



**CIVIL AVIATION BUREAU of JAPAN**

# How ATFM Assists with Disaster Recovery

**ICAO Air Traffic Flow Management Seminar  
13—15 December 2016**

Civil Aviation Bureau Japan

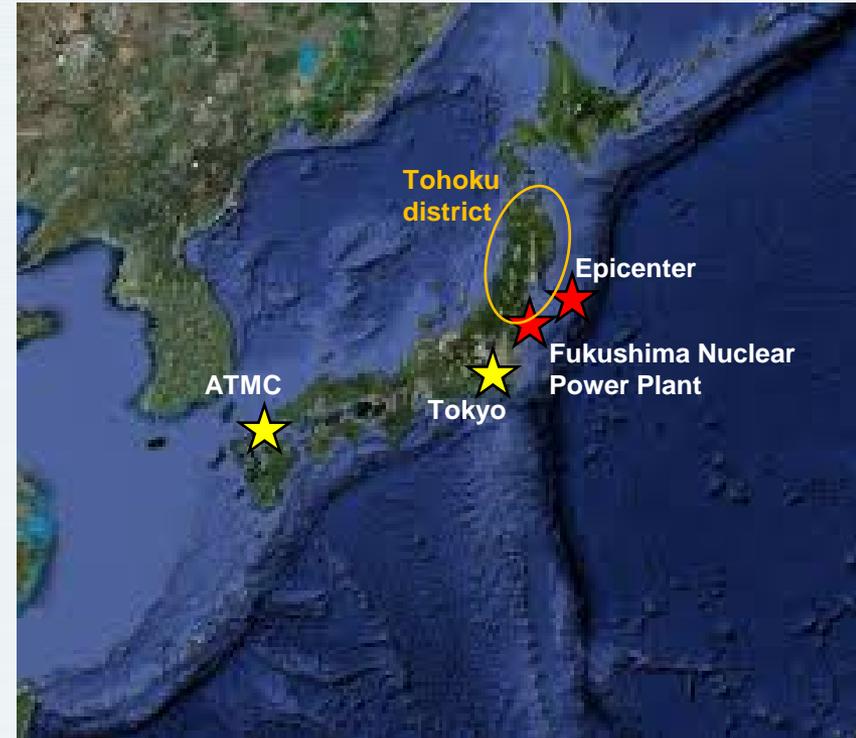
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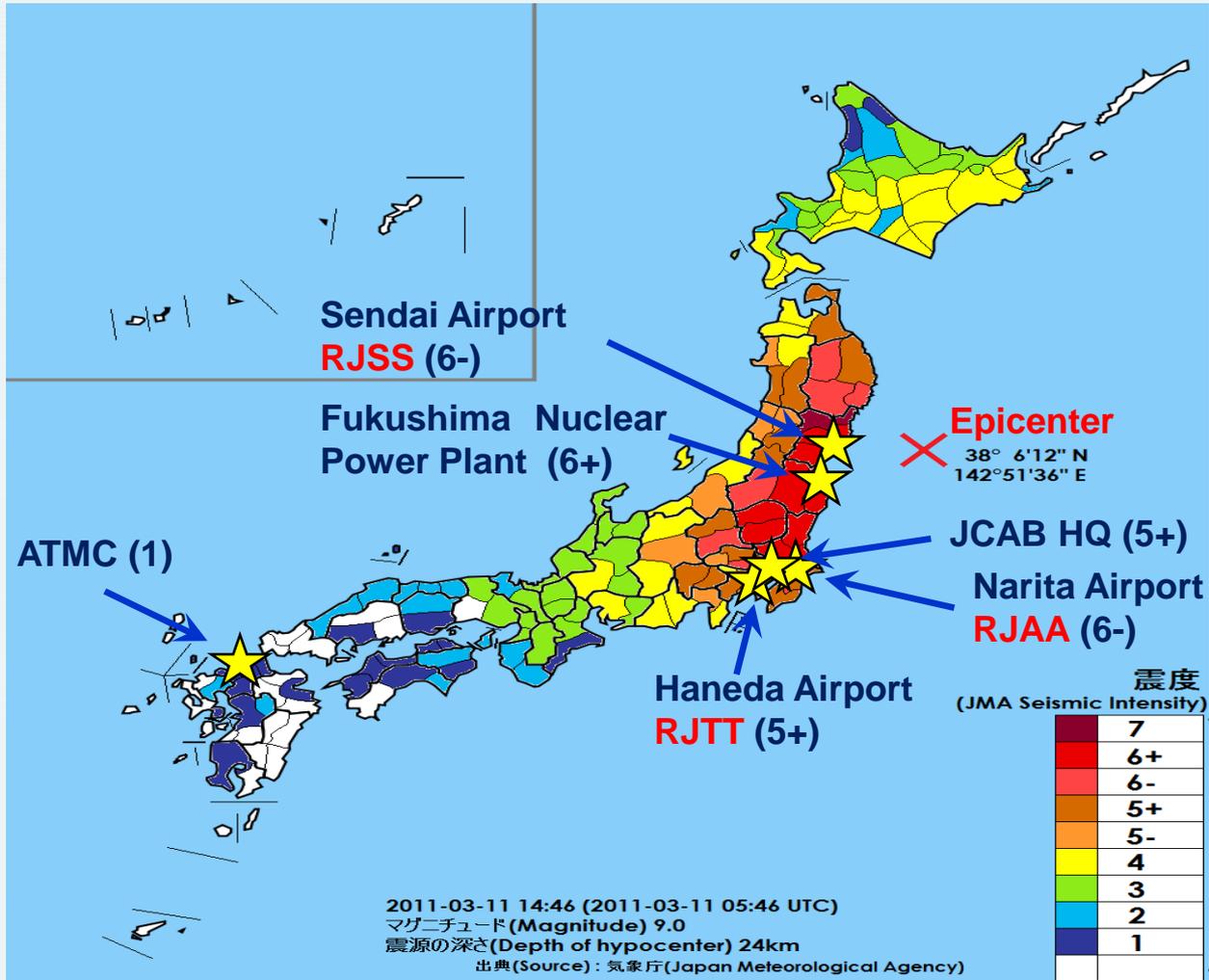
# 1. Outline of The Great East Japan Earthquake

