### AEX/TIMREX and Preliminary Results Invest Monsoon Experiment/Terrainenced Monsoon Rainfall Experiment)

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# Outline

- 1. Scientific objectives of SoWMEX/TiMREX
- 2. Experiment design and operation
- 3. Preliminary results and highlights
- 4. Summary

### Scientific objectives of SoWMEX/TIMREX

MCSs dynamics and microphysics
Mei-yu front and low-level-jet
Convection initiation/diurnal cycle/boundary layer processes
Terrain effect on flow and MCSs
Mesoscale data assimilation/QPF

Multiscale interaction problem







IOP#	Date	Scientific objectives	Dropsonde mission/comments				
1	06Z May 19 to 00Z May 22	Frontal circulation, Upstream environment for orographic convection, Model verification and data assimilation	mission #1 at 21Z May 20, C, 3:20/12 - 4. SOP was scheduled to start on 00Z May 15 and was delayed to 00Z May 19				
2	06Z May 27 to 21Z May 29	Southwest flow interacting with the terrain, Upstream condition for mountain convection, Lee side vortex/shear zone	mission #2 at 21Z May 28, D, 2:35/13 - 6				
3	21Z May 29 to 12Z May 31	Island effects on SW (LLJ) and the Mei - Yu front Upstream condition for heavy precipitation	mission #3 at 21Z May 29, Cn, 2:43/15 - 10, mission #4 at 21Z May 30, Cn, 2:55/13 - 0, EOP started on 21Z May 29 and scheduled to end on 21Z, June 4				
4	21Z June 1 to15Z June 3	Mesoscale convective systems, Shallow surface front, Mesoscale convective vortex	Mission #5 at 09Z June 3, Cn, 2:29/13-0 Astra nose radar malfunction, the flight was delayed (was scheduled on 21Z, June 1)				
5	18Z June 3 to 12Z June 4	Mesoscale convective systems, Quasi-stationary front, Mesoscale convective vortex	mission #6, 21Z June 3, C, 3:47/14-2 mission #7, 05Z June 4, E, 2:08/12-0				
6	18Z June 4 to 12Z June 6	Mesoscale convective systems; Quasi-stationary front; Mesoscale convective vortex	mission <b>#8</b> , 21Z June 4, C, 3:25/15-1; mission <b>#9</b> , 05Z June 5, E, 2:23/10-0; mission <b>#10</b> , 21Z June 5, D, 2:35/12-1; MCV landed and brought heavy rainfall to Kaohsiung; EOP ended at 18Z June 6 and SOP resumed.				
7	00Z June 12 to 12Z June 13	Convection initiation, Orographic convection	<b>UAV</b> mission #1, 04Z and 06Z June 12, Astra engine oil leakage and grounded for a few days				
8	00Z June 14 to 12Z June 17	Southwesterly flow interacting with the terrain, Upstream condition for mountain convection, low level jet, Mesoscale convective systems, Mesoscale convective vortex	mission #11, 09Z June 16, E, 2:15/10-1, mission #12, 21Z June 16, E, 2:25/12-0, mission #13, 04Z June 17, E, 2:29/14-1, Astra available after examining by Singapore engineer				
9	06Z June 23 to 12Z 26 June	Typhoon Fengseng track uncertainty, Typhoon induced southwesterly flow and related heavy rain systems	Dotstar flight at 08Z June 23, 2:30, A, mission #14 at 09Z June 25, E, 2:30/ 15SOP ends on 12Z June 26				
Non- IOP	22-26 May; 7-11; 18-22, June	Afternoon thunderstorm systems and microphysics study					

#### Operation Summary (May 12 to June 26, 2008)

- Science Meeting 38 times
- Daily Planning Meeting 46 times
- Evening update 4 times
- Pre-flight briefing 15 times
- SOP: 42 days,
- IOP: 9 with total 24 days,
- EOP: 9 days (continuous IOP)

Operation	Man-day
OCC-CWB	900
NPUST-Pingtung	~350
SPOL	520
XPOL (mobile)	337
Super-Site	432
Dropsonde	~100
Sounding System	~2800
Shipboard Sounding	507
Total	~6000

	Banciao	Hualien	Dongsha	Magong	Pingtung	Lyudao	Taichung	Liouguei	Hengchun	SW ship	North ship	Tainan	TOTAL
	46692	46699	46810	46734	46750	46780	99770	99744	99759	99810	99692	46741	
# of sondes	183	169	146	243	247	218	165	219	193	146	60	64	2032
Re-lay	5	5	3	11	10	11	11	19	15	3	4	4	105
Missing				1	0	8							9
Time of missing				061806		062100- 062206							





### Diurnal cycle of precipitation systems over southwestern Taiwan during the 2008 Meiyu season



Early morning max over the strait, eastward propagation in the morning and westward propagation in late afternoon (40 precipitation features identified during the period) Oceancoast Moun Foot Taiwan plain hill -tain strait 1.0 0.5 2.0 1.0 n %

### Linear cloud bands over coastal region



#### VQ PID SUR RHI: 39.97 deg - 06/20/2008 06:44:45



## Field Catalog and website



http://sowmex.cwb.gov.tw/

## Summary

- 1. Data quality control is underway (sounding, super-site, radars)
- 2. Dropsonde mission for monsoon rain study needs more elaborate design (targeted observations)
- 3. Mesoscale processes are complex especially under terrain environment (e.g., interaction with local circulation), more studies are needed
- 4. Super-site rain measurement provides important microphysics data for further study of precipitation processes in monsoon rain
- 5. To establish a meso-beta-scale reanalysis data set for model inter-comparison and verification study