

Review of the World Expo Nowcasting Service (WENS) Demonstration Project (Sep. 2010)

WENS Working Group
September 22, 2010
Shanghai



Outline

- 1. Before full operation**
- 2. Full operation**
- 3. Impacts**
- 4. Lessons learnt**
- 5. Issues of concern**
- 6. Plan**



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Shanghai World EXPO 2010 Nowcasting Service Demonstration Project (WENS)

– *The Goals are:*

- In the context of the multi-hazard early warning systems (MHEWS), to demonstrate how nowcasting applications can enhance short-range forecasts of high-impact weather using the opportunity afforded by the World EXPO 2010;
- Promote the understanding and enhance the capability, as appropriate, of WMO Members in nowcasting services.



Objectives

- ❑ Provide *advanced* high impact weather and precipitation nowcasting **products and services** for the World EXPO 2010;
- ❑ Enhance the capacity of the SMB in MHEWS to:
 - Effectively present the information to the decision makers and the public.
 - Demonstrate the introduction, optimal implementation, and training in use (technology transfer) of advanced nowcasting systems in operational forecasting and in the generation of enhanced products and services;
 - Evaluate the impact of the implementation;
 - Promote the implementation of nowcasting services in the Shanghai region initially and ultimately for the benefit of WMO Members, especially those in East Asia.

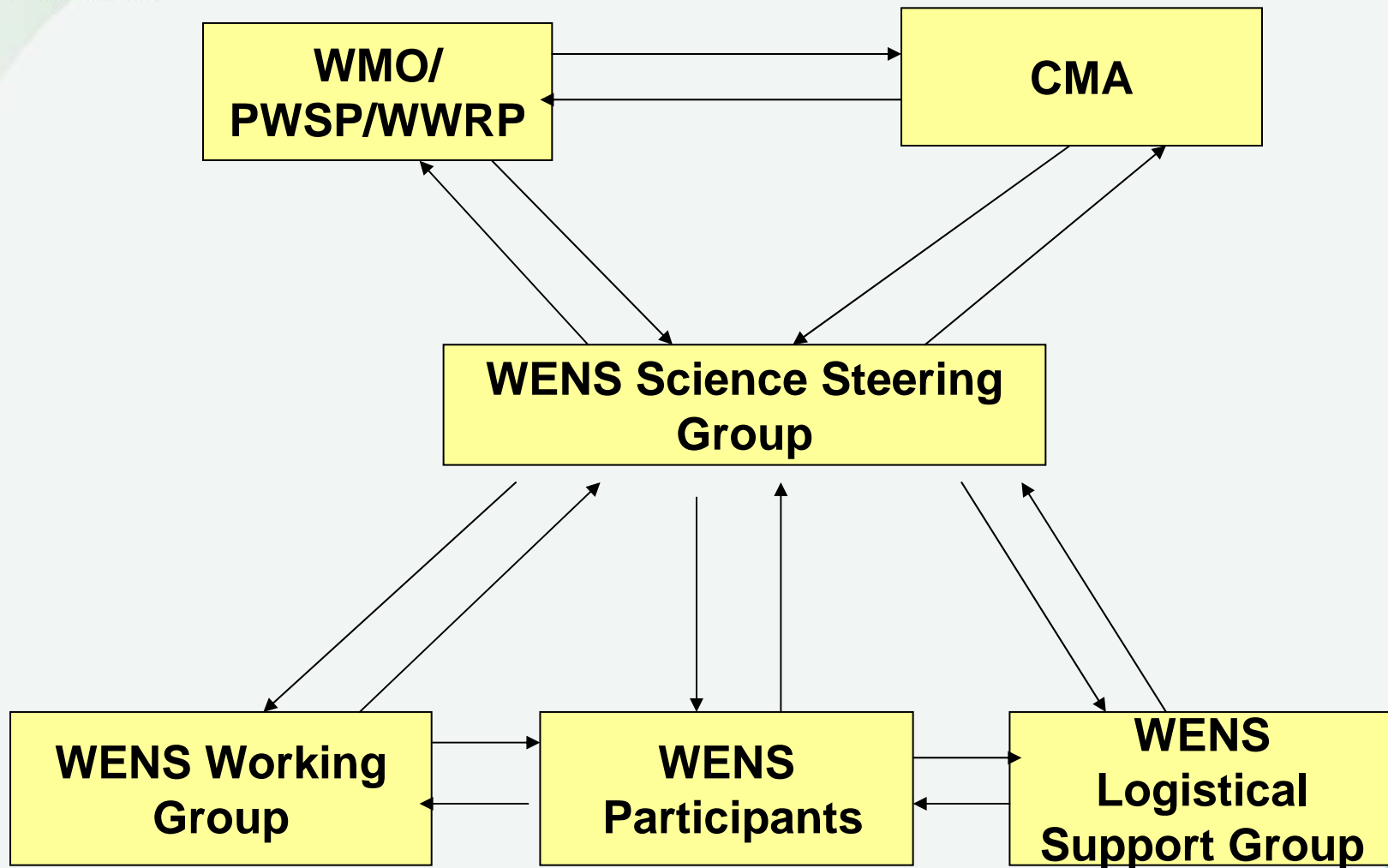


1. Before full operation

1. Establishment of WENS Scientific Steering Group (SSG) and **WENSWG** by interim SSG, draft TORs and draft business plan for WENS. (Interim SSG) in Sep. 2008
2. SSG Planning Meeting finalized TORs and WENS Business Plan on project scope, duration, milestones and deliverables as well as funding arrangements (SSG) in mid Dec. 2008.
3. Implementation of Business Plan (**SMB/CMA, WENSWG, PSOs**). **Oct. 2009.**
4. First trial run (**WENSWG**). Jul.-Aug. 2009
5. Interim Review Meeting. Review objectives, undertake validation and performance assessment of systems taking part in trial run; engage key stakeholders/users to provide feedback on products; adjust Business Plan, if appropriate (SSG). Oct. 2009

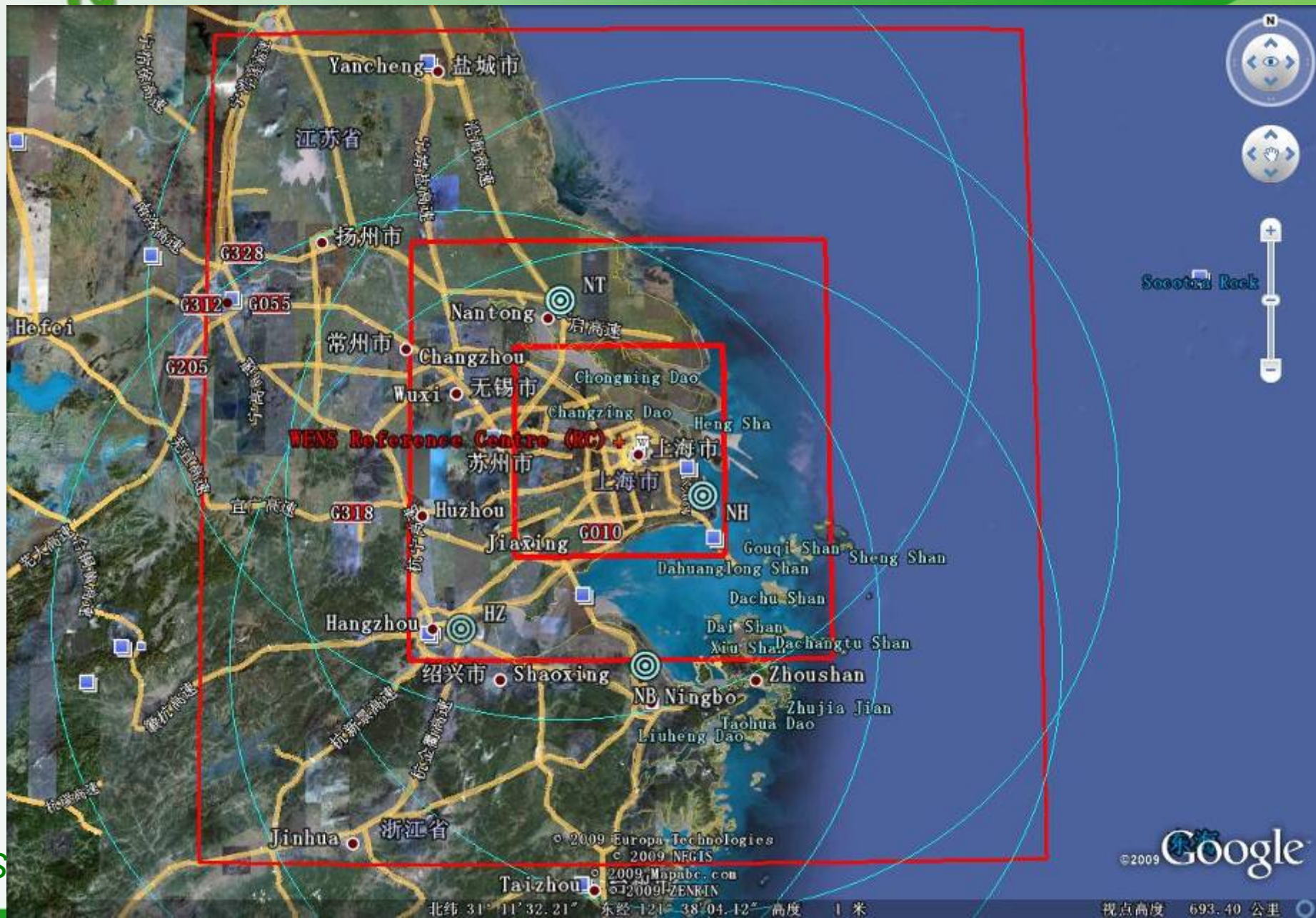


Organization of WENS





Domain 1, 2, 3



WENS and Operations

Shanghai Severe Convective Weather Warning Center

Operational nowcasting system in Shanghai

- SWAN
- NoCAWS

Forecaster



Interactive Processing Nowcasting System

- VIPS

Service Products Generation System

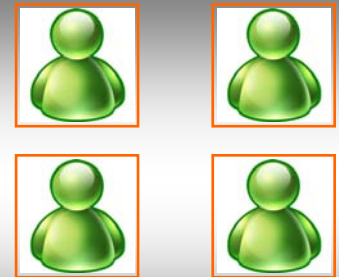
Nowcasting Discussion



Local Champion

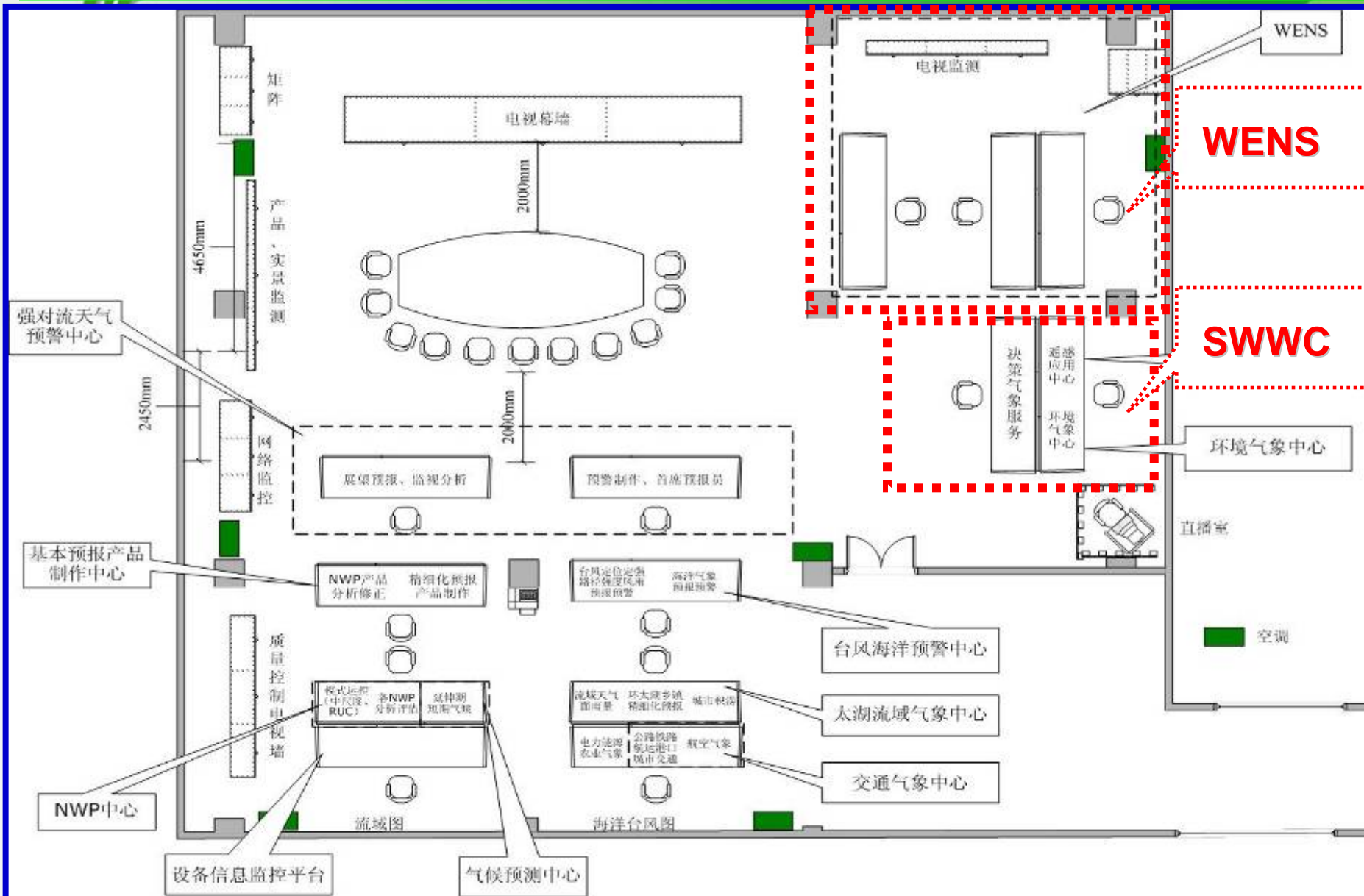
WENS systems

- STEPS
- SWIRLS
- BJ-ANC
- SWAN
- NoCAWS



End Users

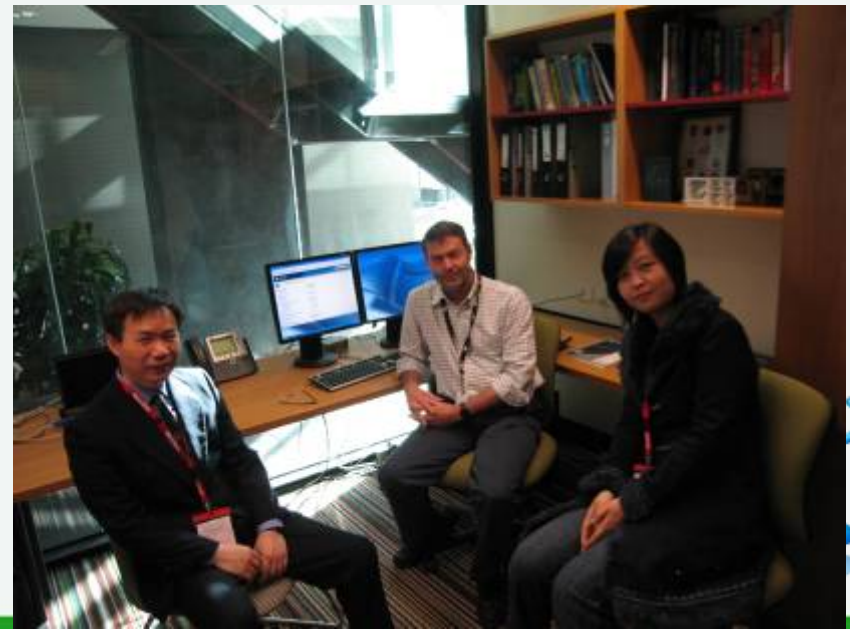
WENS location



三楼预报业务平台设计方案1

Pre-Training

- SMB sent forecasters and/or technicians to Australia and Hongkong to take training in the use of the participating systems.
 - **HKO - SWIRLS**
 - **BOM - STEPS**
- Pre-training for local champions and forecasters in May: Workshop on Severe Convective Weather Forecasting and Nowcasting



Application training

- WENS First Trail Run Training for local champions and forecasters:
 - **Training of participating systems**



Local Champions - SMB

- **Local Champion from the SMB Convective Weather Warning Center**
 - **BJ-ANC:** Lan Tao, Hongping Yin
 - **NoCAWS:** Jianhua Dai, Lei Chen, Mao Mao
 - **STEPS:** Yang Ding, Min Liu
 - **STI-WARR:** Xiaofeng Wang
 - **SWAN:** Yang Ding, Jianhua Dai
 - **SWIRLS:** Lei Chen, Li Xia





First Trial Run – Jul. to Aug. 2009

- System installation and fine-tuning
- Working meeting
- Application Training



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4. Lessons learnt
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2. Full operation

WENS Full Operation, Apr.26 - Oct. 31 2010

2.1 Systems and products

2.2 WENS web site

2.3 Nowcasting service operation

2.4 Important activities and cases

2.5 Evaluation by forecasters





2.1 Systems and products

- Directly used by forecasters in SMB, Expo weather station, and Expo operation center.
- Directly used by service officers and assistants.
- Indirectly used (SMB nowcasting products) by most of the users (government departments, Expo operation center, specialized users, and the public)
- Directly used by several key users on the WENS page on the SMB soweather.com.



