of Haihe River Basin in 2023

Water quality of Liaohe River Basin in 2023

Water body	Number of sections (items)	Percentage (%)						Compared with that of 2022 (percentage points)					
		Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V	Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V
Basin	192	4.2	44.3	35.4	13.5	2.1	0.5	-1.5	-7.8	8.6	1.1	-1.0	0.5
Mainstream	16	0	6.2	31.2	43.8	18.8	0	0	-12.6	0	12.6	0	0
Major tributaries	60	0	28.3	51.7	18.3	0	1.7	0	-8.8	11.4	-1.1	-3.2	1.7
Waters of Daliaohe River	38	5.3	39.5	36.8	15.8	2.6	0	-2.6	-7.9	7.9	2.6	0	0
Waters of the Daling River	16	0	81.2	12.5	6.2	0	0	-6.2	25.0	-25.0	6.2	0	0
Waters of the Yalu River	27	14.8	66.7	18.5	0	0	0	-3.7	-14.8	18.5	0	0	0
Coastal rivers in eastern Liaoning	22	9.1	50.0	40.9	0	0	0	0	-18.2	22.7	-4.5	0	0
Coastal rivers in western Liaoning	13	0	76.9	15.4	7.7	0	0	0	-7.7	7.7	0	0	0

Rivers in Zhejiang and Fujian Provinces were of excellent water quality. Of the 198 surface water sections monitored by the state, 97.5% met Grade I-III standard, down

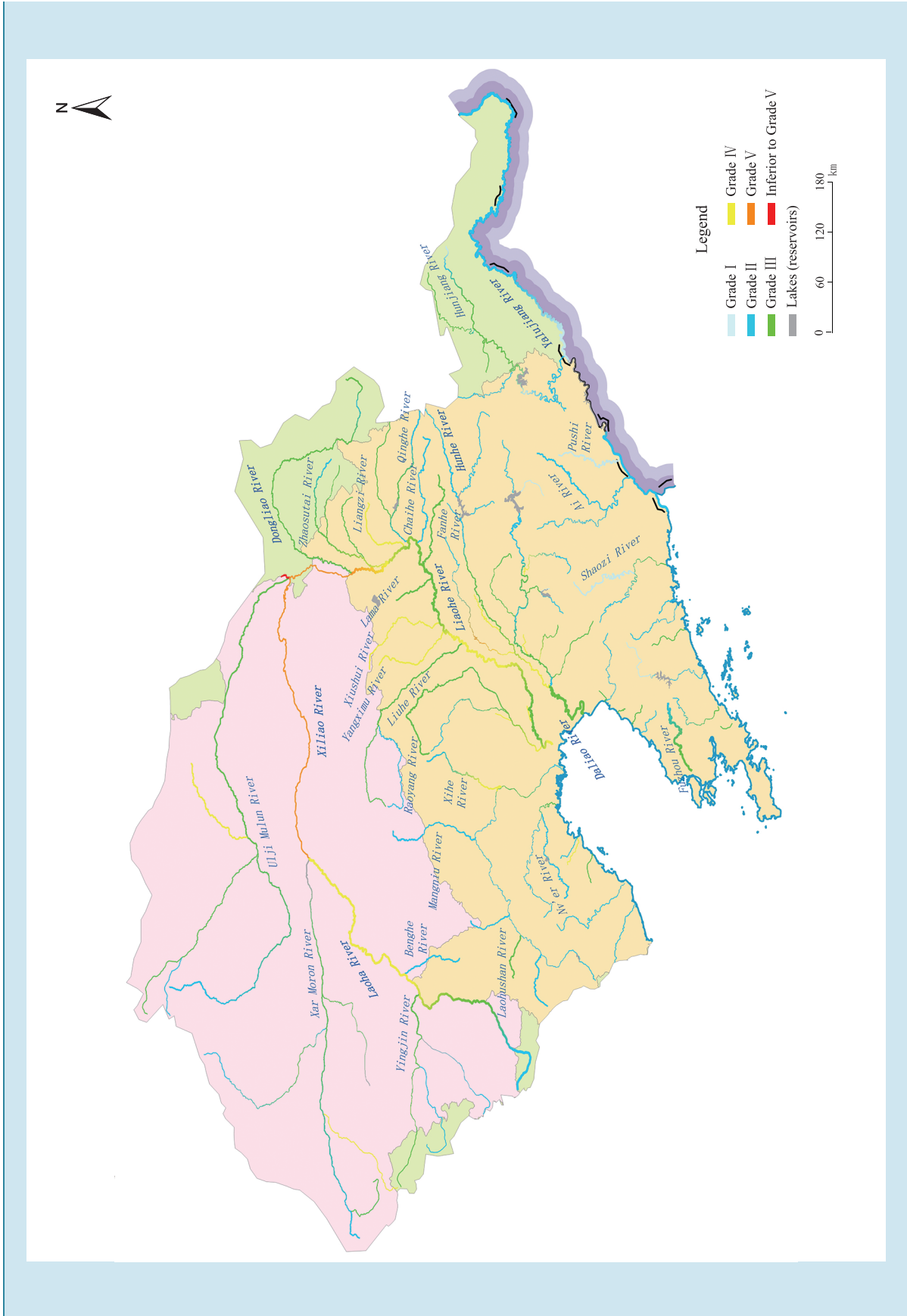
by 1.0 percentage point compared with that of 2022; and no section was inferior to Grade V standard, keeping the same as that of 2022.

Water quality of Rivers in Zhejiang Province and Fujian Province in 2023

Number of sections (items)	Percentage (%)						Compared with that of 2022 (percentage points)					
	Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V	Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V
198	10.1	61.6	25.8	2.0	0.5	0	1.0	-1.0	-1.0	0.5	0.5	0

Rivers in northwestern part of China were of excellent water quality. Of the 107 surface water sections monitored by the state, 97.2% met Grade I-III standard, up by 1.0

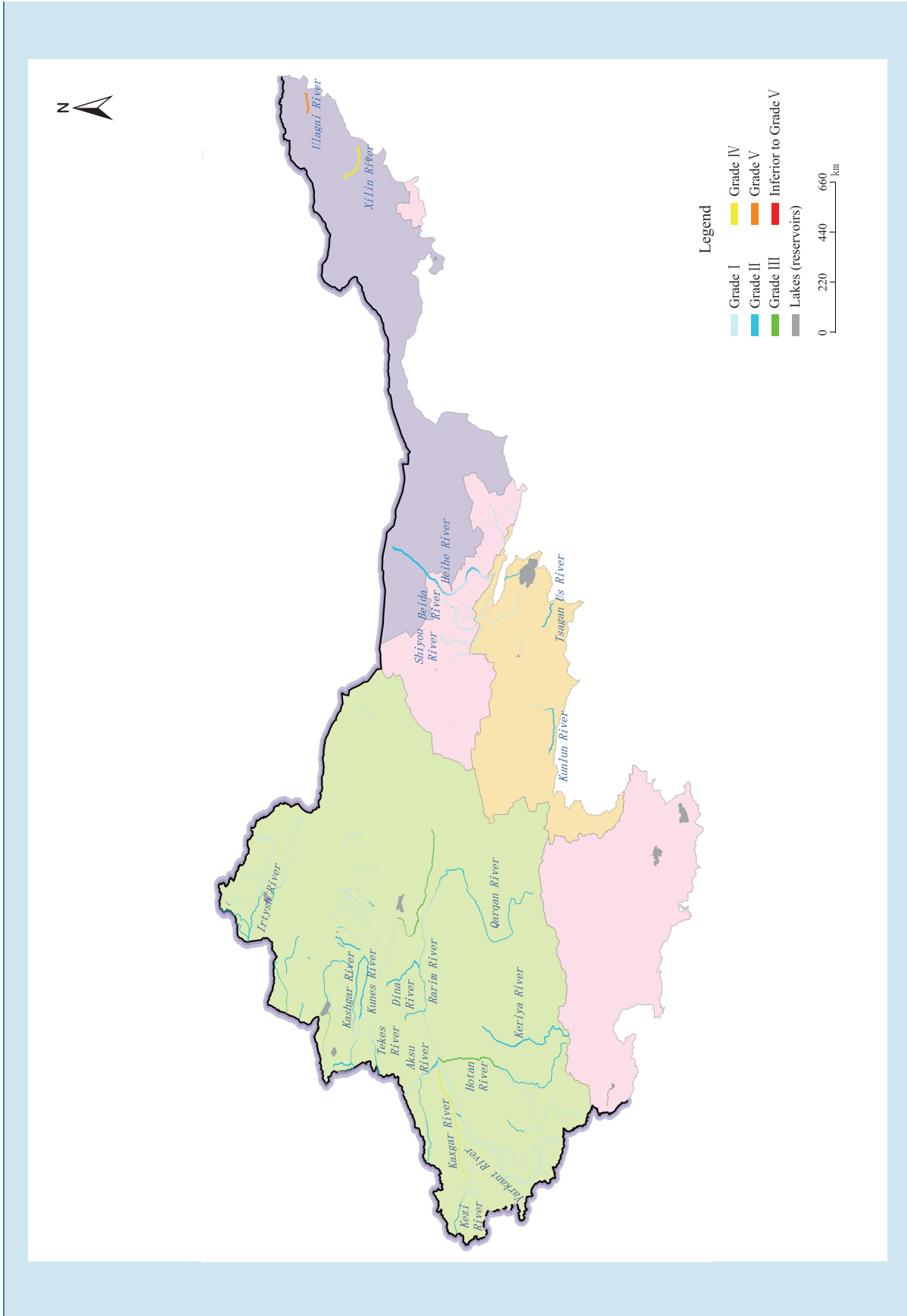
percentage point compared with that of 2022; and no water was inferior to Grade V standard, keeping the same as that of 2022.



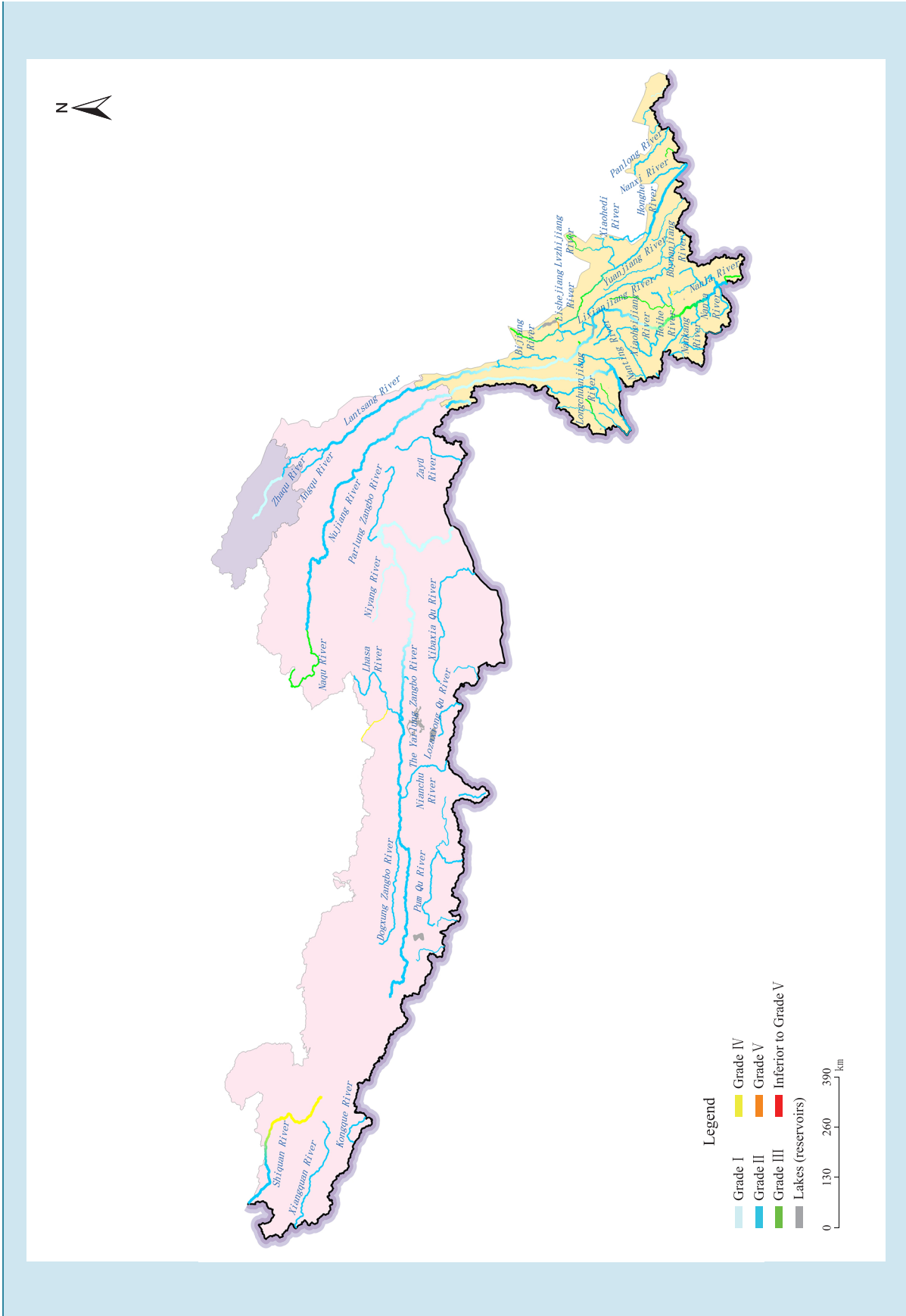
Water quality distribution of Liaohe River Basin in 2023



Water quality distribution of Rivers in Zhejiang Province and Fujian Province in 2023



Water quality distribution of Rivers in northwestern part of China in 2023



Water quality distribution of Rivers in southwestern part of China in 2023

Water quality of Rivers in northwestern part of China in 2023

Number of sections (items)	Percentage (%)						Compared with that of 2022 (percentage points)					
	Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V	Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V
107	53.3	38.3	5.6	1.9	0.9	0	6.6	-7.4	1.8	-1.0	-0.1	0

Rivers in southwestern part of China were of excellent water quality. Of the 133 surface water sections monitored by the state, 97.0% met Grade I-III standard, the same as that of

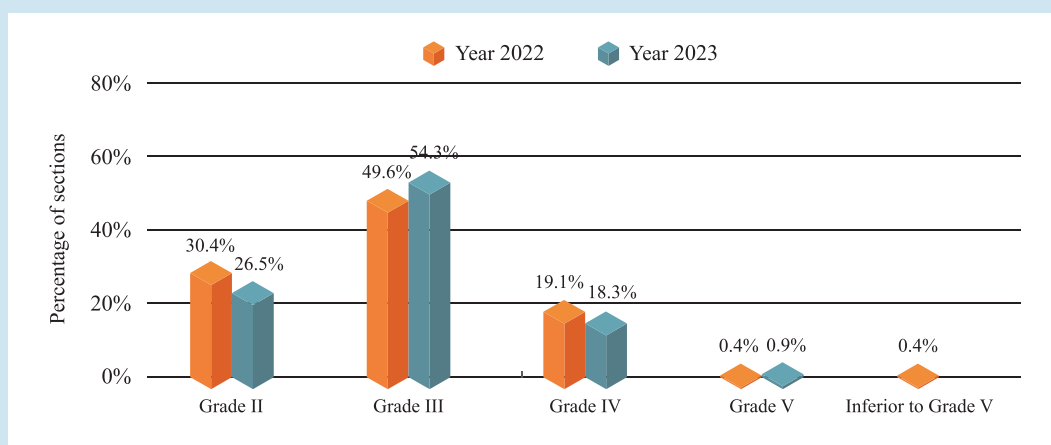
2022; and no water was inferior to Grade V standard, down by 1.5 percentage points compared with that of 2022.

