Rainstorm properties over the northeastern region of Thailand: weather radar analysis

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Agricultural area

Landslide

Drought area

Flooding

Objective

to provide the properties of rainstorms under the influence of "northeast monsoon (NEM)" and the "southwest monsoon (SWM)" over northeastern Thailand

Method

The data from 277 days of rainstorm events occurring from May 2016 to May 2017 were used to investigate temporal distribution properties of convective individual rainclouds by statistical techniques.
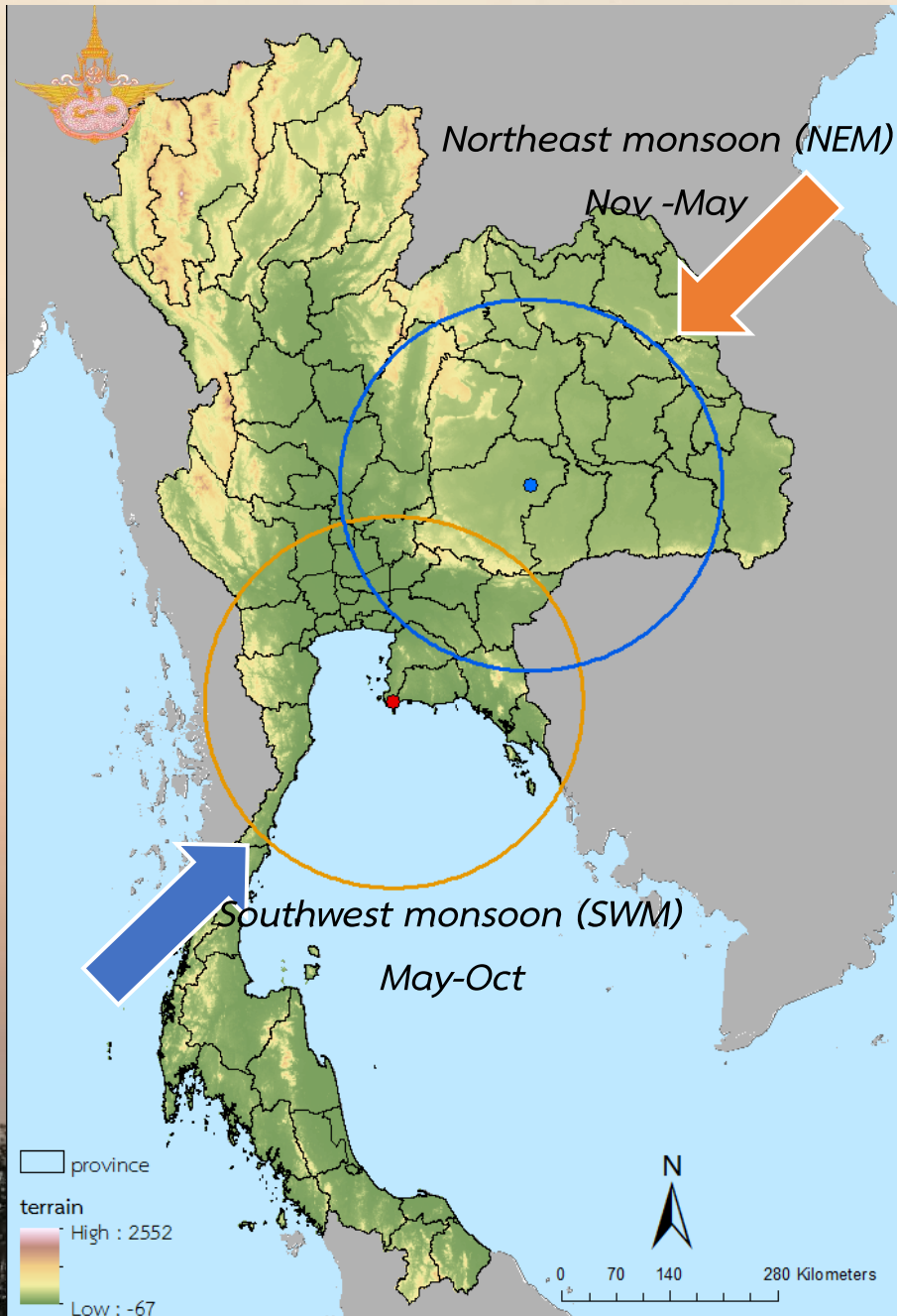
PHIMAI Radar station

Type : S-band (Single polarization)