WENS Participant Systems

- CMA
 - **SWAN** (Severe Weather Automatic Nowcast system)
 - **BJANC** (Beijing Auto-Nowcastor)
 - **NoCAWS** (NowCAsting and Warning System)
 - **STI-WARR** (Shanghai Typhoon Institute – WRF ADAS-3DVar Rapid Refresh system)
- Australia BOM – **STEPS** (Short Term Ensemble Prediction System)
- HKO– **SWIRLS** (Short-range Warning of Intense Rainstorms in Localized Systems)



Products

	Nowcast ell[pses of cloud to ground lightning; hail; downburst; rainstorms				
	Forecasts of storm reflectivity	Forecasts of storm reflectivity	Forecasts of storm reflectivity	Forecasts of storm reflectivity	
	Severe weather alerts or Warning	Severe weather alerts or Warning		Severe weather alerts or Warning	
	Probability of lightning	Probability of lightning		Probability of lightning	
	Storm track and properties	Storm track and properties	Storm track and properties	Storm track and properties	
QPE	QPE	QPE	QPE	QPE	
QPF	QPF	QPF	QPF	QPF	

STEPS

SWIRLS

SWAN

BJANC

NoCAWS

STIWARR

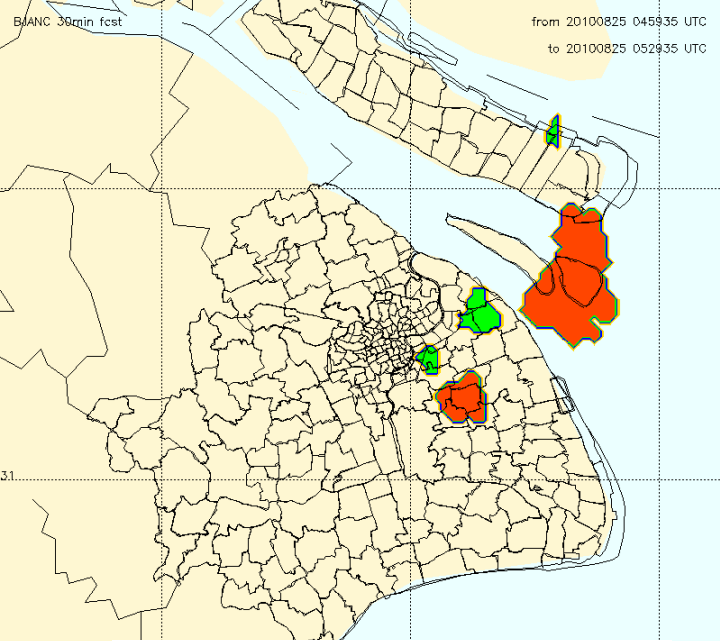
Mesoscales analysis fields				
Reflectivity mosaic	Reflectivity mosaic	Reflectivity mosaic	Reflectivity mosaic	
Storm tracking and extrapolation	Storm tracking and extrapolation	Storm tracking and extrapolation	Storm tracking and extrapolation	
TREC wind	TREC wind		TREC wind	
		Forecasts of storm evolution trend	Forecasts of storm evolution trend	

Conventional hourly updates of current conditions

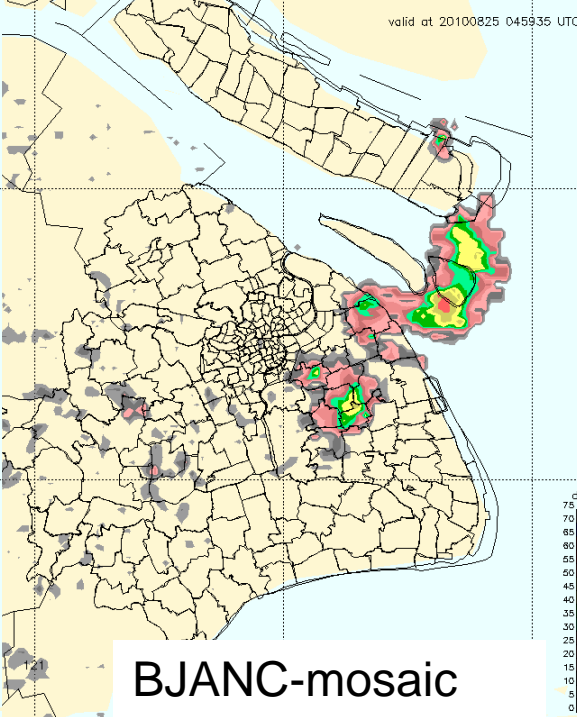
Special product

Satellite-like or Radar-like products

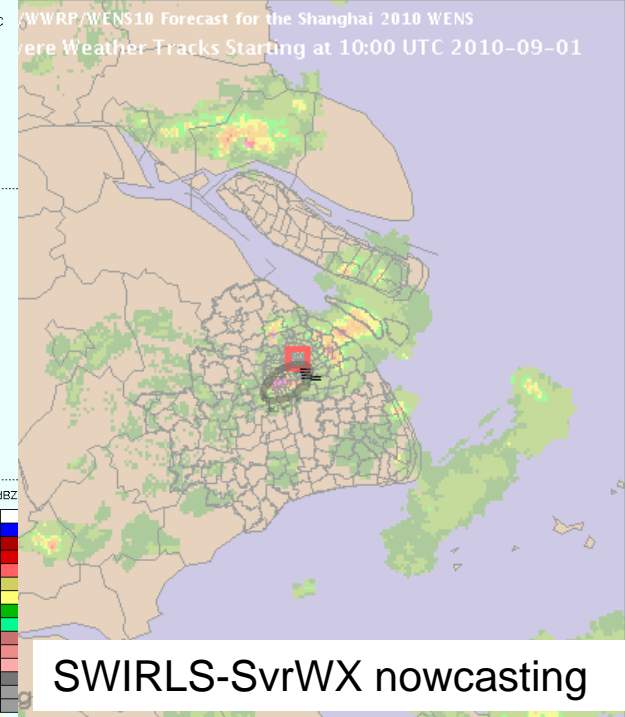




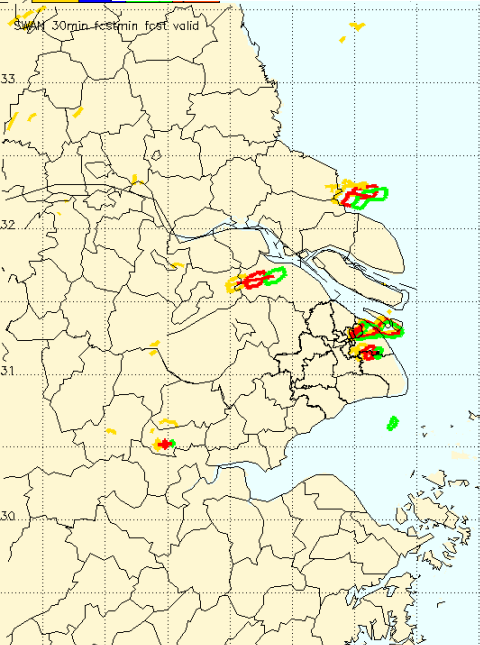
BJANC-STM evolution



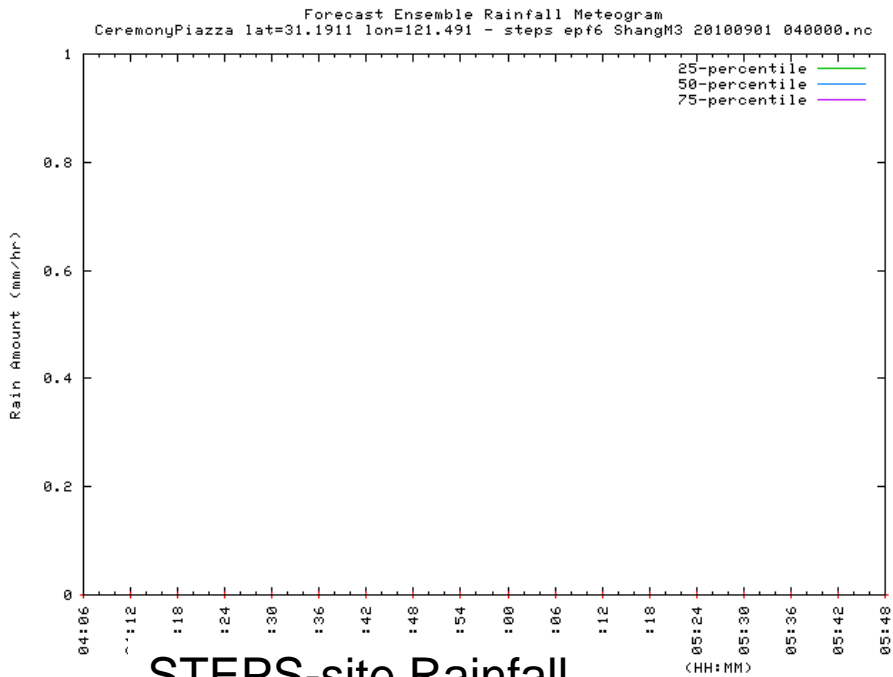
BJANC-mosaic



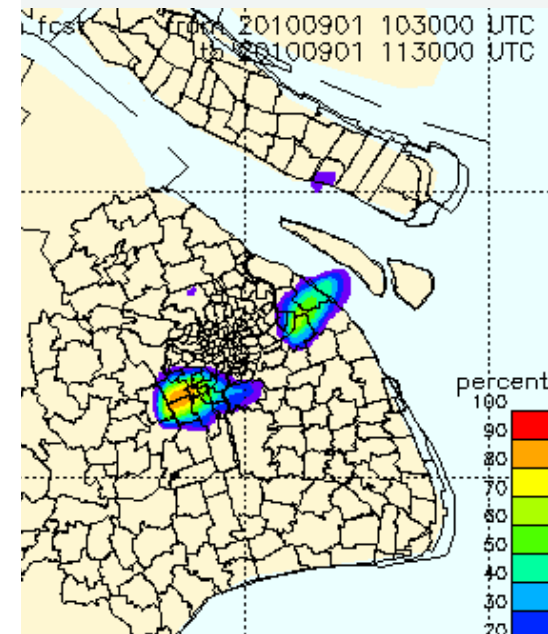
SWIRLS-SvrWX nowcasting



SWAN-STM tracking



STEPS-site Rainfall



STEPS-20mmPoP



2.2 WENS web site

Shanghai 2010 Forecast Demonstration Project - Windows Internet Explorer

http://172.21.99.102/product/obs_rf_swan.php?yftime=2010-09-01 12:00@region=SH

文件(F) 编辑(E) 查看(V) 收藏夹(A) 工具(T) 帮助(H)

收藏夹 Shanghai 2010 Forecast Demonstration Project

WENS

About Us

News | Data monitor | Product monitor | Product | Participants | Proposal | Training

分析(Observation analysis) choose time (UTC): 2010-09-01 12:00 region: 上海 search previous time next time latest time

AWS observation analysis	BJANC MCR BJANC obs 20100901 115918 UTC 	SWAN reflectivity mosaic SWAN obs 20100901 120000 UTC 	SWAN reflectivity CR2D SWAN obs 20100901 120000 UTC
rain			
wind			
观测分析 observation analysis			
观测分析 observation analysis			
QPE观测分析 QPE analysis			
集成预报 consensus product	SWAN reflectivity MCR SWAN obs 20100901 120000 UTC 	SWAN VIL MOSIC SWAN obs 20100901 120000 UTC 	SWAN VIL 2DVILD SWAN obs 20100901 120000 UTC
集成产品 consensus product			
暴雨预报 rainstorm forecast			
降水 precipitation			
降水概率 POP			
强对流天气预报 Severe weather and thunderstorm forecast			
强天气潜势 Severe Weather Potential Outlook (NoCAWS)			
强天气临近预报 severe weather Nowcasting			
风暴追踪 storm track			
反射率 reflectivity			

Internet 0.1KB/S 0.1KB/S

Data Monitor

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Shanghai 2010 Forecast Demonstration Project

页面(P) 安全(S) 工具(O)

- Data Type
- Radar
- Aws
- Satellite
- Lightning
- Profile
- Sonde

选择日期 (Date): 2010-09-18 查看(search) [前一天previous day](#) [后一天\(next day\)](#)

2010-09-18 FDP 雷达数据传输质量监控(Radar Data Monitor)

监控内容(Monitor coment):文件到达时间(file arrival time) 文件大小(file size)

数据状态(data status): ● 正点(on time) ● 迟到(late) ● 未到(not arrive)

观测时间(UTC)	宁波(NB)	南通(NT)	杭州(HZ)	南汇(NH)	常州(CZ)	青浦(QP)
14:00	●	●	●	●	●	●
13:54	2010-09-18 13:59:25 9839872B ●	2010-09-18 13:59:52 9822848B ●	2010-09-18 13:59:44 9832576B ●	2010-09-18 13:59:58 9630720B ●	2010-09-18 13:59:48 9866624B ●	2010-09-18 13:59:36 9871488B ●
13:48	2010-09-18 13:53:24 9827712B ●	2010-09-18 13:53:52 9825280B ●	2010-09-18 13:53:44 9832576B ●	2010-09-18 13:53:56 9630720B ●	2010-09-18 13:53:48 9866624B ●	2010-09-18 13:53:36 9871488B ●
13:42	2010-09-18 13:47:23 9847168B ●	2010-09-18 13:48:04 9825280B ●	2010-09-18 13:47:58 9832576B ●	2010-09-18 13:48:00 9630720B ●	2010-09-18 13:47:53 9866624B ●	2010-09-18 13:47:39 9871488B ●
13:36	2010-09-18 13:41:24 9827712B ●	2010-09-18 13:41:52 9825280B ●	2010-09-18 13:41:44 9832576B ●	2010-09-18 13:41:54 9630720B ●	2010-09-18 13:41:49 9866624B ●	2010-09-18 13:41:38 9869056B ●
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13:00	2010-09-18 13:05:23 9837440B ●	2010-09-18 13:05:55 8237184B ●	2010-09-18 13:05:50 9832576B ●	2010-09-18 13:05:52 9630720B ●	2010-09-18 13:06:00 8390400B ●	2010-09-18 13:05:38 9871488B ●
12:54	2010-09-18 12:59:26 9839872B ●	2010-09-18 12:59:49 9825280B ●	2010-09-18 12:59:44 9832576B ●	2010-09-18 12:59:51 9630720B ●	2010-09-18 12:59:47 9866624B ●	2010-09-18 12:59:39 9869056B ●
	2010-09-18 12:53:25	2010-09-18 12:53:54	2010-09-18 12:53:51	2010-09-18 12:53:52	2010-09-18 12:53:47	2010-09-18 12:53:44

Product Monitor

http://172.21.99.102/product_monitor/

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Shanghai 2010 Forecast Demonstration Project

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- BJANC
- reflectivity
- boundary
- evolution
- QPF
- storm track
- NOCAWS
- reflectivity forecast D3
- reflectivity obs domain 2
- QPF domain D3
- QPE domain D3
- QPE domain D2
- convectionprobability domain D1
- SWIRLS
- QPE blend
- pop
- lightning_probability
- gale
- thunderstorm
- severe weather
- SWIRLS-R
- QPF radar
- STEPS
- QPF D1
- QPF D2
- QPF D3
- pop D1
- pop D2
- pop D3
- STEPS PRECIP6min D3
- STEPS PRECIP6min D1
- STEPS PRECIP6min D2
- STEPS PRECIP30min D3
- STEPS PRECIP30min