Water quality of Rivers in southwestern part of China in 2023

Number of sections (items)	Percentage (%)						Compared with that of 2022 (percentage points)					
	Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V	Grade I	Grade II	Grade III	Grade IV	Grade V	Inferior to Grade V
133	12.8	74.4	9.8	2.3	0.8	0	3.8	-2.3	-1.5	1.5	0	-1.5

Rivers flowing into the sea In 2023, among the 230 surface water sections monitored by the state of rivers flowing into the sea, 80.9% met Grade I-III water quality standard, an increase of 0.9 percentage point from that of 2022; and no wa-

ter was inferior to Grade V standard, down by 0.4 percentage point from that of 2022. The primary pollution indicators are COD, COD_{Mn} and BOD₅.



Water quality of rivers flowing into the sea in 2023 and interannual variation

*During the 14th "Five-Year" Plan period, a total of 230 sections of rivers entering the sea were put under the national monitoring system.

(3) Lakes (reservoirs)

Overall status In 2023, among the 209 major lakes (reservoirs) across the country under the national monitoring program, 74.6% met Grade I-III standard, up by 0.8 percentage point compared with that of 2022; and 4.8% were inferior to Grade V standard, the same as that of 2022. The major pollution indicators were TP, COD and COD_{Mn}.

Of the 205 major lakes (reservoirs) monitored of nutritional status, 8.3% were under oligotrophic status, down by 1.5 percentage points compared with that of 2022; 64.4% were under mesotrophic status, up by 4.1 percentage points compared with that of 2022; 23.4% were under slight eutrophication, down by 0.6 percentage point compared with that of 2022; and 3.9% were under intermediate eutrophication, down by 2.0 percentage points compared with that of 2022.

The Taihu Lake was of slight pollution. The major pollution indicator was TP. In specific, the northern shore line and western shore line were slightly polluted, and the water quality of the central area and the eastern shore line was fairly good. The lake as a whole was under slight eutrophication. In specific, the eastern shore line was mesotrophic, and the central area, the northern shore line and western shore line were under slight eutrophication.

The rivers surrounding the Taihu Lake were of excellent water quality. Of the 133 surface water sections monitored by the state, 42.1% met Grade II standard; 57.1% met Grade III standard; 0.8% met Grade IV standard and none met Grade I, Grade V or was inferior to Grade V standard. Compared with that of 2022, water sections meeting Grade I standard were down by 0.8 percentage point; those meeting Grade II rose by 5.3 percentage points; those meeting Grade III dropped by 5.3 percentage points; those meeting Grade IV standard rose by 0.8 percentage point; and others remained unchanged.

The Chaohu Lake was of slight pollution. The major pollution indicator was TP. In specific, the eastern half and the western half of the lake were both slightly polluted. The lake as a whole, the eastern half and the western half were under slight eutrophication.

The rivers surrounding the Chaohu Lake were of excellent water quality. Of the 21 surface water sections monitored by the state, 38.1% met Grade II standard, down by

14.3 percentage points compared with that of 2022; 61.9% met Grade III standard, up by 19.0 percentage points; no sections met Grade IV standard, down by 4.8 percentage points; and no sections met Grade I and Grade V standard or was inferior to Grade V standard, the same as that of 2022.

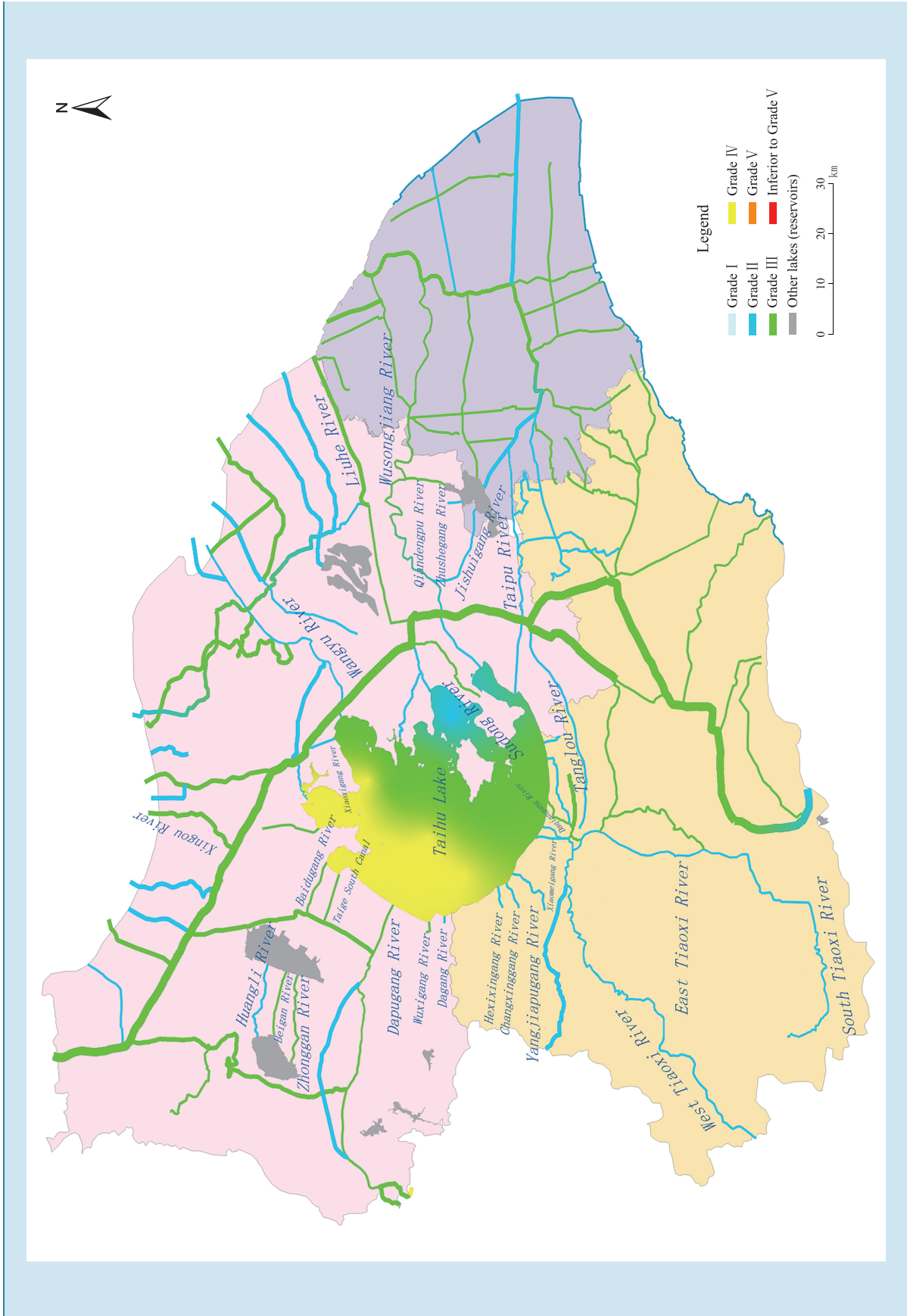
The Dianchi Lake was of slight pollution. The major pollution indicators were COD, TP and COD_{Mn}. In specific, the Caohai area of Dianchi Lake was slightly polluted, and the Waihai area was moderately polluted. The lake as a whole, the Caohai area and the Waihai area were under intermediate eutrophication.

The rivers surrounding the Dianchi Lake were of excellent water quality. Of the 12 surface water sections monitored by the state, 41.7% met Grade II standard, up by 8.4 percentage points compared with 2022; 58.3% met Grade III standard, the same as that of 2022; and no sections met Grade IV standard, down by 8.3 percentage points compared with that of 2022. No sections met Grade I and Grade V standard or was inferior to Grade V standard, the same as that of 2022.

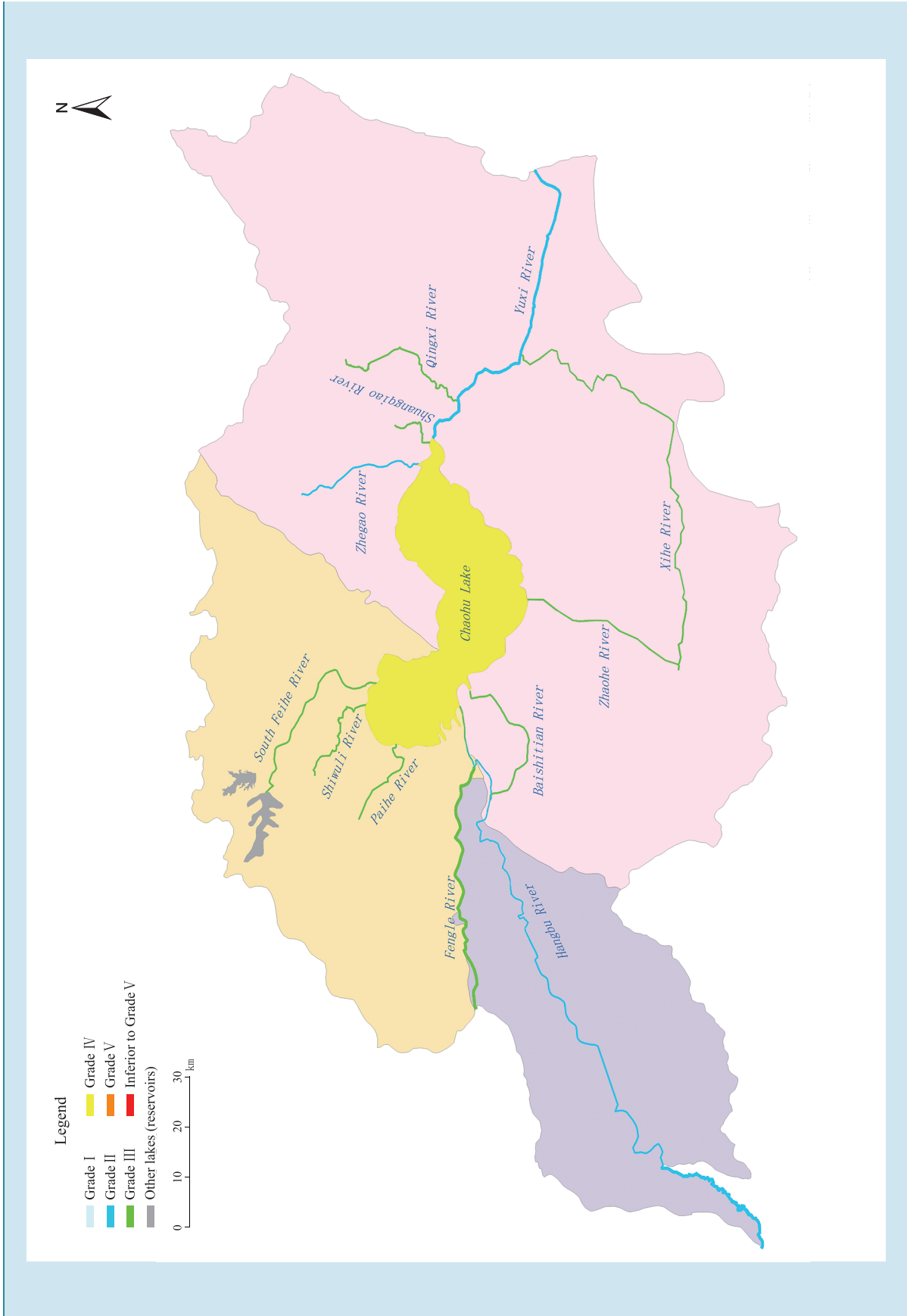
Danjiangkou Reservoir was of excellent water quality, and the whole reservoir was under mesotrophic state. Among the inflow sections of the 10 reservoir-entering rivers monitored, 80.0% met Grade II standard; 10.0% met Grade III standard; 10.0% met Grade IV standard; and none was of Grade I and Grade V standard or worse. Compared with 2022, the share of sections of Grade I water quality decreased by 10.0 percentage points, that of Grade II increased by 10.0 percentage points, and that of other grades remained the same.

Erhai Lake was of fairly good water quality and the whole lake was under mesotrophic state. Of the inflow sections of the 2 lake-entering rivers monitored, one section met Grade II standard and the other section met Grade III standard. Compared with 2022, the water quality of one of the section decreased from Grade II to Grade III standard, whereas the other section was of no significant change.

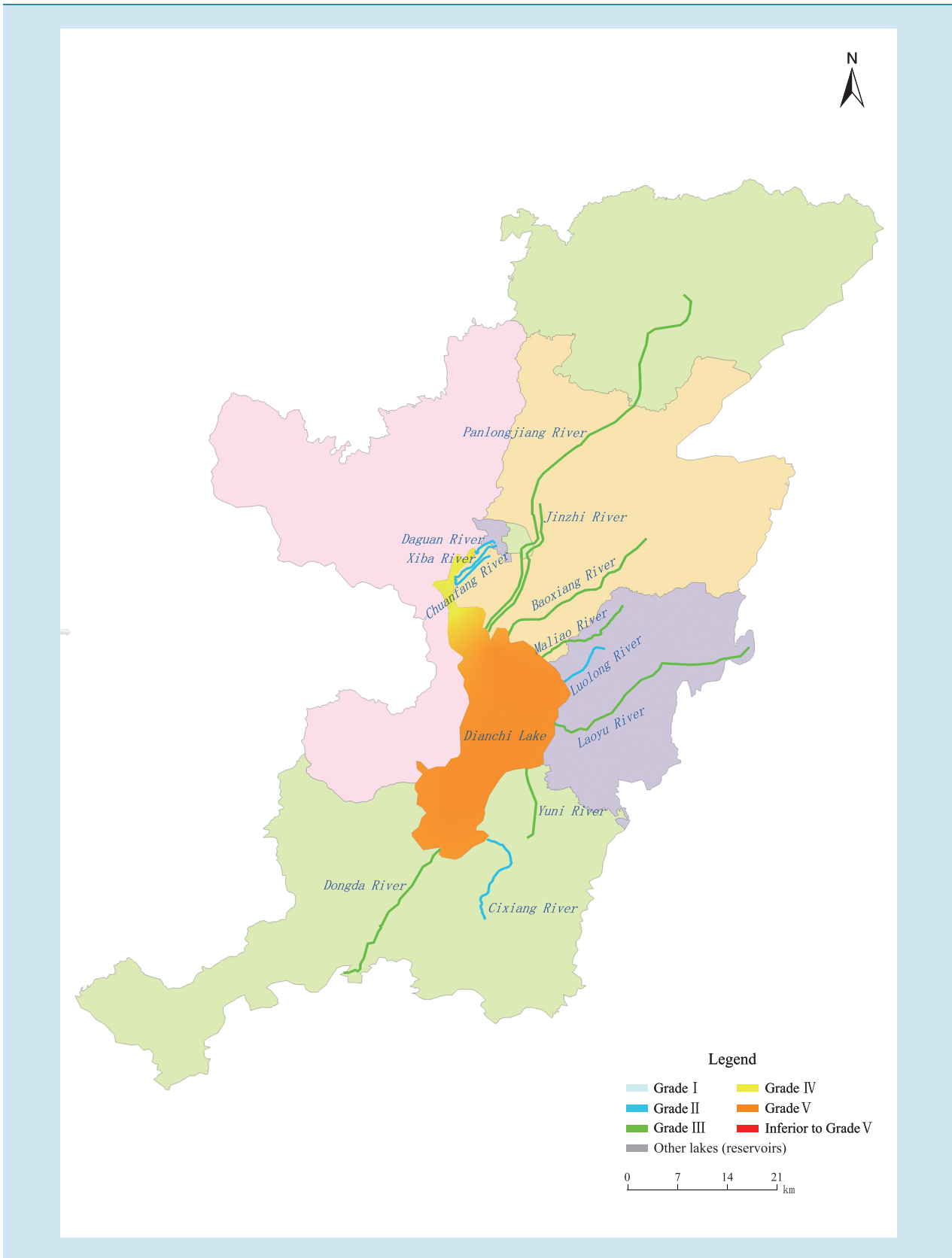
Baiyangdian Lake was of fairly good water quality, and the whole lake was at mesotrophic state. Among the inflow sections of the 4 lake-entering rivers monitored, 2 sections met Grade II water quality standard, and 2 sections met Grade III standard. Compared with 2022, the water quality of 1 section improved from Grade III to Grade II, whereas 1 section degraded from Grade II to Grade III standard, and 2 sections witnessed no significant change.