# What's The Great East Japan Earthquake

- Date & Time : 14:46 (0546UTC) on 11<sup>th</sup> Mar. 2011
- Epicenter Location : 380612N1425136E
- Depth : 24km
- Magnitude: **9.0**  
(biggest earthquake in recorded history in Japan)
- **Tsunami**, created by earthquake, mostly affected Tohoku district.



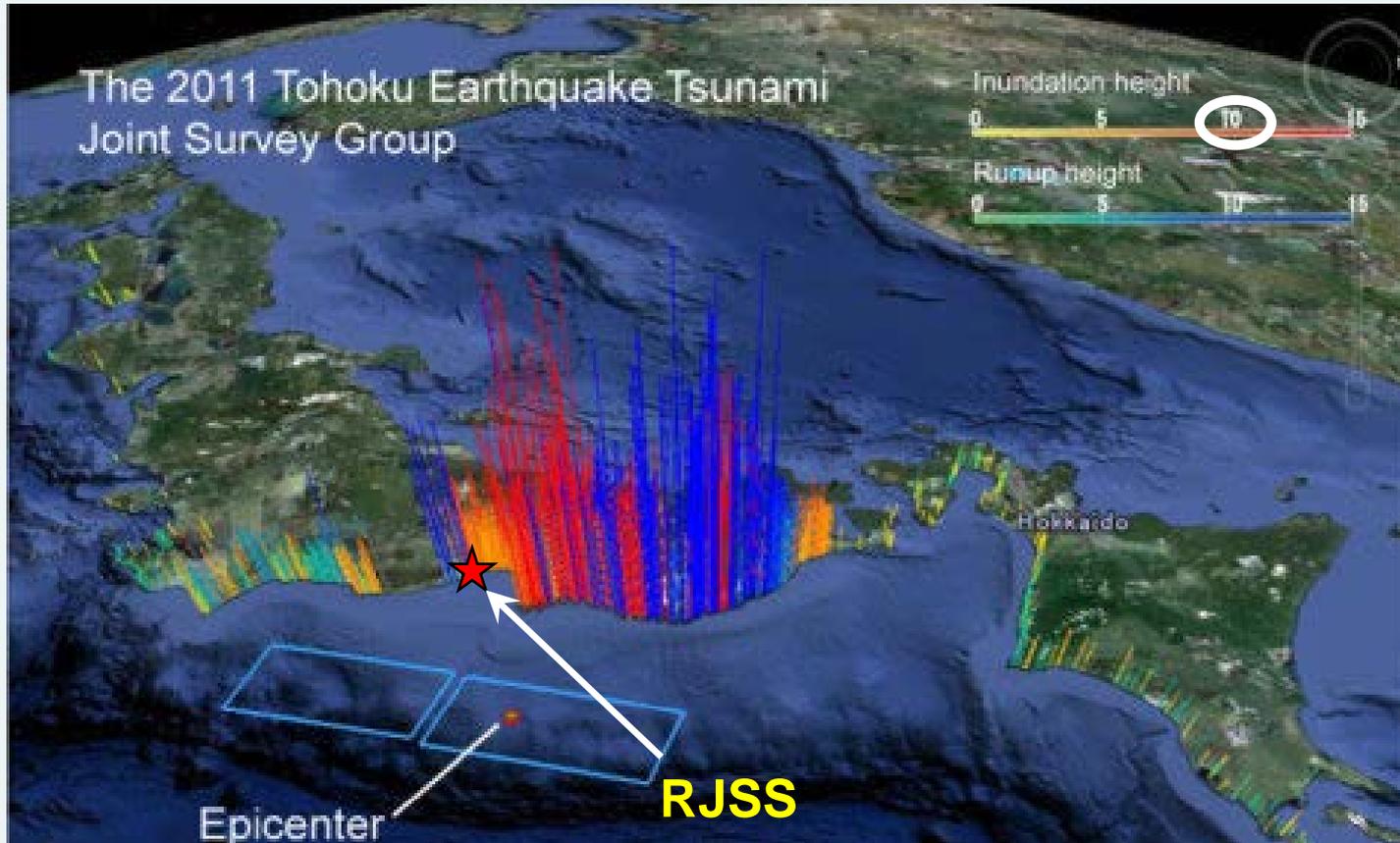
# Map of Seismic Intensity (Japanese scale)



Scale of Seismic intensity

Max : 7  
 Min : 0

# Map of the Height of Tsunami



The source: Tohoku earthquake tsunami joint survey group

## 2. Impact on Airports and Air Traffic

# The Impact of the Earthquake on airports

RJSS ... Complete loss of function of airport

RJAA ... RWY closed +

Immediate evacuation needed from the tower after the earthquake except aeronautical information officers who are in charge of the oceanic area.