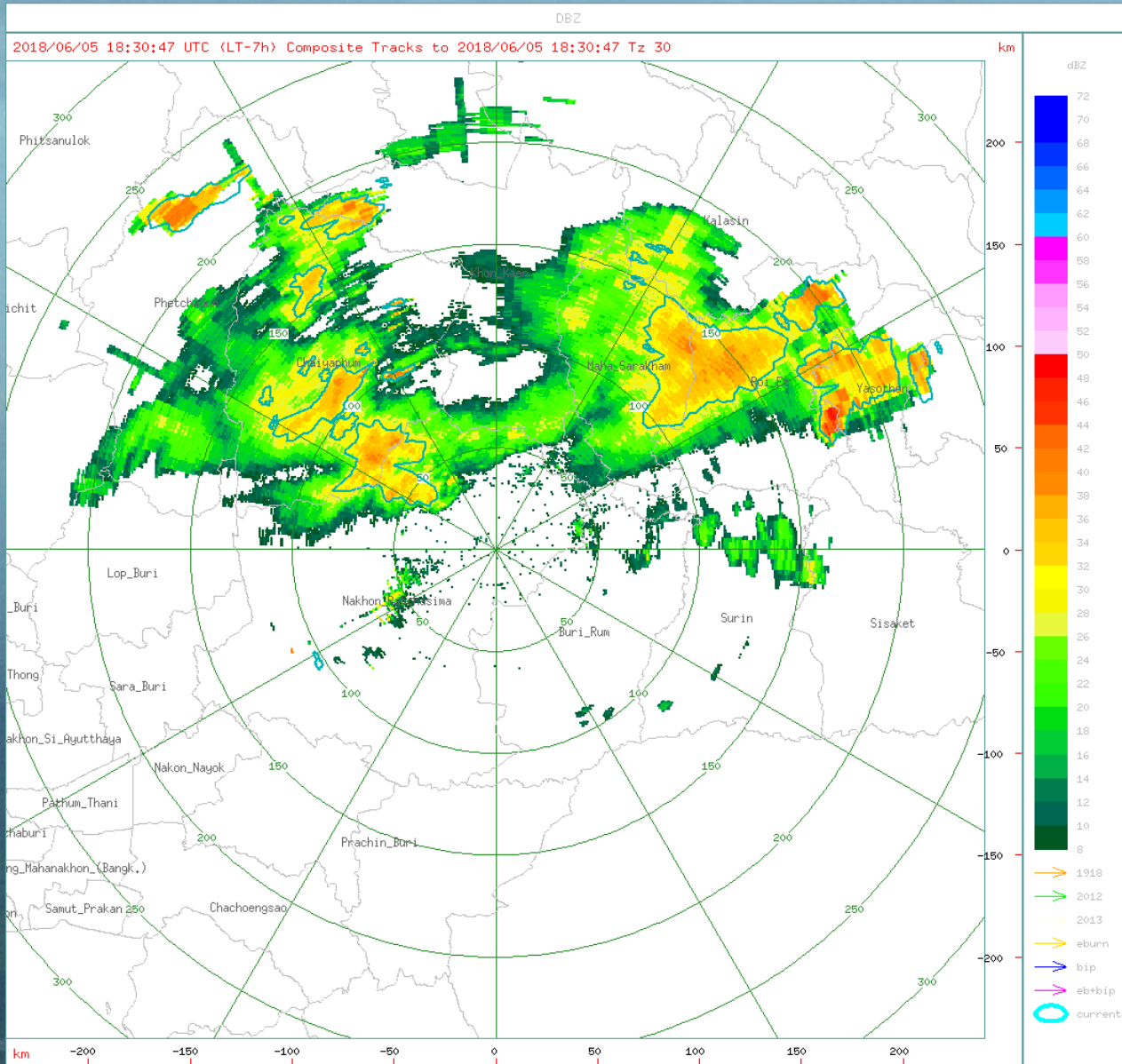Operate mode : VCP 11 (0.5 – 19.5 deg)

