

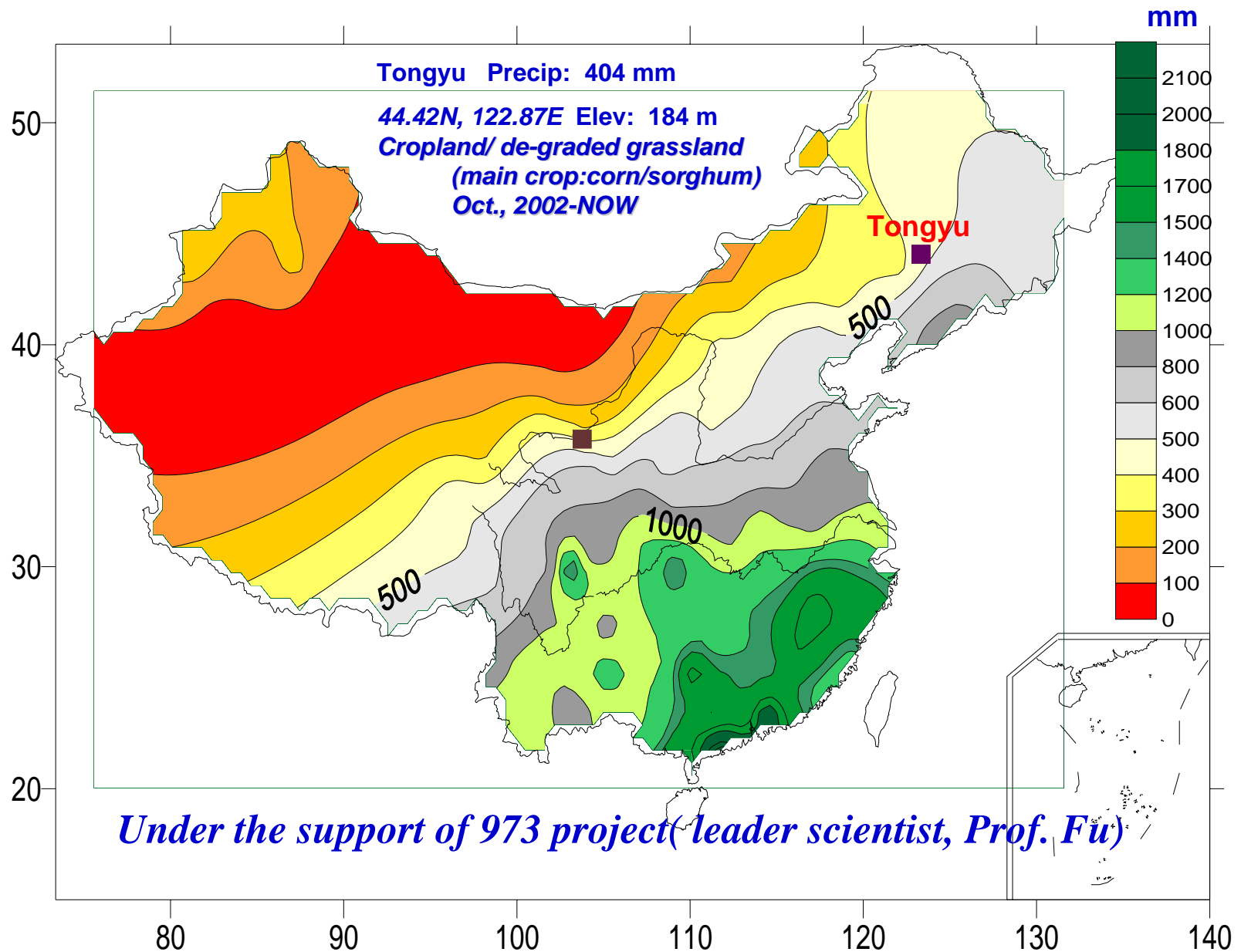
# **Seasonal and Diurnal variations of the exchange of water vapor and CO<sub>2</sub> in semi-arid area, at Tongyu, Northeast China**

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# CEOP Reference site: Tongyu, Jinlin , Northeast China



# Observations elements (cropland)

Observations	Height/depth	unit
Station Pressure	1.5 m	hPa
Air Temperature	1.95 m	deg.C
Specific Humidity	1.95 m	g/kg
Wind Speed/direction	17.06m	m/s deg.
Precipitation	1.0 m	mm
Skin Temperature	1.5 m	Deg.C
Soil Temperature	-2cm, -5cm, -10 cm, -20cm, -50cm, -80cm	%
Sensible Heat Flux	3.5 m	W/m <sup>2</sup>
Latent Heat Flux	3.5 m	W/m <sup>2</sup>
CO2 Flux	3.5 m	micro mol/m <sup>2</sup> /s
Soil Heat Flux	-5cm, -10cm	W/m <sup>2</sup>
Incoming Long-wave Radiation	3.0m	W/m <sup>2</sup>
Incoming Short-wave Radiation	3.0m	W/m <sup>2</sup>
Outgoing Long-wave Radiation	3.0m	W/m <sup>2</sup>
Outgoing Long-wave Radiation	3.0m	W/m <sup>2</sup>
Aerosols		

## Instruments

Parameter	Model	Manufacturer
Station Pressure	CS105	TEXAS ELECT
Air Temperature	HMP	VAISALA
Specific Humidity	45C_L	VAISALA
Wind Speed	034A_L,	Met One
Wind Direction	014A_L	Met One
Precipitation	TE525MM_L	TEXAS ELECT
Incoming Shortwave	CM21	Kipp & Zonen
Outgoing Shortwave	CM21	Kipp & Zonen
Incoming Longwave	CG4	Kipp & Zonen
Outgoing Longwave	CG4	Kipp & Zonen
Skin Temperature	IRTSD-P	APOGEE
Soil Temperature	STP01_L50	HUKSEFLUX
Soil Moisture	CS616_L	CAMPBELL
Sensible Heat Flux	LI-COR CS7500	CAMPBELL
Latent Heat Flux	FW05	CAMPBELL
CO2_Flux	CSAT3	CAMPBELL
Soil Heat Flux	HFP01Sc_L50	HUKSEFLUX