Water quality distribution of Taihu Lake in 2023



Water quality distribution of Chaohu Lake in 2023



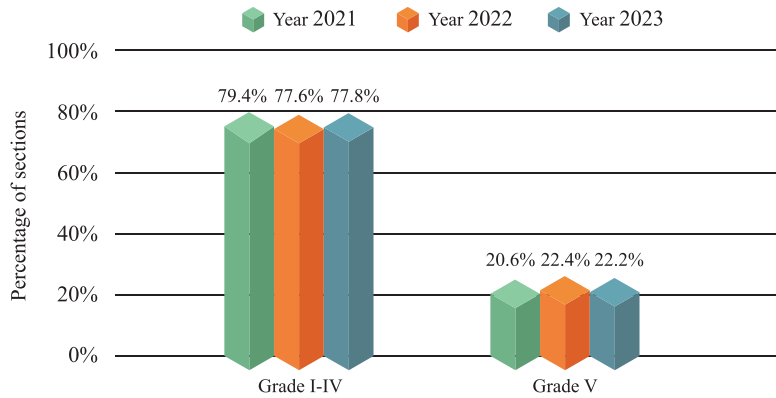
Water quality distribution of Dianchi Lake in 2023

2. Groundwater quality

In 2023, among the 1,888 groundwater environmental quality assessment sites monitored by the state*, 77.8% met Grade I-IV water quality standards, and 22.2% met Grade V standard. In specific, of the 1,084 phreatic aquifer sites**, 75.2% met I-IV water quality standards; of the 804 confined water sites***, 81.2% met I-IV water quality standards. The

major non-attainment pollution indicators were iron, sulfate, and chloride.

In 2021, the Ministry of Ecology and Environment issued the National Groundwater Environmental Quality Assessment Points Setting Program during the 14th “Five-Year” Plan Period, and initiated the monitoring of the national groundwater environmental quality assessment points. From 2021 to 2023, the national groundwater quality remained stable in general, and the proportion of water quality sites meeting Grade I-IV standards ranged from 77.6% to 79.4%.



Water quality of the national groundwater 2021–2023 and interannual variation

3. Water environment quality of major water-use zones

(1) Centralized drinking water source areas****

APL Cities In 2023, among the 889 sections (sites) of

the centralized drinking water sources under the monitoring in APL cities across the country, 858 sections (sites) were up to standard throughout the year, taking up 96.5% of the total. In specific, 634 sections (sites) were surface drinking water source sections (sites), 628 of which were up to standard throughout the year, taking up 99.1%. Major non-attainment pollution indicators were COD_{Mn}, sulfate and iron. There were

*During the 14th “Five-Year” Plan period, a total number of 1,912 groundwater environmental quality assessment sites has been set up nationwide, covering the national first and second level hydro-geological divisions and 339 APL cities. The assessment was based on Standard for Groundwater Quality (GB/T 14848-2017). In 2023, 1,888 sites were actually monitored.

**Groundwater with free water surface below the surface and above the first stabilized aquifer.

***Water of a confined nature filled between two opposing aquifers above and below.

****The assessment of water quality of drinking water sources was based on Environmental Quality Standards for Surface Water (GB 3838-2002) and Standard for Groundwater Quality (GB/T 14848-2017).

255 groundwater drinking water source sites, 230 of which were up to standard throughout the year, taking up 90.2%, with major non-attainment pollutants being manganese, iron and fluoride, mainly attributable to the relatively high natural background value.

County-level Cities In 2023, among the 2,655 sections (sites) of the centralized drinking water sources under monitoring in county-level cities across the country, 2,516 sections (sites) were up to standard throughout the year, taking up 94.8% of the total. In specific, 1,761 sections (sites) were surface drinking water source sections (sites), 1,750 of which were up to standard throughout the year, taking up 99.4%. Major non-attainment pollution indicators were TP, COD_{Mn} and sulfate. 894 were groundwater drinking water source sites, 766 of which were up to standard throughout the year, taking up 85.7% with major non-attainment pollutants being manganese, fluoride and iron, mainly attributable to the relatively high natural background value.

Rural centralized drinking water sources serving a population exceeding 10,000 or with a daily water supply of 1,000 tons In 2023, among the 10,219 sections (sites) of the rural centralized drinking water sources serving a population exceeding 10,000 or with a daily water supply of 1,000 tons, 8,607 sections (sites) were up to standard throughout the year, taking up 84.2% of the total. In specific, 5,629 sections were surface drinking water source sections (sites), 5,449 of which were up to standard throughout the year, taking up 96.8%. Major non-attainment pollution indicators were TP, sulfate and manganese. 4,590 were groundwater drinking water source sites, 3,158 of which were up to standard throughout the year, taking up 68.8% with major non-attainment pollutants being fluoride, sodium and manganese, mainly attributable to the relatively high natural background value.

(2) Water bodies of key water conservancy projects

The Three Gorges Reservoir Area In 2023, the water quality of the main tributaries of the Three Gorges Reservoir Area was excellent. Among the 77 sections monitored, those meeting Grade I-III standard took up 98.7%, sections meeting Grade IV standard took up 1.3%, and no section met Grade V standard or was inferior to Grade V standard, all being the same as that of 2022. No section was under oligotrophic status, the same as 2022; sections under mesotrophic status took up 74.0%, down by 6.5 percentage points compared

with that of 2022; and sections under eutrophic status took up 26.0%, up by 6.5 percentage points compared with that of 2022.

South-North Water Diversion Project (East Route)

In 2023, the water quality of the intake of the Yangtze River was fairly good. The water quality of the Baoying section, Bulao section, Hanzhuang section and Liangji section of the Beijing-Hangzhou Canal was fairly good, and that of Liyunhe section and the Suqian section was excellent.

South-North Water Diversion Project (Central Route) In 2023, the water quality of the intake was excellent. Danjiangkou Reservoir was of mesotrophic status.

(3) Inland fishery waters

Key Fishery Areas in Rivers In 2023, the leading non-attainment indicators of key fishery areas in rivers were TN. The areas of which the concentration of TN, TP, non-ionic ammonia, COD_{Mn}, petroleum, volatile phenol, copper, and zinc was better than the assessment standard accounted for 0.9%, 72.7%, 85.9%, 81.0%, 97.8%, 79.7%, 97.8% and 99.8% of the monitored area respectively. The concentration of lead, cadmium, mercury, arsenic and chromium all met the assessment standards by the monitoring results.

Key Fishery Areas in Lakes (Reservoirs) The leading non-attainment indicators of key fishery areas in lakes (reservoirs) were TN and TP. The areas of which the concentration of TN, TP, non-ionic ammonia, COD_{Mn}, petroleum, volatile phenols, copper, mercury and chromium was better than the assessment standard accounted for 14.4%, 22.2%, 60.7%, 51.7%, 96.1%, 99.97%, 99.9%, 99.9%, and 99.99% of the monitored area respectively. The concentrations of zinc, lead, cadmium and arsenic all met the assessment standards by the monitoring results.

41 National Aquatic Germplasm Resources Conservation Areas The key non-attainment indicator in the water bodies of 41 national aquatic germplasm resources conservation areas was TN. The areas of which the concentration of TN, TP, non-ionic ammonia, COD_{Mn}, petroleum, volatile phenol, copper, zinc, mercury and chromium was better than the assessment standard accounted for 0.6%, 93.2%, 75.9%, 80.6%, 99.0%, 95.6%, 99.97%, 99.99%, 98.6% and 99.99% of the monitored area respectively.

*Including 118 important fish and shrimp spawning grounds, feeding grounds, migration channels, breeding areas, key protected aquatic habitats and aquatic germplasm resources protection areas in the Heilongjiang River Basin, Yellow River Basin, Yangtze River Basin and Pearl River Basin.

(4) Farmland irrigation water

In 2023, among the 1,883 irrigation water sections (sites) with the scale at or above 100,000 mu monitored in farmland

irrigation areas, 1,758 sections (sites) were up to standard, accounting for 93.4%. The main non-attainment indicators are fecal coliform, suspended substance and pH*.

Special Column

More progress in promoting the battle against water pollution

In 2023, the Key River Basin Water Ecological Environment Protection Plan was issued and implemented and the Specifications for the Grading of Water Ecological Assessment Index of the Yangtze River Basin (Trial) was issued for the Yangtze River Basin Water Ecological Assessment. The TP pollution control plans have been developed by 19 provinces and cities in the Yangtze River Basin, with a continued special effort to regulate water pollution in industrial parks along the Yangtze River Economic Belt. Sewage outlets entering rivers and seas continued to be investigated, rectified and standardized, in which more than 250,000 sewage outlets into rivers had been investigated, and about a third of them had completed rectification. The Notice on Further Improving Environmental Protection on the Treatment of Black and Odorous Water Bodies was issued, and a national inspection was conducted on the treatment of urban black and odorous water bodies. 183 outstanding problems were tracked and supervised, and 70% black and odorous water bodies in county-level cities had been eliminated. 7 eastern provinces were guided to take the lead in investigating and treating black and odorous water bodies in county-level cities, and a preliminary list of black and odorous water bodies in county-level cities across the country was established. The standardized construction of urban centralized drinking water sources continued, and the township-level centralized drinking water source protection zones were delineated nationwide. Total nitrogen emissions from sea-entering rivers had been reduced. Tailor-made treatment plan for each specific river had been issued and implemented for more than 50 sea-entering rivers. Compared with 2022, the average concentration of TN in the state monitoring sections of rivers entering the sea dropped by 12.2% nationwide, and that of rivers entering the Bohai Sea dropped by 19.9%.

*The assessment of farmland irrigation water quality was based on the Standard for Irrigation Water Quality (GB 5084-2021).

III . Marine Ecological Environment

1. Marine environmental quality

(1) Sea areas under jurisdiction*

In the summer of 2023, the sea areas meeting seawater Grade I standard took up 97.9% of the total area under

jurisdiction, an increase of 0.5 percentage point from 2022. Sea areas in the Bohai Sea, Yellow Sea, East China Sea, and South China Sea failing to meet Grade I standard were 12,210 km², 5,700 km², 39,070 km², and 6,900 km² respectively. Sea areas in the East China Sea failing to meet Grade I standard have increased compared with that of 2022, while that of the Bohai Sea, the Yellow Sea and the South China Sea decreased.

The sea areas under jurisdiction of China failing to meet Grade I standard in 2023

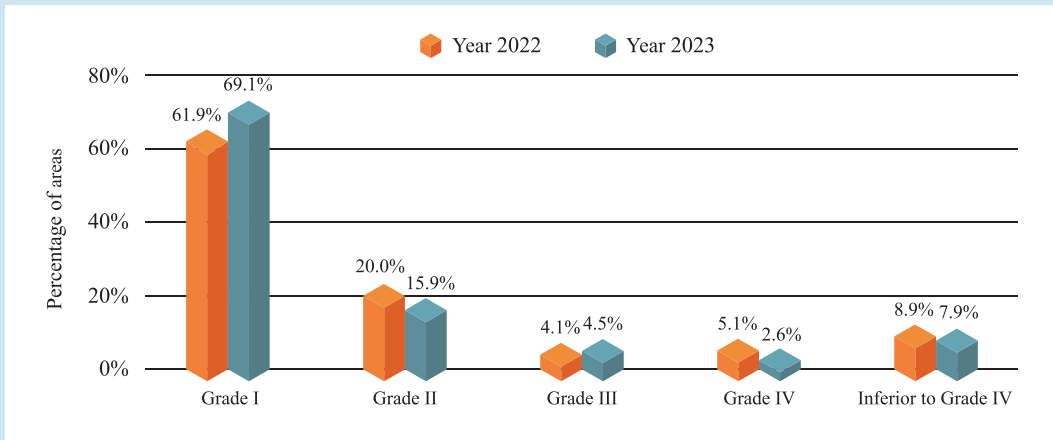
Sea area	Marine area (km ²)				
	Grade II	Grade III	Grade IV	Inferior to Grade IV	Total
Bohai Sea	6,660	2,360	860	2,330	12,210
Yellow Sea	4,850	470	120	260	5,700
East China Sea	16,190	3,260	2,980	16,640	39,070
South China Sea	2,930	890	900	2,180	6,900
Sea areas under jurisdiction	30,630	6,980	4,860	21,410	63,880

(2) Nearshore sea areas

In 2023, of the overall nearshore sea areas in China, 85.0% of the total sea areas were of excellent or good water quality (meeting Grade I & II water quality standards), up

by 3.1 percentage points compared with that of 2022; 7.9% failed to meet Grade IV standard, down by 1.0 percentage point compared with that of 2022. The major indicators that exceeded standards were inorganic nitrogen and active phosphates.

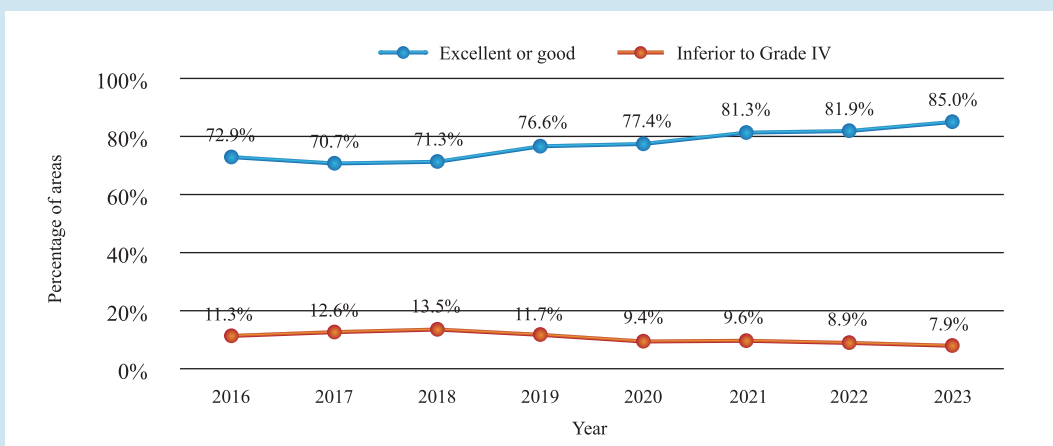
*A total of 1,359 national monitoring sites for seawater environmental quality in sea areas under the jurisdiction of China has been set up, including 1,172 sites in nearshore waters and 187 sites in offshore waters. Three-period monitoring were carried out in spring, summer and autumn in nearshore waters, and one-period monitoring was carried out in summer in offshore waters. The assessment of the jurisdictional sea area adopted the summer monitoring data, and the assessment of the coastal waters adopted the average monitoring data collected in spring, summer and autumn. The seawater quality assessment was based on Technical Specifications for Assessment of Seawater, Marine Sediment and Marine Biological Quality (HJ 1300-2023), Technical Specification for Offshore Environmental Monitoring (HJ 442-2020) and Sea Water Quality Standard (GB 3097-1997).



