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Temporal variations in CH4 and CO2 mixing ratios and fluxes at Lake Taihu

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Introduction

1.The CH_4 and CO_2 fluxes of the lake–atmosphere exchanging process act an important role in atmospheric dynamical process.

2.The CH_4 and CO_2 fluxes and mixing ratios can reflect the anthropogenic influence and the biological function of the atmosphere.

3.We may find new scientific problems by flux observation on lake since there are very few people did this work before.

Material and Methods

Fig.1 Gradient observation device

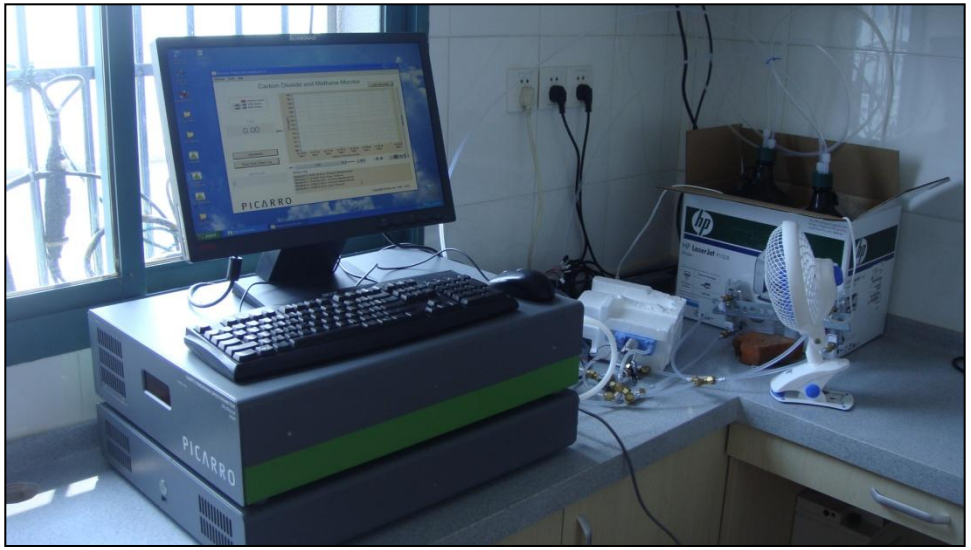

Fig.2 CH_4 CO_2 and H_2O gas analyser

Sampling system

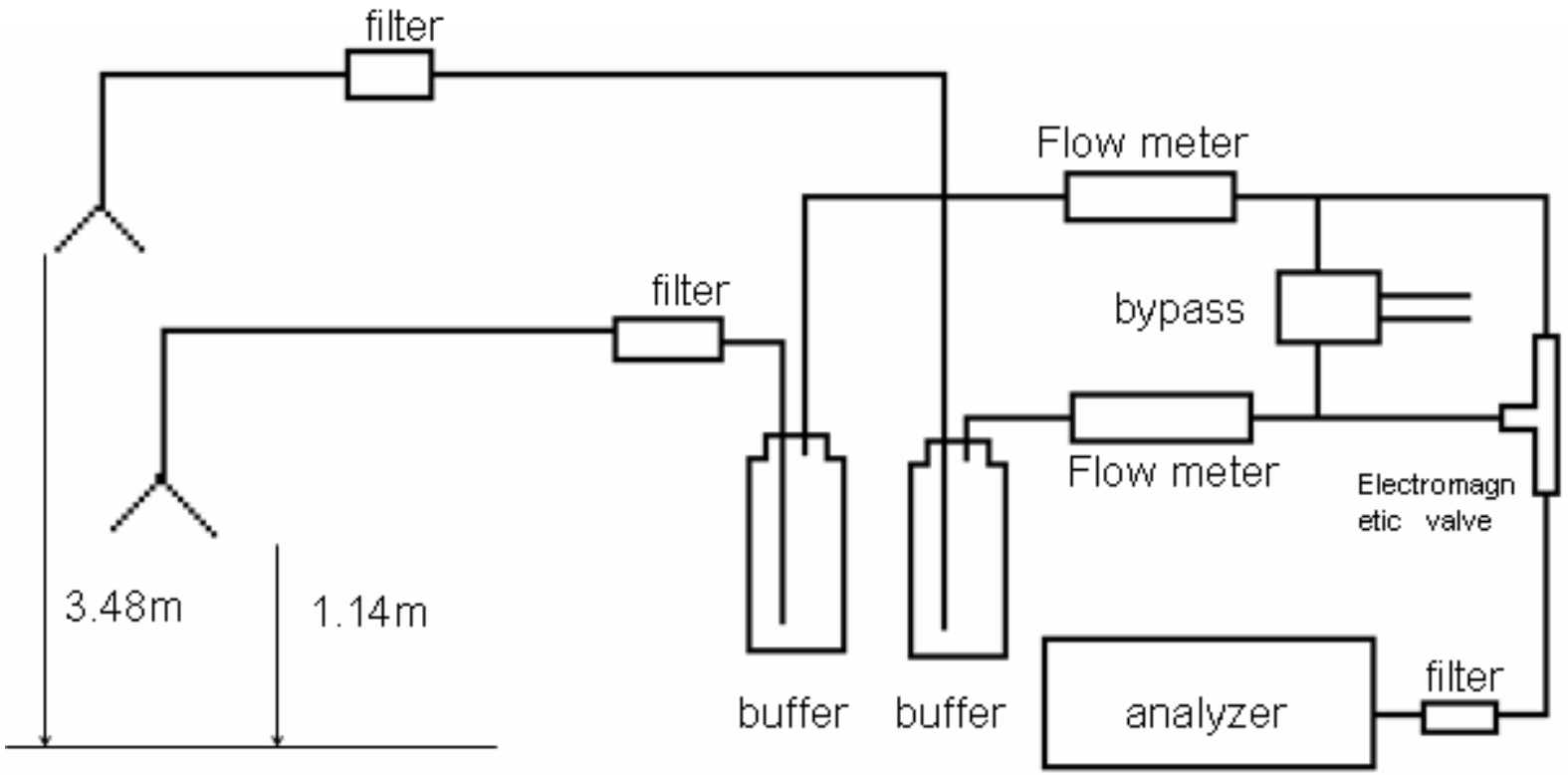

Fig.3

Flux calculation

$$Flux = -\rho_{a*} K_* \frac{r_2 - r_1}{z_2 - z_1}$$

ρ_{a*}: air density .

r_1 : dry air mixing ratio at z_1.

r_2 : dry air mixing ratio at z_2.

$K = k u_* z_g / \varphi_h$

$z_g = \sqrt{z_1 z_2}$

u_* : friction velocity.

k : Von Karman constant.

φ_h : stability function for sensible heat.