Range : 240 km
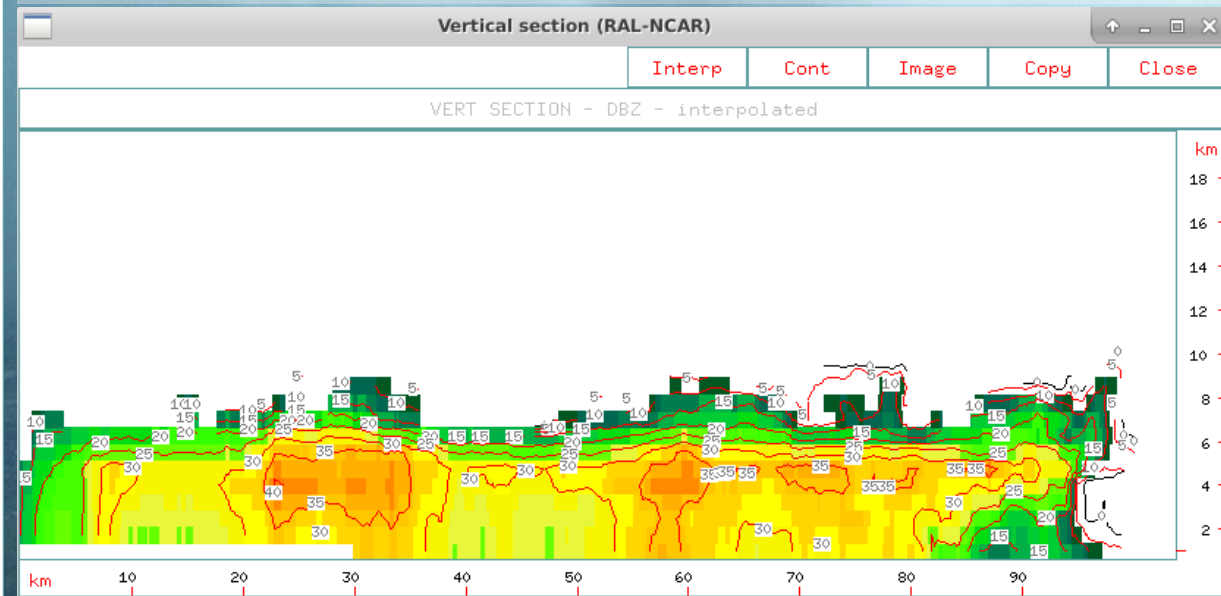
Resolutions : 0.6 km/pix

24 hr. operation

Location : 15.1818,102.5641

P. Chantraket, P. Intaracharoen and S. Kirtsaeng, *Analysis of Rainstorm Characteristics in Eastern Regions of Thailand.* International Journal of Applied Sciences and Innovation, 2016, Vol. 1: 58-70.

TITAN[1] : **T**hunderstorm **I**dentification **T**racking **A**nalysis and **N**owcasting
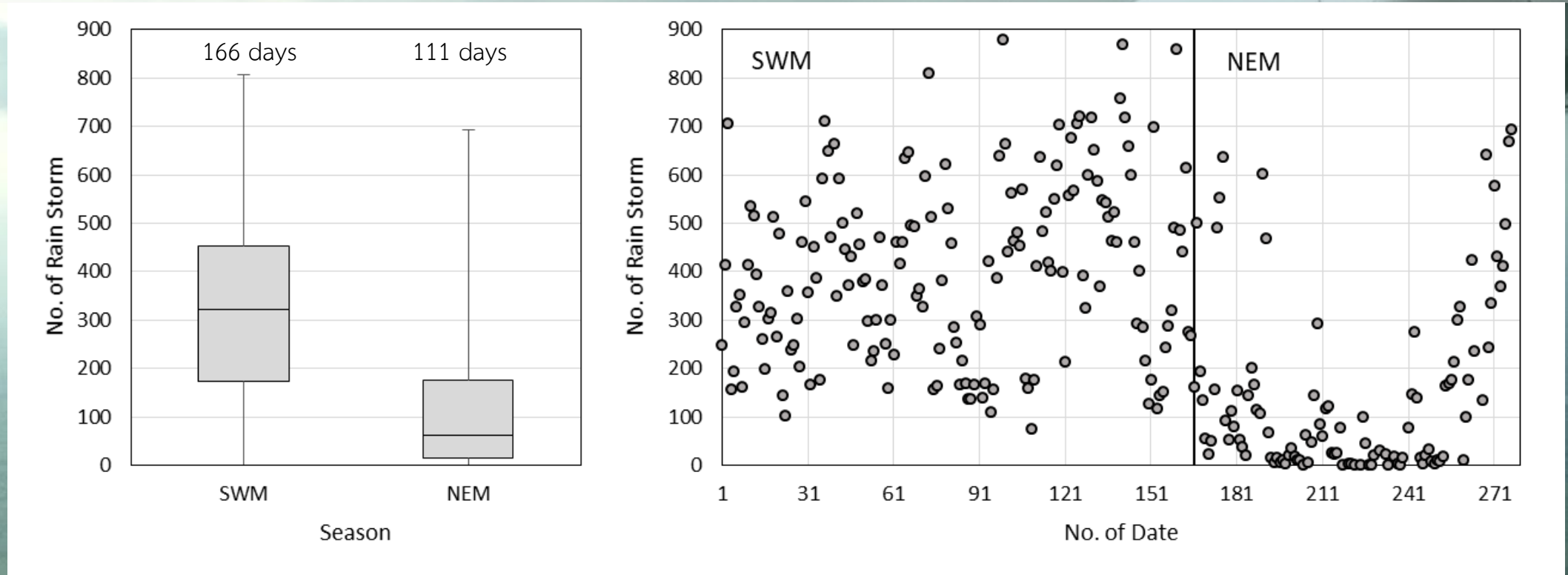
(1) Dixon, M. and G. Wiener, 1993: TITAN: Thunderstorm Identification, Tracking, Analysis, and Nowcasting—A Radar-based Methodology. J. Atmos. Oceanic Technol.,10, 785–797, https://doi.org/10.1175/1520-0426(1993)010<0785:TTITAA>2.0.CO;2

Result and Discussions

Number of rainstorm per day (S_no.)

S_no. (-)			
	SWM	NEM	ratio
Northeast	397.5	64.0	6.2
East	420.0	87.5	4.8

Result and Discussions

Number of rainstorm per day (S_no.)