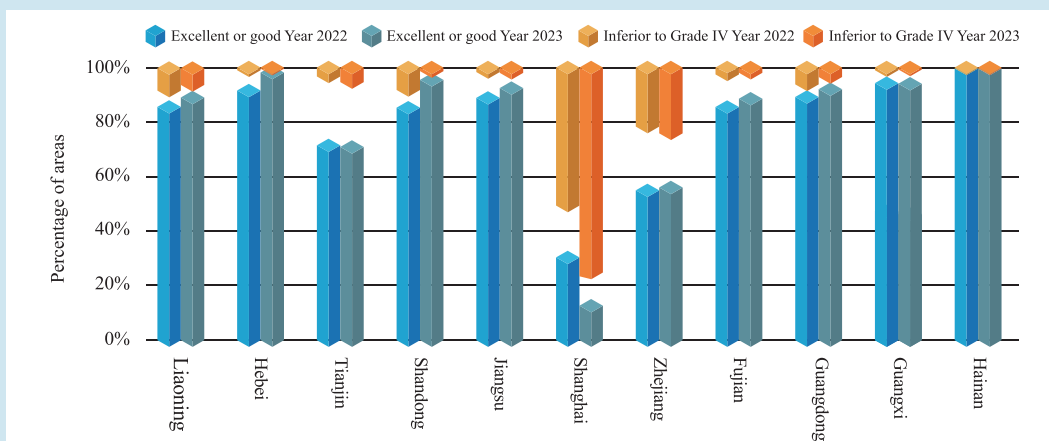
Seawater quality in nearshore waters across China in 2023 and interannual variation

From 2016 to 2023, the proportion of nearshore sea areas with excellent or good water quality rose from 72.9% to 85.0%, an increase of 12.1 percentage points; and the

proportion of nearshore sea areas with water quality inferior to Grade IV standard dropped from 11.3% to 7.9%, a reduction of 3.4 percentage points.



Interannual variance in the percentages of seawater with excellent or good quality and inferior to Grade IV in nearshore waters nationwide 2016–2023



Percentage of seawater with excellent or good quality and inferior to Grade IV in nearshore waters along coastal provinces (autonomous regions and municipalities) in 2023 and interannual variation

The percentage of seawater areas with excellent or good quality in nearshore waters in Liaoning, Hebei, Shandong, Jiangsu, Zhejiang, Fujian and Guangdong increased to a certain extent compared with that of 2022, that of Tianjin, Guangxi and Hainan was basically the same, and that of Shanghai decreased slightly. The percentage of seawater areas with quality inferior to Grade IV standard in nearshore waters in Liaoning, Shandong and Guangdong decreased to a certain extent compared with that of 2022, that of Hebei, Jiangsu, Fujian, Guangxi and Hainan was basically the same, and that of Tianjin, Shanghai and Zhejiang increased to some extent.

among the 32 key bathing beaches under national monitoring, the water quality of 22 bathing beaches was excellent or good during the monitoring periods. Specifically, bathing beaches with excellent seawater quality during the monitoring periods included Tiger Stone and Pingshuiqiao in Qinhuangdao, International Beach in Weihai, as well as Dadonghai Bay and Yalong Bay in Sanya. Some bathing beaches experienced poor seawater quality during some monitoring periods. The main indicators affecting the water quality of bathing beaches were fecal coliforms.

(2) Marine fishery waters**

Key natural marine fishery waters In 2023, the major indicator that exceeded standards in key natural marine fishery waters was inorganic nitrogen. The areas where the concentration of inorganic nitrogen, active phosphate, COD and petroleum was better than the assessment standards accounted for 48.5%, 73.0%, 84.3%, and 98.0% of the total monitored areas respectively. The monitored concentration of copper, zinc, lead, cadmium, mercury, arsenic and chromium were all better than the assessment standards.

2. Environmental status of sea areas for major use categories

(1) Bathing beaches*

During the swimming and holiday seasons in 2023,

*A total of 32 bathing beaches were monitored across the country, and monitoring was carried out twice a week. The assessment was based on Guidelines for Monitoring and Assessment of Bathing Beaches (HY/T 0276-2019) and Marine Water Quality Standard (GB 3097-1997).

**Including 35 important spawning grounds, feeding grounds, migration channels, key protected aquatic habitats and aquatic germplasm resource protection areas of fish, shrimp, and shellfish in the Yellow & Bohai Sea, East China Sea and South China Sea.

Key marine aquaculture areas The major indicator exceeding standards in the key marine aquaculture areas was inorganic nitrogen. The areas where the concentration of inorganic nitrogen, active phosphate, COD and petroleum were better than the assessment standards accounted for 54.2%, 71.8%, 98.6% and 99.96% of the total monitored areas respectively. The monitored concentration of copper, zinc, lead, cadmium, mercury, arsenic and chromium were all better than the assessment standards.

7 national aquatic reserves of germplasm resources The major indicator exceeding standards in the water bodies of the 7 national reserves of aquatic germplasm resources was inorganic nitrogen and COD. The areas where the concentration of inorganic nitrogen, active phosphate, COD, petroleum and copper were better than the assessment standards accounted for 16.4%, 82.3%, 38.5%, 75.9%, and 99.7% of the total monitored areas respectively. The monitored concentration of zinc, lead, cadmium, mercury, arsenic and chromium were all better than the assessment standards.

24 key marine fishery waters Sediment was in good condition. The areas where the concentration of petroleum, copper, zinc, lead, cadmium, mercury, arsenic and chromium were better than the assessment standards accounted for 98.5%, 97.2%, 98.5%, 100%, 95.7%, 99.98%, 99.9% and 87.4% respectively.

3. Marine ecosystem conditions*

In 2023, among the 24 marine ecosystems monitored, 7 were in a healthy state, and 17 were in a sub-healthy state. In specific, the 7 marine ecosystems in healthy state included those of 4 coral reefs in the southwest coast of Leizhou Peninsula, Beihai of Guangxi, the east coast of Hainan and Xisha, the mangrove ecosystems of Beihai and Beilun estuary of Guangxi and the seagrass bed ecosystems in Beihai of Guangxi. The 17 marine ecosystems in sub-healthy state included the 7 estuary ecosystems in the Yalu River Estuary, Shuangtaizi Estuary, Luanhe River Estuary-Beidaihe, Yellow River Estuary, Yangtze River Estuary, Minjiang Estuary and Pearl River Estuary, the 8 bay ecosystems in Bohai Bay, Laizhou Bay, Jiaozhou Bay, Hangzhou Bay, Yueqing Bay, areas along the coast of East Fujian, Daya Bay and Beibu Gulf, the ecosystems of northern Jiangsu shoal wetland and the seagrass bed ecosystems of the east coast of Hainan. No ecosystem was in unhealthy state.

*A total of 24 marine ecosystems had been monitored nationwide. The assessment is based on the Guidelines for the Assessment of Coastal Marine Ecosystem Health (HY/T 087-2005).

Special Column**Intensified efforts to build beautiful bays and comprehensively control pollution in key sea areas**

In 2023, the Ministry of Ecology and Environment, together with relevant departments and local governments of coastal areas, intensified efforts to build beautiful bays and comprehensively control pollution in key sea areas with continuous improvement of the eco-environment quality of coastal waters through the coordinated protection of land-marine and river-marine environment. On a bay-by-bay basis, coastal cities were encouraged to formulate and implement plans for building beautiful bays, jointly advance pollution prevention and control in nearshore waters, ecological protection and restoration, and beach environmental improvement with a “one bay, one policy” approach. The 2nd batch of 12 outstanding cases of beautiful bays had been selected across the country, and special cleaning operations were carried out in 11 key bays to make bays more beautiful with clear waters, clean beaches, swarming fish and seabird and harmony between people and the sea. Focusing on the Bohai Sea, the Yangtze River Estuary-Hangzhou Bay, and the adjacent waters of the Pearl River Estuary, key tasks such as land and sea pollution prevention and control, ecological protection and restoration, and environmental risk prevention had been further implemented. Efforts were made to coordinate the improvement of water quality of sea-entering rivers, the investigation and rectification of sewage outlets entering into the sea, and pollution control in coastal cities and agricultural and rural areas. The supervision of the marine ecological environment was strengthened and on-site quality inspections and random sampling of sewage outlets into the sea were conducted, and coastal provinces issued local standards for marine aquaculture tailwater discharge. The 3rd marine pollution baseline survey had been initiated across the country and 5 marine environmental emergency bases were unveiled in Tianjin, Shanghai and other cities.

IV. Soil Environment

1. Soil environmental quality

In 2023, the soil environmental risks nationwide were basically brought under control, and the increasing trend of soil pollution had been initially curbed. The safe utilization rate of agricultural land had been stabilized at 91% nationwide with the soil environment of agricultural land being generally stable. Heavy metals in soil decreased across the key-risk soil monitoring sites. The safe utilization of key construction land had been effectively guaranteed.

2. Quality of cultivated land

According to the 2019 Report on the Grade of Cultivated Land Quality of China^{*}, the average grade of cultivated land quality nationwide was 4.76, among which the areas ranging from the 1st to 3rd grade accounted for 31.24% of the total cultivated areas; that ranging from the 4th to 6th grade accounted for 46.81%; and that ranging from the 7th to 10th grade accounted for 21.95%.

3. Soil environment conditions

(1) Soil erosion

According to the dynamic monitoring of soil erosion in 2022^{**}, 2.6534 million km² of land were subject to soil erosion in China. Among them, 1.0906 million km² were under water erosion and 1.5628 million km² under wind erosion. In terms of erosion intensity, the areas of mild, moderate, severe, extremely severe and fierce erosion accounted for 64.7%, 16.5%, 7.3%, 5.4% and 6.0% of the total area of soil erosion in the country respectively.

(2) Land desertification and sandification

According to the monitoring results of the 6th National Monitoring of Desertification Land and Sandy Land, there were 2.5737 million km² desertification land and 1.6878 million km² sandy land across the country. According to the 4th Monitoring of Rocky Desertification in the Karst Area, the existing rocky desertification land area in the karst area of China was 7.223 million hectares^{***}.

^{*}The grading of cultivated land quality was based on Cultivated Land Quality Grade (GB/T 33469-2016) with the classification of ten grades. The quality of first-class cultivated land is the best, and the quality of the tenth grade is the worst. The first to third grades, the fourth to sixth grades, the seventh to tenth grades are categorized as high grade, medium grade and low grade respectively. Up to the time this Report was published, the results of the 2019 Report on the Grade of Cultivated Land Quality of China are the latest data.

^{**}Up to the time this Report was published, the monitoring results of soil erosion in 2022 are the latest data.

^{***}Up to the time this Report was published, the monitoring results of the 6th National Monitoring of Desertification Land and Sandy Land and the 4th Monitoring of Rocky Desertification in the Karst Area remain to be the latest.

Special Column

More progress in fighting the battle against soil pollution

In 2023, continued efforts were made to control the source of heavy metal pollution such as cadmium in agricultural soil, 124 major projects were launched to control the source of soil pollution, and key areas were designated in 23 provinces across the country to implement special emission limits for particulate matter and heavy metal pollutants. In plots of cultivated land where the source of soil pollution had been controlled, the overall content of heavy metals in the soil was on a downward trend. Remote sensing was adopted to monitor the implementation of risk management and control for contaminated cultivated land on a regular basis, and the prevention and control of source contamination and safe use of cultivated land had been incorporated into the protection of cultivated land for food safety and security, as well as into other relevant assessments. The initiative of “Recheck” over the hidden dangers of soil pollution had been completed targeting more than 6,400 enterprises included in the priority list of soil pollution supervision. The Guiding Opinions on Promoting Soil Pollution Risk Control and Green and Low-Carbon Remediation was issued, and a total of 2,058 plots of land were included in the soil pollution risk control and remediation list. More than 9,000 plots of land vacated by closed and relocated enterprises were included in the priority supervision list. The Technical Guidelines for Designating Key Areas for Groundwater Pollution Prevention and Control (Trial) was issued. 2,616 enterprises were included in the list of key polluting units for groundwater pollution prevention and control. Pilot projects for soil and groundwater pollution control and remediation were launched among enterprises and chemical parks. More than 2,700 counties (cities and districts) nationwide had prepared and issued special plans for the management of rural domestic sewage in their counties, and 611 counties hosting large-scale livestock farms had prepared and issued plans for the prevention and control of livestock and poultry breeding pollution. The Guiding Opinions on Further Promoting the Treatment of Rural Domestic Sewage and the Guidelines for the Treatment of Rural Black and Odorous Water Bodies were issued, as a result of which the environmental renovation had been completed in more than 16,000 administrative villages across the country, and more than 800 relatively-large black and malodorous water bodies were treated.

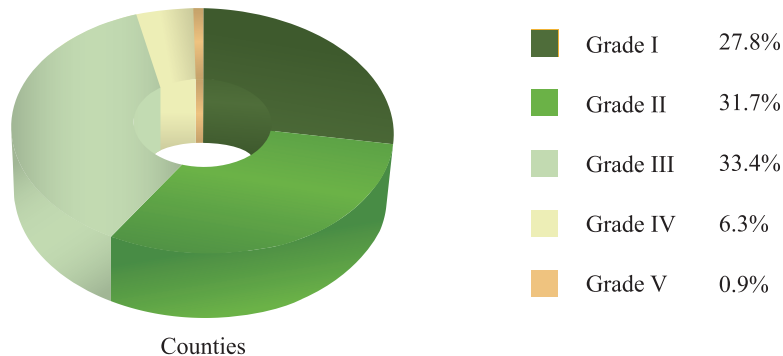
V. Natural and Ecological Environment

1. Ecological environment quality

In 2023, the national Ecological Quality Index (EQI) value was 59.6, and the ecological quality fell into Grade II*, witnessing no notable change compared with that of 2022.