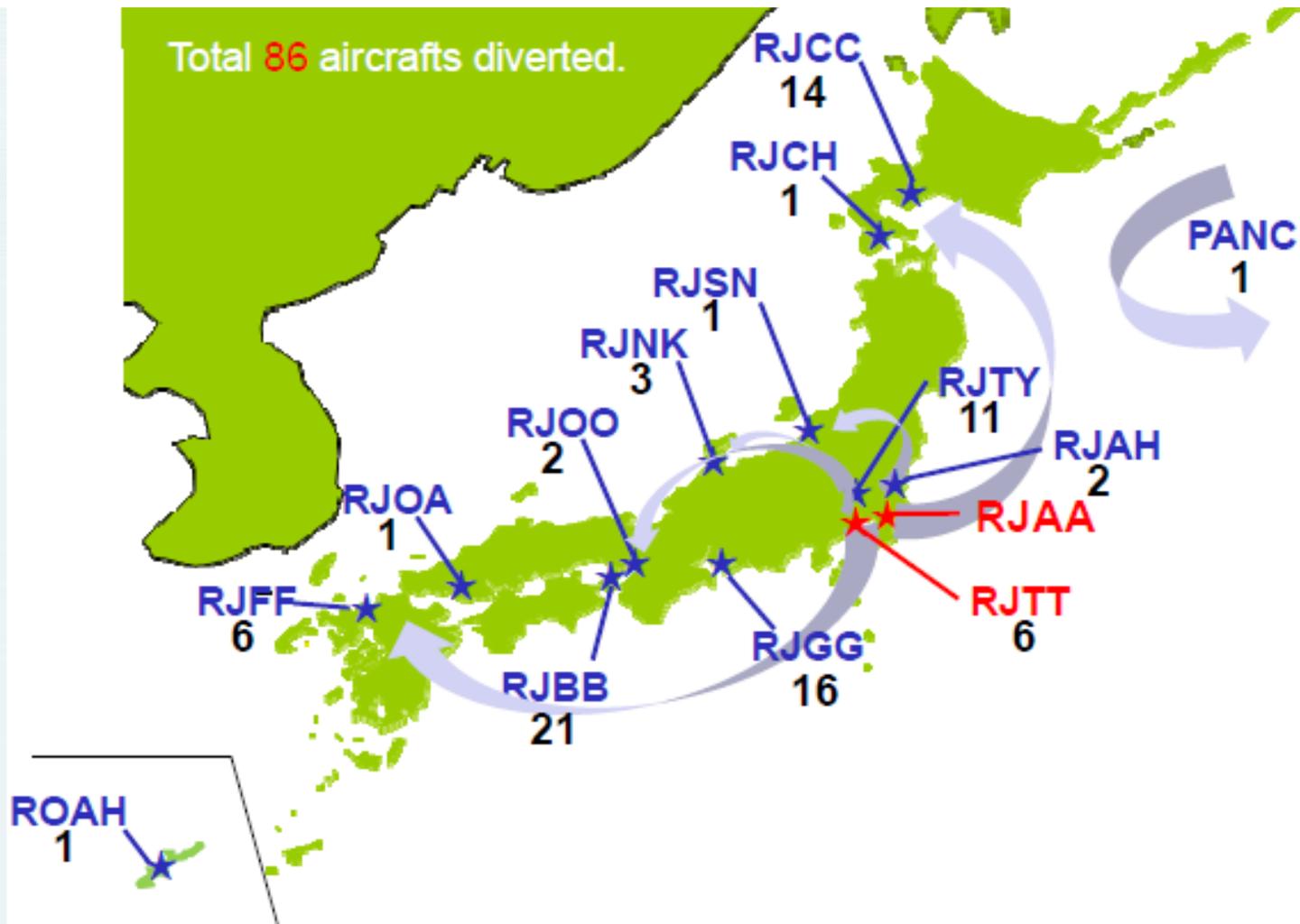
RJTT ... RWY closed +

Almost all transportation stopped. The terminal buildings were heavily congested, no aircraft was accepted during this period.