**Degraded grassland**

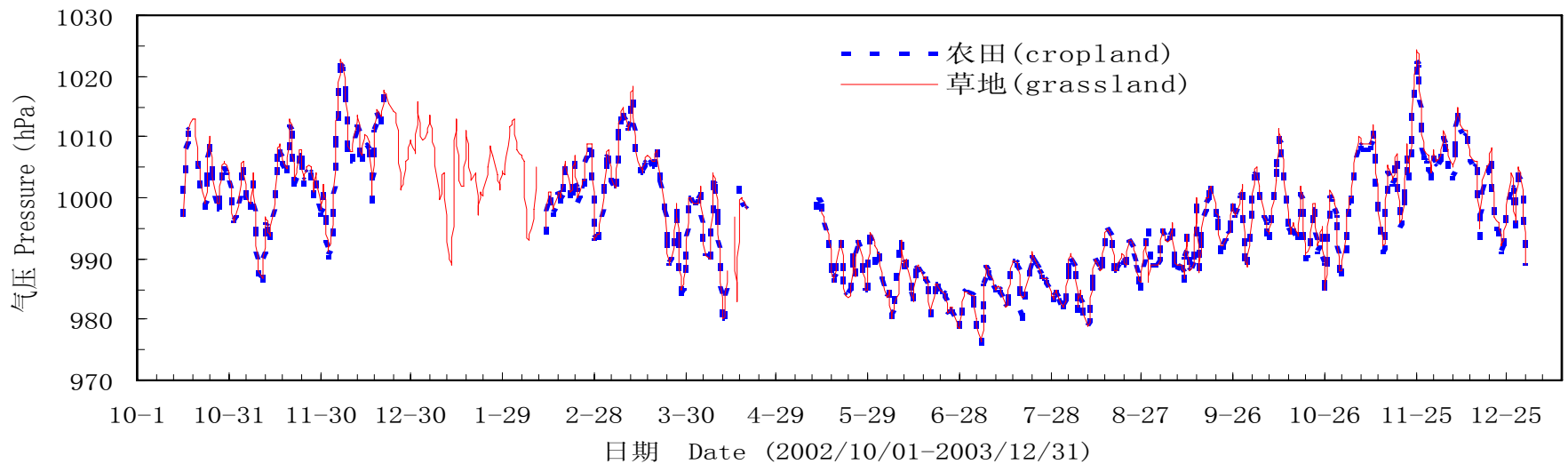
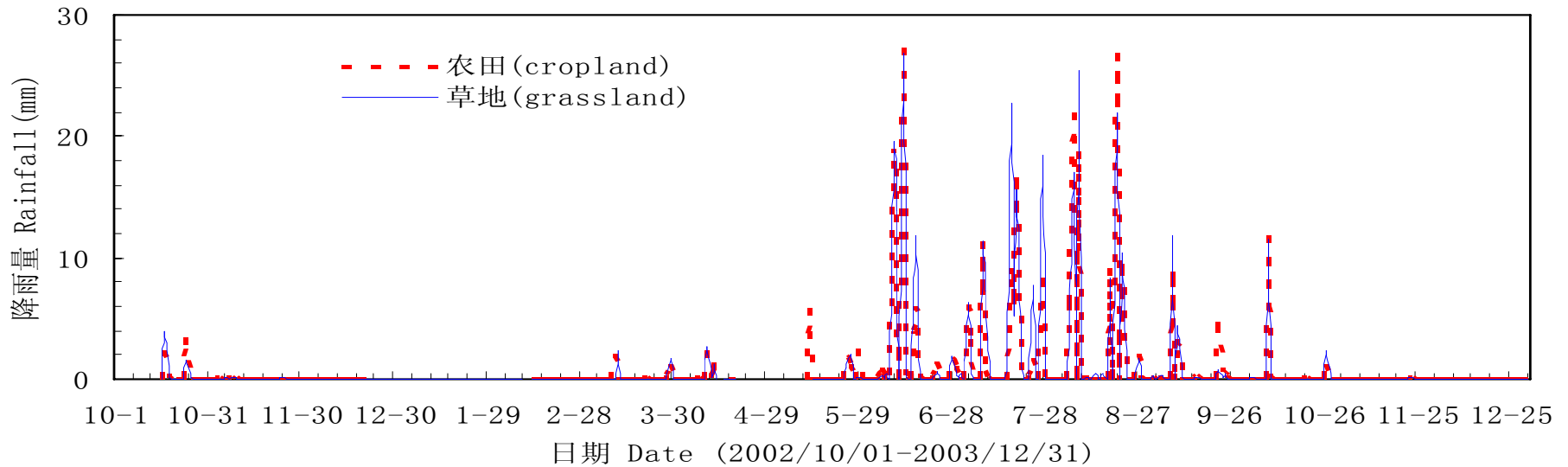
**2003/07**

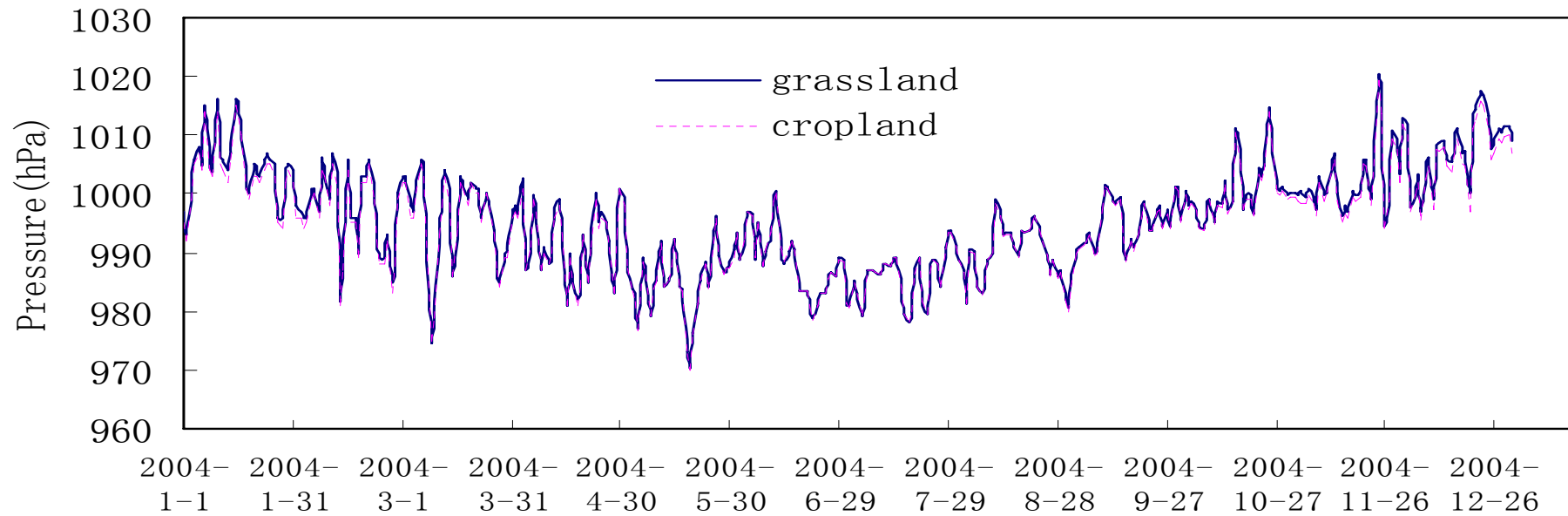
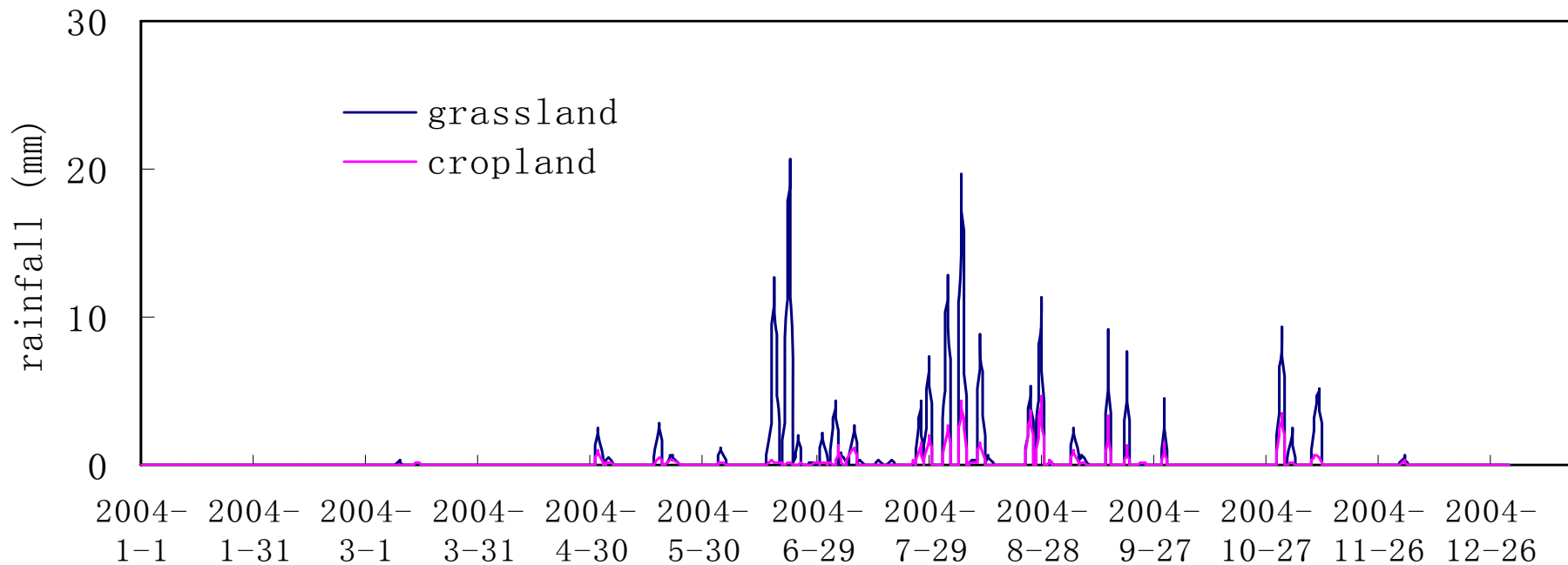