选择日期(Date): 查看(search) 前一天(previous day) 后一天(next day)

2010-09-18 NOCAWS reflectivity forecast D3 WENS产品数据生成质量监控(WENS product create Monitor)

监控内容(Monitor coment):文件到达时间(file arrival time) 数据状态(data status): ●正点(on time) ●迟到(late) ●未到(not arrive)

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12:48	NoCAWS_ReffCst_D3_20100918_124800.nc	2010-09-18 13:01:03	●
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11:10	NoCAWS_ReffCst_D3_20100918_111000.nc	2010-09-18 11:19:05	●
11:04	NoCAWS_ReffCst_D3_20100918_110400.nc	2010-09-18 11:13:06	●
10:59	NoCAWS_ReffCst_D3_20100918_105900.nc	2010-09-18 11:07:05	●



WENS web visits statistics

#module=Dashboard&action=embeddedIndex&idSite=1&period=month&date=yesterday - Windows Internet Explorer

http://172.21.99.102/piwik/index.php?module=CoreHome&action=index&idSite=1&period=month&date=yesterday#module=Dashboard&action=eml

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Dashboard | All Websites | Widgets | API | PDF | Give us Feedback! | 简体中文 | Hello, piwik_admin! | Settings | 注销

控制台 访客 进站活动 推介网站 Goals wens_tongji

Date range: 2010-09 增加一个小工具... About Piwik 0.9

Page Name	Pageviews	Unique Pageviews
观测分析页面	431	82
雷达监控页面	144	78
SWIRLS_SWN页面	64	39
QPE观测分析页面	203	39
QPF页面	361	38
BJANC_Evolution页面	71	37
POP页面	304	33
集成预报页面	66	31
强天气临近预报页面	139	27
outlook页面	52	21
AWS Wind 页面	49	20
AWS Rain 页面	49	19
反射率页面	247	18
雷达追踪页面	100	16

关键词列表

There is

外来网站清单

Website

172.21.1.62

依服务器时段记录 Hourly Visits

访问次数

时段	访问次数
0时	8
1时	7
2时	10
3时	9
4时	5
5时	4
6时	9
7时	8
8时	17
9时	23
10时	3
11时	4
12时	7
13时	1
14时	5
15时	3
16时	2
17时	1
18时	2
19时	1
20时	2
21时	1
22时	4

完成 Internet 100%



2.3 Nowcasting service operation

- Early detection
- Early information or communication
- Early warning
- Early service
- Nowcasting and warning





Severe weather early detection, early communication, early warning and early service

- based on
 - mid-term and short-term weather forecast (synoptic situation)
 - severe weather forecast
 - Very short-term forecast and/or nowcasting
 - observations
 - service need of linkage department
-
- key Time Period:
 - Time period before working time
 - Time period when severe weather comes
 - Time period of special services or activities



Severe weather early warning and early service - procedures

- Early warning issued by chief forecaster, polished and delivered by chief service officer
- Early warning issued through
 - E-mail platform or fax
 - Cell phone text messaging service
 - Direct phone call (chief service officer or assistant)
 - Weather hot line- 969221





Warning signals and disaster prevention in Expo site

From May 1 to Sep.9, **69 warning signals have been issued:**

- Heat wave: yellow 20, orange 15, red 3
- Lightning: yellow 9, orange 3
- Strong wind: blue 4, yellow 2
- Heavy rain: yellow 8, orange 3
- Fog: yellow 1
- Typhoon: blue 1



No significant damage associated with severe weather in Expo site





Severe weather and Expo activity

Severe weather warning signal & Early warning/communication	Response in Expo site
<p>Heat wave: yellow 20, orange 15, red 3</p> <p>Lightning: yellow 9, orange 3</p> <p>Strong wind: blue 4, yellow 2</p> <p>Heavy rain: yellow 8, orange 3</p> <p>Fog: yellow 1</p> <p>Typhoon: blue 1</p> <p>Early communication or warning: 93</p>	<p>Totally 565 activities cancelled</p> <p>288 cancelled due to severe weather early warning</p> <p>Expo ferry cancelled 10 times due to strong wind and heavy rain.</p> <p>Expo Axis closed 3 times due to lightning</p> <p>Electric bus stopped service operation 11 times due to heavy rain</p> <p>Sight view buses stop service while raining</p> <p>Switzerland pavilion's cable car stopped service while strong winds and raining</p>



Six government departments are informed.

Early warning 30 times with PoD 82.7%、 FAR 17.3%、
MR27.1%. Lead time prior to warning signal **84.8 min.**

Month	Early warning	PoD	FAR	MR	Lead time (min)
7	11	73.3%	26.7%	42.1%	124
8	13	93.1%	6.9%	10%	71.2
9	3	83.3%	16.7%	50%	119.6





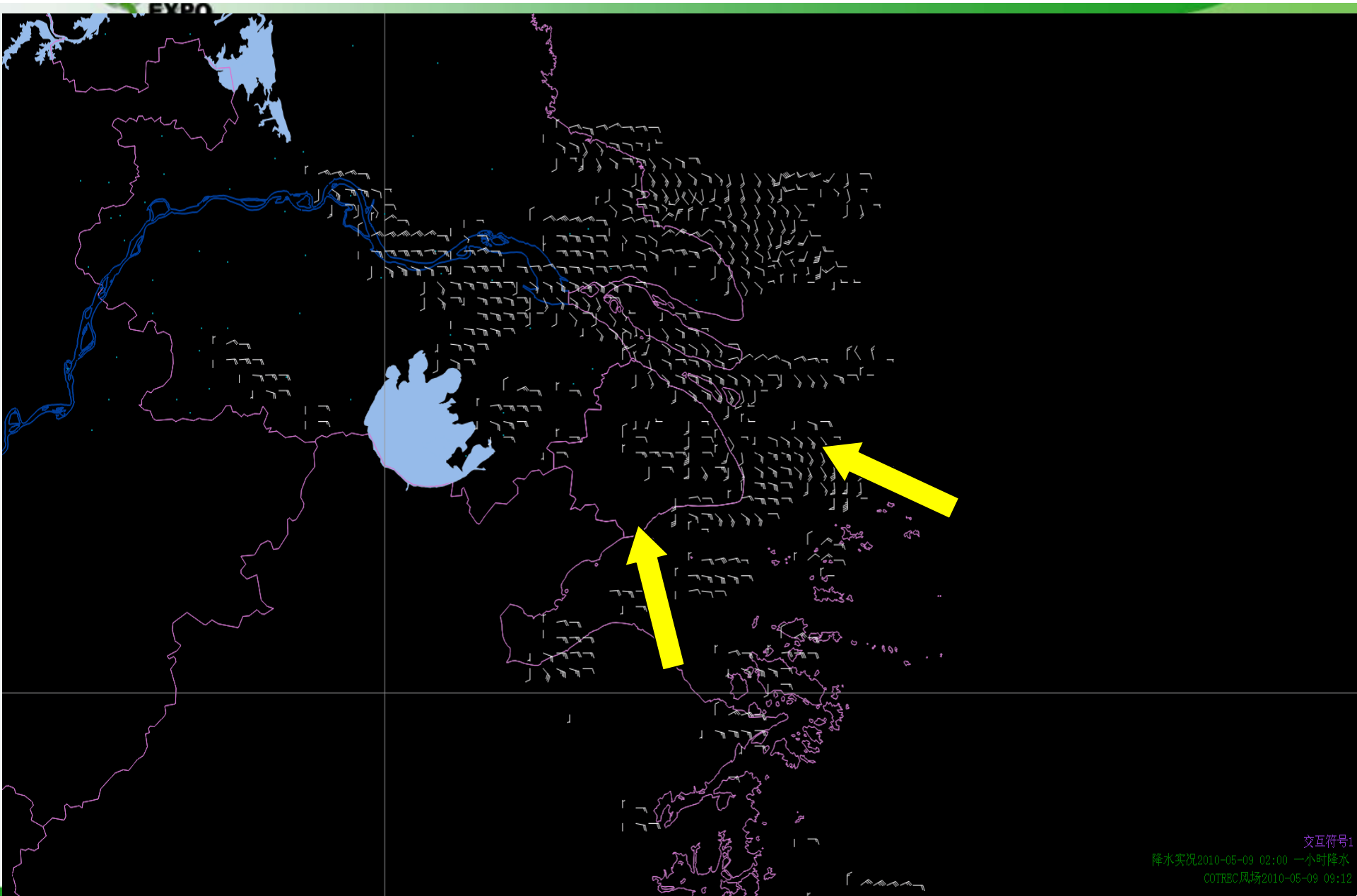
2.4 Important activities and cases

- Apr. 30, Expo opening ceremony
- May 1, Expo site opening ceremony
- May 9, WMO Mete-Pavilion Day
- Lot of severe weather cases

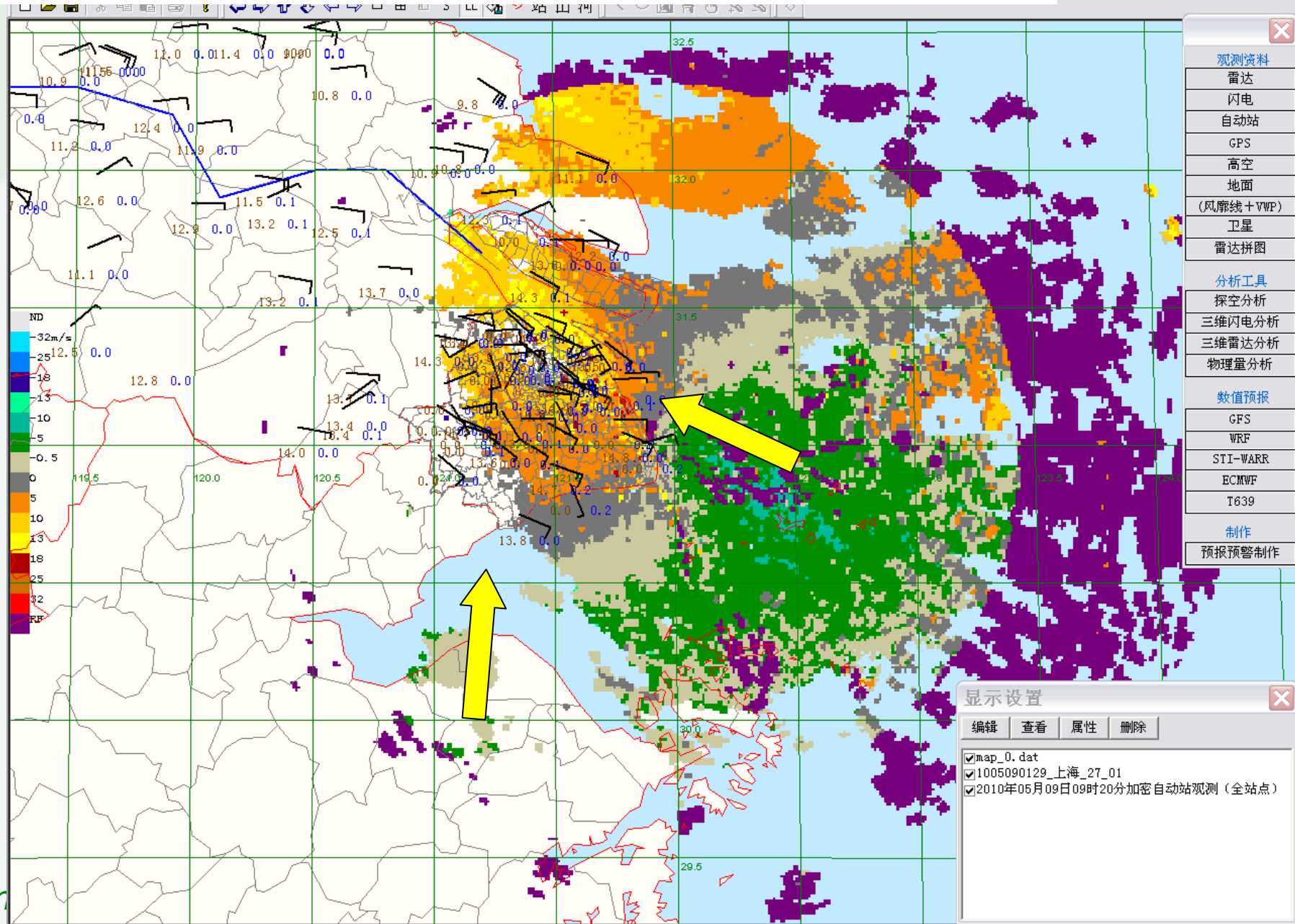


WMO Mete Pavilion Honor Day on May 9

SWAN-TRECwind field



WSR-88D Doppler radar velocity



Shan

就绪

数字

Cases

- Case 1: Jul. 4, 2010. How to provide early warning and service.
- Case 2: Aug. 25, 2010. How the WENS systems performed in a local severe thunderstorm.
- Case 3: Sep. 1, 2010. How the WENS systems performed in a tropical cyclone related heavy rain.