**86 aircraft** bound for RJAA or RJTT were required to **divert** to other airports.

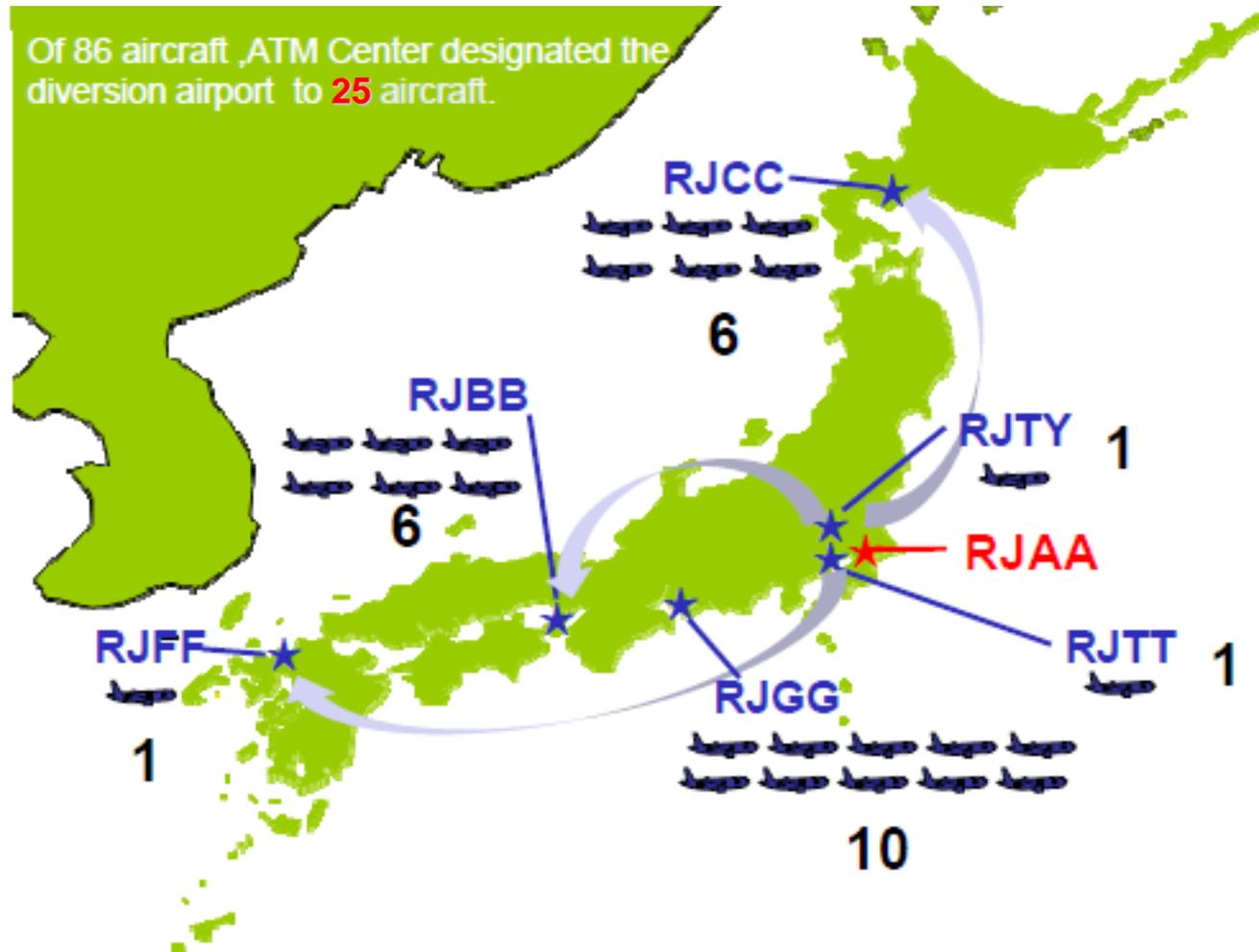
# The Number of Aircraft Diverted from RJAA and RJTT (TOTAL)



Airline	Number of Aircraft
AAL	5
ACA	2
ADO	1
AFR	1
AJX	1
ANA	21
ANZ	1
CES	1
COA	2
CPA	3
CSN	1
DAL	9
GEC	1
IBX	1
JAL	23
KLM	1
NCA	2
SIA	2
THA	1
UAE	1
UAL	6
<b>TOTAL</b>	<b>86</b>