**CROPLAND**  
**2003/07**

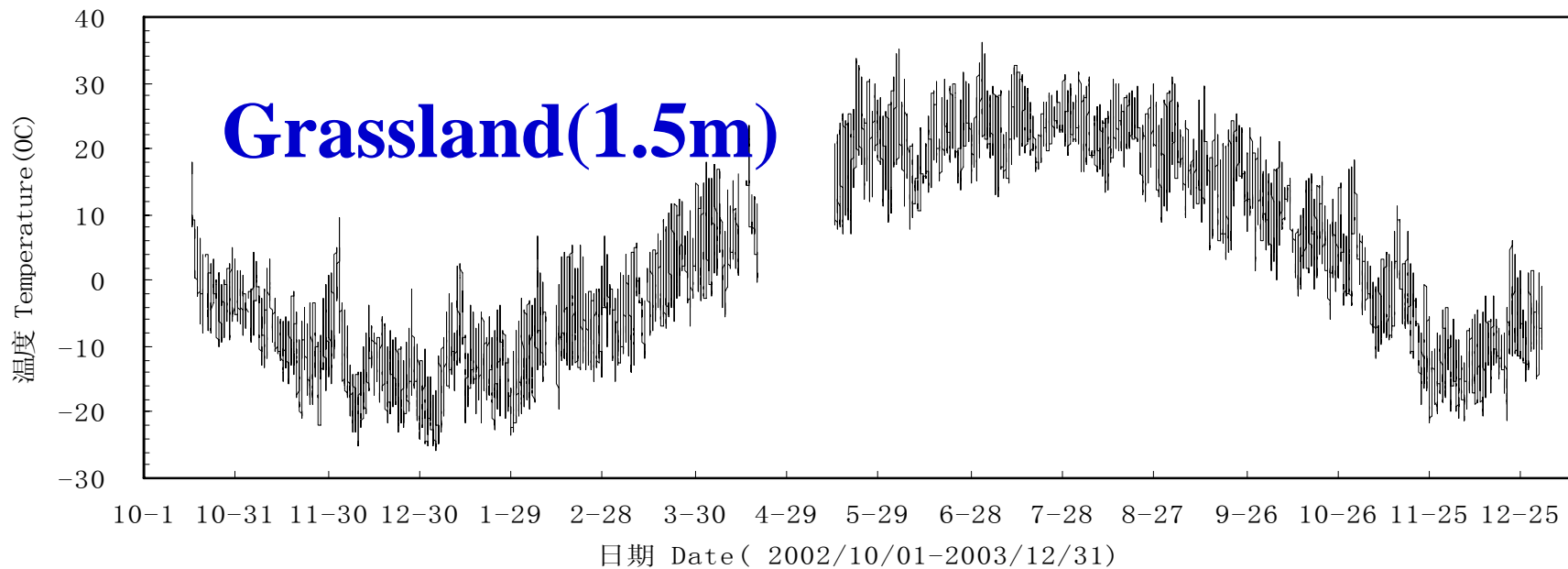
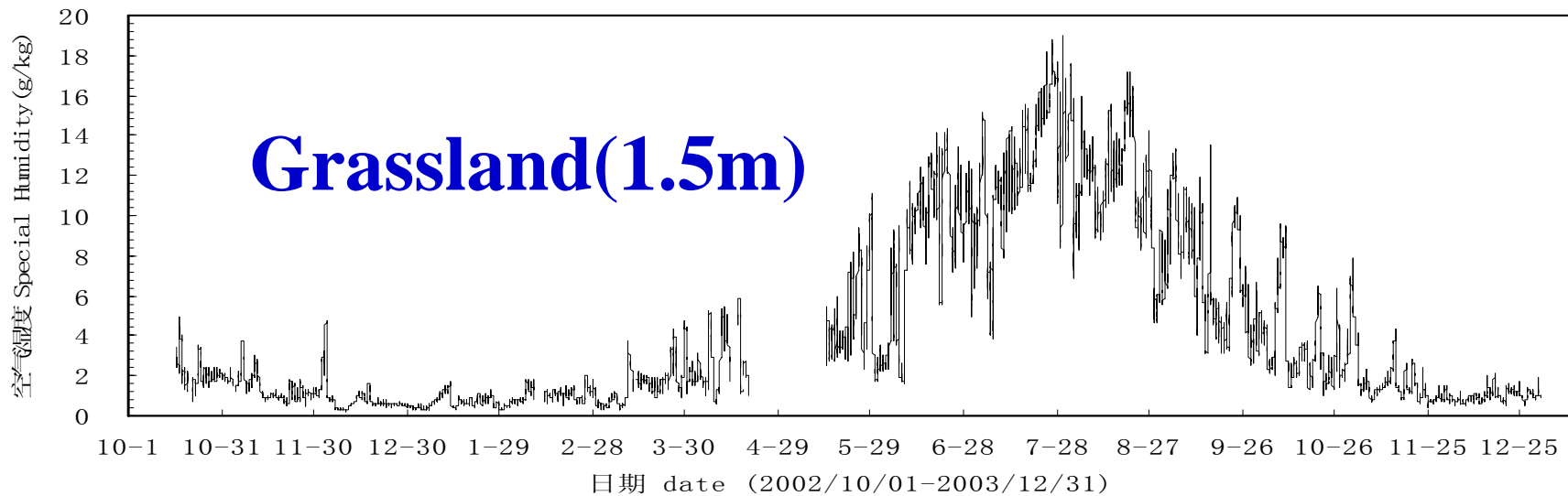


