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AEROSOL DISTRIBUTION AND SEVERE STORM DYNAMICS IN NORTHERN THAILAND DURING THE PRE-MONSOON SEASON

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Background of
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SEVERE STORM AND HAIL IN NORTHERN THAILAND

105TH ANNUAL MEETING
12–16 JANUARY
NEW ORLEANS & ONLINE
AMERICAN METEOROLOGICAL SOCIETY



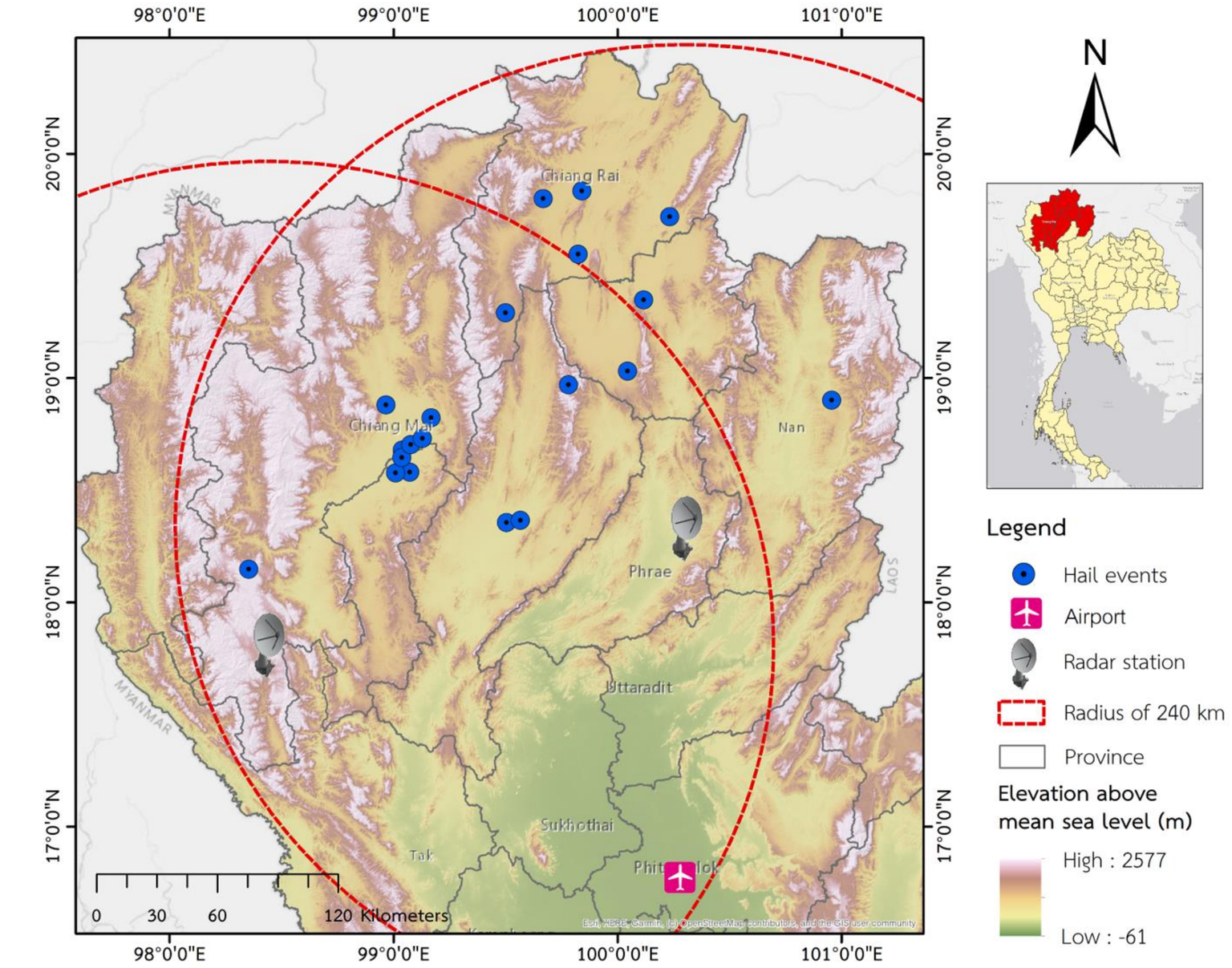








CASE DESCRIPTION AND OBSERVATIONS



Airborne Measurement

- UHSAS (0.06 to 1.0 µm)
- PCASP (0.1 to 3.0 µm)
- FFSSP (1 to 50 µm)

Weather Radar

- Mosaic 2 S-band radar station

Upper-Air Sounding





Figure 1 Study area, Rong-Kwang and Omkoi radar station over the northern Thailand and the location of hail observation during 7 to 10, May 2024.