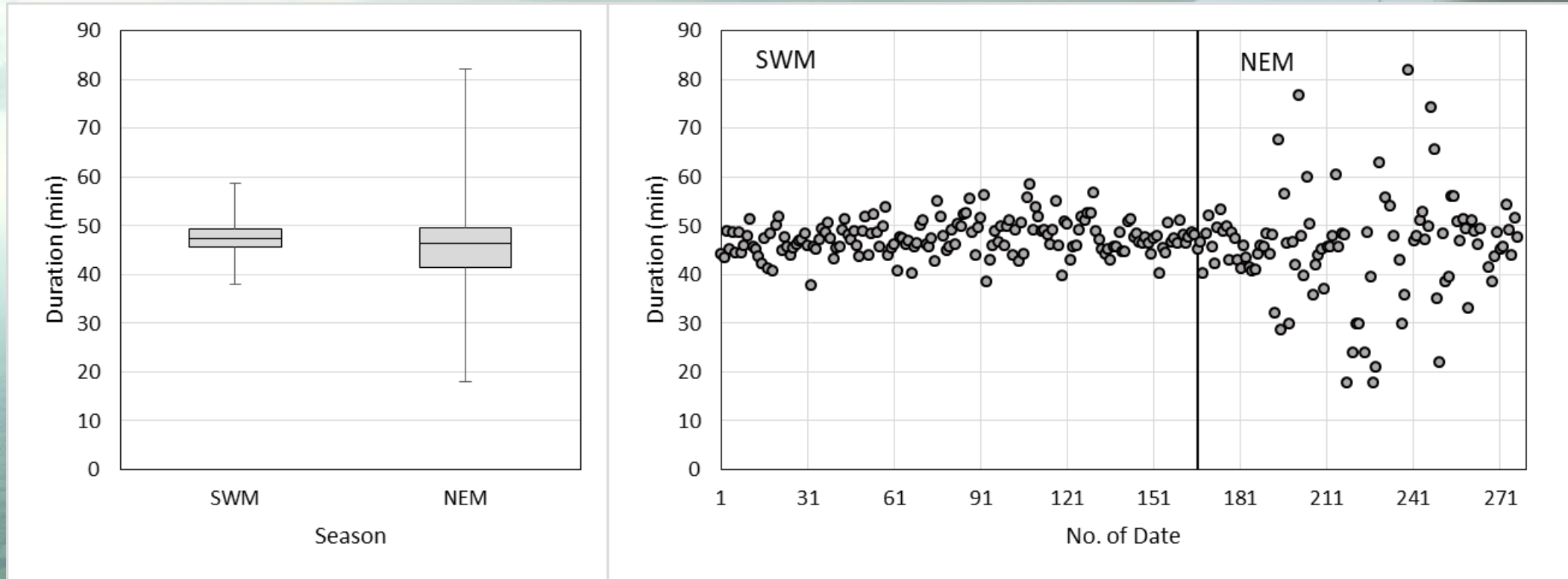Mean Annual Rainfall in Thailand (mm)
30-year period : 1981-2010
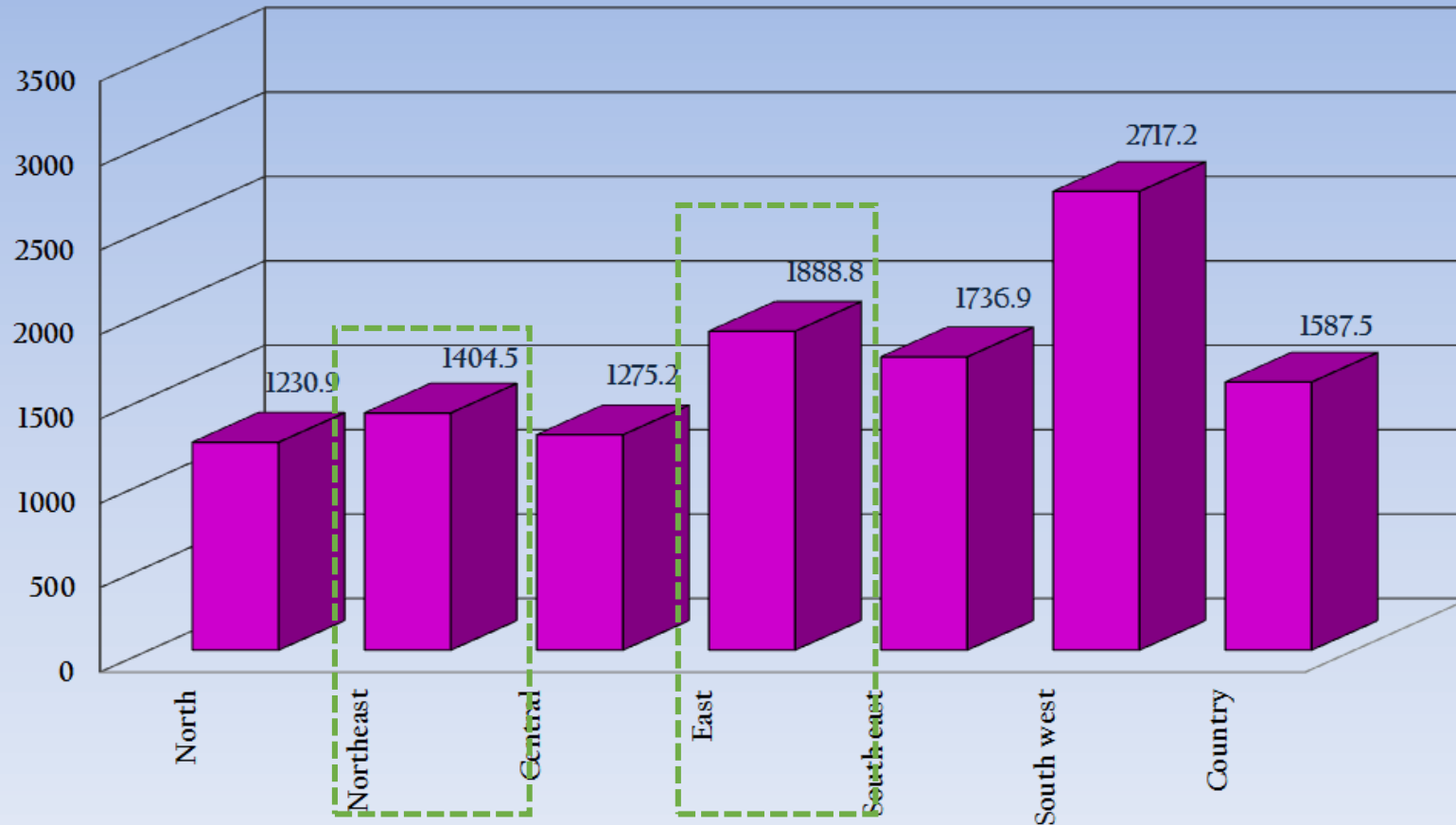
S_no. (-)		
	SWM	NEM
Northeast	397.5	64.0
East[2]	420.0	87.5