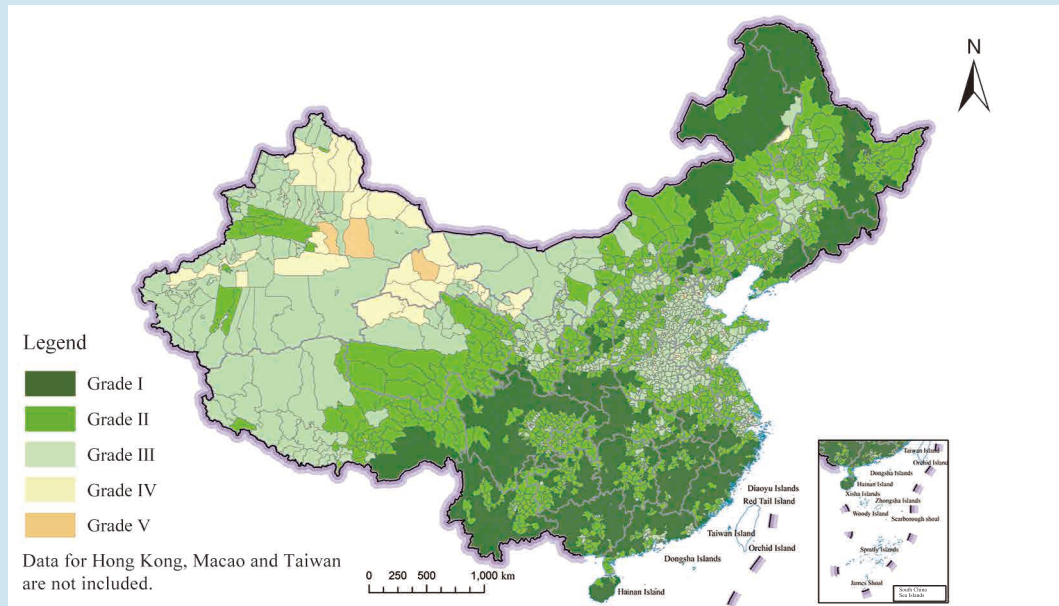
The total area of counties with ecological quality of Grade I took up 27.8% of total land area in China, mainly distributed in the Daxing'anling and Xiaoxing'anling Mountain areas, Changbai Mountain, the southeast of the Qinghai-Tibet Plateau, the west of Yunnan-Guizhou Plateau, Qinling

Mountains and Jiangnan hilly areas. The total area of counties with ecological quality of Grade II took up 31.7%, mainly distributed in Sanjiang Plain, Inner Mongolia Plateau, Loess Plateau, the northwest of the Qinghai-Tibet Plateau, Sichuan Basin and the middle and lower reaches of the Yangtze River. The total area of counties with ecological quality of Grade III took up 33.4%, mainly distributed in the North China Plain, Alxa in Inner Mongolia, the central and western Qinghai-Tibet Plateau and most parts of Xinjiang. The total area of counties with ecological quality of Grade IV took up 6.3%, and that of Grade V took up 0.9%, mainly distributed in central and northern Xinjiang and western Gansu.



General eco-environmental quality of counties in China in 2023

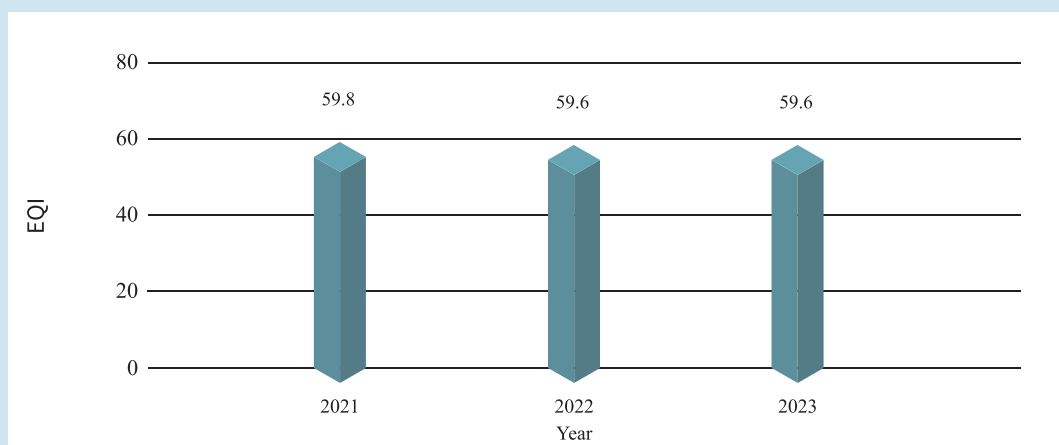
*In 2023, ecological quality monitoring and assessment was conducted among 2,855 county-level administrative units across the country. The assessment was conducted based on the Regional Ecological Quality Assessment Methods (Trial). $EQI \geq 70$ falls into Grade I, $55 \leq EQI < 70$ falls into Grade II, $40 \leq EQI < 55$ falls into Grade III, $30 \leq EQI < 40$ falls into Grade IV, and $EQI < 30$ falls into Grade V.



Map of eco-environmental quality of counties in China in 2023

In 2021, the Ministry of Ecology and Environment issued the Regional Ecological Quality Evaluation Methods (Trial), which adopts the Ecological Quality Index (EQI) to comprehensively evaluate regional ecological quality in terms of four aspects: ecological pattern, ecological function,

biodiversity and ecological stress. From 2021 to 2023, the national EQI ranged from 59.6 to 59.8, with ecological quality falling into Grade II, indicating that China is rich in biodiversity with a wide coverage of natural ecosystem, a complete ecological structure and sound ecological functions.



Interannual variance in the national Ecological Quality Index (EQI) 2021–2023

2. Biodiversity

(1) Ecosystem diversity

China boasts various types of natural ecosystems including forests, grasslands, deserts, wetlands, islands, bays, mangroves, coral reefs, seagrass beds, estuaries and up-welling currents, as well as artificial and semi-artificial ecosystems such as cropland and urban ecosystems.

The land-based ecological protection red line in China covers an area of about 3.04 million km², accounting for more than 30% of the land area and effectively protecting 90% of the terrestrial ecosystem types and 74% of the nationally protected wildlife and plant populations under key national protection.

(2) Species diversity

The 2023 Catalogue of Species of China registered a total of 148,674 species and subspecies. Among them, 69,658 were of animalia species, 47,100 botanical species, 25,695 fungi, 2,566 protogenesis animalia, 2,381 pigment species, 469 bacteria species and 805 viruses.

980 species and 8 categories of wild animals are included in the Catalogue of Wild Animals under Key State Protection, covering 234 species and 1 category of first-class national protected wild animals and 746 species and 7 categories of second-class national protected wild animals. Wild animals such as giant panda, Hainan gibbons, *Procapra przewalskii*, brown-eared pheasant, Yangtze finless porpoise, Yangtze sturgeon, and Chinese alligator are unique to China. 455 species and 40 categories of wild plants are included in the Catalogue of Wild Plants under Key State Protection, including 54 species and 4 categories of first-class national protected wild plants, and 401 species and 36 categories of second-class national protected wild plants. Wild plants such as *Abies beshanzuensis*, *Metasequoia*, *Dendrobium huoshanense*, and Yunnan agarwood are unique to China.

(3) Genetic resource diversity

According to incomplete statistics, China has 1,339 species of cultivated crops in 455 categories, more than 1,000 economic tree species, and 7,000 native ornamental

plant species. The 3rd national census on genetic resources of livestock and poultry shows that China currently has 1,018 local breeds, cultivated breeds and introduced breeds of livestock and poultry. 539,000 samples of crop germplasm resources are preserved for a long-term basis.

3. Threatened species

The assessment results of 39,330 species of higher plants (including subspecies) across China showed that 11,715 species of higher plants require special attention and protection, taking up 29.8% of the total assessment amount, among which, 4,088 species were threatened, 2,875 species belong to near threatened (NT) Grade, and 4,752 belong to data deficient (DD) Grade. The assessment results of the 4,767 identified vertebrates (marine fishes excluded) showed that 2,816 vertebrates require special attention and protection, taking up 59.1% of the total assessment amount, among which 1,050 vertebrates were threatened, 774 vertebrates belong to NT Grade, and 992 belong to DD Grade. The assessment results of the 9,302 identified macro-fungi showed that 6,538 species of macro-fungi require special attention and protection, taking up 70.3% of the total assessment amount, among which 97 macro-fungi were threatened, 101 belong to NT Grade, and 6,340 belong to DD Grade.

4. Nature reserves

In 2023, the Master Plan for the 1st Batch of National Parks was officially released, with a total planned area of more than 230,000 km² for 5 national parks, including Sanjiangyuan, Giant Panda, Siberian Tiger and Leopard, Hainan Tropical Rainforest, and Wuyi Mountain national park. 27 candidate national parks in 24 provinces (autonomous regions and municipalities) were making active preparation in the running up to official national park. The total area of various types of nature reserves at all levels of the country accounted for about 18% of the land area in China. China is also home to 14 world natural heritage sites, 4 world natural and cultural heritage sites and 41 world geological parks.

Special Column**Construction of the national ecological quality comprehensive monitoring stations**

In 2023, in line with the spirit of the National Conference on Ecological and Environmental Protection and to further enhance the ecological quality supervision and monitoring capabilities, the Ministry of Ecology and Environment identified 55 comprehensive monitoring stations including Miyun Reservoir Station (wetland) in Beijing, Hulun Buir Station (grassland) in Inner Mongolia, Shanghuang Station (forest) in Jinhua Zhejiang as the 1st batch of national ecological quality comprehensive monitoring stations, and included them in the national ecological quality monitoring network. The national monitoring network involves 7 ecosystem types of forest, farmland, grassland, wetland, desert, urban and rural areas and oceans across 26 provinces (autonomous regions and municipalities). The comprehensive stations play a pivotal role in the supervision, monitoring and evaluation of regional ecological quality. Their main tasks are “sample site monitoring and data accumulation; sky-ground integration and ground verification; problem discovery and supporting supervision services; focused research and talent training”. The comprehensive stations are mainly responsible for sample site monitoring tasks, biodiversity monitoring, monitoring data gathering, ground verification and accuracy assessment of ecological remote sensing parameter products, on-site calibration of clues to ecological problems detected by remote sensing monitoring and special research such as regional ecological problem investigations and ecological risk warnings.

Special Column

Continuous strengthening of the protection and supervision of natural and ecological system

In 2023, the national survey and assessment on ecological status change (2015-2020) was completed, and the result assessment of the pilot ecological protection and restoration program for the 13th “Five-Year” Plan period was carried out for mountains, rivers, forests, farmlands, lakes and grasslands. The campaign of “Green Shield 2023” was continued to intensify supervision on nature reserves including on-site inspections of 65 nature reserves. A total of 179 key issues were identified and rectified. Remote sensing monitoring of human activities within the ecological protection red line was organized, and 225 ecological damage issues were discovered through field verification. The China Biodiversity Conservation Strategy and Action Plan (2023-2030) was released, and the Implementation Plan for Major Projects on Biodiversity Conservation was studied and formulated. The standards and specifications for wetland protection supervision were revised, law enforcement inspections on the Wetland Protection Law were enhanced, and technical specifications for desertification areas and wetland ecological quality assessment were formulated. Institutional progress had been made in inter-departmental ecological supervision work such as desertification prevention and control and wetland protection. A total of 15 outstanding ecological protection and restoration cases were released, and the 3rd batch of 7 integrated protection and restoration projects was announced for mountains, rivers, forests, farmlands, lakes, grasslands and deserts. A total of 104 national demonstration zones (7th batch) for building ecological civilization and 53 practice and innovation bases highlighting “lucid waters and lush mountains are invaluable assets” were unveiled.

VI . Acoustic Environment*

1. Acoustic environment of functional zones**

In 2023, acoustic environment of functional zones of APL cities was monitored, 96.1% of which met the standard during daytime, up by 0.1 percentage point compared with that of 2022; the figure stood at 87.0% during nighttime, up by 0.4

percentage point compared with that of 2022.

The rate of urban acoustic environment of functional areas reaching standard during daytime across the country was higher than that during nighttime. In terms of the acoustic environment of functional areas that range from Type 1 to Type 4a during nighttime, the rate of Type 3 functional area reaching standard during nighttime was the highest, and that of the Type 1 and Type 4a during nighttime was the lowest.

Rate of different acoustic environment functional zones reaching standard in cities across China in 2023 (Unit: %)

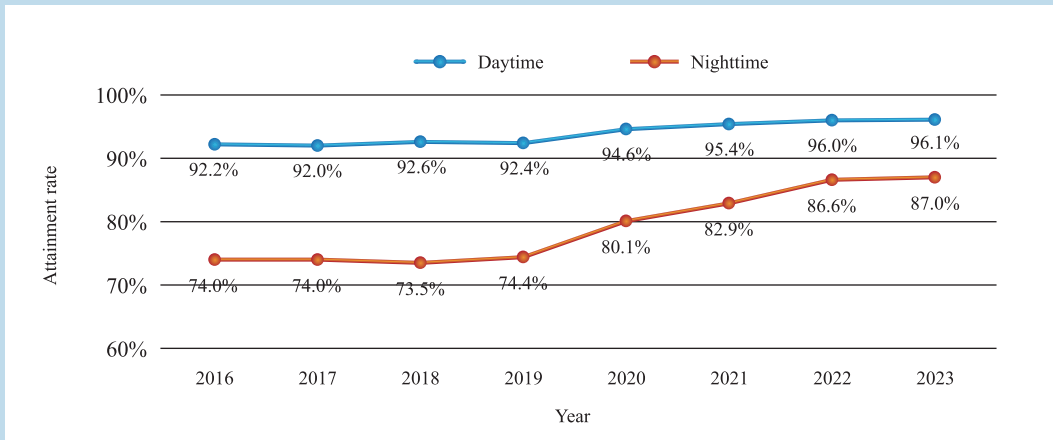
Year	Type 1		Type 2		Type 3		Type 4a	
	Day	Night	Day	Night	Day	Night	Day	Night
2022	91.1	83.1	96.2	93.2	98.9	94.6	98.5	70.4
2023	90.1	82.2	96.9	94.1	98.9	95.6	98.2	70.1

From 2016 to 2023, the rate of acoustic environment functional zones reaching standard during daytime in APL cities rose from 92.2% to 96.1%, an increase of 3.9

percentage points; and that of the nighttime rose from 74.0% to 87.0%, an increase of 13.0 percentage points.

*In 2023, urban acoustic environment monitoring was carried out among over 70,000 monitoring sites in APL cities across the country. The assessment of acoustic environment was based on Environmental Quality Standard for Noise (GB 3096-2008) and Technical Specifications for Environmental Noise Monitoring - Routine Monitoring for Urban Environmental Noise (HJ 640-2012).

**The acoustic environment quality in functional areas is mainly monitored manually. Type 1 function area refers to the areas with residential community, health care, culture and education, scientific research and development, and administration as the main functions, which need quiet environment. Type 2 function area refers to the areas with commerce, finance and market as main functions or areas mixing residential communities, commerce and industries, which need to maintain quiet environment for residential areas. Type 3 function area refers to the areas dominated by industrial production, warehouse and logistics in need of prevention of the strong impacts of industrial noise on surrounding environment. Type 4a function area refers to the areas along expressways, first-class highways, second-class highways, urban expressways, urban arterial roads, urban secondary arterial roads, urban rail transit (ground section), and areas on both sides of inland waterways.