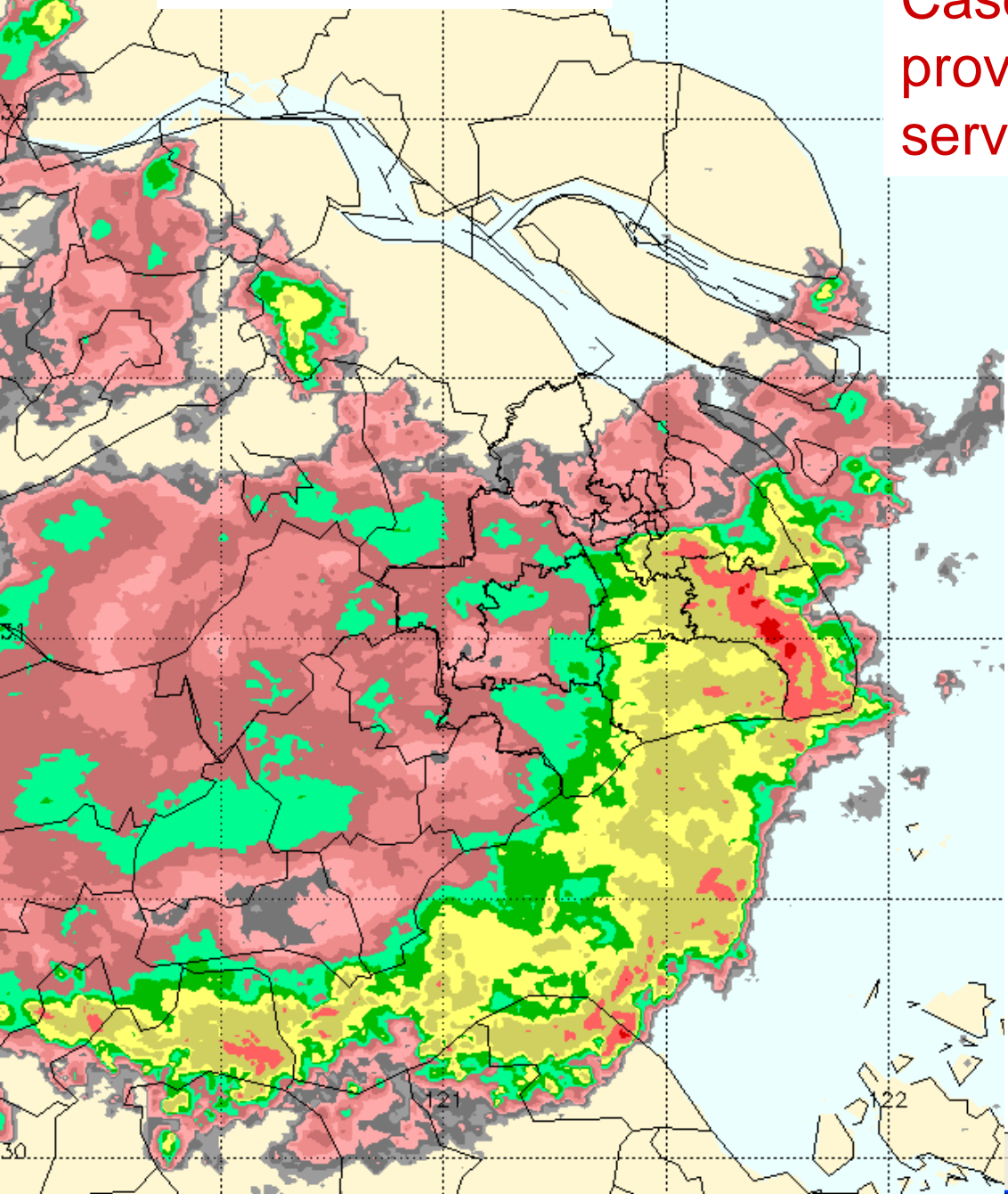


BJANC obs

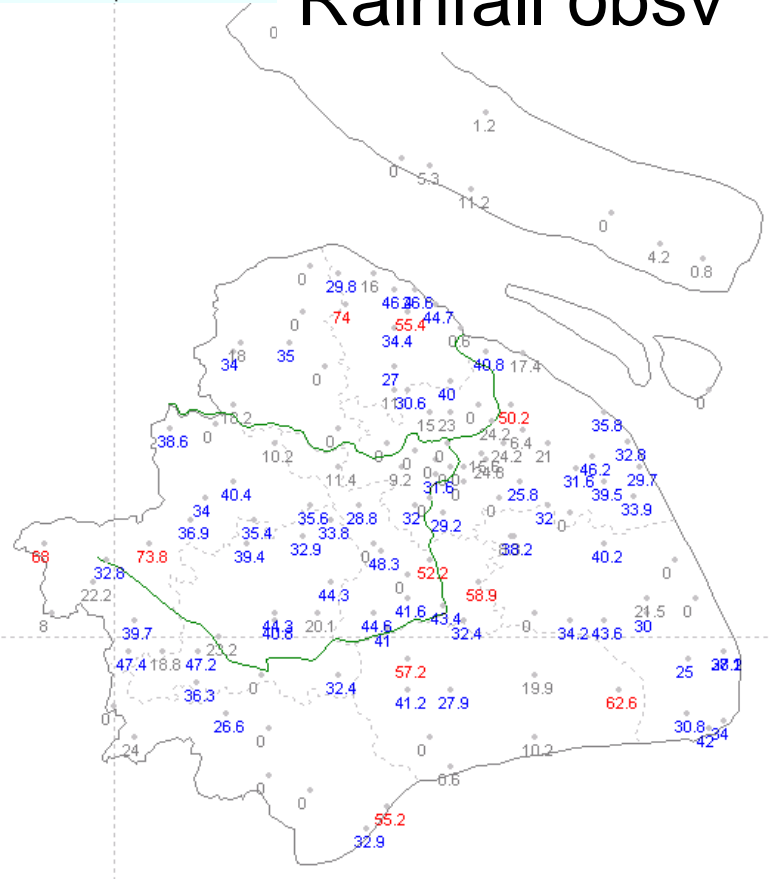
BJANC-REF

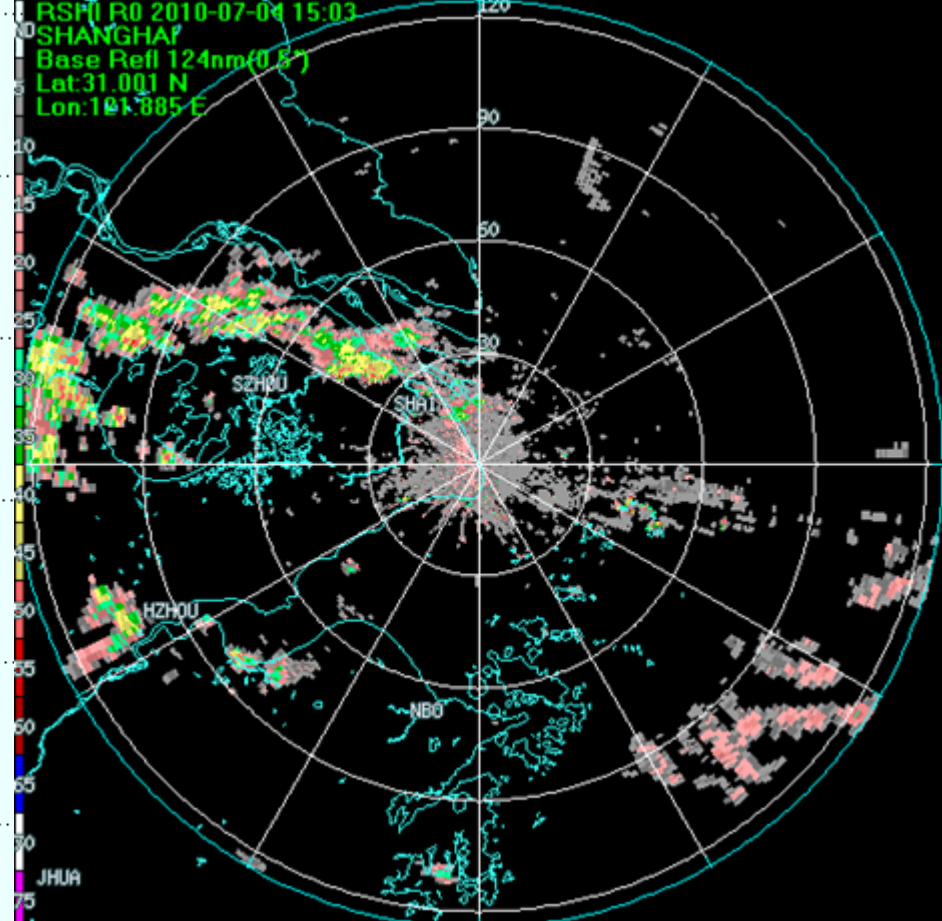
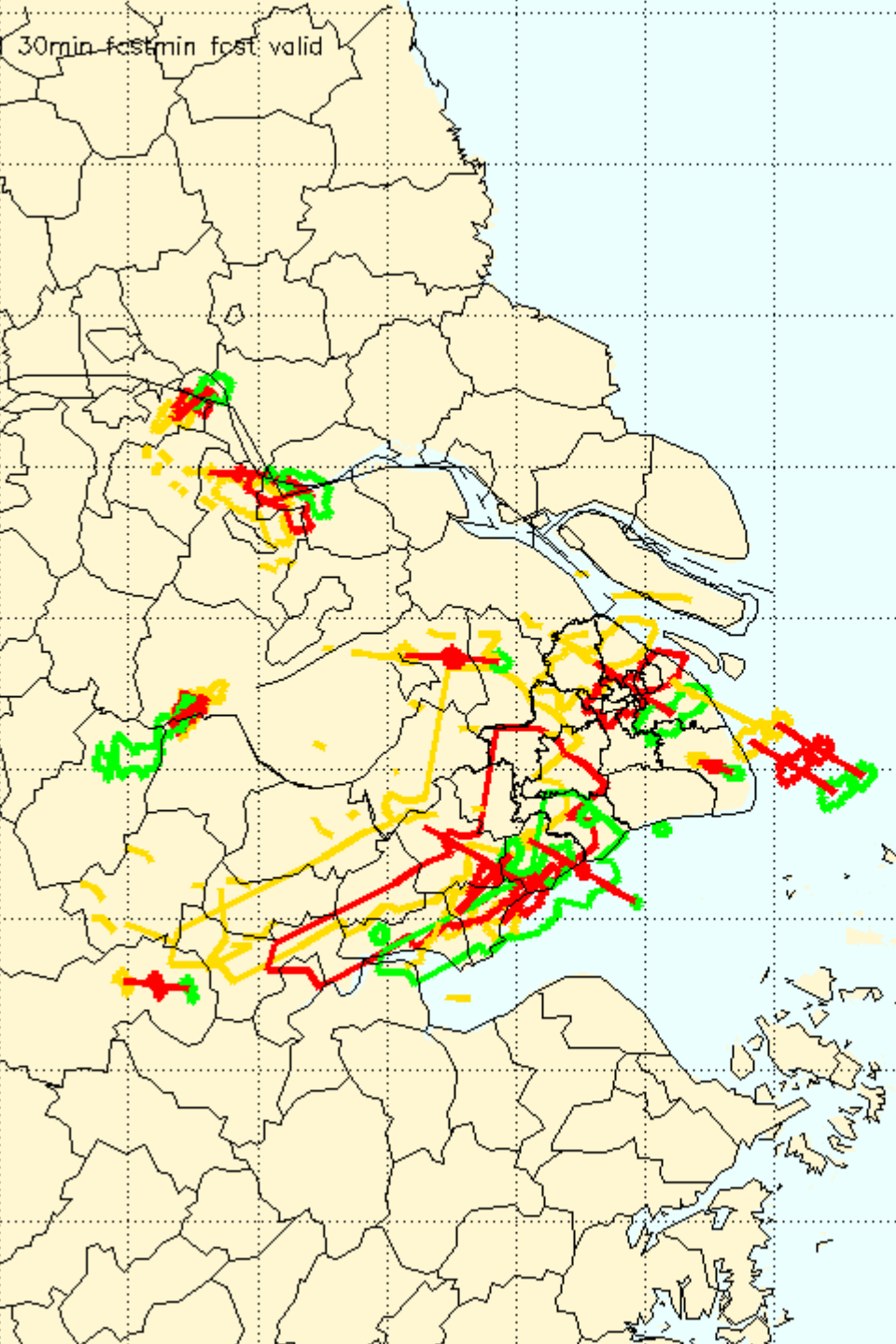
valid at 20100704 102931 UTC

Case 1: Jul. 4, 2010. How to provide early warning and service.



Rainfall obsv





Severe weather early warning for city and the Expo site



- **Severe weather early warning** was sent to some key users, e.g., local government, emergency response agency, flood prevention department, and the Expo operation center @ 00:30,05:35 UTC.
- Lightning, wind gust, heavy rain **warning signals** issued for city and the Expo site @ 05:50, 08:00,08:40.
- **Joint action and cooperation** among different government departments triggered by SMB severe weather warning.
- **Warning information with guidance** sent to the public via TV, radio, web site (soweather), cell phone text message

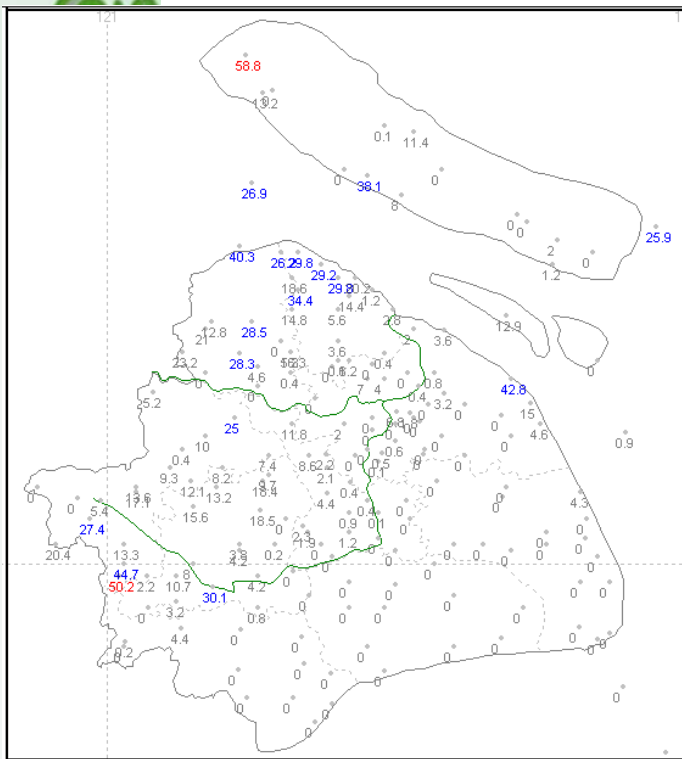




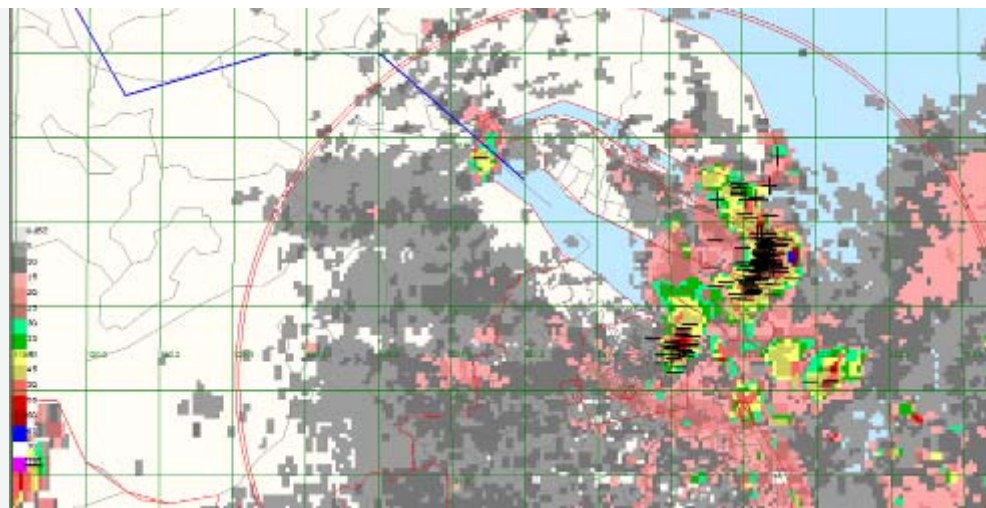
The WMO-CMA Mete-Pavilion



Case 2: Aug. 25, 2010. Aug. 25, 2010. How the WENS systems performed in a local severe thunderstorm.



Accurate Rainfall from 00 to 12 UTC



Radar image & Lightning at 06 UTC

Signals Issued:

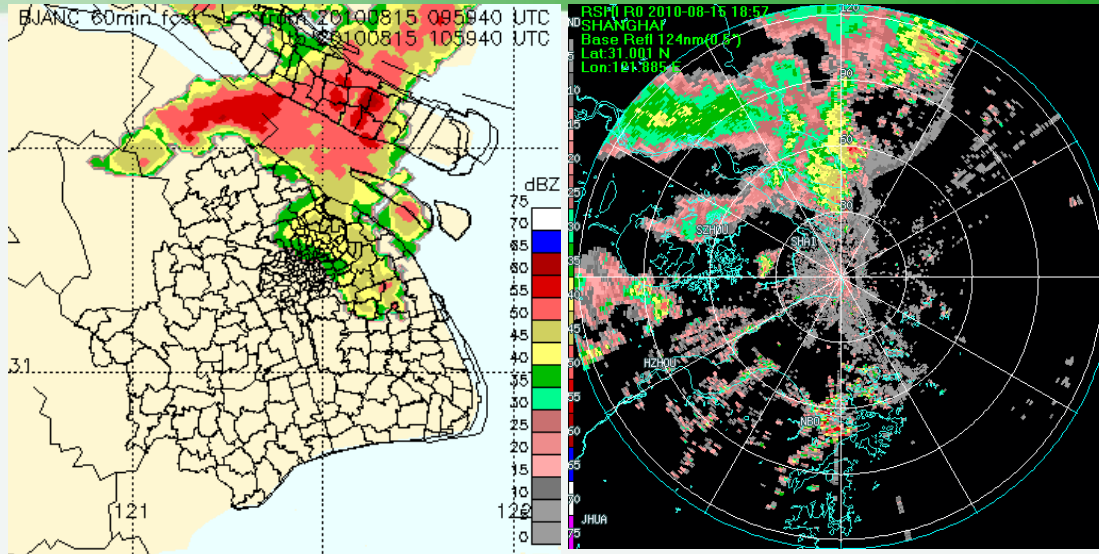


(2010-08-15 08:00至2010-08-15 20:00) 长三角最大风速 Top 10									
上海 世博南市烟囱	上海 石洞口	上海 芦浦大桥桥头堡	上海 世博局	上海 防汛前线指挥部	上海 华新	上海 芦浦大桥顶	上海 西部渔村	安徽 广德	上海 长江大桥
26.9 m/s	26.9 m/s	26.5 m/s	26.0 m/s	24.9 m/s	24.9 m/s	24.4 m/s	24.4 m/s	23.7 m/s	22.8 m/s