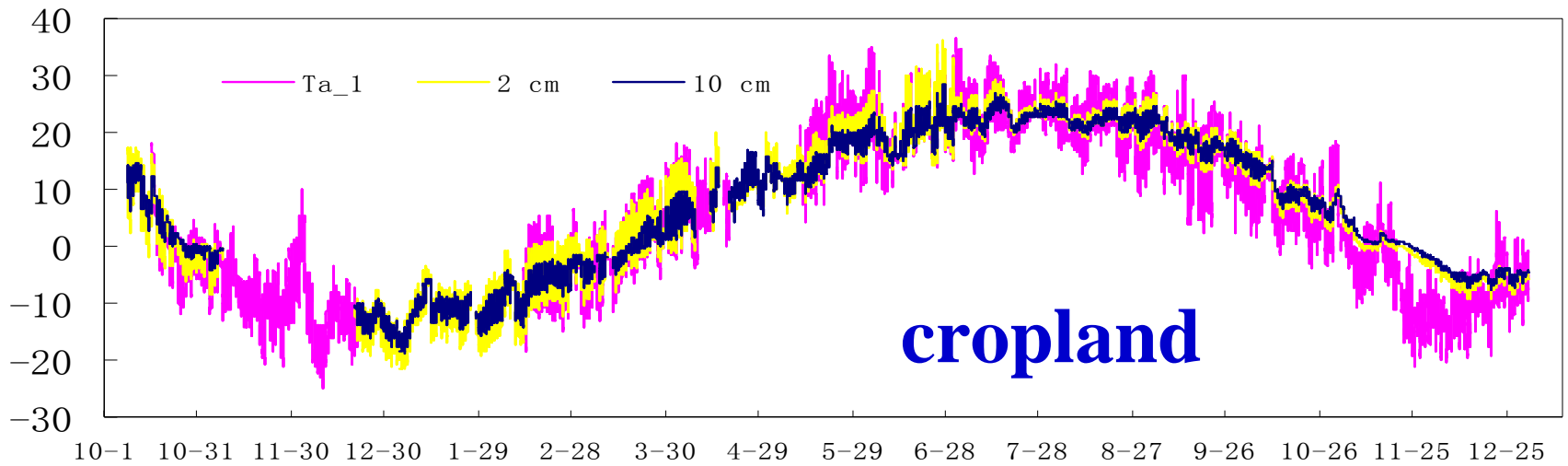
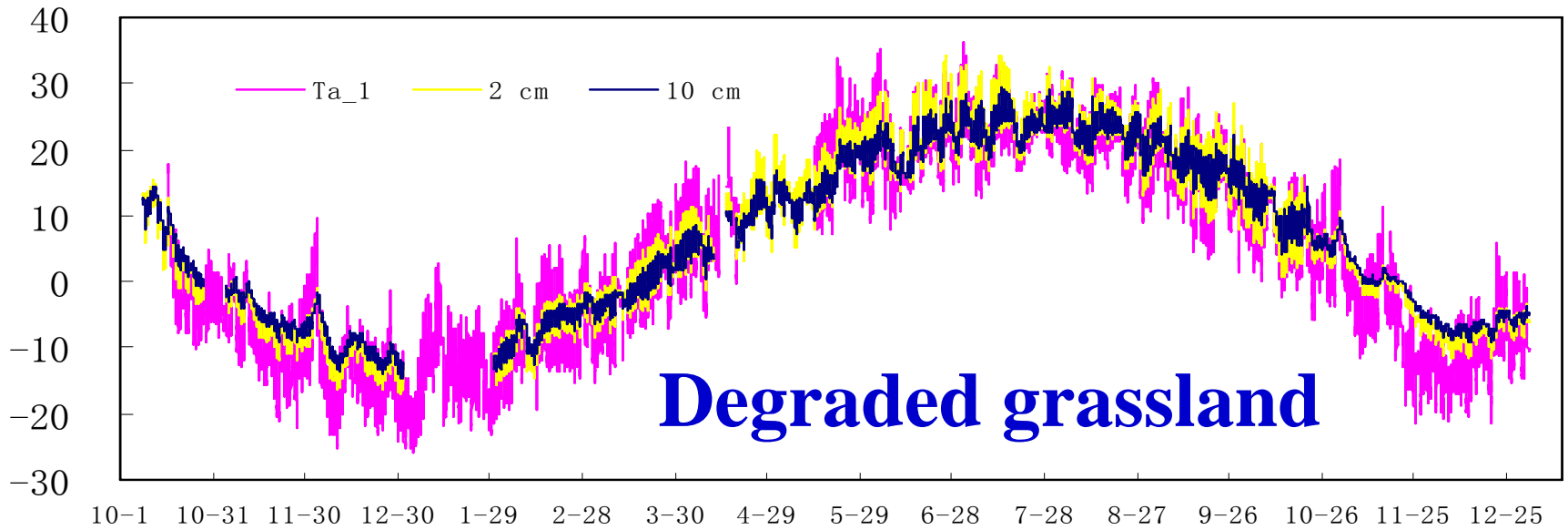
# The pressure and rainfall at Tongyu site