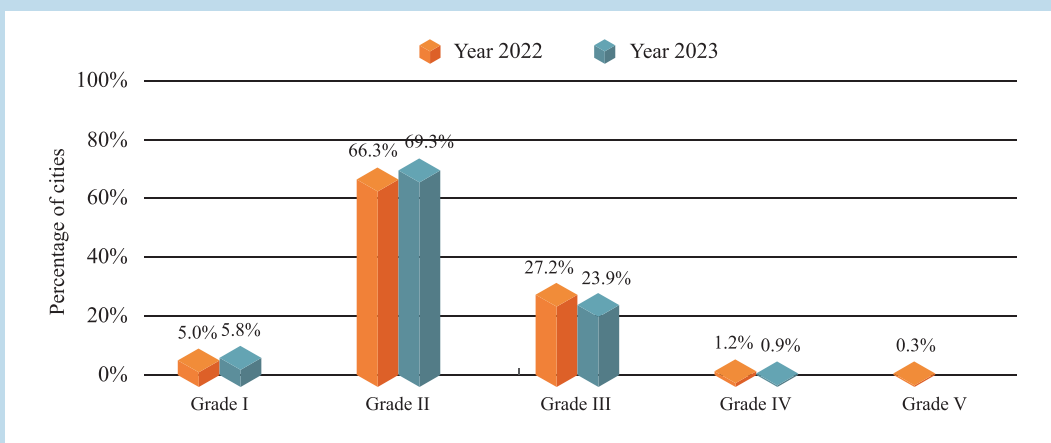


Interannual variance of rates of urban acoustic environment functional areas meeting standard during daytime and nighttime nationwide 2016–2023

2. Regional acoustic environment

In 2023, regional daytime acoustic environment of APL cities was monitored, and the average value of equivalent sound level was 53.9 dB(A), 0.1 dB(A) lower than that of 2022. Among them, 5.8% of the cities met Grade I urban

daytime acoustic environment standard on the whole, up by 0.8 percentage point from 2022; 69.3% of the cities met Grade II standard, up by 3.0 percentage points; 23.9% of the cities met Grade III standard, down by 3.3 percentage points; 0.9% of the cities met Grade IV standard, down by 0.3 percentage point; no city was at Grade V standard, down by 0.3 percentage point from 2022*.

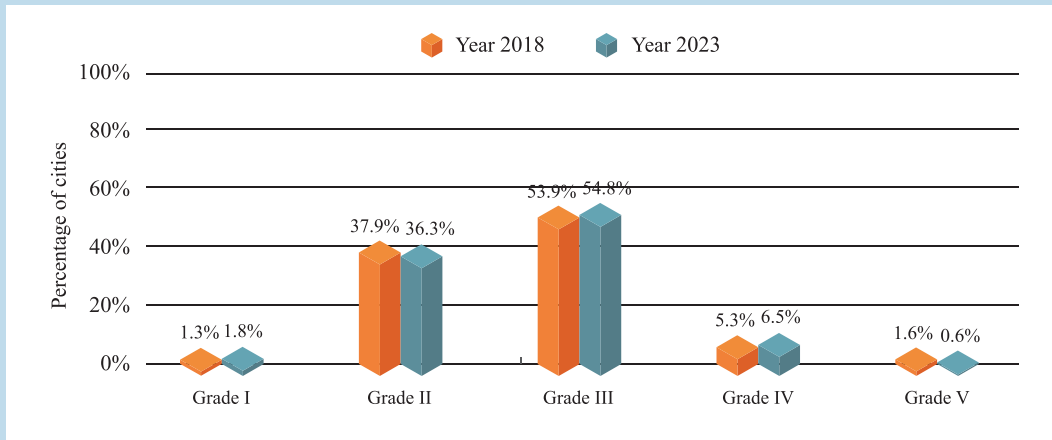


Percentage of cities across China in terms of varying grades of overall environmental noise during daytime in 2023 and interannual variation

*The average equivalent sound level during daytime ≤ 50.0 dB(A) is excellent (Grade I); 50.1–55.0 dB(A) is good (Grade II); 55.1–60.0 dB(A) is average (Grade III); 60.1–65.0 dB(A) is relatively poor (Grade IV) and >65.0 dB(A) is poor (Grade V).

In 2023, regional nighttime acoustic environment of APL cities was monitored, and the average value of equivalent sound level was 46.0 dB(A), the same as that of 2018. Among them, 1.8% of the cities met Grade I urban nighttime acoustic environment standard on the whole, up by 0.5 percentage point from 2018; 36.3% of the cities met Grade II standard,

down by 1.6 percentage points; 54.8% of the cities met Grade III standard, up by 0.9 percentage point; 6.5% of the cities met Grade IV standard, up by 1.2 percentage points; 0.6% of the cities met Grade V standard, down by 1.0 percentage point from 2018*.



Percentage of cities across China in terms of varying grades of overall environmental noise during nighttime in 2023 and interannual variation

3. Acoustic environment of traffic noise

In 2023, the acoustic environment of traffic noise of APL cities was monitored in the daytime, and the average value of equivalent sound level was 66.2 dB(A), the same as that of 2022. Among them, 79.8% of the cities met Grade I urban traffic noise intensity standard in the daytime, up by 2.0 percentage points compared with 2022; 18.7% of the cities met Grade II standard in the daytime, down by 1.1 percentage points; 1.5% of the cities met Grade III standard in the daytime, down by 0.6 percentage point; no city was at Grade IV standard in the daytime, down by 0.3 percentage point; and

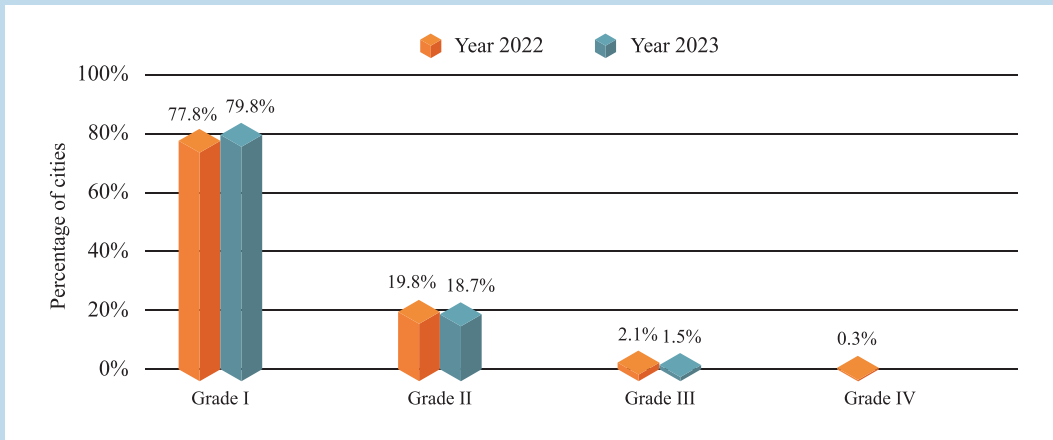
no city was at Grade V standard, the same as that of 2022**.

In 2023, the acoustic environment of traffic noise of APL cities was monitored in the nighttime, and the average value of equivalent sound level was 58.1 dB(A), the same as that of 2022. Among them, 44.0% of the cities met Grade I urban traffic noise intensity standard in the nighttime, down by 3.0 percentage points compared with 2018; 22.2% of the cities met Grade II standard in the nighttime, up by 4.8 percentage points compared with 2018; 16.0% of the cities met Grade III standard in the nighttime, up by 4.5 percentage points compared with 2018; 12.3% of the cities met Grade IV standard in the nighttime, down by 1.4 percentage points compared with 2018; and 5.5% of the cities met Grade V standard, down by 4.8 percentage points compared with 2018***.

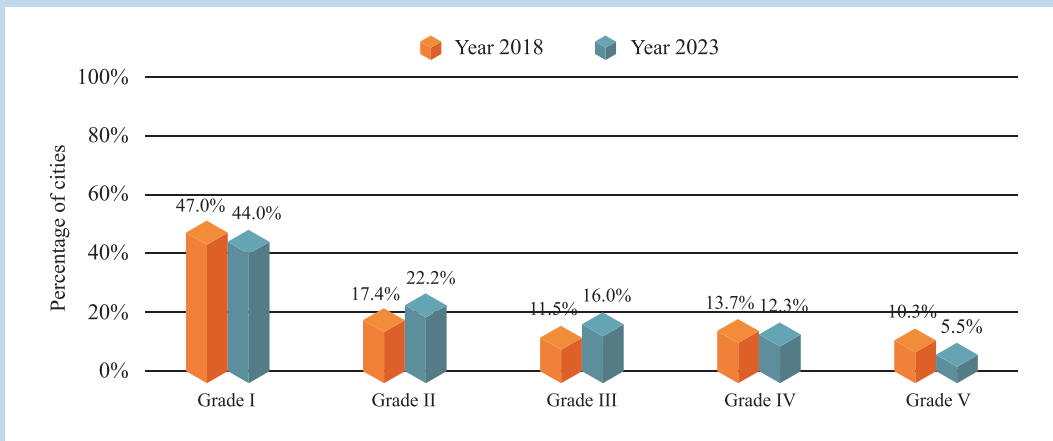
*Regional nighttime acoustic environment monitoring is conducted once every five years, scheduled in the third year of each five-year period. The average equivalent sound level during nighttime ≤ 40.0 dB(A) is excellent (Grade I); 40.1~45.0 dB(A) is good (Grade II); 45.1~50.0 dB(A) is average (Grade III); 50.1~55.0 dB(A) is relatively poor (Grade IV) and >55.0 dB(A) is poor (Grade V).

**The average equivalent sound level during daytime ≤ 68.0 dB(A) is excellent (Grade I); 68.1~70.0 dB(A) is good (Grade II); 70.1~72.0 dB(A) is average (Grade III); 72.1~74.0 dB(A) is relatively poor (Grade IV) and >74.0 dB(A) is poor (Grade V).

***Regional nighttime traffic noise acoustic environment monitoring is conducted once every five years, scheduled in the third year of each five-year period. The average equivalent sound level during nighttime ≤ 58.0 dB(A) is excellent (Grade I); 58.1~60.0 dB(A) is good (Grade II); 60.1~62.0 dB(A) is average (Grade III); 62.1~64.0 dB(A) is relatively poor (Grade IV) and >64.0 dB(A) is poor (Grade V).



Percentage of cities across China in terms with varying grades of traffic noise intensity during daytime in 2023 and interannual variation



Percentage of cities across China in terms with varying grades of traffic noise intensity during nighttime in 2023 and interannual variation

Special Column

Enhancing work on noise pollution prevention and control

In 2023, the Ministry of Ecology and Environment, together with 16 Ministries and Commissions including the Central Commission for Guiding Cultural and Ethical Progress, jointly issued the 14th “Five-Year” Action Plan for Noise Pollution Prevention and Control in a bid to build a new pattern of inter-departmental collaboration for noise pollution control. Pilot work was initiated on delineation of areas where noise-sensitive buildings are concentrated, building “quiet communities”, urban noise control assessments, and the application of urban noise maps. The Opinions on Strengthening Noise Monitoring Work was released to further standardize and strengthen noise monitoring. 338 APL cities and above (excluding Sansha City) had fully completed the assessment of the delineation of acoustic environment functional zones and basically completed the authorization of monitoring points, while 36 municipalities directly under the central government, provincial capitals and cities with independent planning status had basically set up automatic monitoring systems for the quality of the acoustic environment in functional zones. For the first time, the China Noise Pollution Prevention and Control Report (2023) was jointly issued in collaboration with 14 Ministries and Commissions including the Central Commission for Guiding Cultural and Ethical Progress. The Technical Specifications for Application and Issuance of Pollutant Emission Permits-Industrial Noise and Notice on the Administration of Industrial Noise Pollutant Emission Permits were formulated, and 81,000 pollutant emission units that generate industrial noise were included in the pollution emission permit management. The Guideline List of Low-Noise Construction Equipment (1st Batch) was jointly issued with the authorities of industry and information technology, housing and urban-rural development, and market regulation. 33 typical cases of noise complaint were selected from 28 provinces with high complaint rates and strong public concern, and all provinces were urged to address the noise-related public concerns. A typical case database for noise pollution prevention and control was built, and a special column entitled “Quiet China, I’m in!” was created on the Weibo and WeChat account of the Ministry of Ecology and Environment for publicity and promotion.

VII. Radiation Environment

1. Environmental ionizing radiation

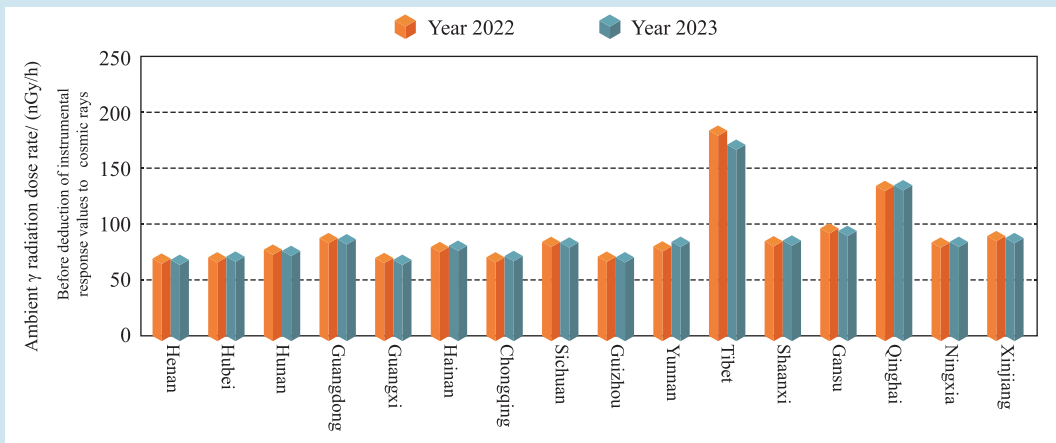
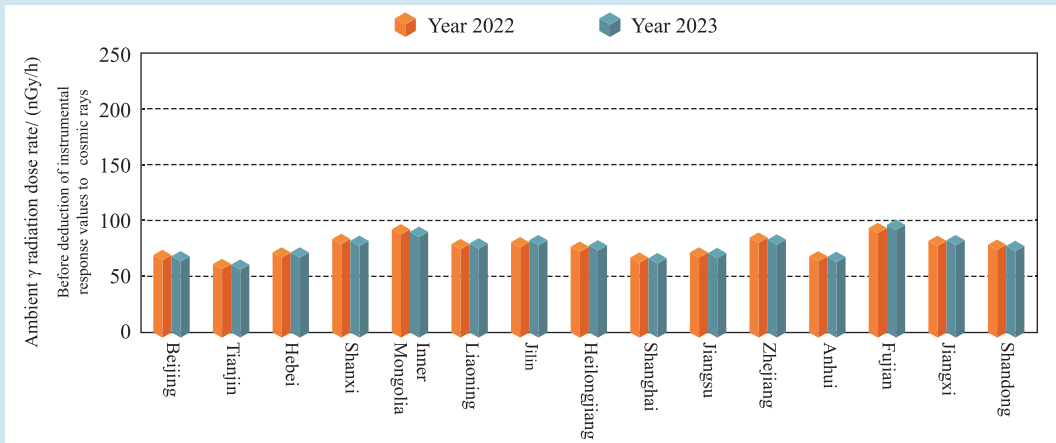
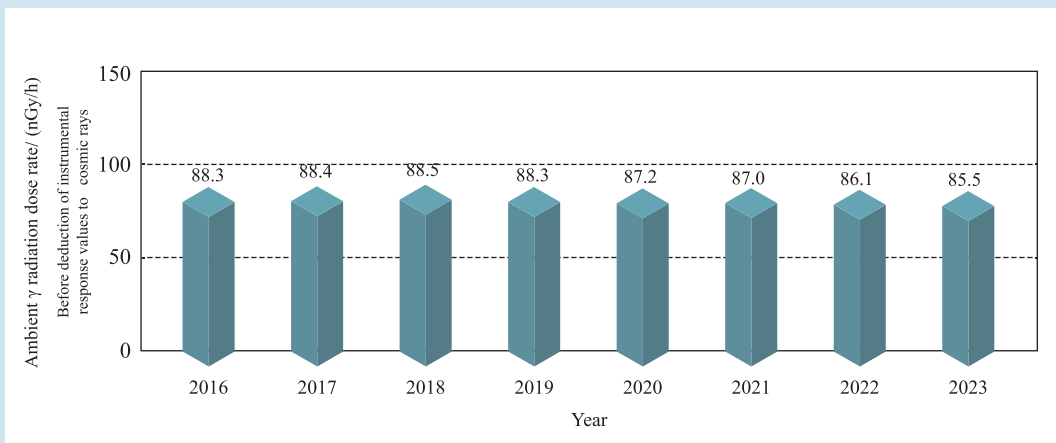
(1) Ionizing radiation in China^{*}