# The Number of Aircraft Diverted from RJAA and RJTT (ATMC assigned)

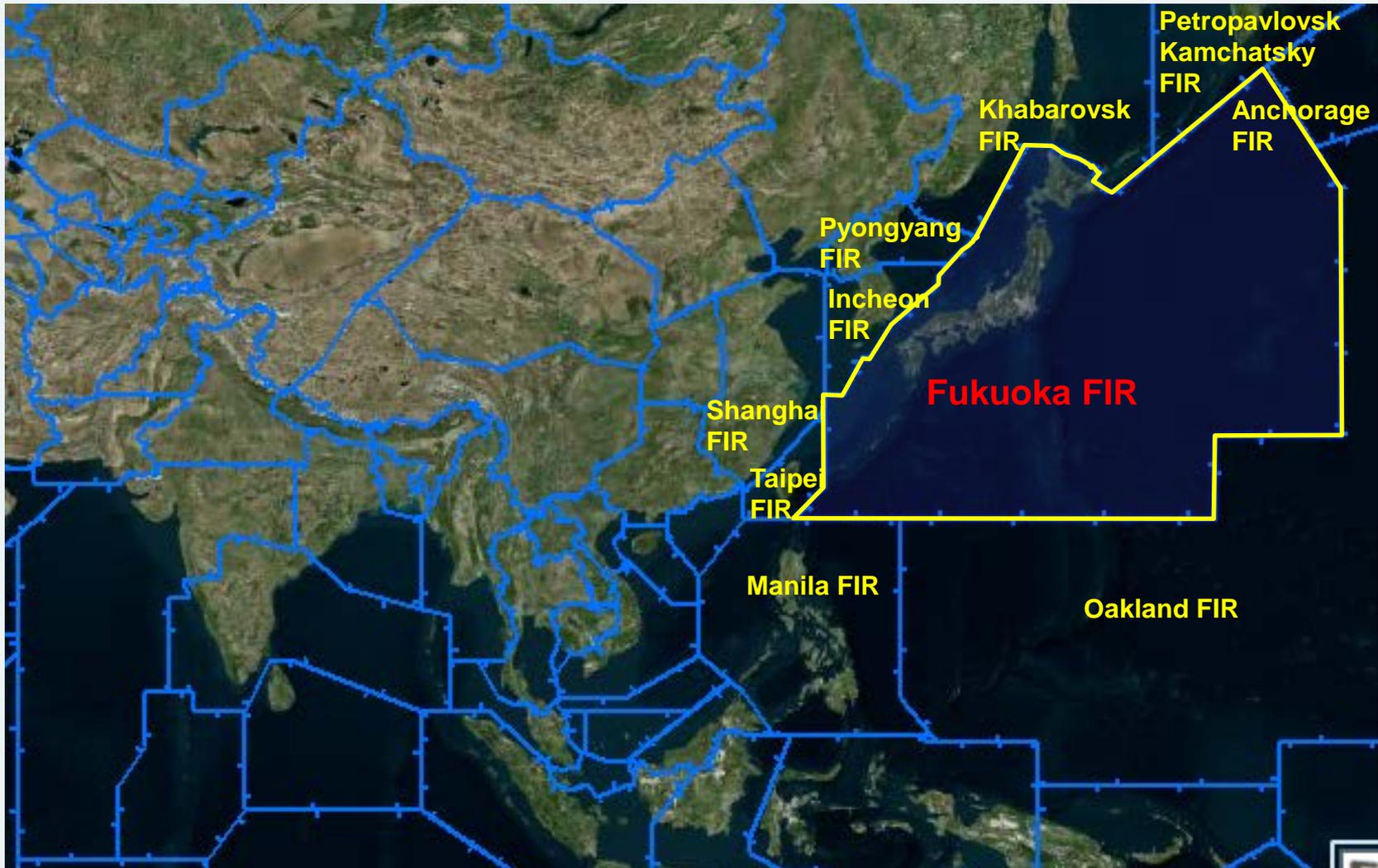
Of 86 aircraft, ATM Center designated the diversion airport to **25** aircraft.