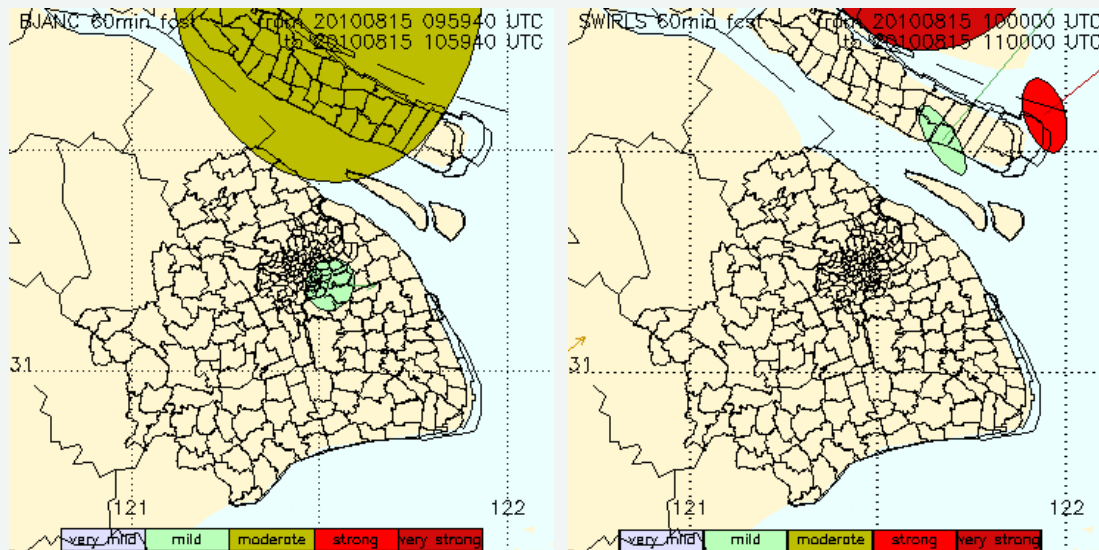
Maximum Wind Gust – Top 10



Some WENS products



BJANC reflectivity 60min fcst & NH RADAR observation

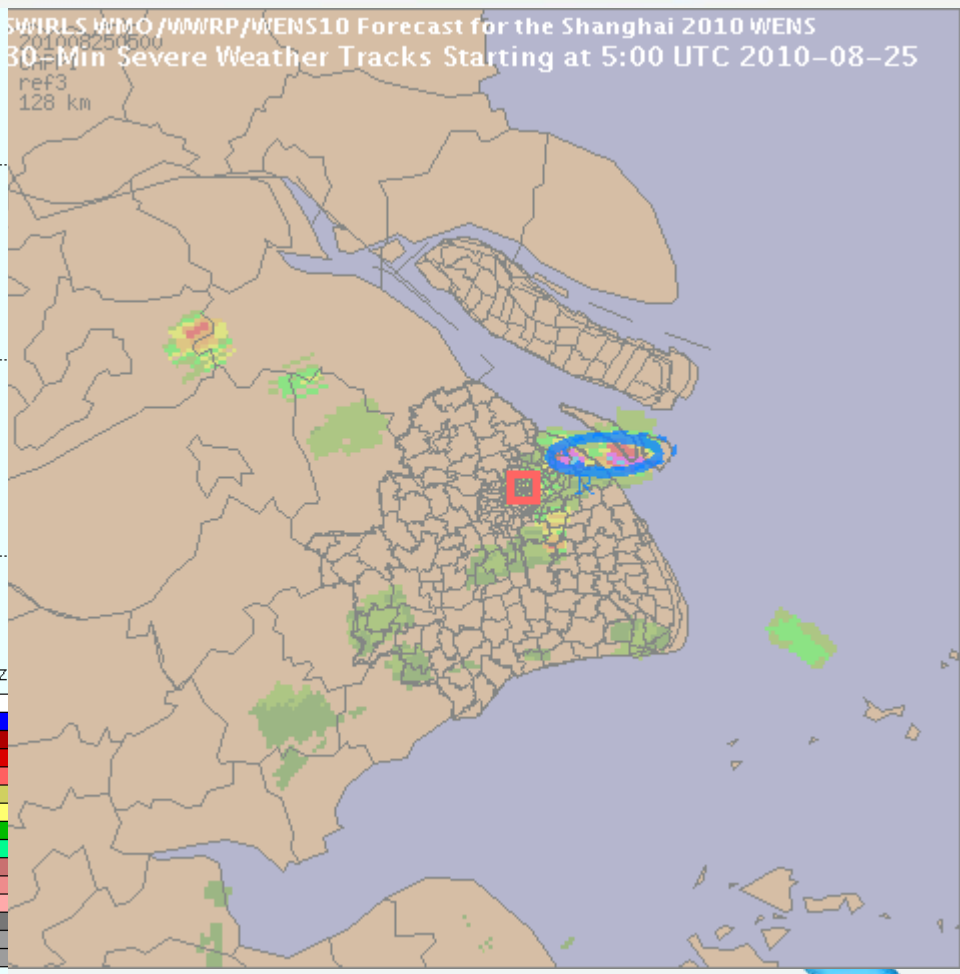
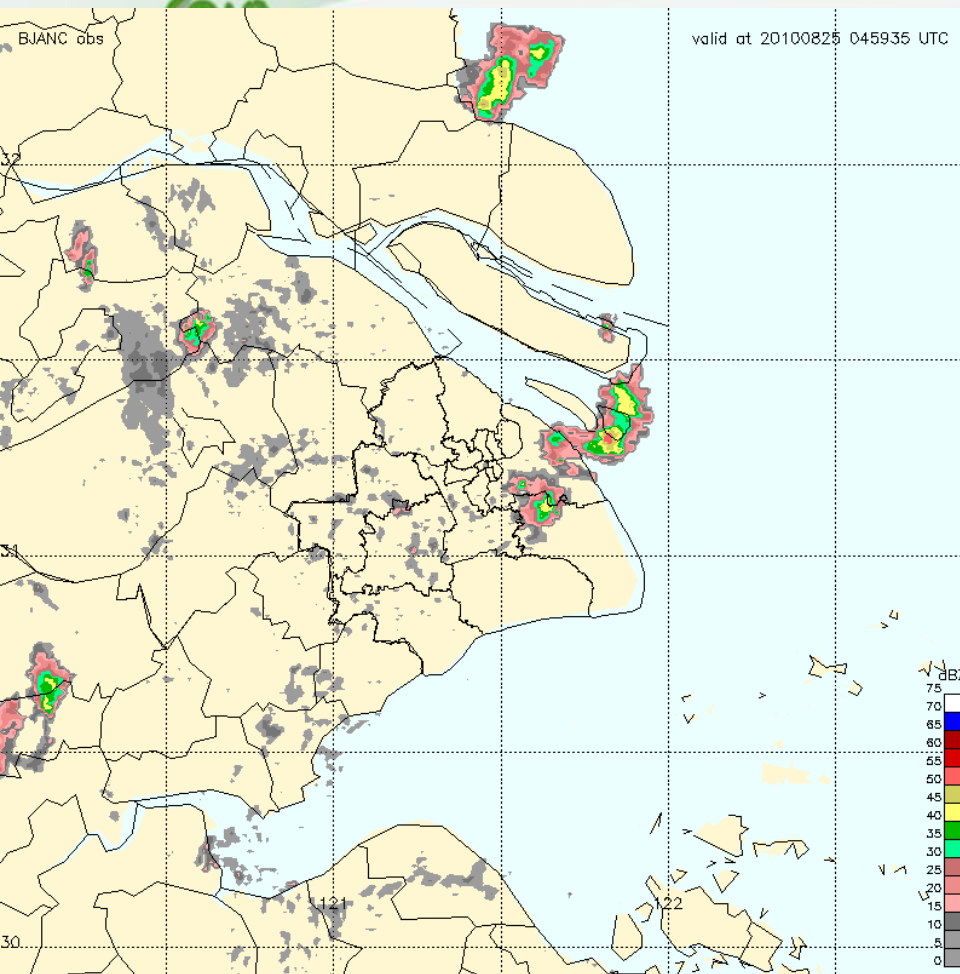


Storm track 60min





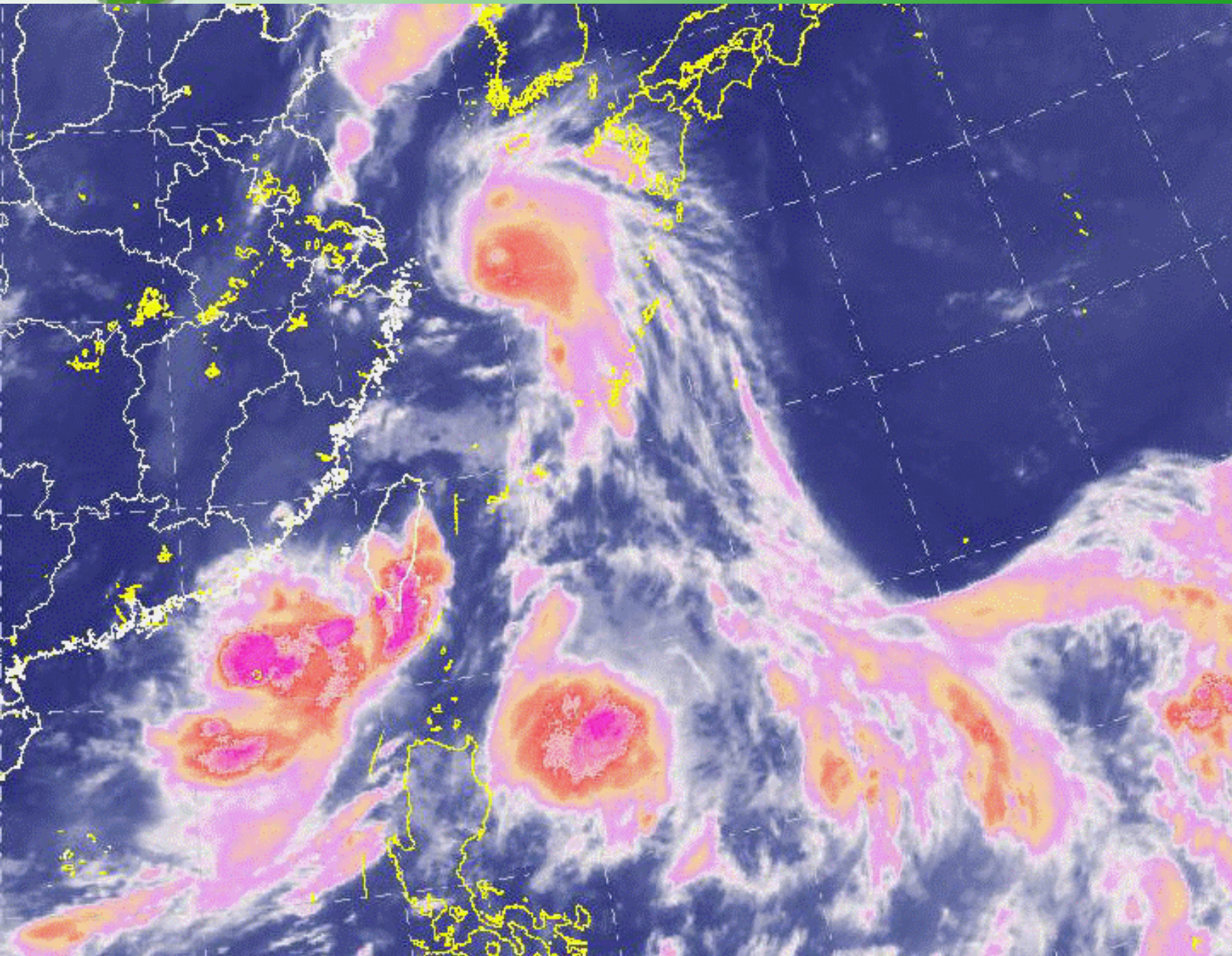
BJANC mosaic and SWIRLS svrWX



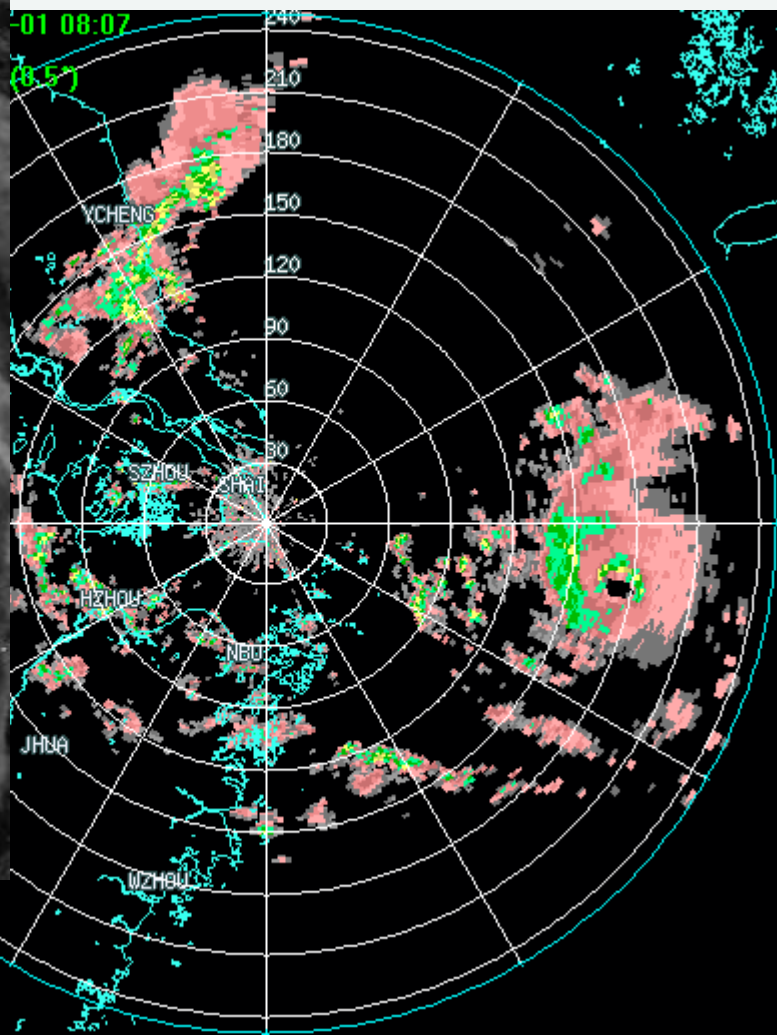
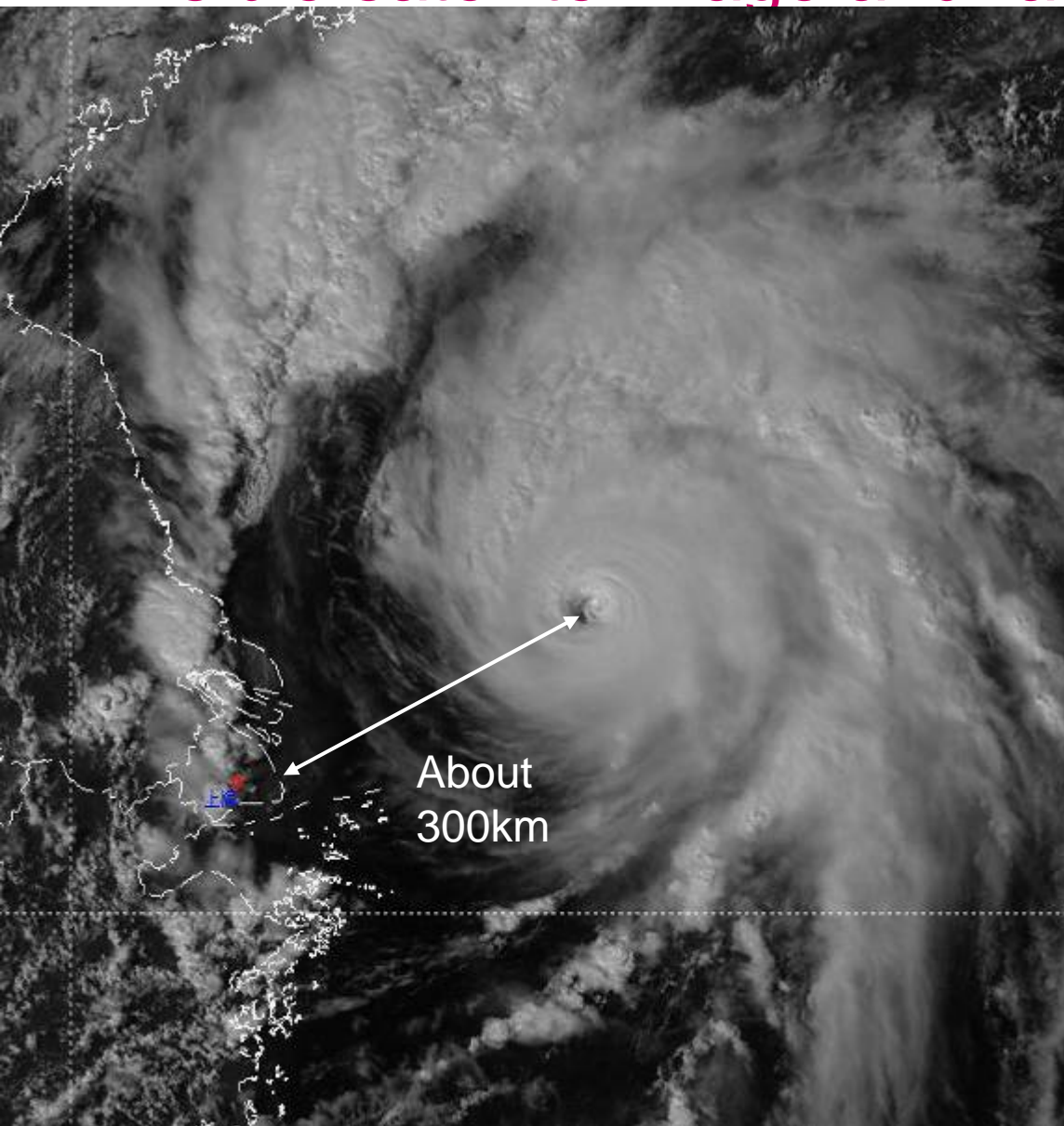
Case 3: Sep. 1, 2010. How the WENS systems performed in a tropical cyclone related heavy rain.