RESULTS AND DISCUSSION

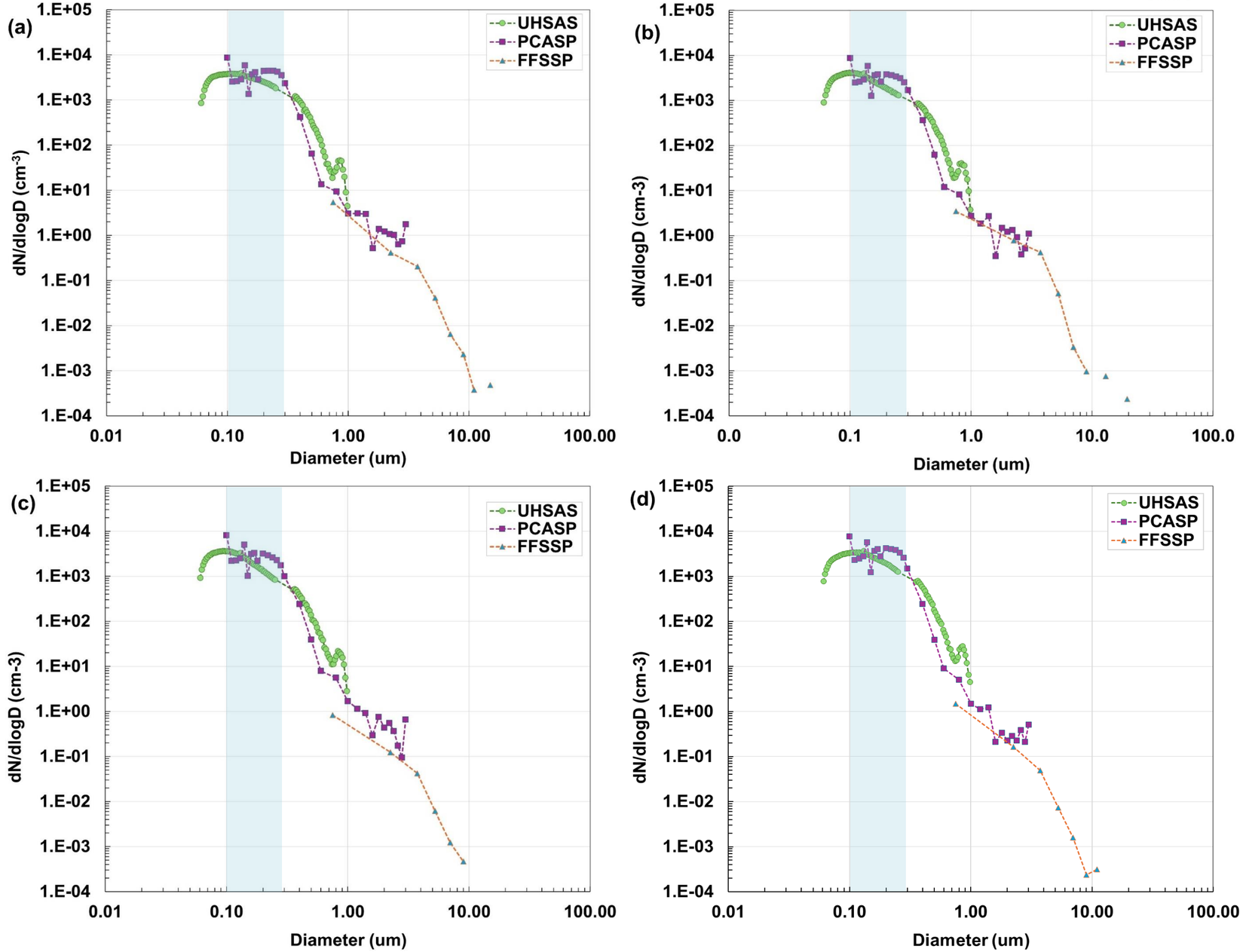


Figure 2 The aerosol size spectra from the USHAS, PCASP and FFSSP measurements of (a) May 7, (b) May 8, (c) May 9 and (d) May 10, 2024.