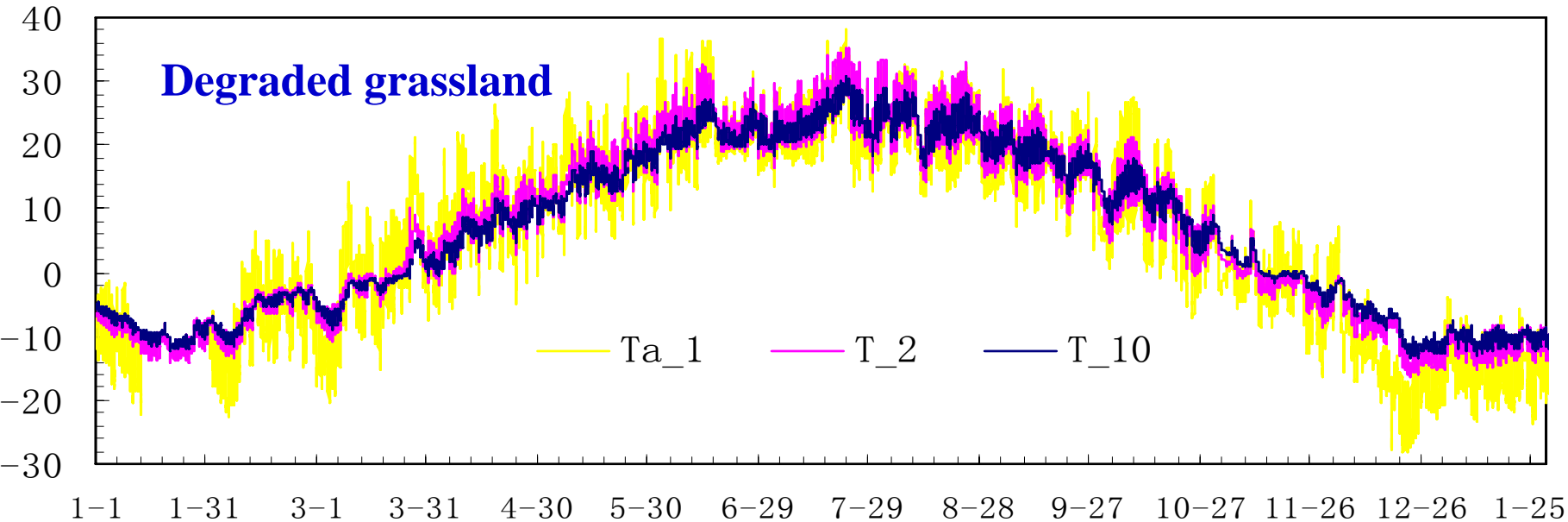




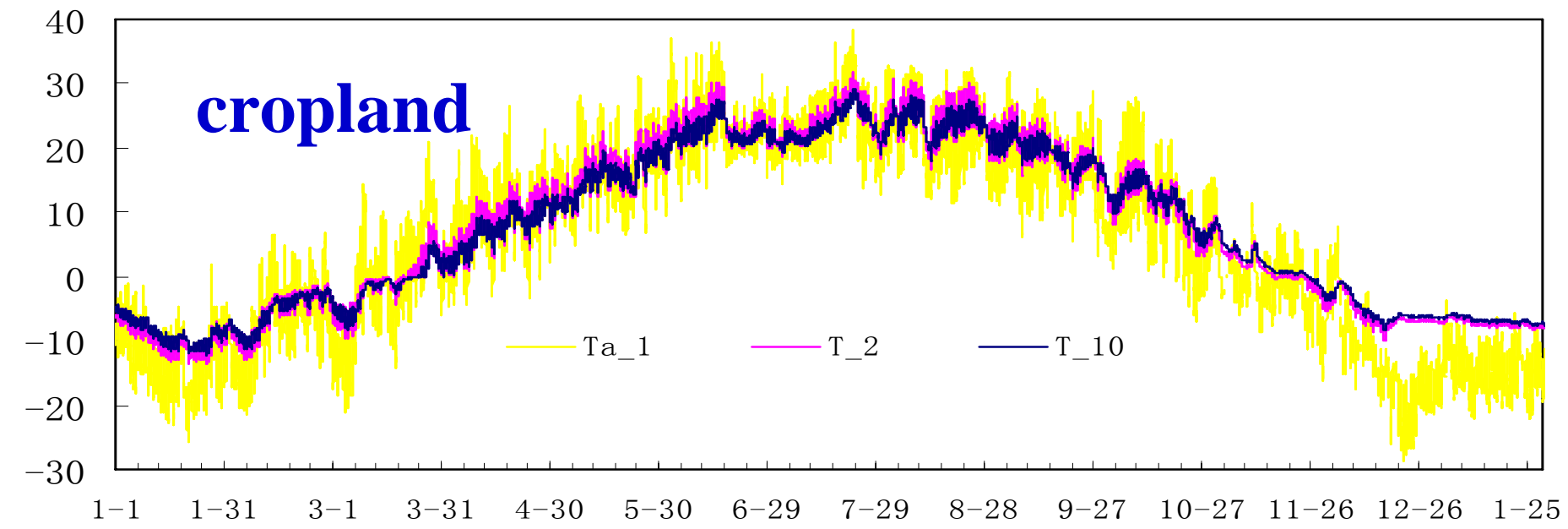




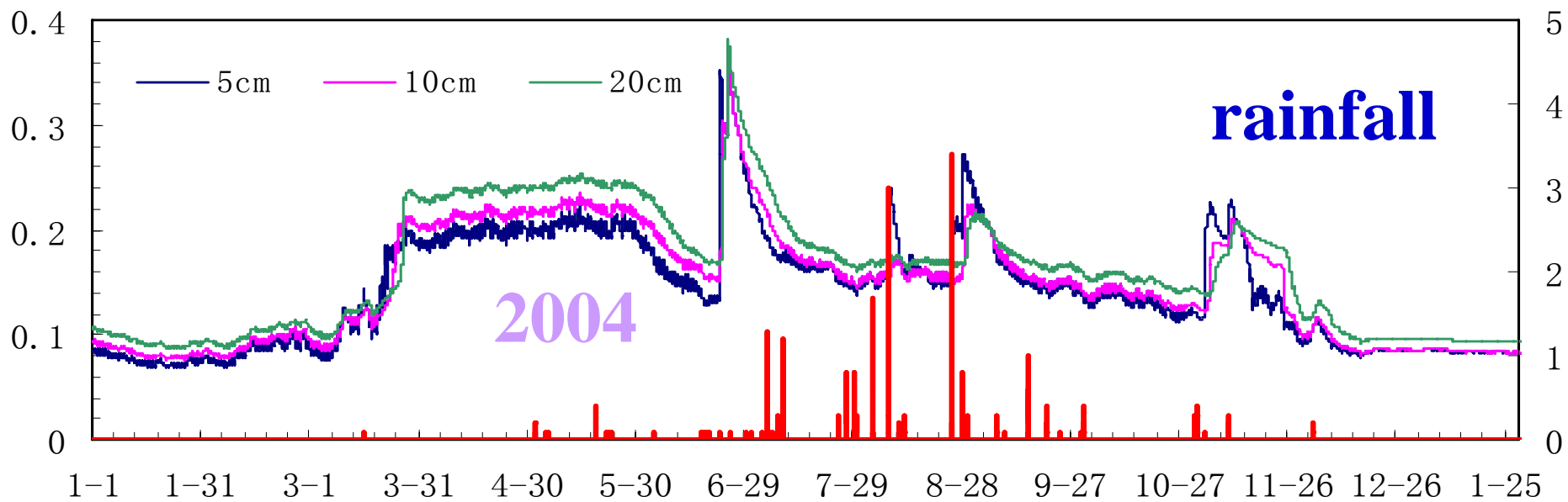
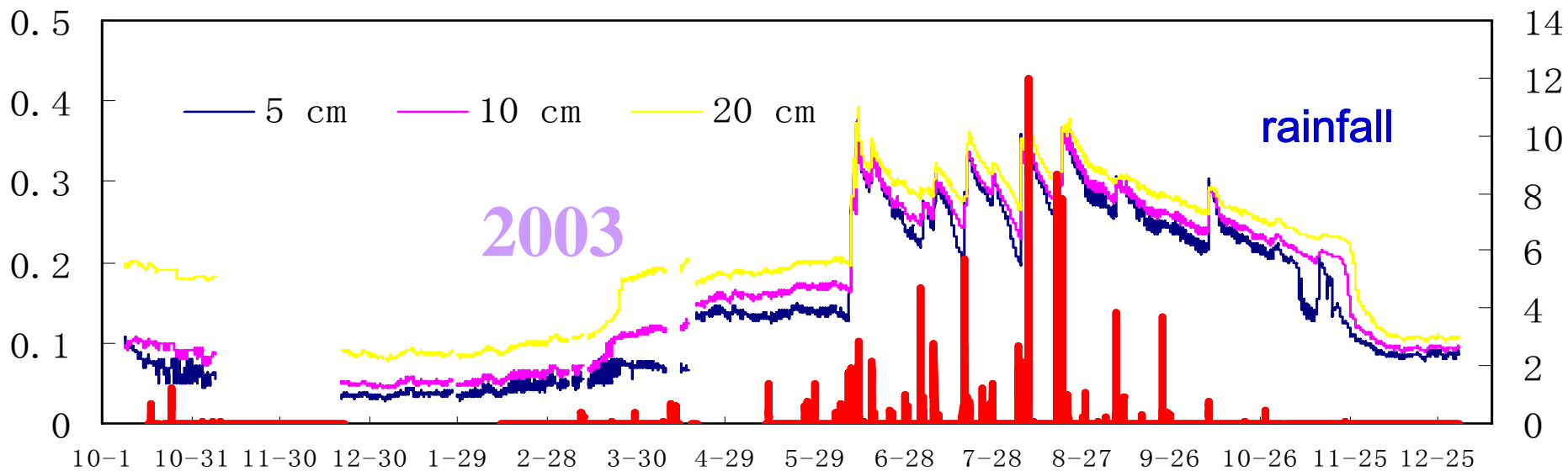
# Degraded grassland