Satellite IR loop



Visible satellite image and radar reflectivity loop



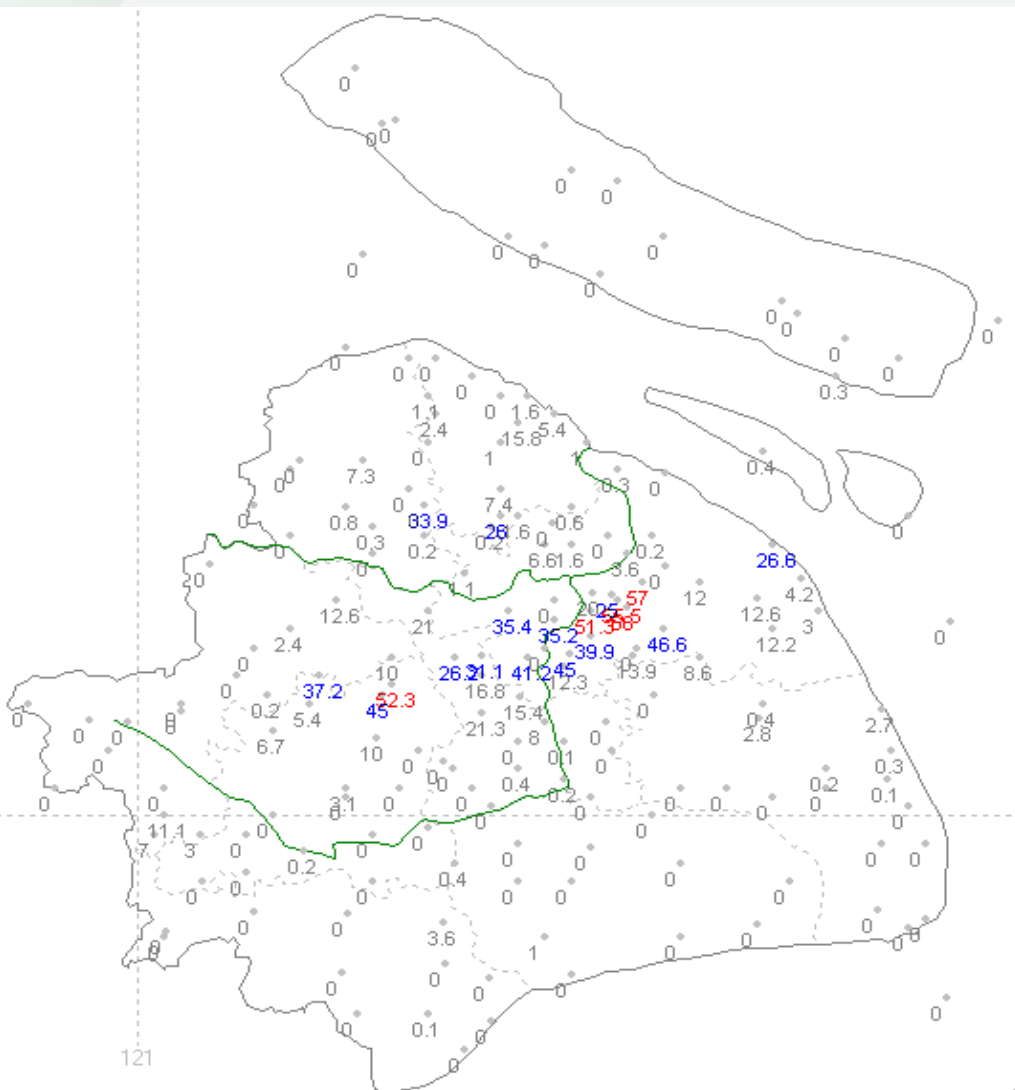


Shanghai Meteorological Bureau



A red signal of heavy rain warning issued

• 1-h rainfall

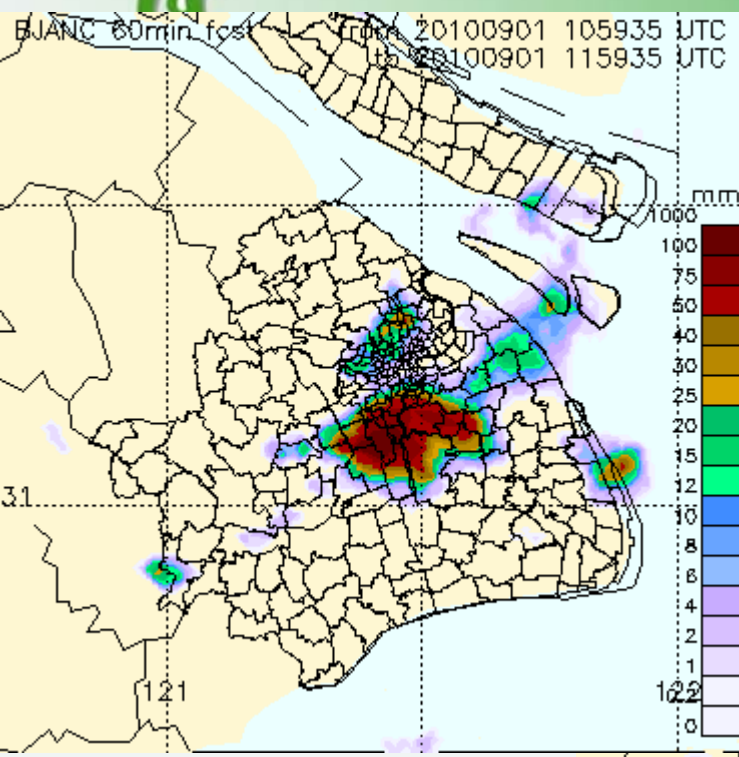


上海(全部)	
站点	雨量
防汛办	66.0 mm
徐家汇公园	62.0 mm
浦东	55.5 mm
康健公园	53.6 mm
九亭	52.3 mm
南码头	51.3 mm
中山公园	50.2 mm
世博后滩公园	48.1 mm
世博休闲广场	47.7 mm
世博村	47.6 mm
张江华师大二附中	46.6 mm
济阳公园	45.0 mm
世博白莲泾公园	41.5 mm
徐家汇	41.2 mm

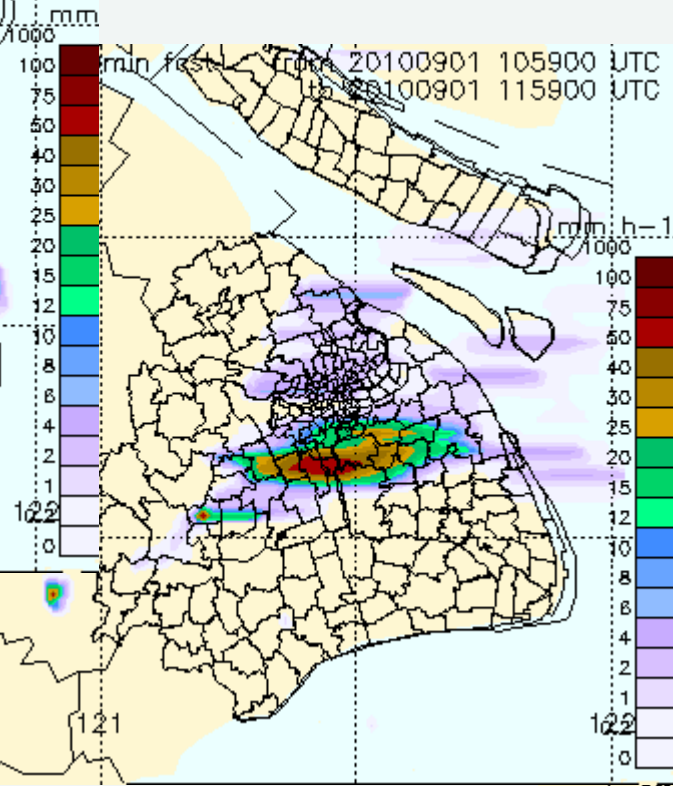
上海(全部)	
站点	雨量
世博局	39.9 mm
大宁灵石公园	36.0 mm
延安西路	35.4 mm
南洋中学	35.2 mm
长寿公园	34.9 mm
世博公园	34.6 mm
襄阳公园	32.9 mm
世博中心	32.5 mm
甘泉公园	31.8 mm



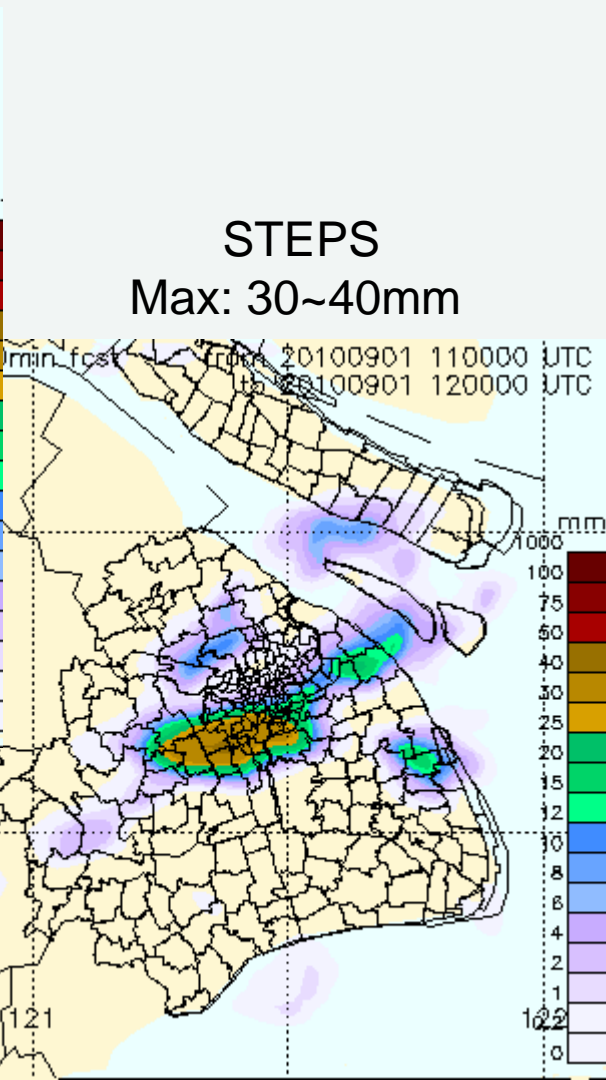
WENS-QPFs



BJANC
Max: 75~100mm

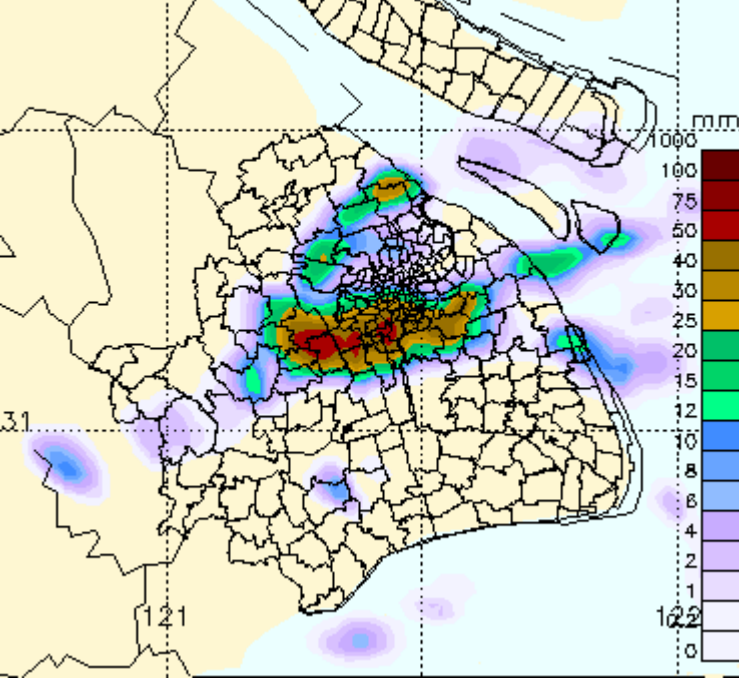


NOCAWS
Max: 50~75mm



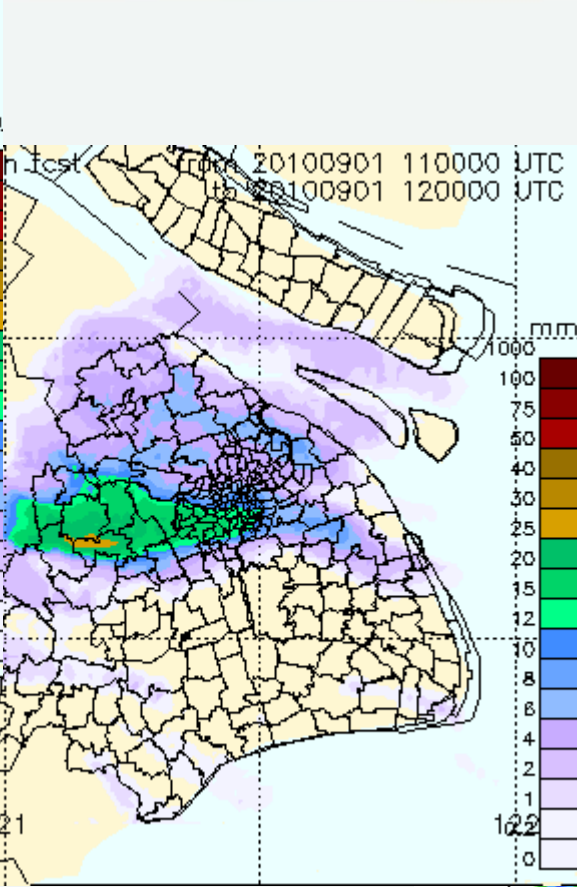
WENS-QPFs

SWIRLS → R 60min Forecast from 20100901 110000 UTC to 20100901 120000 UTC



SWIRLS
Max: 50~75mm

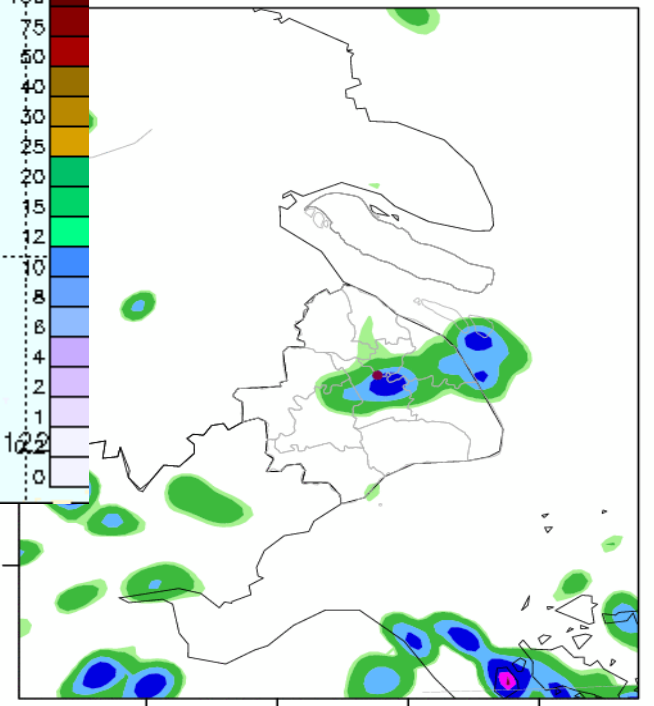
SWAN Forecast from 20100901 110000 UTC to 20100901 120000 UTC