(2) P. Chantraket, P. Intaracharoen and S. Kirtsaeng, **Analysis of Rainstorm Characteristics in Eastern Regions of Thailand**. International Journal of Applied Sciences and Innovation, 2016, Vol. 1: 58-70.

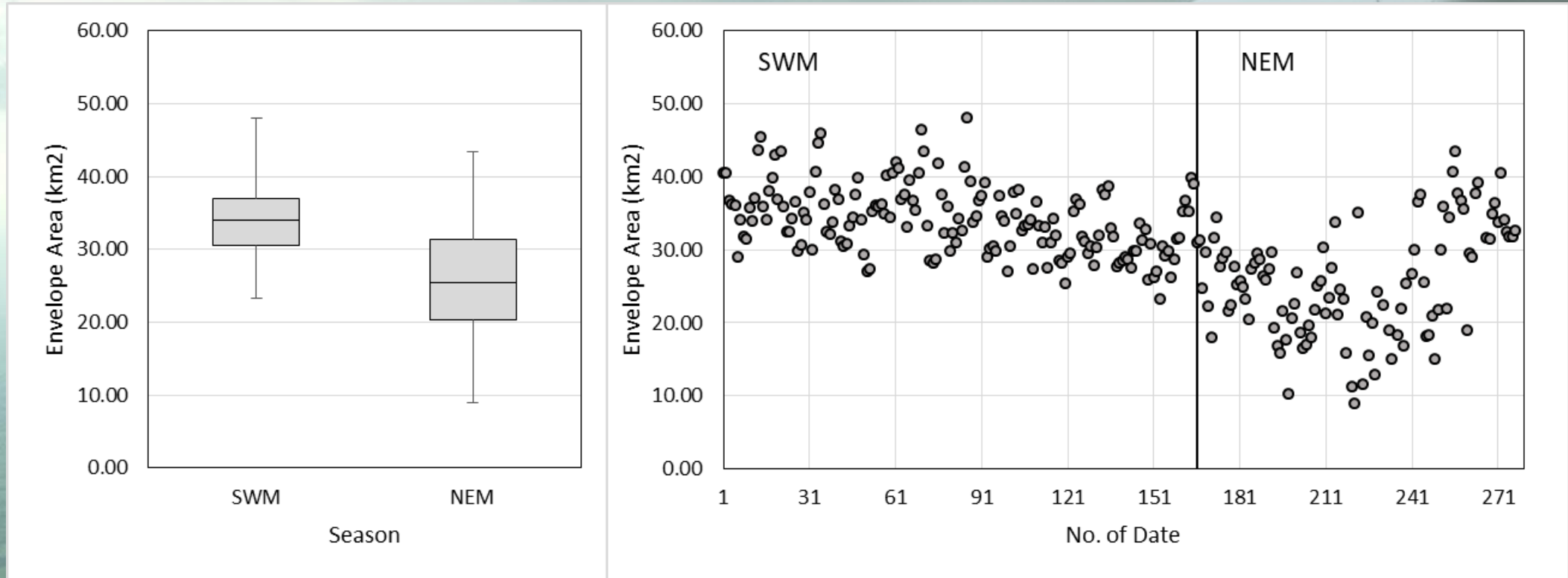# Result and Discussions

Duration of rainstorm (S_duration, min)