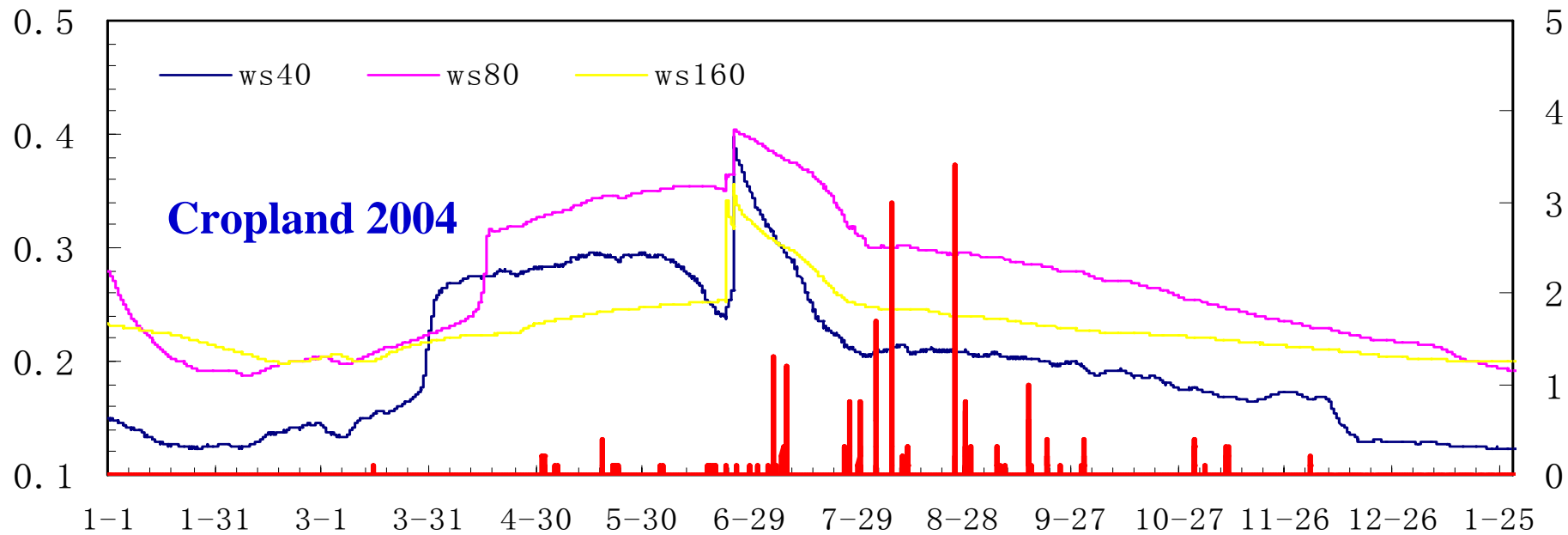
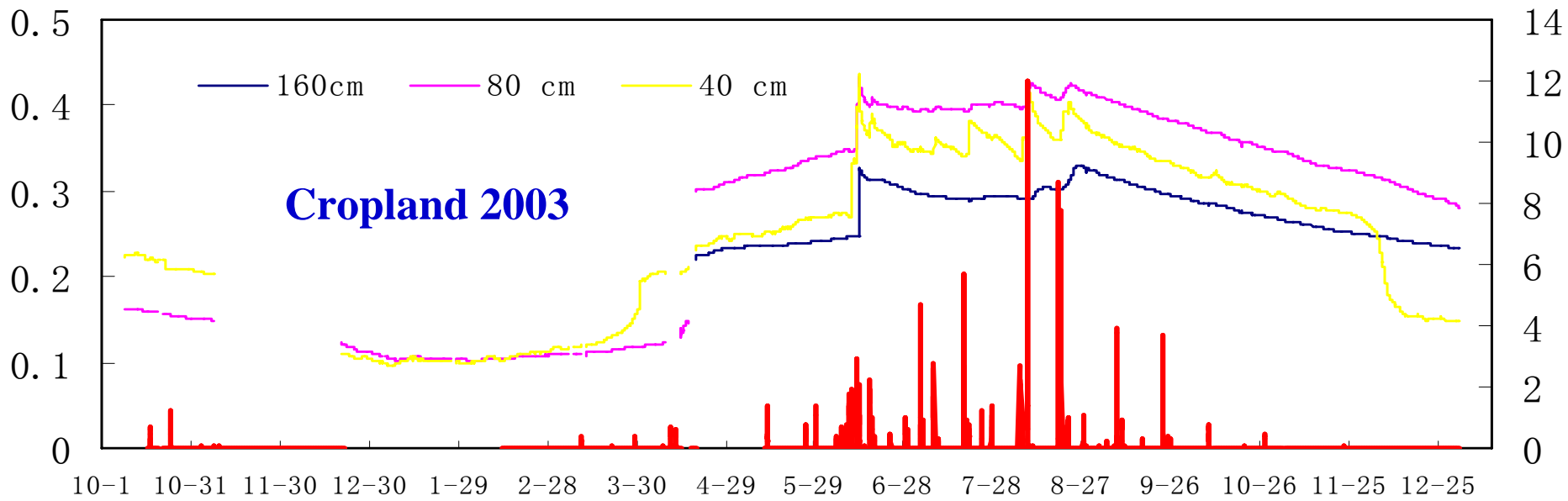


# cropland

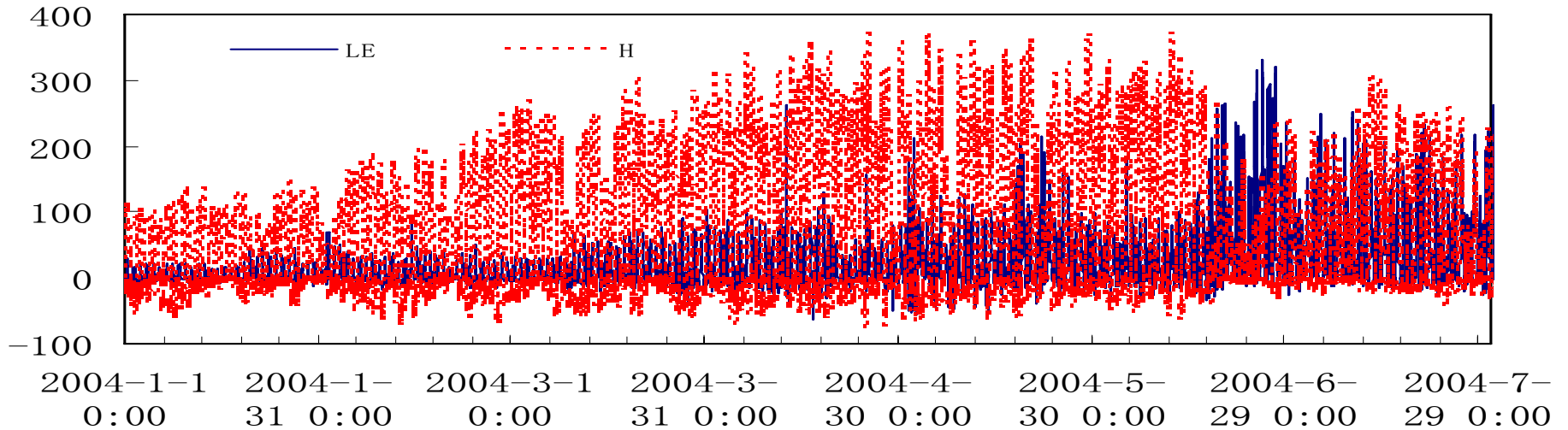
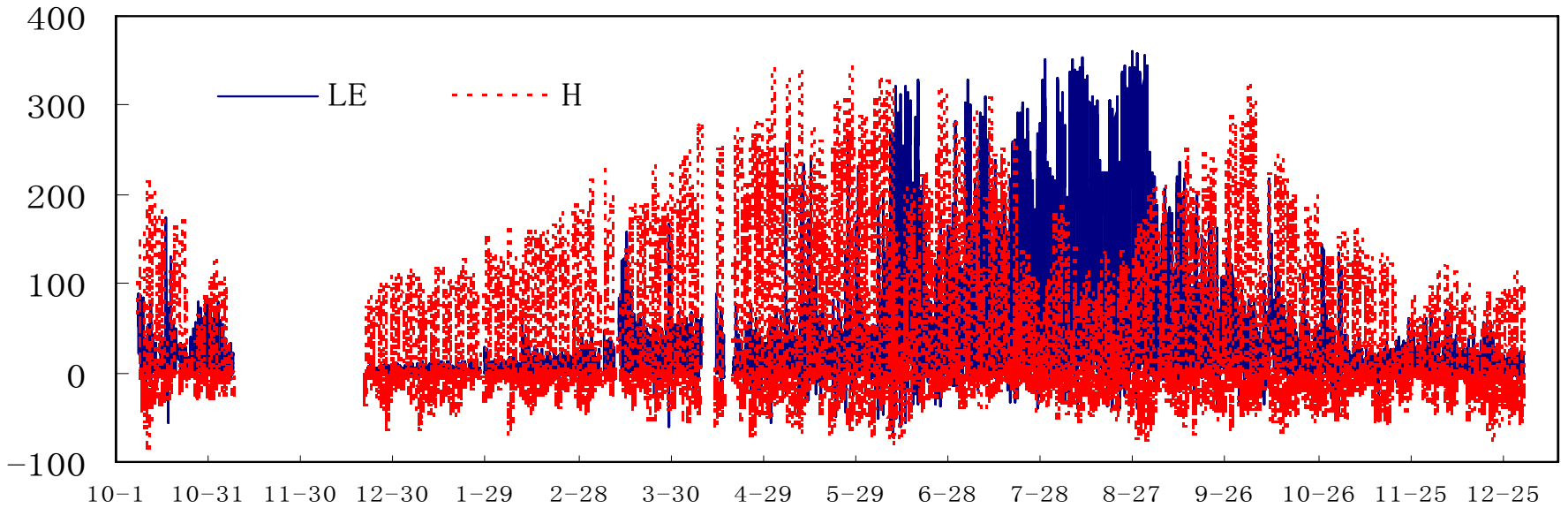