Result and Analysis

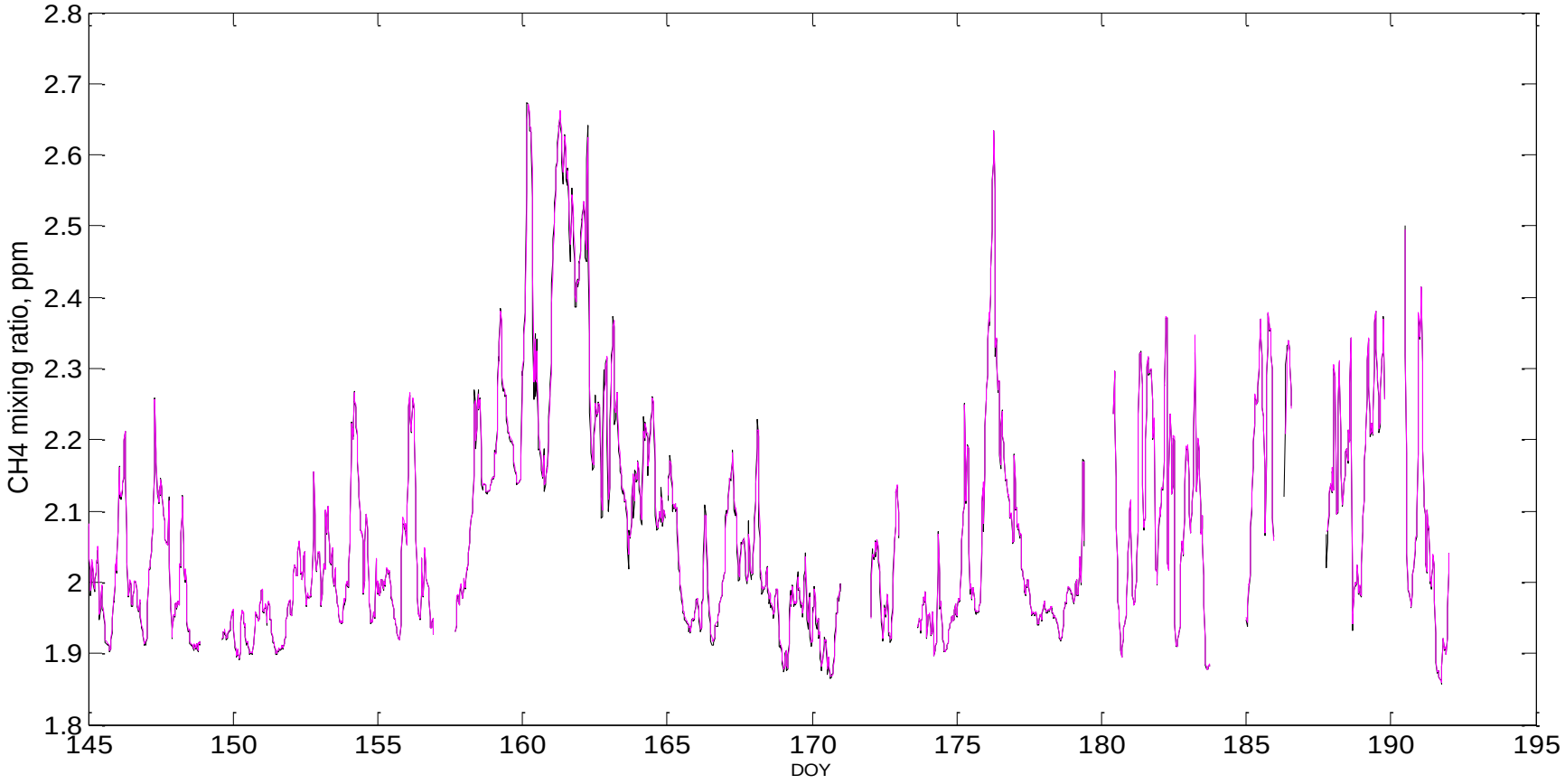

Fig.4 CH4 mixing ratio

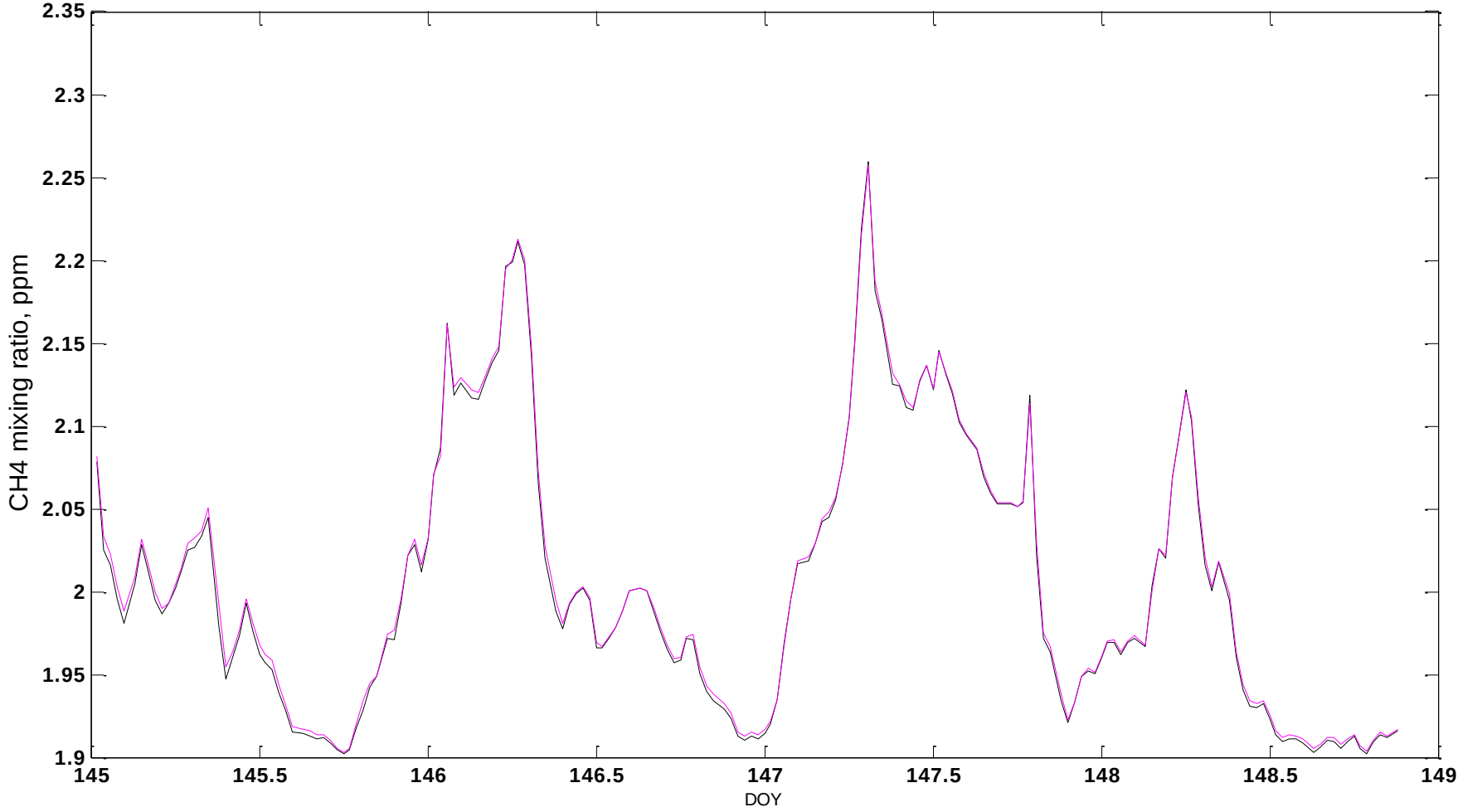

Fig.5 CH4 mixing ratio of 4 days

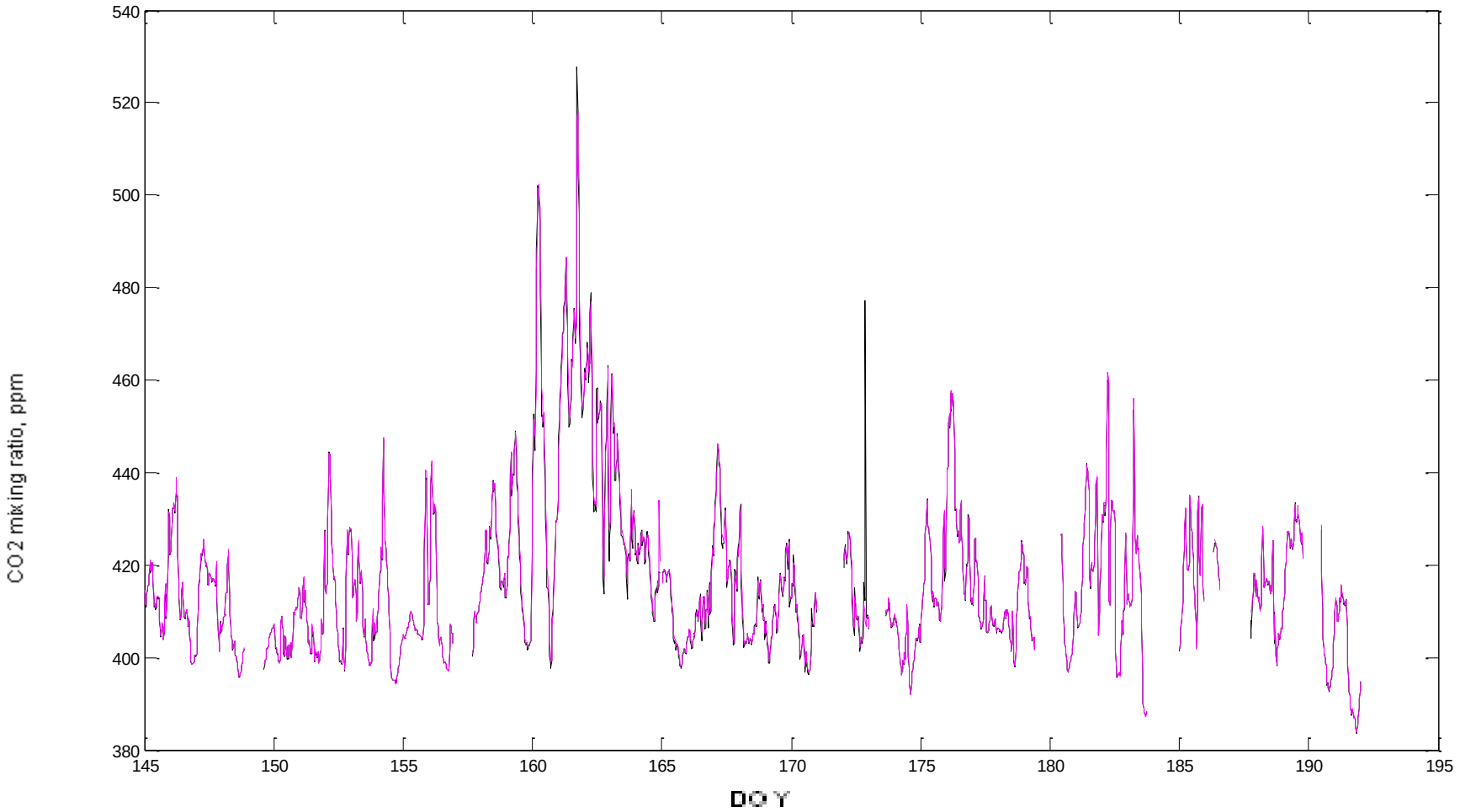

Fig.6 CO2 mixing ratio