SWAN
Max: 25~30mm

STI_RUC
Max: 15~40mm

VARR 1-h CYCLE
Init: 2010090119
Valid: 2010090120
Total Precipitation : 2010090119 TO 2010090120 (mm)



1-hour Total Precipitation : 2010090119 TO 2010090120 (mm)





2.5 Evaluation by Forecasters

System (samples) Score	Product	Intensity	Area	Useful	System (samples) Score	Product	Intensity	Area	Useful
BJANC (25) 4.10	Storm Evolution	4.24	4.18	4.22	NOCAWS (25) 4.18	Ref Forecast	3.90	3.90	3.90
	QPF	4.10	4.10	4.10		QPF	4.24	4.26	4.26
	Storm Track	4.12	4.12	4.12		Convective Outlook	4.06	4.06	4.06
STEPS (22) 3.82	QPF	3.84	3.82	3.82	SWAN (25) 3.70	Ref Forecast	3.88	3.88	3.96
	PoP	4.21	4.21	4.21		QPF	3.66	3.86	3.76
	Site QPF	3.77	3.82	3.77		Storm Track (TITAN)	3.95	4.00	3.98
SWIRLS (25) 4.24	QPF	4.26	4.28	4.28	STI_RUC (25) 4.06	Ref Forecast	4.06	4.04	4.04
	PoP	4.02	4.04	4.04		QPF	3.98	3.96	3.96
	Severe Weather Analysis	4.28	4.28	4.28					

Outline

1. Before full operation
2. Full operation
- 3. Impacts**
4. Lessons learnt
5. Issues of concern
6. Plan



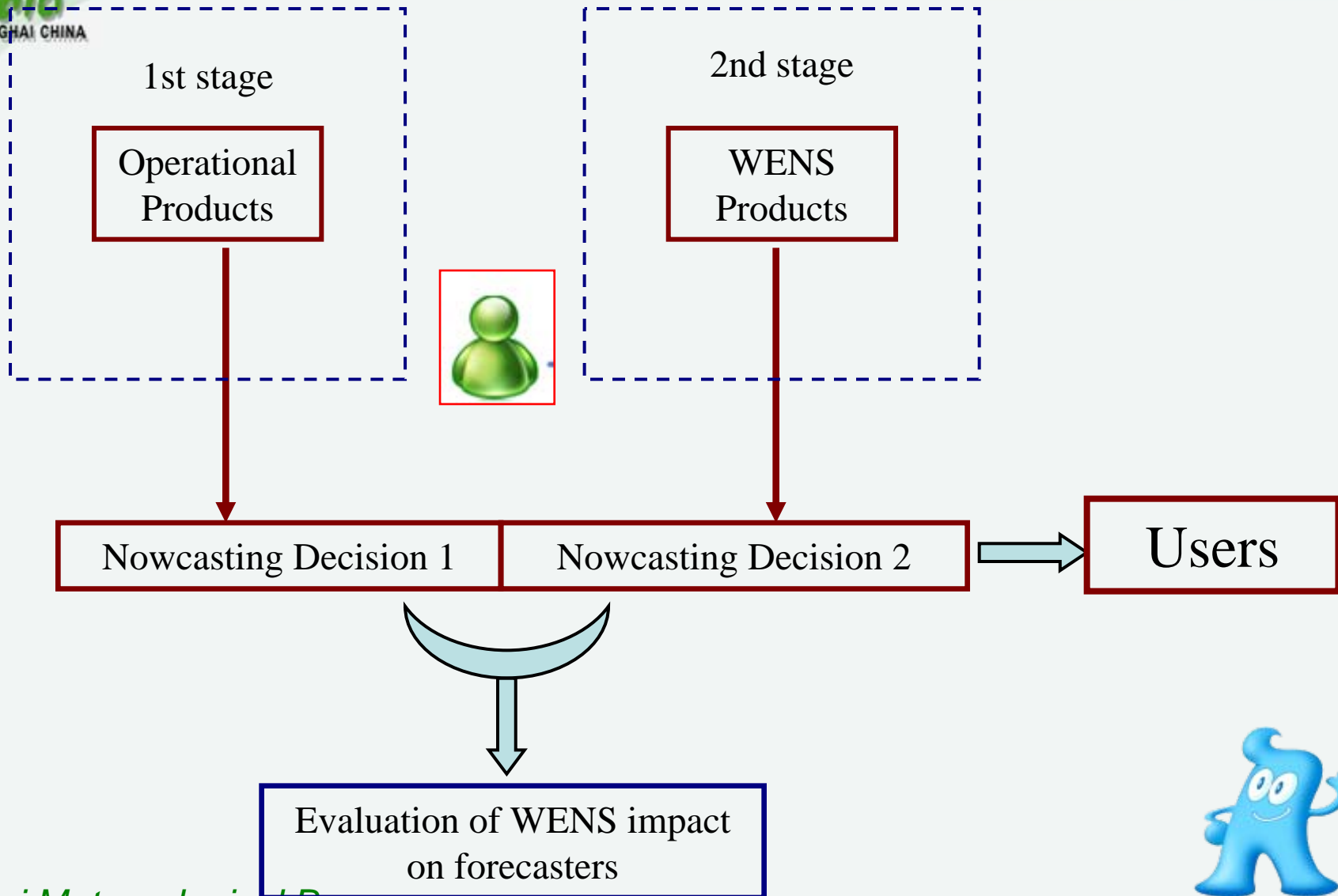
3. Impacts

- For nowcasting operation
- For end users – **by Ms Mi Weihong**



Nowcasting decision making procedure using WENS

EXPO
2010
SHANGHAI CHINA



2010年上海世博会临近预报服务示范项目（WENS）效益评估登记表

预报发布时间（北京时间）	预报员	Decision 1			Decision 2 using WENS			Observations		
		天气	雨强 (mm/h)	强对流类型及等级	天气	雨强 (mm/h)	强对流类型及等级	天气	雨强 (mm/h)	强对流类型和强度
1130	816	雷电 阵雨	10	雷电黄色	雷电 短时强降水	15-35	雷电黄色 暴雨黄色	雷电 短时强降水	30	雷电黄色 暴雨黄色
1220	818	短时降水	5		短时降水	10		短时降水	1.6	
1602	809	短时降水	20-35	暴雨黄色	雷电、大风、短时强降水 20-35			雷电、大风、 短时强降水	35	雷电、大 风、暴雨 黄色
未发布雷电预警	816	雷电 阵雨	10	雷电黄色	BJANC evolution产品认为回波东移减弱，对上海无明显影响			北部有弱雷电和阵雨，其他大部无明显回波		
1430	226	雷电		雷电黄色	雷电（SWIRLS）、BJANC evolution产品认为：回波在1小时内会发展		雷电黄色	雷电		雷电黄色
1500	226	大风、短时强降水	10-20	大风黄色、暴雨黄色	大风（SWIRLS--15时42分预报半小时内嘉定附近有downburst）、短时强降水	35-50	大风黄色、暴雨红色	大风（安亭：15时55分 20.8m/s）、 20.4m/s等）	35-50	大风黄色、暴雨黄色
1500	226	强降水	20-30	暴雨黄色	17时之后的强降水：BJANC evolution产品认为：回波在1小时内为稳定和发展。	10-20， bjanc50-100	暴雨黄色（bjanc暴雨红色）	短时强降水（18时开始统计）	20-50	暴雨黄色
1210	809	雷电 短时强降水	25-35	雷电黄色\ 暴雨黄色	雷电、短时强降水 10-20 BJANC evolution产品认为：回波在1小时内会发展	15-35	雷电黄色	雷电，短时降水	35	雷电黄色\ 暴雨黄色
1116、1152	809	雷电 短时强降水	25-35	雷电黄色\ 暴雨橙色	雷电、短时强降水 10-20 BJANC evolution产品认为：回波在1小时内会发展	10月20日	雷电黄色、暴雨橙色	雷电，短时降水	25	雷电黄色\ 暴雨黄色

Outline

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4. Lessons learnt

- **What nowcasting operation needs from nowcasting systems and products:**
 - conclusion or support for decision making?
- **Information delay**
 - nowcasting based on observation, but severe thunderstorms change rapidly
 - 6-18 min delay vs obsv
- **How to use some new nowcasting products?**
 - PoP (STEPS/SWIRLS)
 - station / point PoP (STEPS)
 - severe weather nowcasting (BJ-ANC, SWIRLS, NoCAWS)
 - storm evolution (BJ-ANC)



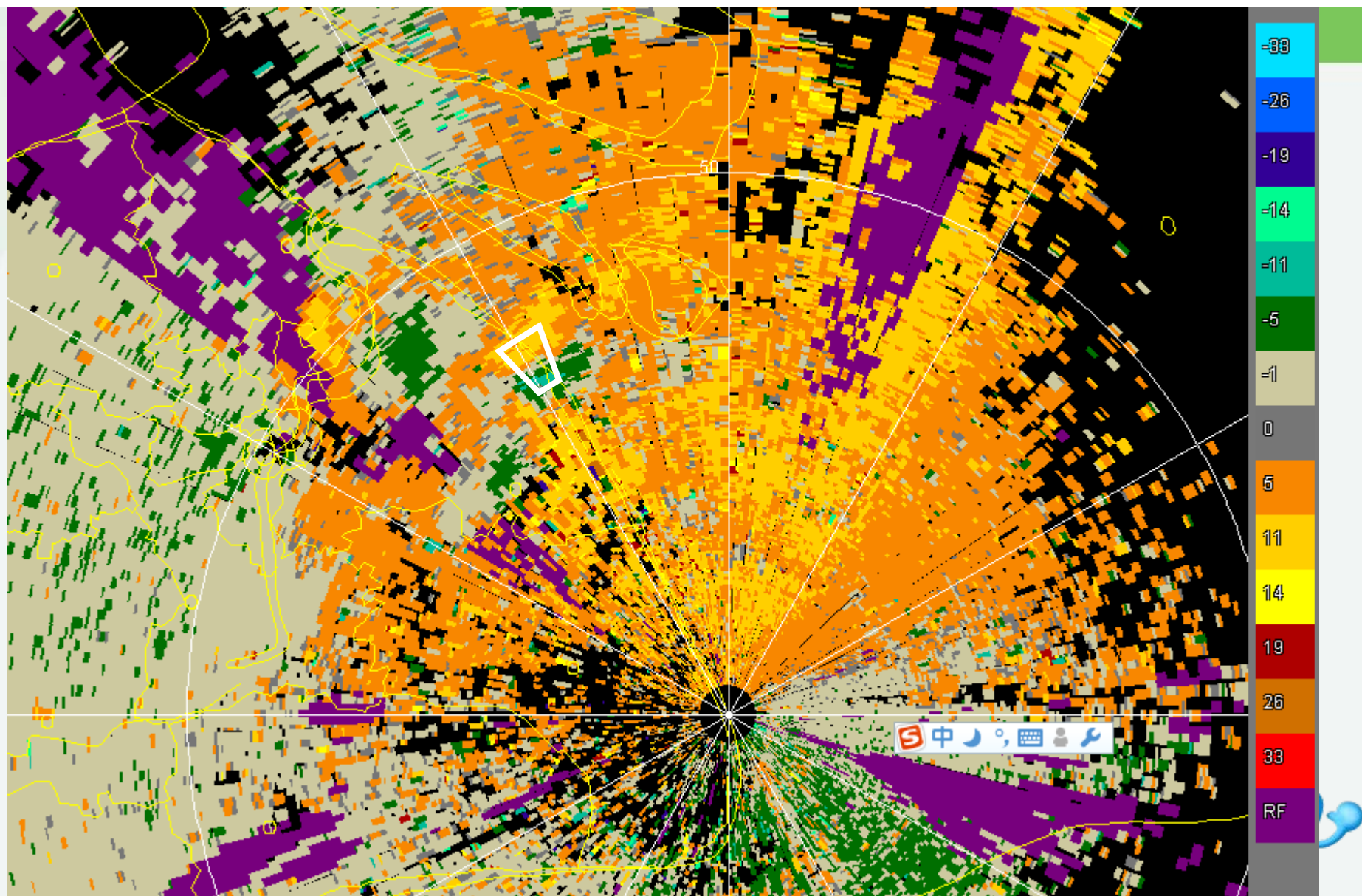


4. Lessons learnt (cont.)

- **Which one is the best?**
 - six nowcasting systems with at least 5 products each at the same time
 - not always good or bad, e.g., QPF
- **Lack of ‘direct’ nowcasting products for wind gusts, hail, lightning**
- **How to improve nowcasting technology**
 - data quality control
 - weather type-based nowcasting methods
- **How to improve nowcasting service?**
 - provide what we can provide, or what users need
 - need more communication with users