# Soil volumetric water content over cropland (m<sup>3</sup>/m<sup>3</sup>)

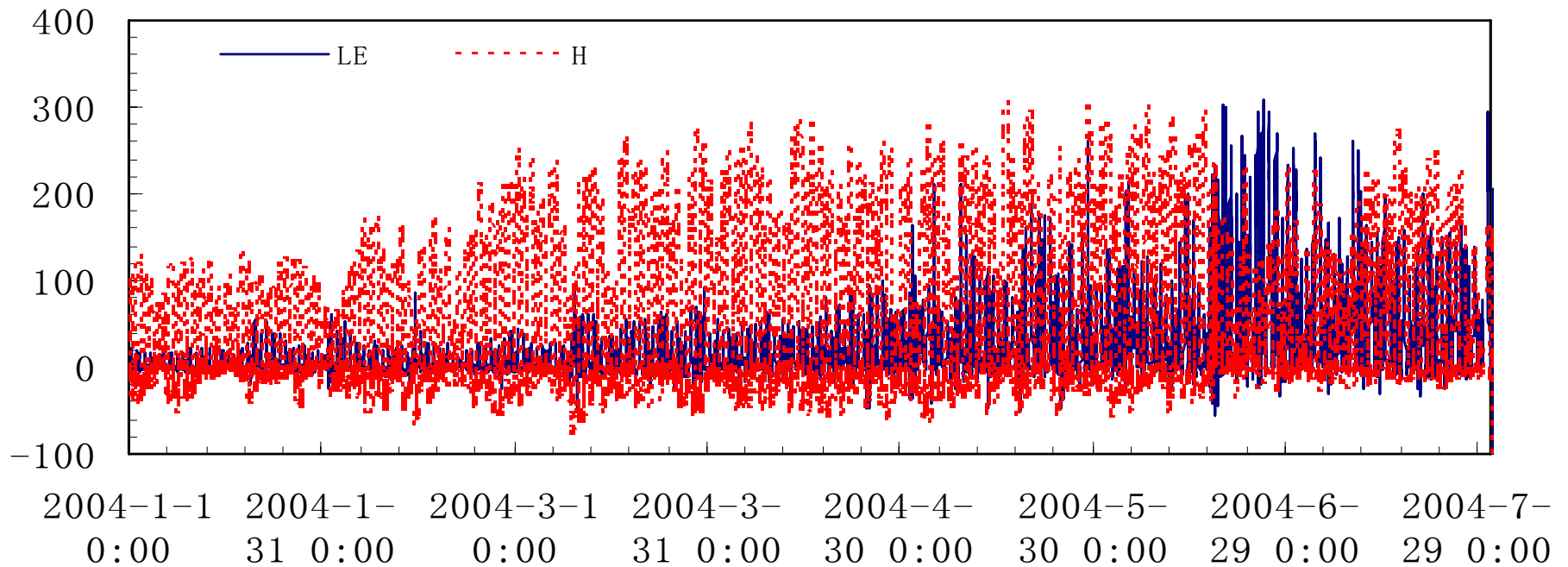
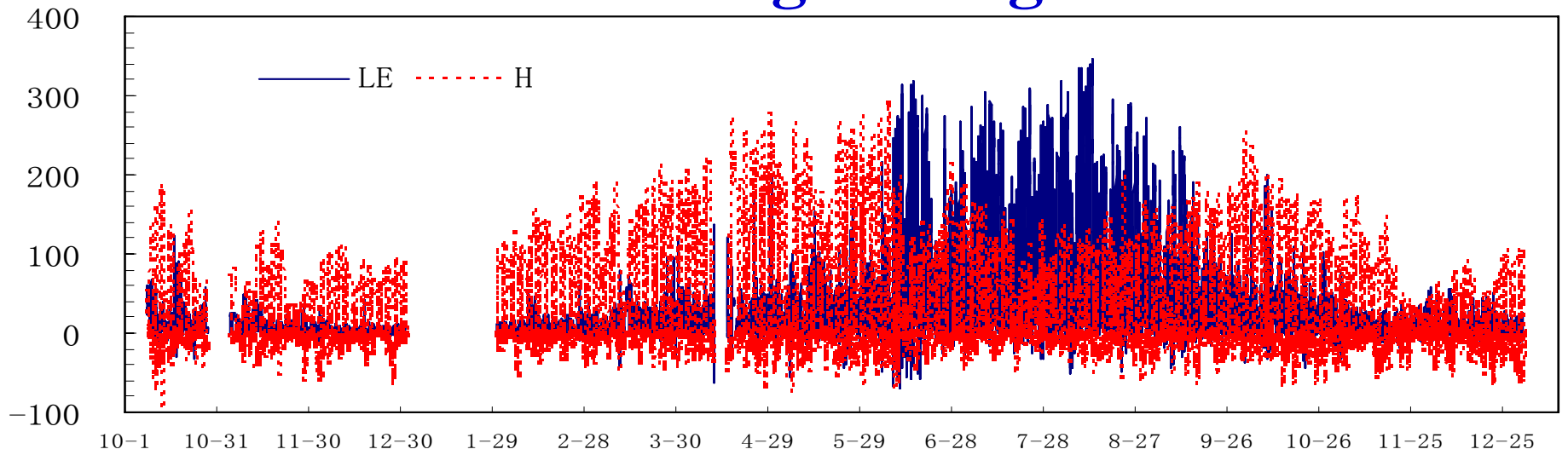