S_duration, min		
	SWM	NEM
Northeast	47.48	46.50
East	49.20	47.40

Result and Discussions

Envelope area of rainstorm (S_area, km^2)

	S_area, km^2	
	SWM	NEM
Northeast	33.94	25.41
East	110.99	63.69

Result and Discussions

Volume of rainstorm (S_volume, km^3)
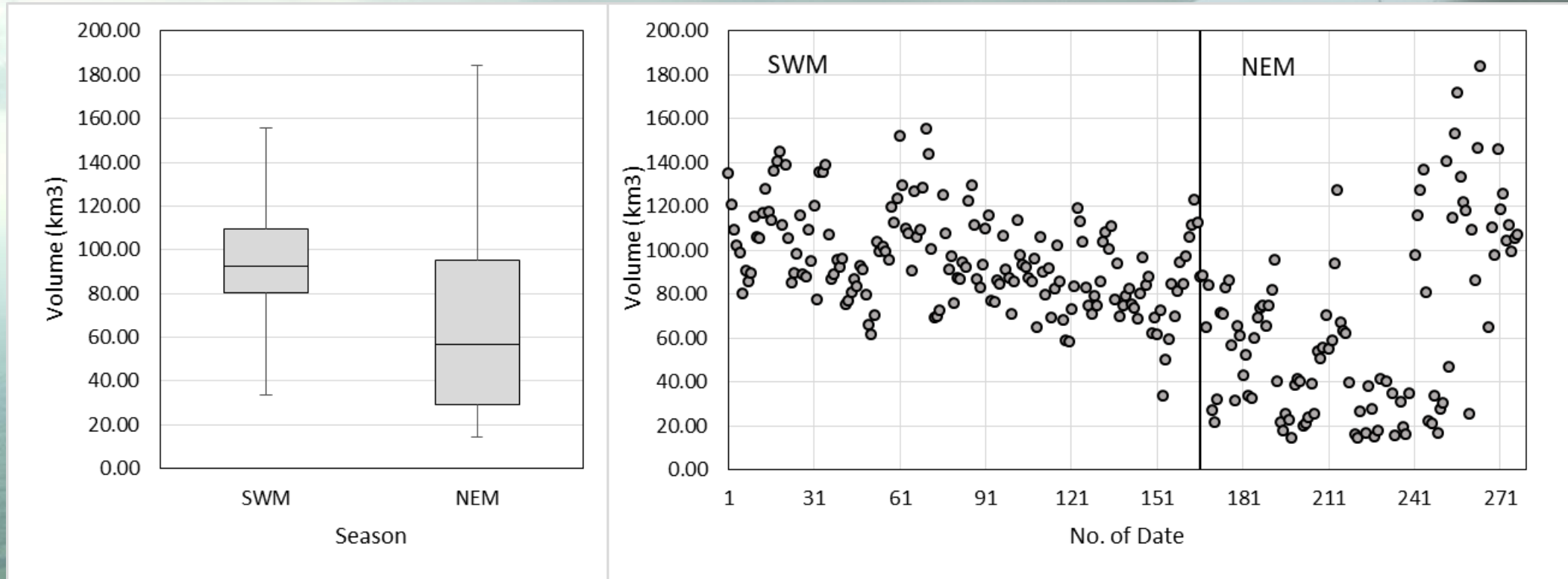
S_volume, km^3		
	SWM	NEM
Northeast	92.21	56.85
East	304.14	170.47

Result and Discussions
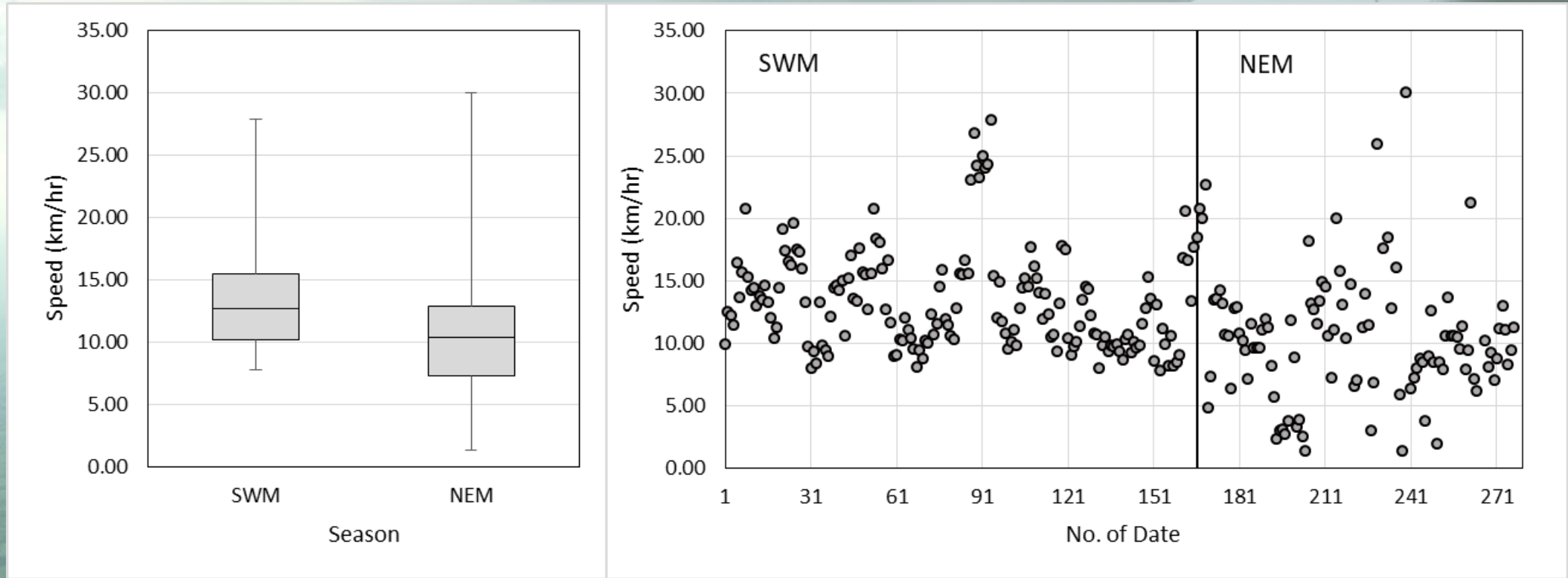
Speed of rainstorm (S_speed, km/hr)