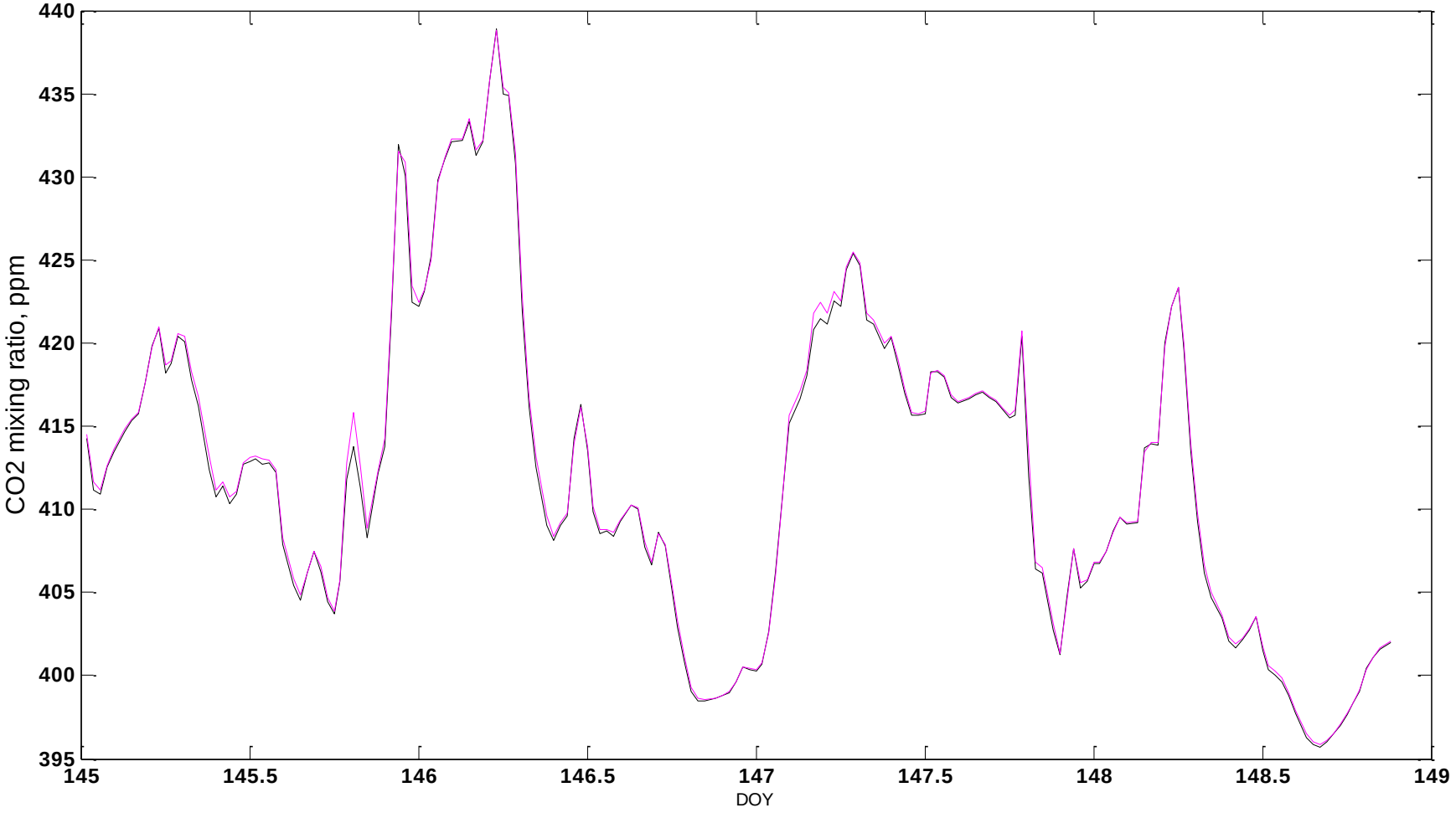

Fig.7 CO2 mixing ratio of 4 days

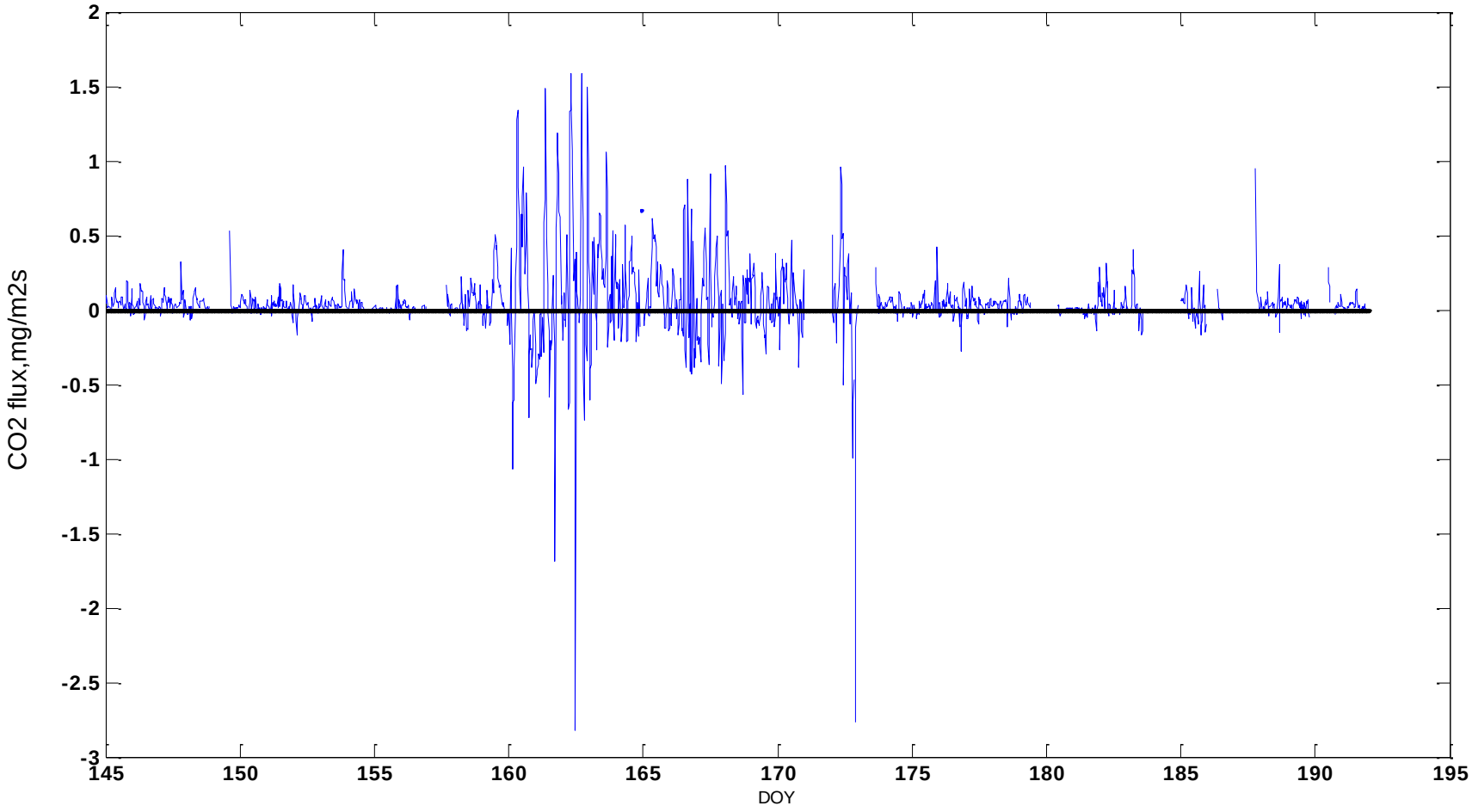

Fig.8 CO2 flux

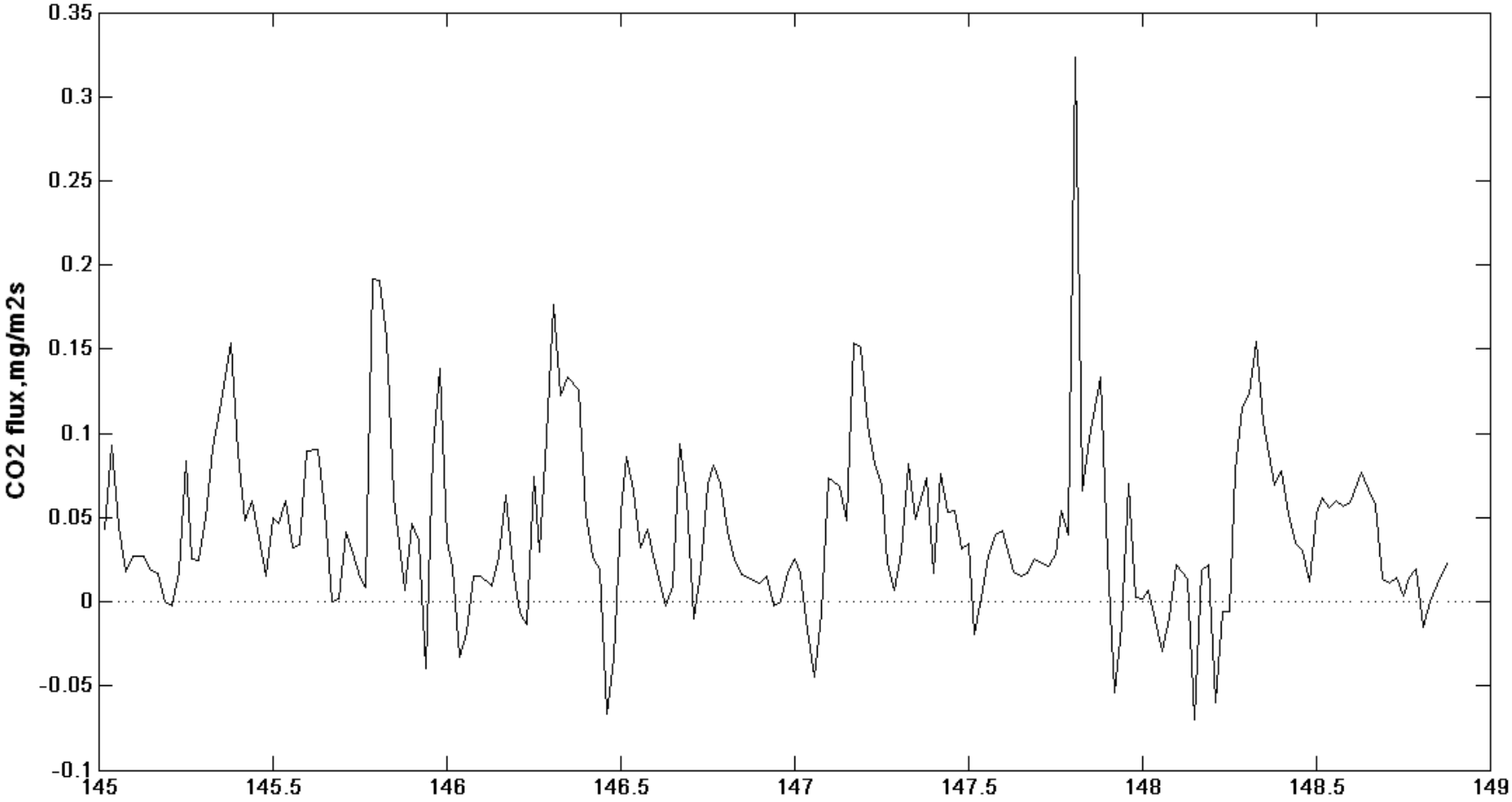

Fig.9 CO2 flux of 4 days