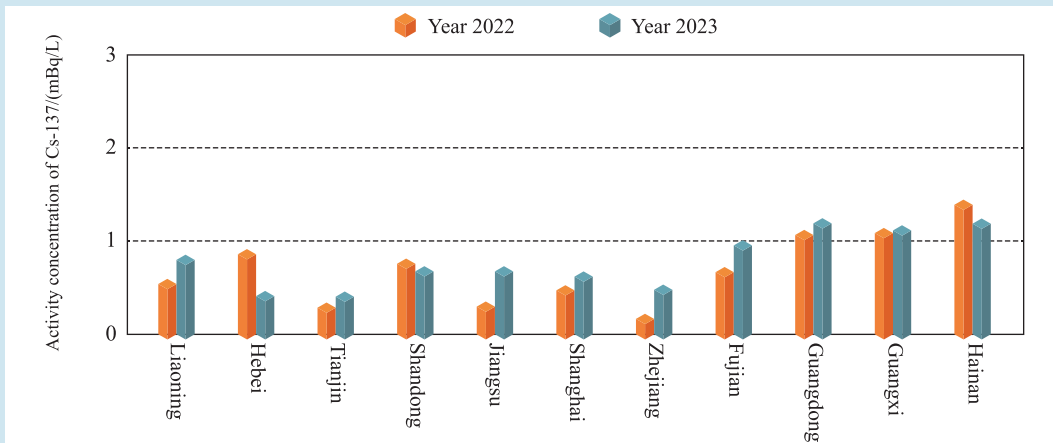
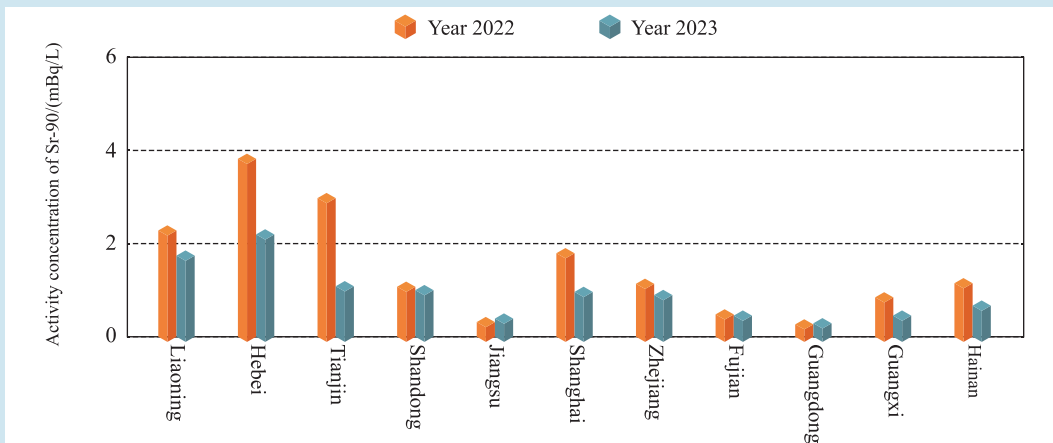
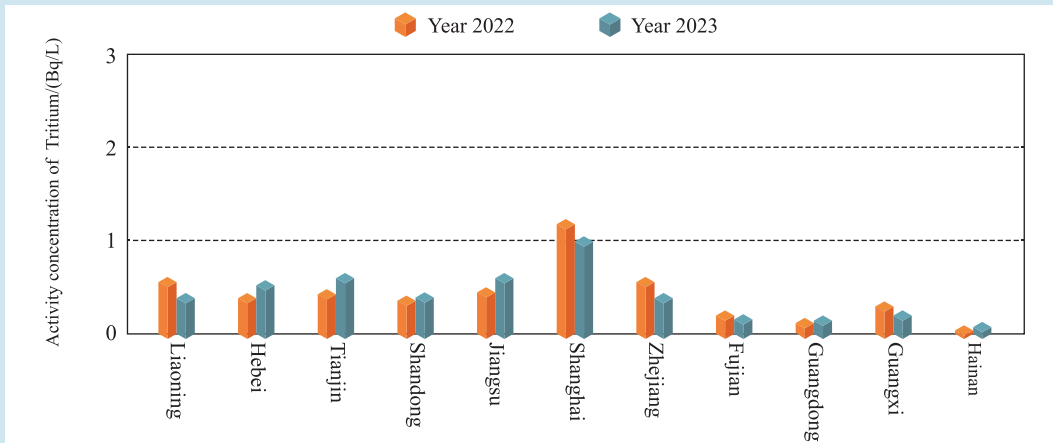
The environmental ionizing radiation level in China remained within the fluctuation range of natural background level in 2023. The ambient γ radiation dose rate was within the fluctuation range of natural baseline value. The natural radionuclide activity concentration in the air were within the natural background level, and no abnormality was seen in artificial radionuclide activity concentration. The activity concentration of natural radionuclides remained at the baseline level, and that of artificial radionuclides saw no abnormality in the 7 major river basins (including Yangtze River, Yellow River, Pearl River, Songhua River, Huaihe River, Haihe River and Liaohe River), rivers in Zhejiang and Fujian Province, Northwest and Southwest China and major lakes (reservoirs). The activity concentration of gross α and gross β of groundwater met the Grade III standard specified in the Standard for Groundwater Quality (GB/T 14848-2017).

The activity concentration of gross α and gross β of urban centralized drinking water sources met the limit specified in the Standard for Drinking Water Quality (GB 5749-2022). The activity concentration of natural radionuclides in nearshore marine water and marine organisms was at the baseline level, and no abnormality was seen in the activity concentration of artificial radionuclides. In specific, the activity concentration of artificial radionuclides Sr-90 and Cs-137 in marine water was far below the limit specified in Sea Water Quality Standard (GB 3097-1997). The activity concentration of artificial radionuclides Sr-90 and Cs-137 in marine organisms was much lower than the limit specified in the Limit Concentration of Radioactive Materials in Foods (GB 14882-94). The activity concentration of natural radionuclides in soil was at the baseline level, and no abnormality was seen in the activity concentration of artificial radionuclide.

From 2016 to 2023, the environmental ionizing radiation level remained within the fluctuation range of natural background level nationwide, and the automatic monitoring results of the ambient γ radiation dose rate remained stable, with an annual average value ranging from 85.5 to 88.5 nGy/h.

^{*}A total of 497 automatic monitoring sites and 328 cumulative monitoring sites had been set up for the monitoring of ambient γ radiation dose rate. Monitoring of air included 362 aerosol monitoring sites, sediment and gaseous radioactive iodine isotope monitoring sites, and 32 air (water vapor) and precipitation monitoring sites. Monitoring of water bodies included 81 river water monitoring sections, 21 lake and reservoir water monitoring sites, 344 urban centralized drinking water source monitoring sites, 31 urban groundwater monitoring sites, 48 seawater monitoring sites, and 34 marine organism monitoring sites. Monitoring of soil included 362 monitoring sites. Relevant methods in the series of standards for statistical processing and interpretation of data were used to assess background fluctuations, baseline value and abnormalities, as well as to compare with the limits specified in relevant standards.

Automatic monitoring results of the ambient γ radiation dose rate in 2023 nationwideAutomatic monitoring results of the ambient γ radiation dose rate 2016–2023 nationwide



Monitoring results of Tritium, Sr-90 and Cs-137 in nearshore water of China in 2023 and interannual variation

(2) Ionizing radiation in the vicinity of nuclear facilities

In 2023, the ambient γ radiation dose rate in the vicinity of operating nuclear power bases, civil research reactors, nuclear fuel cycling facilities and waste disposal facilities, together with the activity concentration of radionuclides in such environmental media as air, water, soil and organism related to facility activities were both within the range of fluctuations over the years on the whole. The assessment findings showed that the radiation dose resulting from the operation of the above-mentioned nuclear facilities to the public was far below the national limit, making no impact on environmental safety and public health.

(3) Ionizing radiation in the vicinity of uranium mines and metallurgical plants

In 2023, both the ambient γ radiation dose rate in the vicinity of uranium mining and metallurgical facilities, and the activity concentration of radionuclides in air, water and soil related to facility activities were within the range of fluctuations over the years.

2. Ambient electromagnetic radiation**

In 2023, the environment electromagnetic radiation level of state monitoring sites in 31 provinces (autonomous regions and municipalities), and that of radio and television signal emitting facilities, power transmission and transformation facilities and antenna of mobile communication base stations were all within the public exposure limit specified in the Controlling Limits for Electromagnetic Environment (GB 8702-2014).

*Nuclear facility includes 13 nuclear power bases, 5 civil research reactors, 6 civil nuclear fuel cycling facilities and 3 waste disposal facilities as well as 17 uranium mining and metallurgy facilities. In principle, the monitoring work was conducted on the basis of "Tailor-made monitoring plan for each individual premise". The relevant methods in the series of standards for data statistical processing and interpretation were used to assess the fluctuations over the years. The dose estimation methods in relevant standards such as Basic Standards for Protection against Ionizing Radiation and Protection of Radiation Source Safety (GB 18871-2002) were used to assess the effective dose to a representative person as a result of the operation of the facility.

**Including 44 state monitoring sites for environment electromagnetic radiation, as well as 32 radio and television signal emitting facilities, 6 power transmission and transformation facilities and 2 mobile communication base stations.

Special Column

Stepping up efforts in stringent supervision on nuclear and radiation safety

In 2023, safety review, environmental impact assessment and supervision of nuclear power plants under construction were carried out in accordance with the law. Four new construction licenses for nuclear power units and 10 review opinions on site selection for nuclear power units were issued. A mid-term evaluation of the 14th “Five-Year” Plan for Nuclear Safety was organized to supervise the implementation of the three-year action plan for nuclear and radiation safety hazard inspection and rectification. The decommissioning of old nuclear facilities and the management of historical radioactive waste were accelerated, and the safe disposal of radioactive waste was strengthened. Documents were issued to strictly control the online sales of radioactive materials to eliminate safety risks. Nationwide, the operating nuclear power units, in-service civilian research reactors, and civilian nuclear fuel cycle facilities had been operating safely, and the construction quality of nuclear power units and civilian research reactors under construction had been carefully controlled on the whole. No events classified as Level 2 or above were occurred according to the International Nuclear and Radiological Event Scale (INES), and the incidence of radiation accidents from radioactive sources remained at a low level of less than 1 per 10,000 radioactive sources per year. The tasks of implementing the Joint Review Conference of the Parties to the Convention on Nuclear Safety was successfully completed. Efforts were made to actively gather the feedback of experience on key nuclear safety issues and to study nuclear safety situations so as to improve the pertinence and effectiveness of nuclear safety supervision. On-site supervision of nuclear safety equipment and competence assessment of nuclear safety personnel were also strengthened.

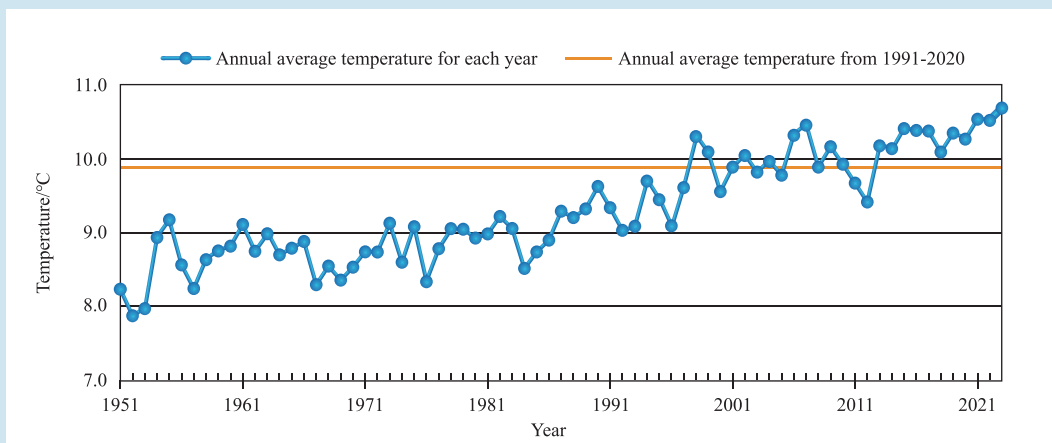
VIII. Climate Change and Natural Disasters

1. Climate change

(1) Air temperature

In 2023, the national average air temperature was 10.71

°C, 0.82 °C higher than the average figure over the years (1991-2020), being the highest in history since 1951. The temperature in each month was slightly higher than that of the same period over the years, except for April and May when the temperature was slightly lower than that of the same period over the years.

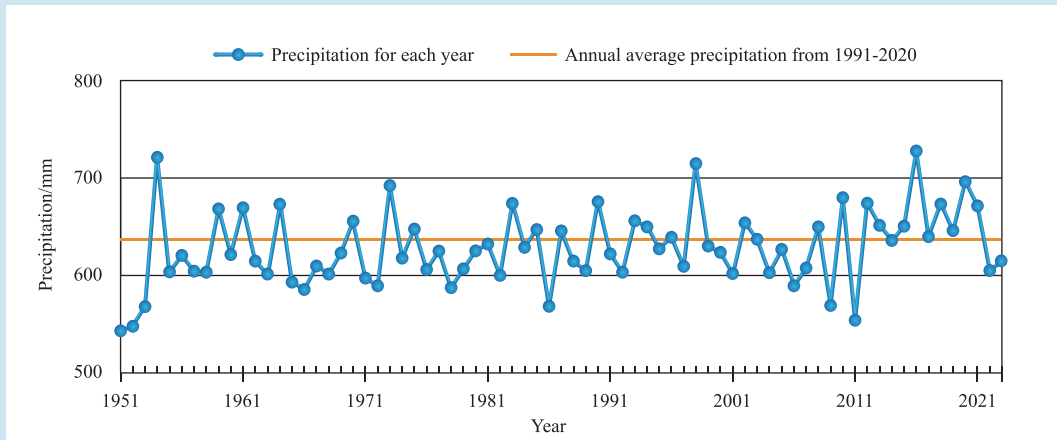


Interannual change of national average air temperature 1951–2023

The temperature in all 31 provinces (autonomous regions and municipalities) across the country was relatively higher than the same period over the years. Shandong, Liaoning, Xinjiang, Guizhou, Yunnan, Tianjin, Hunan, Hebei, Sichuan, Beijing, Henan, Inner Mongolia and Guangxi had experienced the highest temperature in history since 1961.