Airline	Number of Aircraft
AAL	4
ACA	1
AEU	1
AFR	1
ANZ	1
CES	1
COA	1
CPA	3
CSN	1
DAL	4
GEC	1
SIA	2
THA	1
UAE	1
UAL	2
<b>TOTAL</b>	<b>25</b>

# 3. ATFM's Response to the Disaster

# Fukuoka FIR and Adjacent FIRs

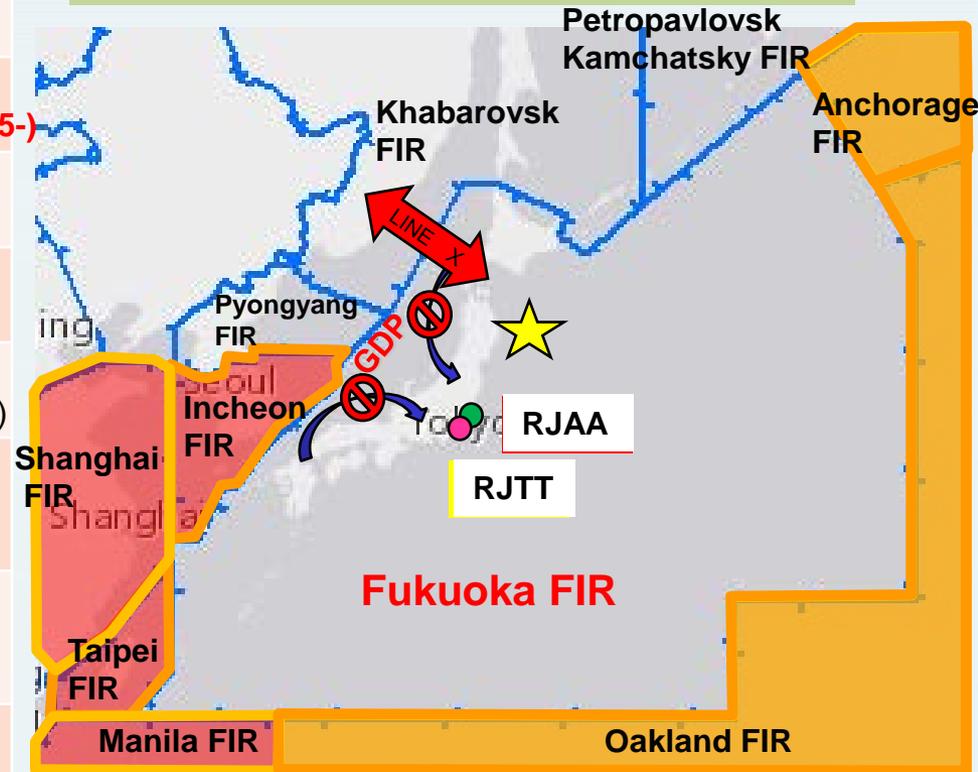


# 3.11 Time Sequence (1)

Time(z)	ATFM	Other Events
0546	<b>The earthquake occurred.</b>	
0551	Ground Stop( <b>GS</b> ) for RJAA/RJTT from dom. AP.	<b>RJAA/RJTT (All RWY) CLOSED.</b>
0600	For RJAA/RJTT from <b>Incheon/Taipei suspended.</b>	RJTT B/D RWY opened.
0605	For RJAA/RJTT from <b>Shanghai suspended.</b>	
0617		<b>RJTT (All RWY) CLOSED. (aftershock:5-)</b>
0627	For RJAA/RJTT from <b>Manila suspended.</b>	
0634	For RJAA/RJTT from <b>Oakland suspended.</b>	
0637		Sharing information with ATCSCC (Hot Line)
0638	For RJAA/RJTT from <b>Anchorage suspended.</b>	29 ACFT for RJAA 16 ACFT for RJTT In Fukuoka FIR
0649		Most staff in RJAA office <b>evacuated.</b>
0656		Comm. Lines between <b>Russia and Japan</b> out intermittently

Time(z)	ATFM	Other Events
0720	<b>GS</b> for RJTT cancelled. GDP (CTOT) implemented.	<b>RJTT (ALL RWY) OPENED.</b>
0720	Suspension for RJTT from <b>Anchorage/Oakland</b> cancelled.	