RESULTS AND DISCUSSION

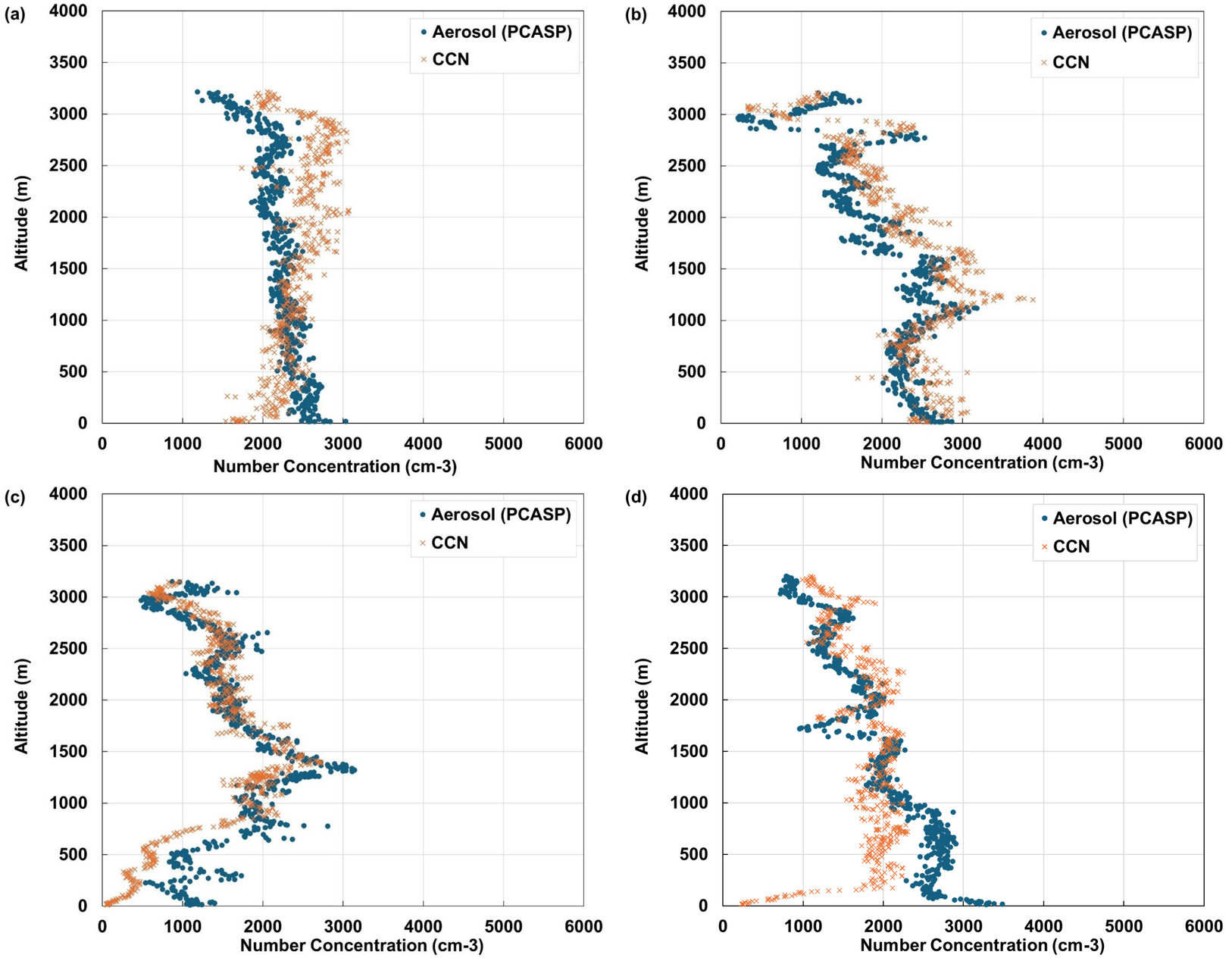


Figure 3 The vertical distributions of aerosol and CCN concentrations for (a) May 7, (b) May 8, (c) May 9 and (d) May 10, 2024.

