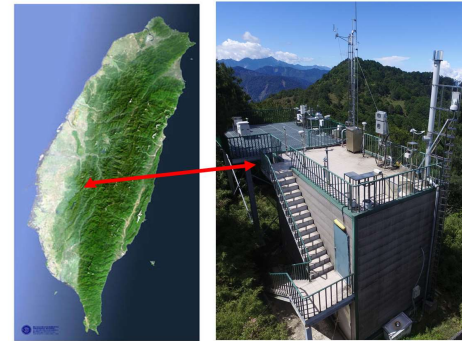


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Motivation and Introduction

Biomass burning (BB) in Indochina during springtime plays a great impact on the air quality downwind region that was continuously obtained at the Lulin Atmospheric Background Station (LABS). Although there have been many studies on the characteristics of Indochinese BB, however, there is no specific article reported on detail event study in terms of transport dynamics, evolution, and chemical transformation. In this study, we combine the data from LABS, MERRA reanalysis, satellites to elucidate a biggest BB event (March 17-18, 2009) in the historical record. Our analysis have proven that the event could be served as a good benchmark for identifying a relatively pure BB long-range transport from Indochina to Mt. Lulin, which is useful for future event identification.



Take-Home-Messages

- ❑ The event can be served as a good benchmark for identifying a relatively pure BB long-range transport from Indochina to Mt.Lulin.
 - ❑ UV Aerosol Index is useful to observe long-range transport of biomass burning smoke in this case.
 - ❑ SSA and char-EC/soot-EC ratio are 0.87 ± 0.04 and 29.4 which comparable with the sources region, indicating the plume contained high absorption aerosol
 - ❑ Fairly little change in the BB aerosol component during long-range transport.
- Contact me: carlo@cc.ncu.edu.tw

1. Measurements and satellite data

Product/data	Product name/instrument	Satellite sensor	Resolution
AOD	MYD08-M3 - CIMEL	Aqua MODIS	
Fire count	MYD14	Aqua MODIS	
Aerosol Index	UV Aerosol Index	Aura OMI	Daily / 1°
Backward Trajectory	HYSPLIT (NOAA Air Resources Laboratory)		5day/1°
O ₃	EC9810B		Hourly
Gaseous Elemental Mercury (GEM)	Tekran 2537 system		5 min
CO	NDIR (APMA-360, Horiba, Japan)		Hourly
EC/OC	DRI Model 2001A OC/EC Carbon Analyzer		
PM ₁₀	R&P TEOM 1400a		Hourly
NRB	MPLNET LIDAR		
Angstrom exponent, SSA, Fine mode fraction	AERONET CIMEL		
Vertical feature mask		CALIOP	

3. Transport of BB smoke

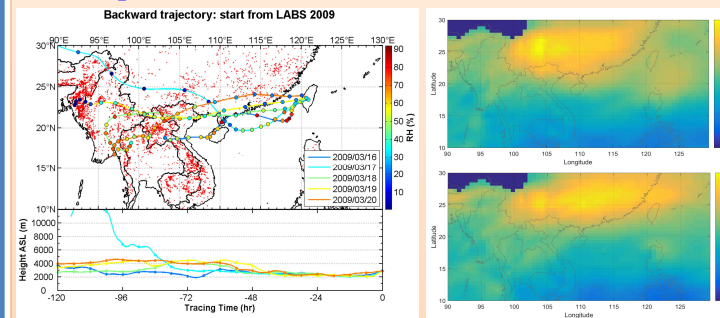


Figure 2. 5-day backward trajectories with endpoint at LABS (line) with air mass RH% at 700hpa (~3km of height) on 2009/03/17 (circle) and MODIS fire count (red dot) over Southeast Asia on 2009/03/16-20

Figure 3. Merra reanalysis zonal wind on 2009/03/17 (top) and 2009/03/18 (bottom)

2. Identified and characteristic of the BB event in 2009

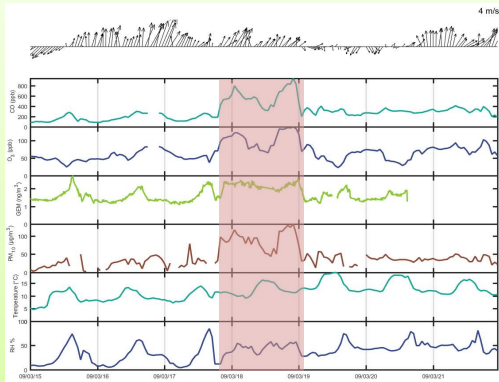


Figure 1. Time series of CO, O₃, GEM, PM₁₀ and meteorology data observed at LABS during 15-21 March 2009. The period time of the event are highlighted

"The same air mass affected to the LABS at the time period of the event."

Event time: 21:00 March 17 - 1:00 March 19

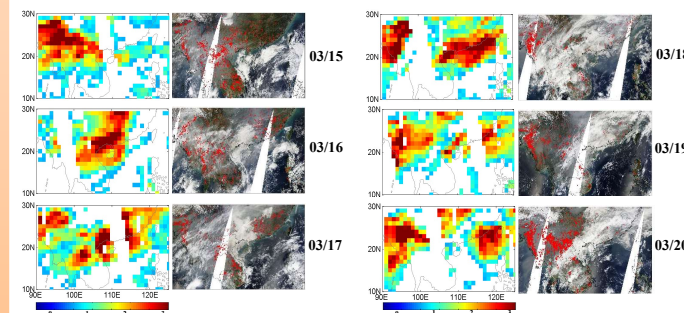


Figure 4. OMI UV Aerosol Index (left) and MODIS True color image with fire count on 2009/03/15-20

"Smoke transport accompanied with strong westerly wind and insignificant cloud interaction"

4. Optical properties of aerosol

	AOD @500 nm	AE @440-870 nm	Fine mode fraction	SSA
Event Average	0.28 ± 0.06	1.30 ± 0.23	0.97 ± 0.01	0.87 ± 0.04

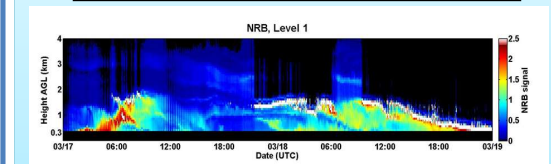


Figure 5. MPLNET NRB signal on 2009/03/17-18 UTC at NCU station

"Aerosol widely distributed at around 3km height around Taiwan Optical properties of aerosol at LABS was similar to the source region."

5. Ratios of pollutants

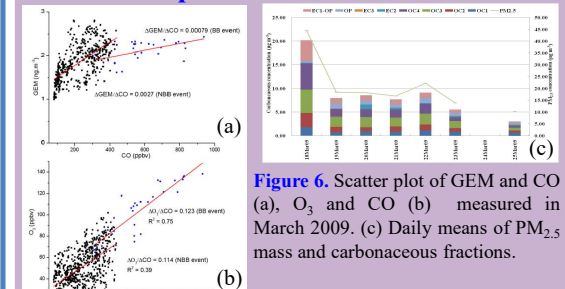


Figure 6. Scatter plot of GEM and CO (a), O₃ and CO (b) measured in March 2009. (c) Daily means of PM_{2.5} mass and carbonaceous fractions.

"Char-EC/soot-EC ratios was 29.4 on the event day which was comparable with the ratios obtained in the emission source => No change in the BB aerosol component during long-range transport"

Acknowledgments

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