(2) Precipitation

The national average precipitation was 615.0 mm in 2023, down by 3.9% compared with the average figure over the years (1991-2020). The precipitation was less than usual in the period of January-March, May-June and October and the precipitation in April, July-September and November-December was higher than usual.



Interannual change of national average precipitation from 1951–2023

Compared with previous years, the precipitation was 20%-100% more in the central part of Northeast China, central and southern part of Hebei, western Shandong, most parts of Henan, southeastern Shaanxi, central and northern part of Hubei, northeastern Chongqing, southeastern Qinghai and northern Xinjiang. The precipitation was 20%-50% less than usual in central Hunan, northern and western part of Guangxi, eastern Yunnan, northeastern Hebei, central and western part of Inner Mongolia, central and western part of Gansu, southern Xinjiang and western Tibet, with some local areas 50%-80% less than usual. The precipitation in other parts of the country was close to usual.

2. Response to climate change

(1) Greenhouse gas

In 2022*, the average concentrations of CO₂, CH₄ and N₂O in Waliguan Station in Qinghai were 419.3±0.2 ppm, 1,979±0.6 ppb and 336.5±0.2 ppb respectively. The annual average absolute increments over the past 10 years were 2.16 ppm, 9.8 ppb, and 1.09 ppb respectively.

*Up to the time this Report was published, the monitoring results of greenhouse gas in 2022 are the latest data.

**CO₂ emission per 10,000 yuan of GDP was calculated at 2020 price.

***Thermal power includes coal-fired power generation, oil-fired power generation, gas-fired power generation, residual heat, residual pressure, residual gas power generation, waste incineration power generation, and biomass power generation.

Based on preliminary calculations, the CO₂ emission per 10,000 yuan of GDP in 2023 nationwide was the same as that of 2022**.

(2) Energy

Energy output According to preliminary accounting, the total output of primary energy across the country in 2023 stood at 4.83 billion tons of standard coal, up by 4.2% from 2022. Among the major energy products covered in the accounting, the output of raw coal was 4.71 billion tons, an increase of 3.4% from 2022, crude oil was 209.026 million tons, an increase of 2.1%, and natural gas was 232.43 billion m³, an increase of 5.6%. The power generation totaled 9,456.44 billion kWh, an increase of 6.9% from 2022. In specific, the production of thermal power*** registered 6,265.74 billion kWh, an increase of 6.4% from 2022, hydropower registered 1,285.85 billion kWh, a decrease of 4.9%, nuclear power at 434.72 billion kWh, an increase of 4.1%, wind power at 885.87 billion kWh, an increase of 16.2%, and solar power at 584.15 billion kWh, an increase of 36.7% from 2022.

Energy consumption According to preliminary accounting, the total energy consumption in 2023 was 5.72 billion tons of standard coal, an increase of 5.7% from 2022. Coal consumption accounted for 55.3% of total energy

consumption, a decrease of 0.7 percentage point from 2022. Clean energy consumption including natural gas, hydropower, nuclear power, wind power, and solar power accounted for 26.4% of the total, an increase of 0.4 percentage point from 2022.

(3) Transportation

In 2023, the amount of motor vehicles reached 435 million nationwide. The comprehensive energy consumption per unit of railway transportation workload in China was 3.78 tons of standard coal per million converted ton-kilometers, a decrease of 4.1% from 2022. The total volume of freight transported by rail was 5.03535 billion tons, an increase of 1.0% from 2022. The total number of new energy buses in the country reached 557,000, accounting for 81.9% of the total number of urban buses.

3. Natural disasters

(1) Meteorological disasters

In 2023, a total of 17 typhoons (peak near-center wind level ≥ 8) were generated in the Northwest Pacific Ocean and the South China Sea, which was 8.1 less than the annual average (25.1), and 6 of them landed in China, 1.1 less than the annual average (7.1). A total of 33 regional strong convective weather processes occurred, which was less than the average of the past three years (36). In 2023, there were 11.9 days with high temperature (daily maximum temperature ≥ 35 °C), 3.9 days more than usual, the second highest in the same period in history after year 2022. A total of 33 cold air processes (including 8 cold wave processes) occurred, and both cold air and cold wave processes were more than normal. A total of 13 sand and dust weather processes occurred in the northern region, 2.4 times more than the same period average (10.6 times) from 2000 to 2022, including 5 sand and dust storm process.

(2) Flood and drought disasters

In 2023, floods and droughts occurred concurrently and successively across the country. A total of 35 regional torrential rains were occurred nationwide, and 708 rivers in 29 provinces (autonomous regions and municipalities) experienced floods above the warning level, of which 49 rivers experienced the largest floods since the start of actual

observation records. Major rivers experienced 4 numbered floods, and the Haihe River Basin experienced the largest basin-wide mega-flood since 1963, and some tributaries of the Songhua River Basin experienced floods that exceeded the measured records. Droughts occurred in 19 provinces (autonomous regions and municipalities). The main droughts included spring droughts in Southwestern China, summer droughts in Northern China, and summer and autumn droughts in northwestern China. Among them, the most severe drought since 1961 occurred in parts of the southwestern and northwestern China.

(3) Earthquake disasters

In 2023, there were 11 earthquakes at or above magnitude 5.0, mainly concentrated in western regions such as Gansu and Xinjiang. The largest earthquake causing the heaviest loss was the Gansu Jishishan earthquake on December 18th, with a magnitude of 6.2.

(4) Geological disasters

In 2023, 3,668 various kinds of geological disasters happened across China, including 925 landslides, 2,176 collapses, 374 debris flows, 193 ground collapse, most of which were mild ones.

(5) Forest disasters

Forest pest hazard In 2023, a total of 10.923 million hectares of forests across the country suffered from forest pest hazards, down by 8.1% compared with that of 2022, among which 6.777 million hectares forests were affected by insect pest hazards, down by 7.3% compared with that of 2022, and 2.25 million hectares forests were affected by forest disease, down by 14.4% compared with that of 2022.

Forest fires In 2023, a total of 328 cases of forest fires took place across the country, down by 53.7% compared with that of 2022. The damaged forest area was 4,134.9 hectares, down by 39.7% compared with that of 2022.

(6) Grassland disasters

Grassland pest hazard In 2023, a total of 593 million mu of grassland across the country had been damaged by grassland pest hazards, down by 18.3% compared with that of 2022. Among them, 427 million mu were damaged by rodent pest hazards, down by 19.7% compared with that of 2022, 97 million mu were damaged by insect pest hazards, down by 13.4%, and 68 million mu were damaged by harmful plants,

down by 12.8%.

Grassland fires In 2023, a total of 15 grassland fires occurred across the country, down by 28.6% compared with that of 2022. The damaged grassland area was about 143,366 hectares.

(7) Marine ecological disasters

Red Tide In 2023, a total of 46 red tides occurred

in China's waters, covering an area of 1,466 km² in accumulation. Among them, toxic and harmful red tides occurred 29 times, with a cumulative affected area of 1,118 km².

Green Tide From April to August of 2023, the green tide disasters occurred at the Yellow Sea of China, with the coverage area reaching the highest on June 25th at about 998 km². The distribution area reached the highest on June 30th at about 61,159 km².

Special Column

Extreme high temperature weather

In 2023, the high temperature weather process in the central and eastern regions occurred early with a wide-range impact and a high degree of extremity and regionality. North China and Huanghuai region (Beijing-Tianjin-Hebei-Shandong-Henan) experienced the highest temperature weather process since 1961. High temperature days in northeastern North China, northeastern and southern East China, northeastern and southern Central China, most of South China, northeastern Southwest China, western Inner Mongolia, and most of Xinjiang totaled 20 to 30 days. Compared with the same period of the years, high temperature days in most parts of the country outnumbered that of the usual, among which Beijing, Hebei, Tianjin, most of Shandong, northern Henan, Hunan, Guangxi, northeastern Sichuan, most of Chongqing, western Inner Mongolia, and most of Xinjiang experienced 5 to 30 more hot days than the same period over the previous years. Beijing, Hebei, Gansu, Xinjiang and other four provinces (regions and cities) experienced the highest number of high temperature days in the same period since 1961.

Special Column**Active response to climate change**

In 2023, China continued to implement the national strategy of actively responding to climate change and unwaveringly follow a pathway of prioritizing ecological conservation and pursuing green and low-carbon development. Relevant measures also included adjusting industrial structure, optimizing energy mix, restructuring transportation, saving energy and improving efficiency, controlling non-CO₂ GHG emissions, increasing ecosystem carbon sinks, promoting the synergy of pollution reduction and carbon reduction, and improving adaptability to climate change. The Key Tasks for Response to Climate Change (2023-2025) and the Action Plan for Methane Emission Control were compiled and issued. The 2nd compliance cycle of the national carbon emission trading market (2021 and 2022) was successfully concluded, with a total of 2,257 key emission units in the power generation industry included, covering more than 5 billion tons of CO₂ emissions annually and with a compliance completion rate of more than 99%. The National Carbon Trading Market Management Platform was established and had been in good operation; special supervision and assistance for the data quality of carbon emission report was organized to ensure the quality of carbon emission data. The Interim Measures for the Administration of Voluntary Greenhouse Gas Emission Reduction Trading was issued and implemented, and the national voluntary greenhouse gas emission reduction trading market was launched, marking the initial establishment of the carbon trading market system in China. The 1st China Carbon Market Conference was successfully held. The National Climate Change Adaptation Strategy 2035 started to be implemented, and local governments were guided to formulate and implement provincial climate change adaptation action plans. The Notice on Deepening the Pilot Projects of Climate Adaptive Cities was circulated.

IX. Others

1. Flue gas

According to preliminary calculation, in 2023, 441,642 sets of flue gas treatment facilities in flue gas-related industrial enterprises* was surveyed nationwide, with overall SO₂ removal rate of 96.6% and NO_x removal rate of 76.6%.

2. Wastewater

(1) Industrial wastewater

According to preliminary calculation, in 2023, 79,488 sets of wastewater treatment facilities in wastewater-related enterprises** had been surveyed across the country, with the treatment capacity of 199.14 million tons per day.

(2) Urban sewage

According to preliminary calculation, in 2023, the urban sewage treatment capacity nationwide reached 224 million m³ per day, with the total sewage treatment volume reaching 64.1 billion m³.

3. Solid waste

(1) General industrial solid waste

According to preliminary calculation, in 2023, 4.28

billion tons of general industrial solid waste were generated nationwide, of which 2.57 billion tons were utilized through multiple means, and 870 million tons were disposed of.

(2) Urban domestic waste

According to preliminary calculation, in 2023, the harmless treatment capacity of urban domestic waste across the country was 1.152 million tons per day, with a total of 259 million tons actually treated, registering a harmless treatment rate of 99.9%.

(3) Hazardous waste

According to preliminary calculation, in 2023, there were about 77,000 units nationwide that declared an annual generation volume of 10 tons of hazardous waste or more, adding up to a total of about 110 million tons. By the end of 2023, nationwide there were around 3,600 integrated hazardous waste treatment and utilization hubs, with a total of roughly 210 million tons of treatment and utilization capacity per year.

(4) Agricultural solid waste

In 2023, the comprehensive utilization rate of livestock manure exceeded 78%. The comprehensive utilization rate of straw was kept at or above 86%, and the recovery rate of agricultural film stayed at or above 80%.

*Referring to any industrial enterprise that generates or discharges any flue gas pollutant.

**Referring to any industrial enterprise that generates or discharges any wastewater pollutant.

Special Column

Strengthening the control of solid waste and emerging pollutants

In 2023, the “zero-waste cities” pilot program was expanded to cover a total of 113 APL cities and 8 special areas, with more than 3,200 engineering projects involving a total investment of more than 1 trillion yuan. The development of “zero-waste cities” made headways across 15 provinces in an orderly manner. The joint prevention and control of solid waste and hazardous waste pollution was promoted in the Yangtze River Delta in a coordinated manner, the Chengdu-Chongqing economic circle deepened the joint construction of “zero-waste cities”, and the Guangdong-Hong Kong-Macao region started to build itself into a “zero-waste bay area”. A total of more than 20,000 “zero-waste cells” such as “zero-waste schools” and “zero-waste enterprises” had been built. The Overall Implementation Plan for the Construction of Major Hazardous Waste Projects (2023-2025) was issued, which provided scientific guidelines for the deployment and construction of the “1+6+20” major projects on hazardous waste, and accelerated the strengthening of past weak links in environmental risk prevention, control and disposal capacity of hazardous waste. The 3-year special campaign for hazardous waste control was accomplished. The standardized environmental management assessments for hazardous waste had been carried out continuously, and information-based environmental supervision of hazardous waste had been strengthened. The Action Plan for the Control of Emerging Pollutants was implemented. The Statistical Survey System for Environmental Information on Chemical Substances was issued and implemented, in which the environmental information statistics on the production and use of more than 4,000 key chemical substances in 122 key industries was completed; full life-cycle environmental risk control measures had been adopted for 14 types of emerging pollutants, and 8 types of key controlled emerging pollutants had been phased out. The environmental management registration system for emerging chemical substances began to be implemented comprehensively. Efforts had been made to rectify problems related to 1,136 tailings ponds in the Yangtze River Economic Belt and 235 tailings ponds in the Yellow River basin. A “clean-up campaign” was launched in the Yellow River basin, cleaning up and treating nearly 34 million tons of solid waste in the relevant provinces, with 99.4% of the identified problems in the Yellow River basin rectified. The investigation and assessment of the pollution status of abandoned mines in the Yellow River basin was basically completed. More than 610 heavy metal emission reduction projects had been completed in various localities, and thallium pollution control actions were strengthened in key provinces under guidance.

Special Column**Ecological and environmental risk prevention and control and emergency response**

In 2023, the national ecological security coordination mechanism was strengthened, with a plenary meeting held and working guidelines issued. Efforts were also made to promote the development of a risk monitoring and early warning system. The formulation of “one river, one policy, one map” environmental emergency response plan had been completed for 2,266 key rivers, accounting for 90% of the planned total. Overall, 106,500 environmental emergency risk hazards had been investigated nationwide with about 95% cases rectified already. A total of 130 cases of environmental emergencies of various types had been properly handled, of which 3 were classified as serious and 127 as moderate.

Special Column**Full implementation of the pollutant discharge permit system**

In 2023, steps had been taken to promote the “full coverage” of pollutant discharge permits for stationary pollution sources, with 3.639 million stationary pollution sources included in the pollutant discharge management system. In specific, 360,000 were issued pollutant discharge permits (101,000 for key management and 259,000 for simplified management), 3.279 million were registered pollutant dischargers, and 537,000 water pollution discharge outlets and 1.097 million air pollution emission outlets were brought under control. The “Double 100%” inspection task (100% submission rate and 100% approval rate of performance report of permit-holding pollutant discharge units) was concluded. By the end of 2023, a total of 368,800 pollutant discharge permits had been audited, and 256,600 performance reports had been reviewed for content standardization. The rectification of problematic pollutant discharge activities was completed in full within the designated timeline. Local governments were instructed to properly address historical problems and promote the licensing of all stationary pollution sources in accordance with the law, and 31,500 companies completed the rectification of historical problems within the set time limit.

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The national data referred to in this Report did not cover Hong Kong SAR, Macao SAR and Taiwan Province of China except those on administrative zoning, national land area or otherwise specified.

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Ministry of Emergency Management

National Bureau of Statistics

China Meteorological Administration

State Forestry and Grassland Administration

National Railway Administration