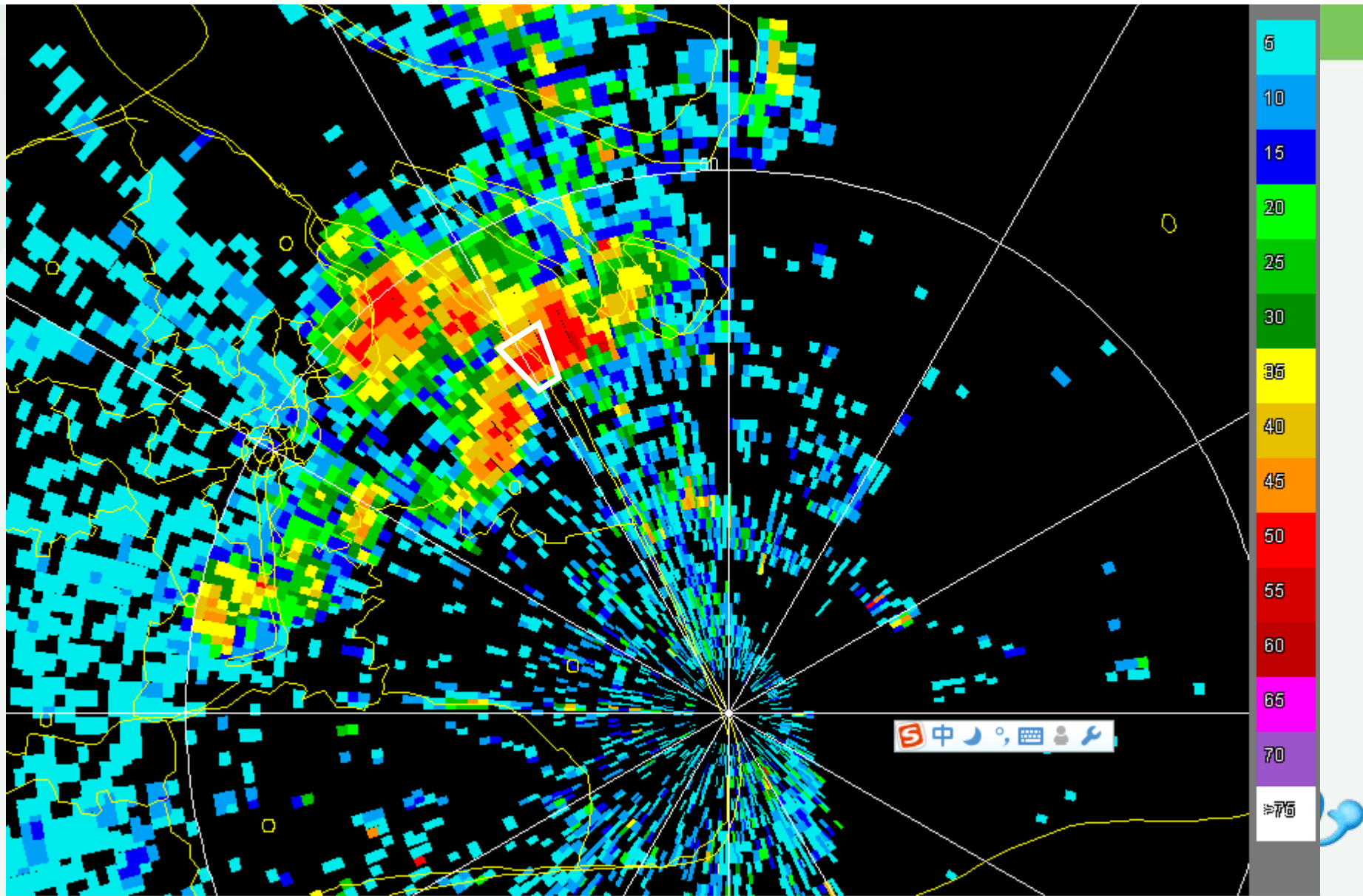


A new automatic downburst identification method by SMB/SWAN



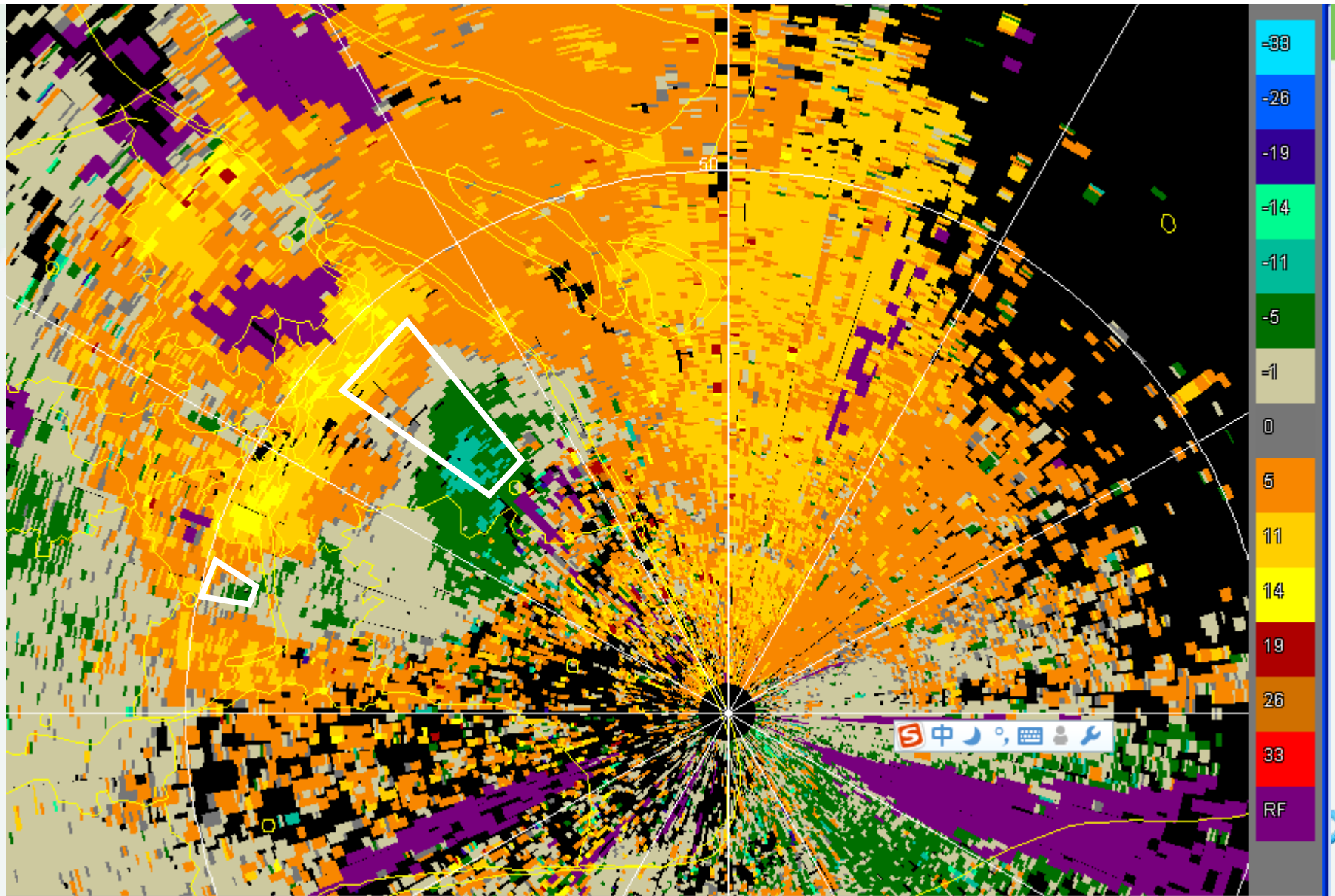
Shanghai Me 2010-08-25 0529 (UTC) Vel 0.5 deg

A new automatic downburst identification method by SMB/SWAN



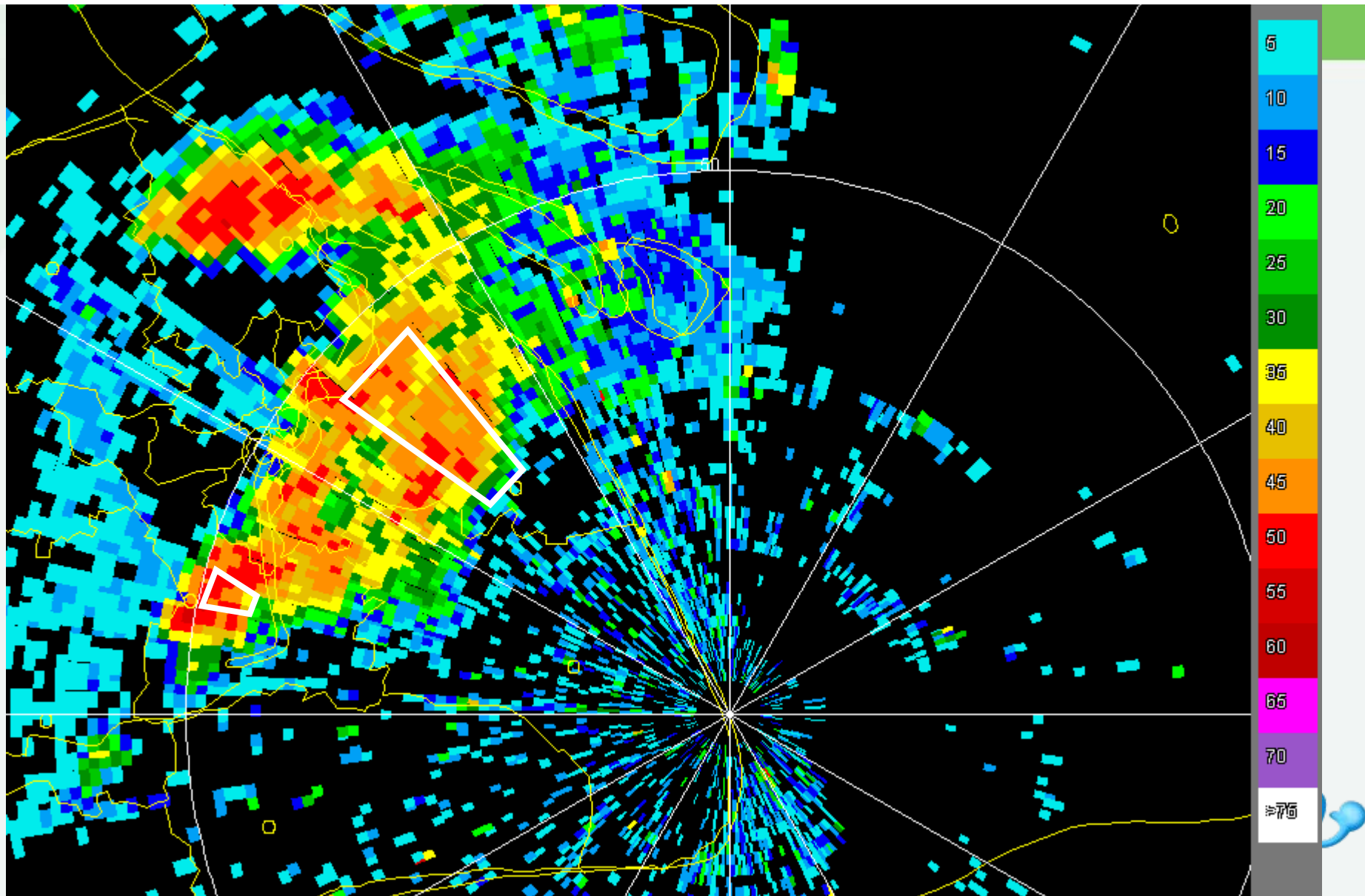
Shanghai Me 2010-08-25 0529 (UTC) Ref 0.5 deg

A new automatic downburst identification method by SMB/SWAN

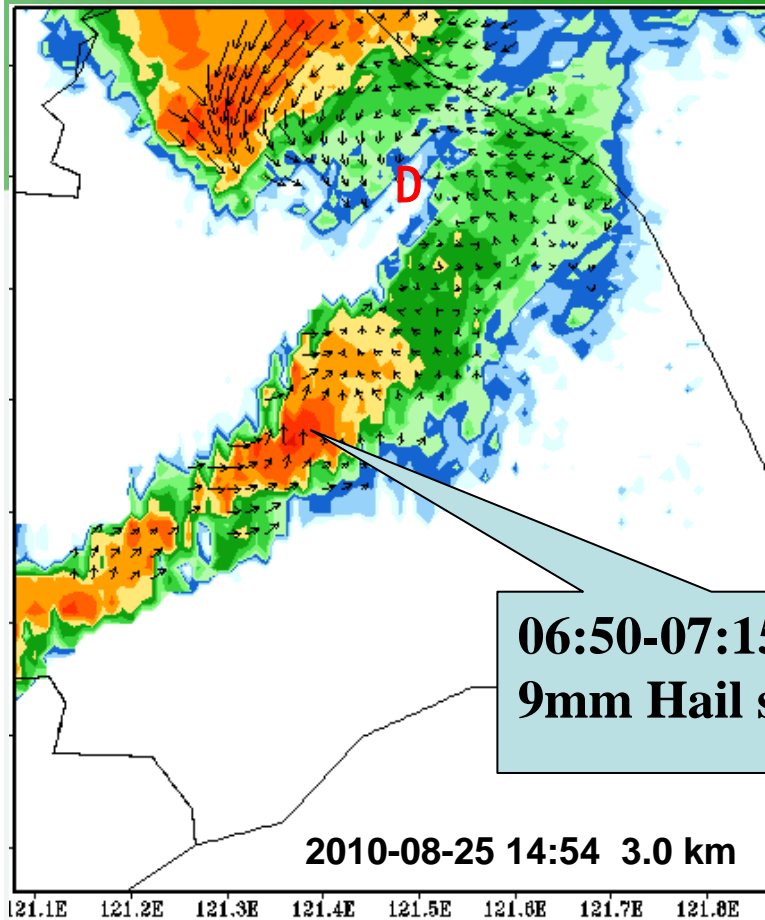
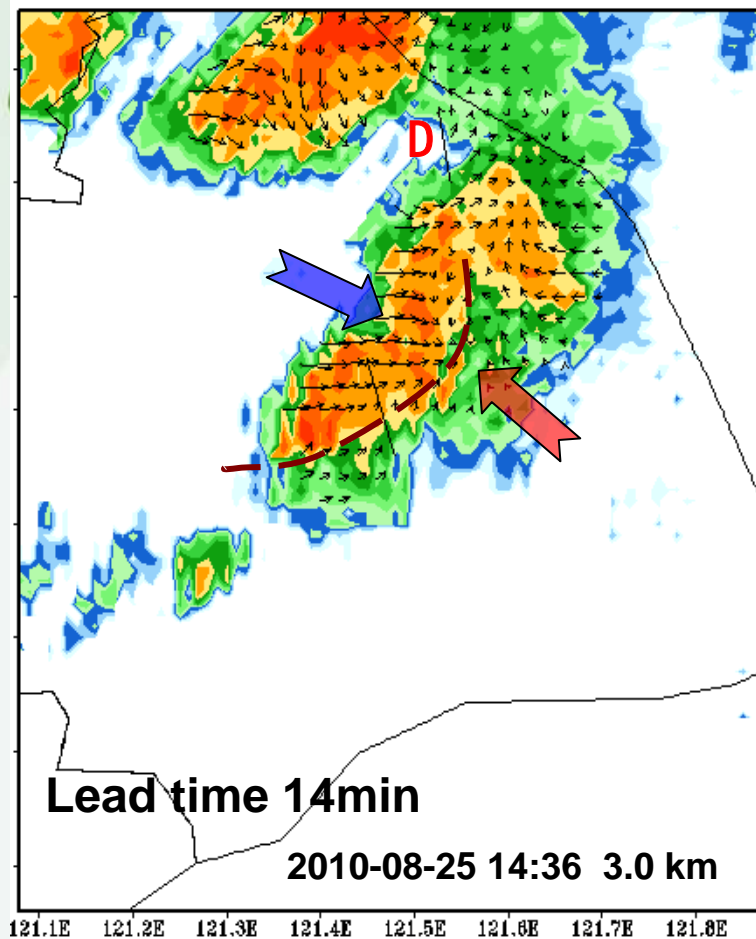


Shanghai Me 2010-08-25 0626 (UTC) Vel 0.5 deg

A new automatic downburst identification method by SMB/SWAN



Shanghai Me 2010-08-25 0626 (UTC) Ref 0.5 deg



**06:50-07:15
9mm Hail stone**

**Dual-Doppler radar observation
And wind field retrieval**



Outline

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5. Issues of concern

- **Focus on impact evaluation**
- Focus on how to evaluate nowcasting?
- Focus on how to deliver nowcasting services to different users




5. Issues of concern

- Focus on impact evaluation
- **Focus on how to evaluate nowcasting?**
- Focus on how to deliver nowcasting services to different users



How to evaluate severe weather forecast?

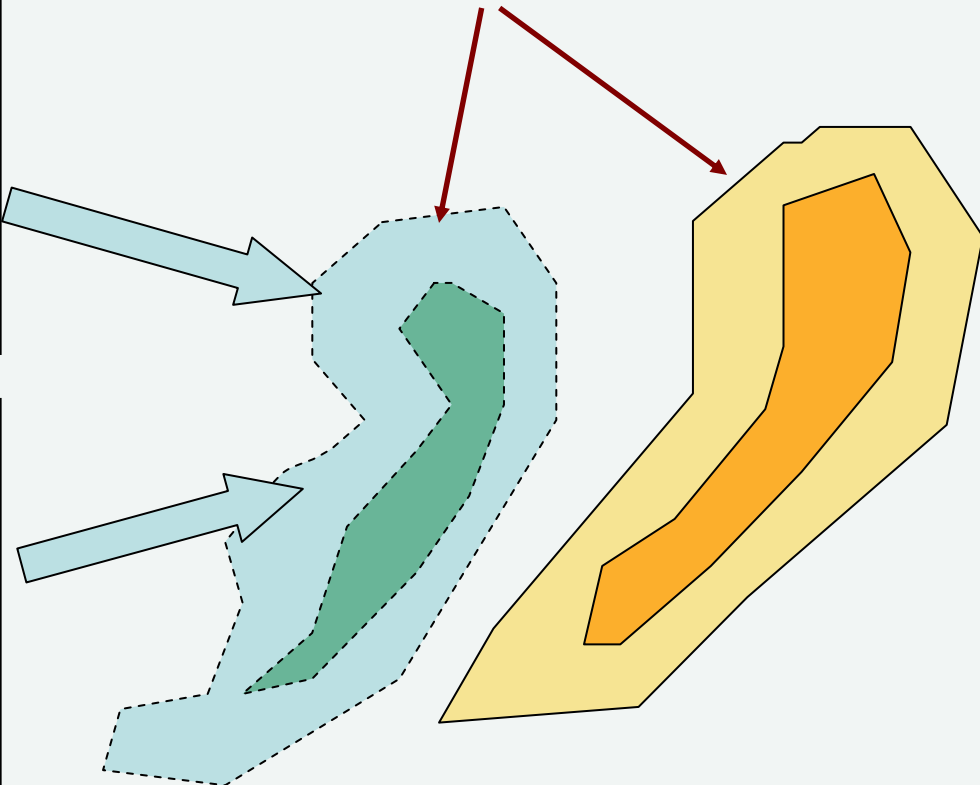
Verification system



forecasters



Verification: **CSI or TS = 0**



Forecast

Observation



5. Issues of concern

- Focus on impact evaluation
- Focus on how to evaluate nowcasting?
- **Focus on how to deliver nowcasting services to different users**



Needs from different users

Point – false alarm



Aviation – correct



Forecast

Observation



Outline

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6. Plan

1. **Post-project survey** to assess impact of WENS (WENSWG). December 2010-February 2011
2. **Final Review Meeting and Report Preparation** (SSG). To be completed by end of March 2011
3. **Publication of Guidelines** on provision of nowcasting services reflecting experience gained from WENS, to be followed by a Capacity Building Workshop for WMO Members (SSG, Secretariat). To be completed by end of 2011





Shanghai Meteorological Bureau





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