S_speed, km/hr		
	SWM	NEM
Northeast	12.73	10.43
East	14.26	7.72

Result and Discussions

Speed of rainstorm (S_speed, km/hr)
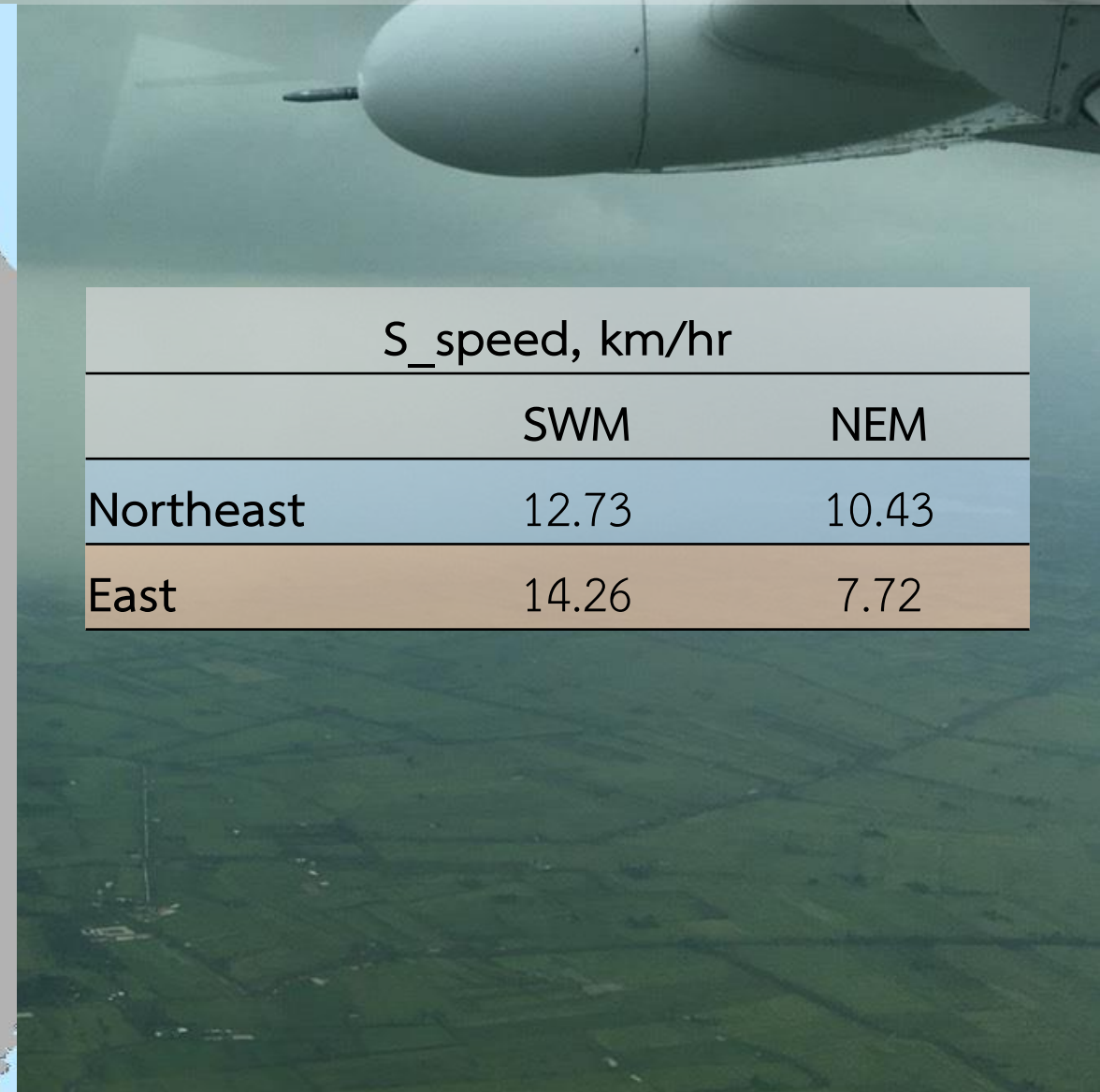
S_speed, km/hr		
	SWM	NEM
Northeast	12.73	10.43
East	14.26	7.72