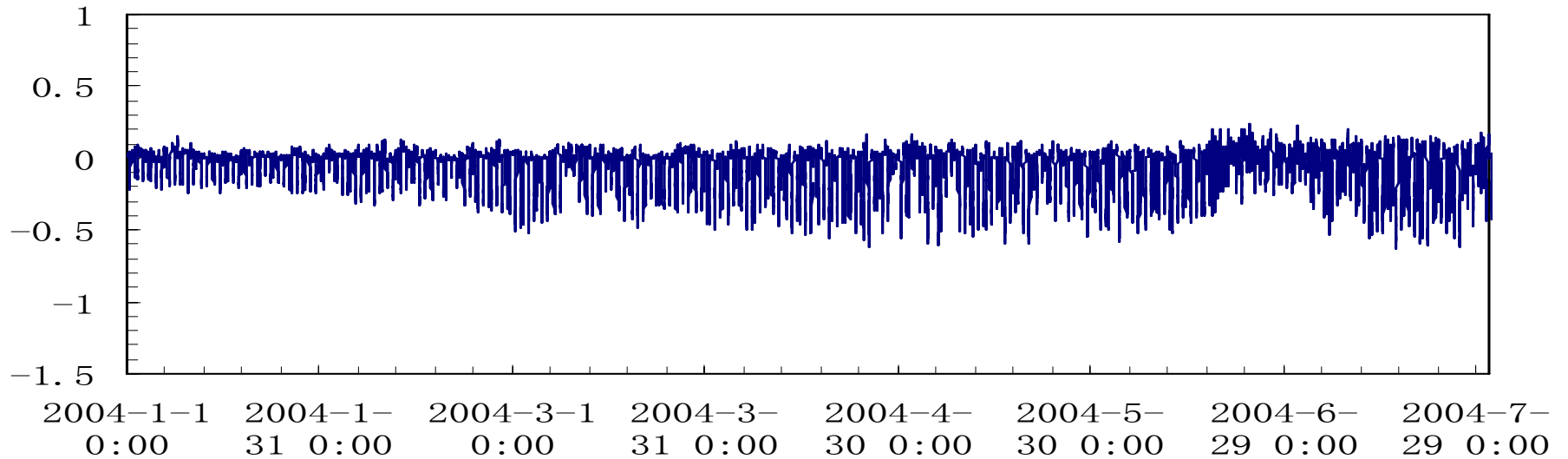
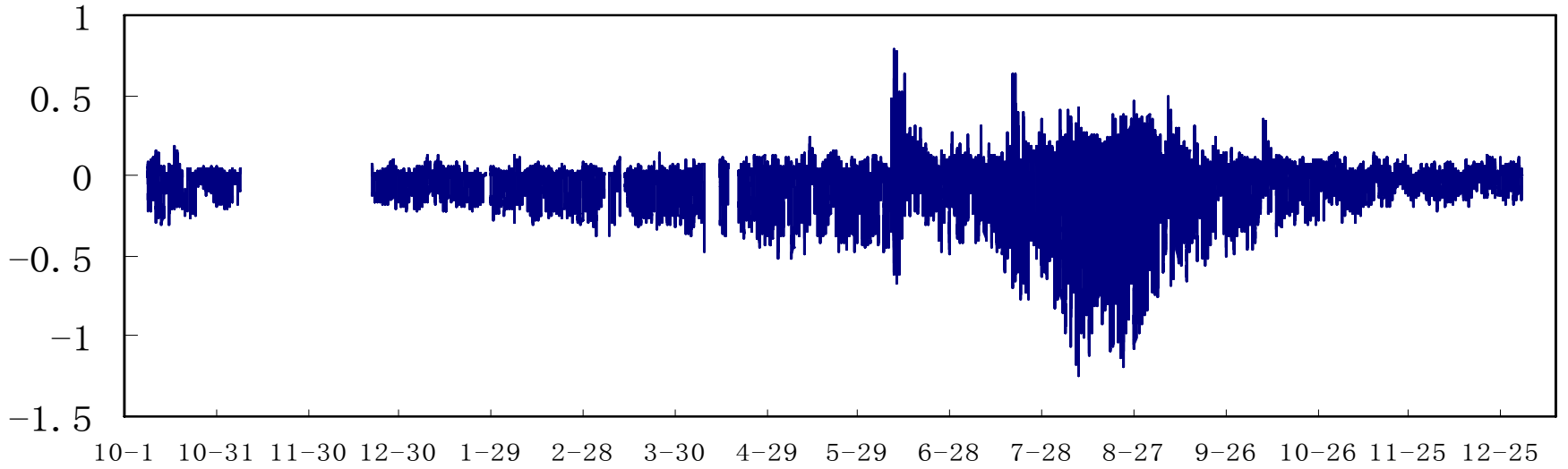
# cropland



# Degraded grassland

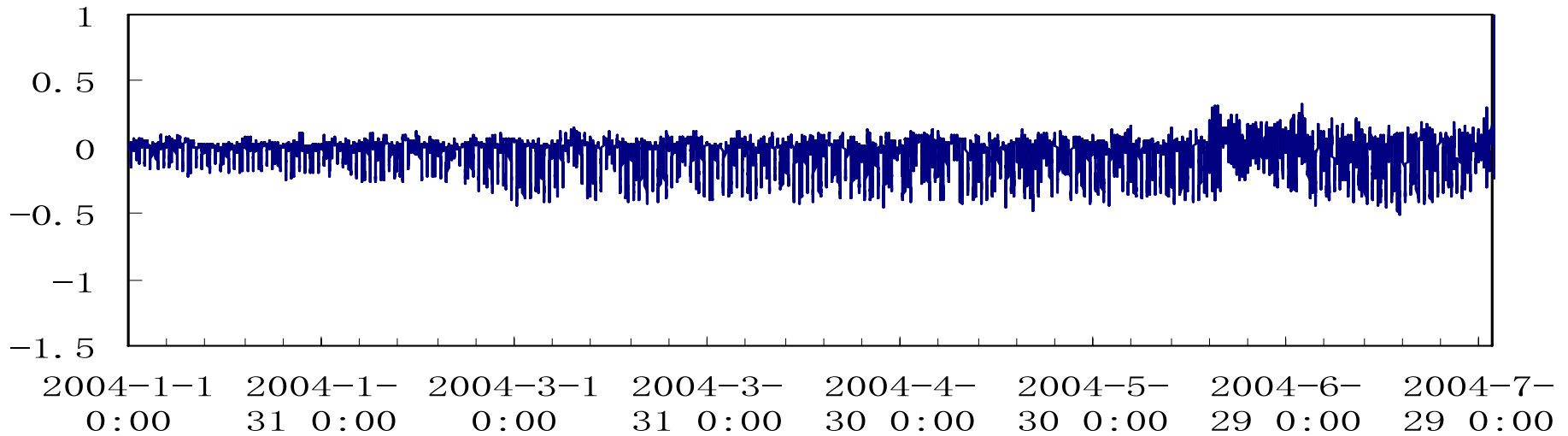
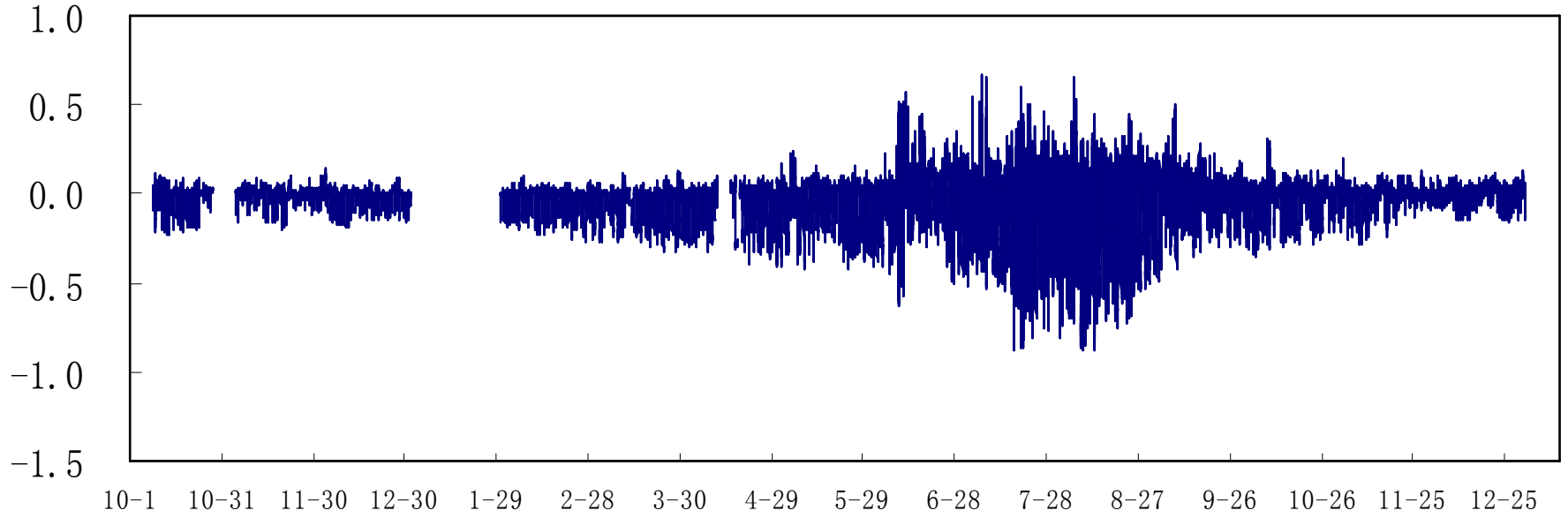


FCO2 ( mg /m<sup>2</sup>/s) over cropland





FCO2 ( mg/m2/s) over degraded grassland



# Next step:

*Remote sensing :Upscale, point to area average*

*Land surface process model*

*regional water and energy budget over semi-arid area*

*The characteristics of the land surface process  
over arid or semi-arid area?*

*The mechanism of the aridification in North  
China*

*Thank you for your attention!*