RESULTS AND DISCUSSION

Table 1 Atmospheric instability indices

Parameter	7 May	8 May	9 May	10 May
CAPE (J/kg)	2862	651	2610	1508
LI(C)	-4.0	-1.3	-4.8	-3.1
SI	-2.3	-2.0	-3.2	-2.5
KI(C)	36.2	36.0	38.8	34.8
TTI(C)	46.2	45.8	47.4	45.6
Hail Event	6	2	10	2

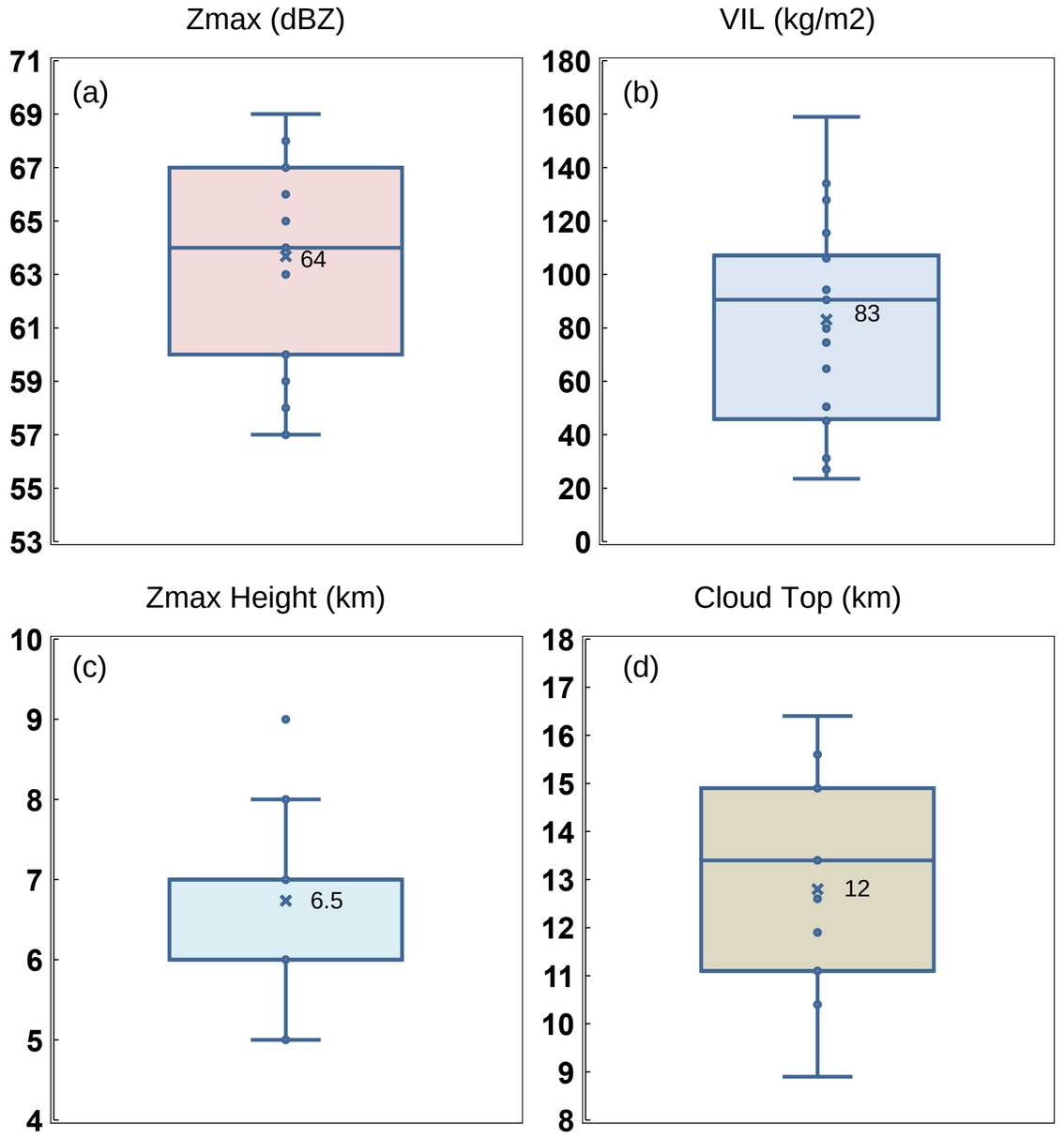
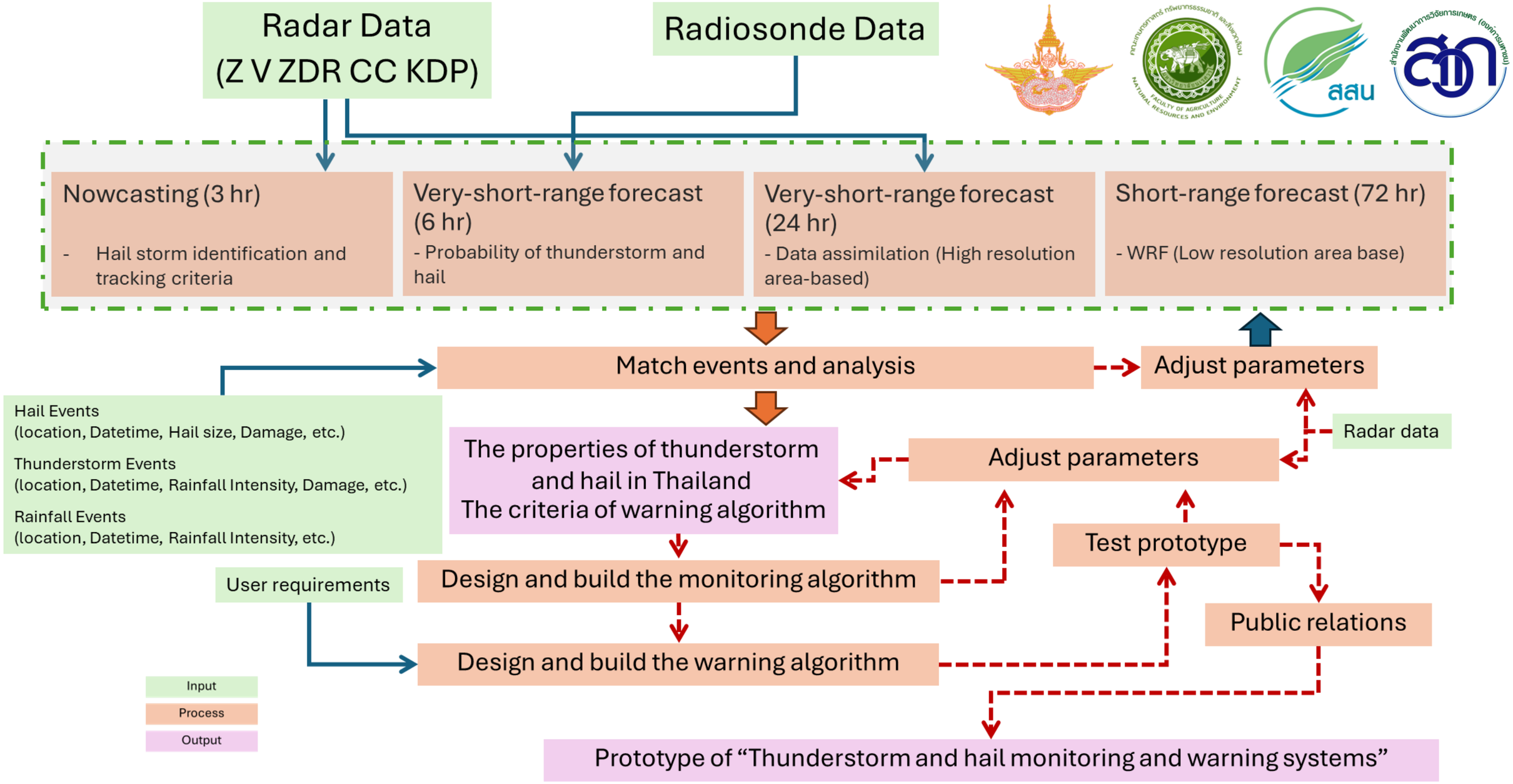


Figure 4 Box and whisker plot of (a) maximum reflectivity, (b) Vertical Integrated Liquid (VIL), (c) height of maximum reflectivity and (d) cloud top.

FUTURE WORK


Radar Data
(Z V ZDR CC KDP)
Radiosonde Data
Nowcasting (3 hr)
- Hail storm identification and tracking criteria
Very-short-range forecast (6 hr)
- Probability of thunderstorm and hail
Very-short-range forecast (24 hr)
- Data assimilation (High resolution area-based)
Short-range forecast (72 hr)
- WRF (Low resolution area base)
Match events and analysis
Adjust parameters
Hail Events
(location, Datetime, Hail size, Damage, etc.)
Thunderstorm Events
(location, Datetime, Rainfall Intensity, Damage, etc.)
Rainfall Events
(location, Datetime, Rainfall Intensity, etc.)
The properties of thunderstorm and hail in Thailand
The criteria of warning algorithm
Adjust parameters
Radar data
Test prototype
User requirements
Design and build the monitoring algorithm
Public relations
Design and build the warning algorithm
Input
Process
Output
Prototype of “Thunderstorm and hail monitoring and warning systems”

THANK YOU

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