Result and Discussions

Intensity of rainstorm (S_intensity, dBz)
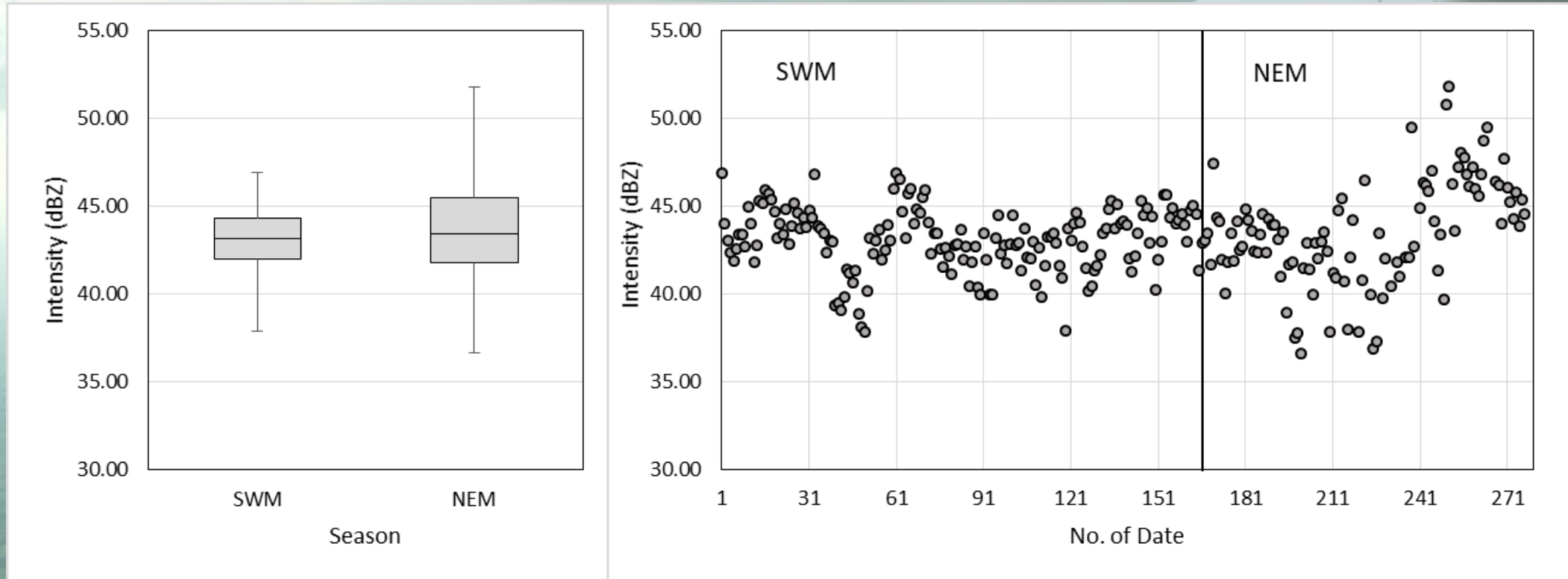
S_intensity, dBz		
	SWM	NEM
Northeast	43.19	43.47
East	44.08	50.27

$$Z \equiv \int N_i D^6 dD$$

➢ N_i : number of drops of diameter D (-)
➢ D : drops size diameter (mm)

Conclusion

● The SWM rainstorms are larger number of the storm (397, 64 no./day), storm area (33.94, 25.41 km²) and storm volume (92.21, 56.85 km³) than NEM rainstorms, respectively.

● The storm duration during the SWM and NEM was found a minor difference in both periods (47.48, 46.50 min).

● The storm velocity was not exceeding 13 km/hr (12.73 km/hr for SWM and 10.43 km/hr for NEM).

● The rainstorm intensity was found a little difference as 43.19 dBz for SWM and 43.47 dBz for NEM.

Recommendation

The rainstorm properties were used for daily rainmaking operation and evaluated the efficiency of cloud seeding.

Future plan

The data will be analyzed and find the relation with raingauge and upper air data to study rainstorm characteristic.

Thank you

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Publications

P. Intaracharoen and P. Chantraket and C. Detyothin and S. Kirtsaeng, "*Rainstorm Characteristics over the Northeastern Region of Thailand: Weather Radar Analysis.*" World Academy of Science, Engineering and Technology. March 2018, vol. 12(3). 1025 - 1029.