Concentration variation and law of greenhouse gases in National Station for Background Atmospheric Monitoring, Menyuan, Qinghai, China and compare with Xining

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Concentration variation and law of greenhouse gases in National Station for Background Atmospheric Monitoring, Menyuan, Qinghai, China and compare with Xining

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Abstract. Greenhouse gas means which can absorb reflection of solar radiation on the ground and re-emit some radiation, such as water vapor, carbon dioxide (CO₂), methane (CH₄), most refrigerants, etc. Greenhouse gases can cause the greenhouse effect, and lead to the increase of atmospheric temperature. Although most of the greenhouse gases are relatively stable in the air, it can impact on the atmospheric environment, and then affect the environment chemical reactions in the air and rust in atmospheric pollution.

1. Introduction
National Station for Background Atmospheric Monitoring, Menyuan, Qinghai, China is one of the background Atmospheric Monitoring of China, it represents the background monitoring value of one region, Menyuan is in the middle area of Qinghai province. The Monitoring built in grassland, the pollution is light there. And the monitoring value is real and accountable.

2. Sources of data and research methods

2.1. Sources of data
In this study, the data was collected in National Station for Background Atmospheric Monitoring, Menyuan, Qinghai, China, which was checked and accepted by China Environmental Monitoring Station. The data could reflect contents of greenhouse gases of the background in this area.

2.2. Research methods
Continuous measurements on methane and carbon dioxide were carried out in Menyuan from 2012 to 2013, the variation and relationship were discussed detailedly. Then, we explored the reasons and forecasted the law of variation in future.

2.3. Apparatus
CO₂ was collected by API-M360E CO₂, and adopted non-dispersive infrared gas filter correlation method. All of data were measured between 0 and 2000mg/l, the limit of detection is 0.2mg/l.
CH₄ was collected by SYNSPEC-ALPHA115, and adopted FID. All of data were measured between 0 and 10/100mg/l, the limit of detection is 0.05mg/l.
3. Result

3.1. Average concentration of CO2, CH4
In 2012 and 2013, the concentration of CO2 were 388.45 mg/l, 396.91 mg/l, it increase 2.1%. Compared with concentration of CO2 which were monitored by Waliguan[1] global atmospheric base station. The concentration of CO2 in the background Atmospheric Monitoring Menyuan was approach, but it maintain a ascendant trend.

![Fig.1 The concentration of CO2 of Menyuan in 2012 and 2013](image1.png)
The concentration of CH4 was 1.46mg/l and 1.80mg/l in 2012 and 2013 increase 23%.

![Fig.2 The concentration of CH4 of Menyuan in 2012 and 2013](image2.png)

3.2. CH4 Monthly concentration of CO2, CH4
Compared with 2012, 2013 concentration variation of CO2, it is clearly that the concentration of CO2 is highest at November 2012 and the lowest at Mayday. It increased in wave mode until November. The concentration of CO2 was higher in Mayday 2013, and then reduced until July to 383.3mg/l. There was a slight ascension after July. However, there was maximum in Mayday, which is 403.9mg/l.
It was 383.3mg/l in July, and then rise to 402.4mg/l. It irregular change may have close relationship with temperature changes in 2013.

![The monthly concentration of CO2 of Menyuan in 2012 and 2013](image1)

**Fig.3** The monthly transformation of concentration of CO2 in a quarter of 2012 and 2013

The concentration of CH4 was higher in Mayday to November and lower in February and December, and rise from February to April reduce in December. The concentration of CH4 changed regularity in 2013 than 2012, Compared concentration of CH4 in this two years,it can be found the concentration of CH4 has a small elevate.

![The monthly concentration of CH4 of Menyuan in 2012 and 2013](image2)

**Fig.3** The transformation of concentration of CO2 in a quarter of 2012 and 2013

The concentration of CH4 was higher in Mayday to November and lower in February and December, and rise from February to April reduce in December. The concentration of CH4 changed regularity in 2013 than 2012, Compared concentration of CH4 in this two years,it can be found the concentration of CH4 has a small elevate.
3.3. Daily concentration of CO2, CH4
According to 2012, 2013 the daily variation of CO2 in Menyuan, it obtained the value is higher early, and followed by a gradual decline. Meanwhile, plants respiration show undulant change, the concentration of CO2 is influenced by meteorology. 2013, the daily variation of CO2 is higher than 2012. It indicated that there is increase trend.

2012 and 2013 the daily value of CH4 showed that, the daily concentration of CH4 show undulant change. By the time, there is a ascendant trend, but, the margin is slight. 2013, the concentration of CH4 was higher than it in 2012. It indicated that the concentration of CH4 in the background have a increased[2].
4. Conclusion

4.1. The law and variation of CO2

According to analysis, it was obtained that the concentration of CO2 changed seasonally, and it was influenced by meteorological factors, especially, it was higher in the first and fourth quarter. The range of concentration was 379.9 mg/l-403.1 mg/l. Therefore, it was lower in the second and third quarter and the range of concentration was 386.7 mg/l-397.2 mg/l. The annual change magnitude is 23.2 mg/l. The concentration of CO2 also showed a rise trend year by year in Menyuan. Hence, we must pay attention to the effects of rising CO2 concentration. And because of the plants, the concentration of CO2 was higher than Xining.

4.2. The law and variation of CH4

According to analysis, the concentration of CH4 changed seasonally. In Menyuan the concentration had a obviously variation in a period. And it increased year by year. In Menyuan there is more change than in Xining in one year. It may be effected by natural factors.

5. Acknowledgement

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