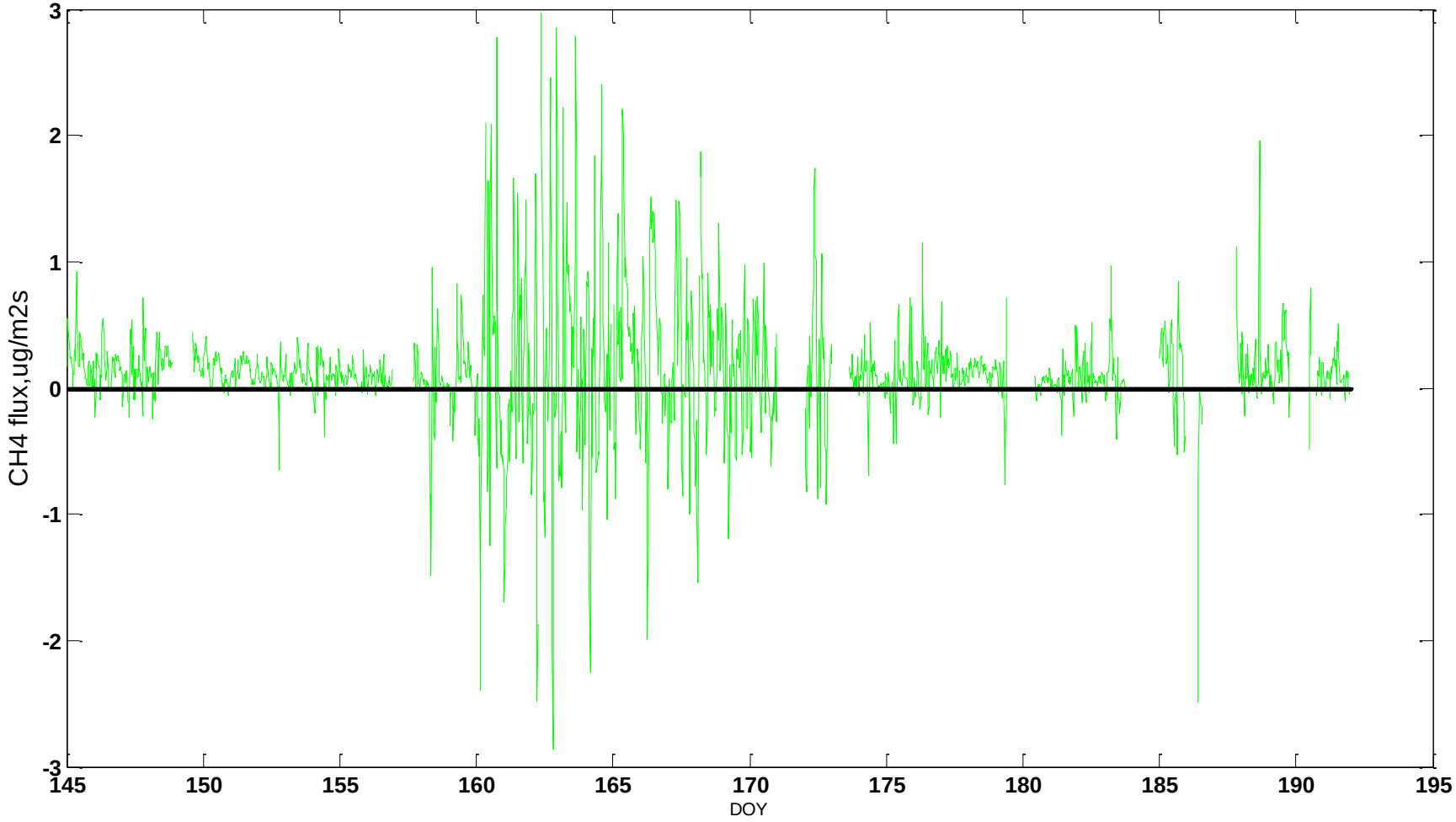

Fig.10 CH4 flux

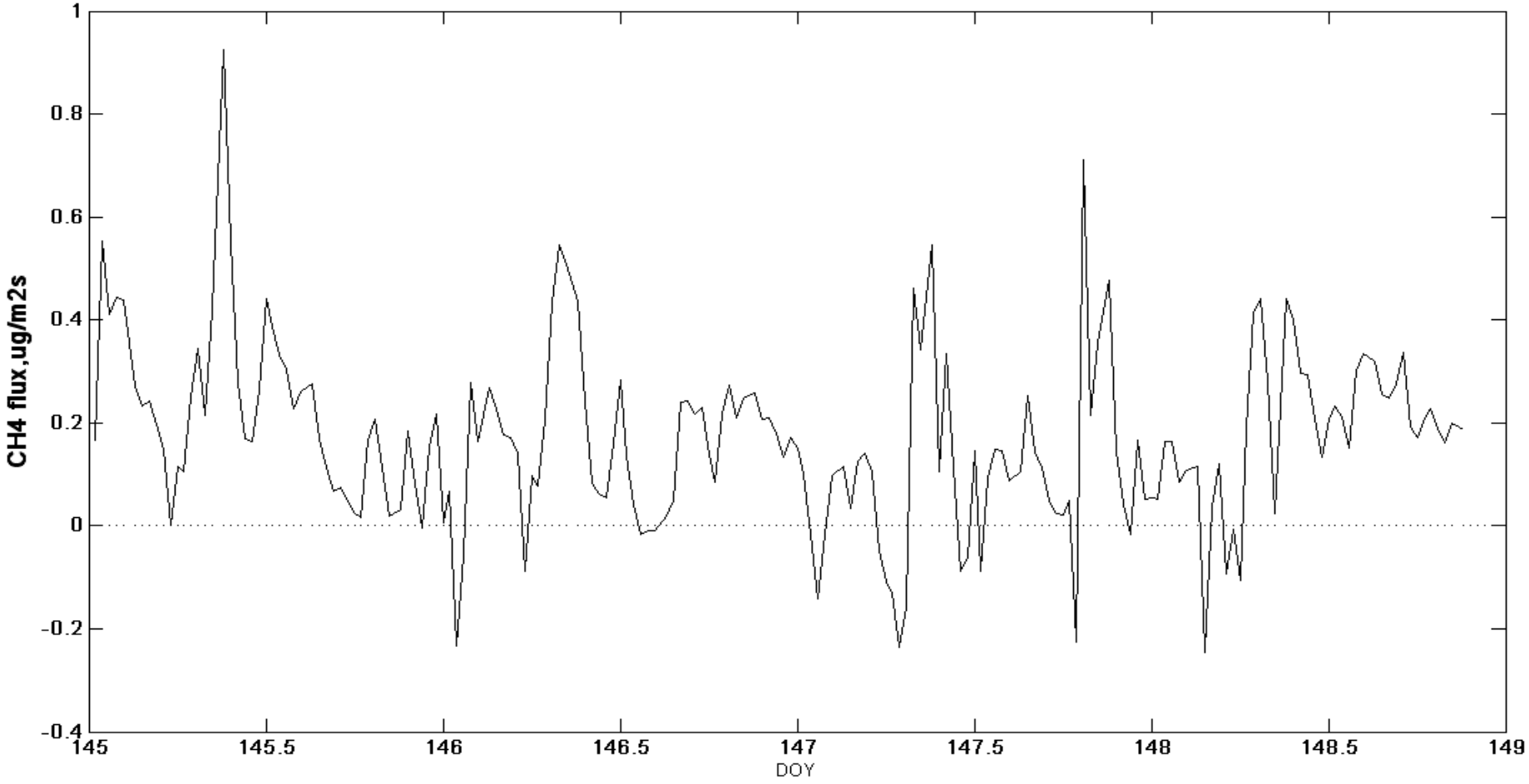

Fig.11 CH4 flux of 4 days

Results

1.The diurnal variation of CO_2 concentration shows good consistency with bio-physiological processes. The fluctuations of CO2 vary greatly when in summer.

2.CH4 concentration reaches the peak in the forenoon and achieves low values in the afternoon. The fluctuations of CH4 vary greatly when in summer.

3.The trends of CH4 and CO2 variation are similar. The fluctuations vary greatly with the elapsing of the time.

Discussion

1.From the current CO_2 and CH_4 fluxes observation, we have not find some obvious laws.

2.The diurnal variation of CO_2 mixing ratio may be related to bio-physiological processes.

Following work

1.All testing equipment must be suitable for the precision of observation.

2.Sum up the maintenance experience and improve the maintenance method .

3.Gather some useful information about greenhouse gases influenced by human activity .

4.Try to find out some important factors which influence greenhouse gas fluxes.

Thank you !