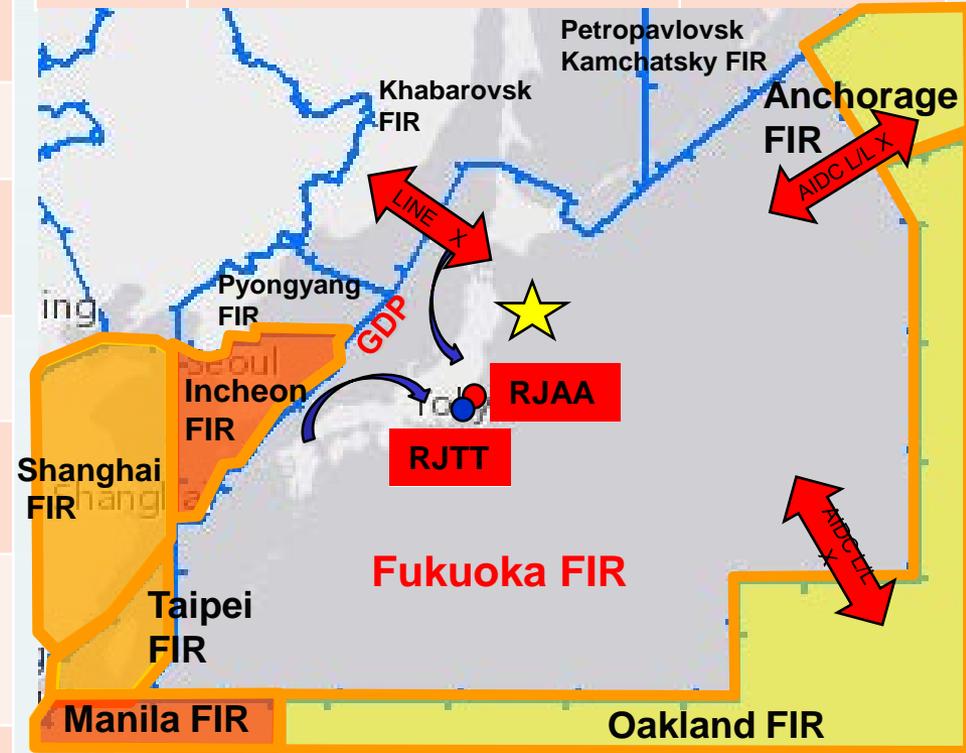
Highlighted by Green : Cross-Border ATFM



### 3.11 Time Sequence (2)

Time(z)	ATFM	Other Events
0730	Suspension for RJTT from <b>Manila</b> cancelled.	The number of flight in Fukuoka FIR : 231
0730	Suspension for RJTT from <b>Shanghai Taipei Incheon</b> cancelled. → 30MIN in Trail RALT.	
0749		AIDC and L/L between <b>Anchorage/Oakland and Japan</b> were out.
0952	GDP for RJTT terminated.	
1053		<b>GS for RJTT by HQ (Due to congestion of Terminal Building)</b>
1100	For RJTT from <b>Taipei</b> suspended again.	
1105	For RJTT from <b>Shanghai</b> suspended again.	
1204	Suspension for RJTT from <b>Taipei and Shanghai</b> cancelled.	@ 1155 Suspension for RJTT cancelled. (for only intl. ferry, cargo, government)
1455	<b>GS for RJAA</b> cancelled.	<b>RJAA OPENED.</b>

Time(z)	ATFM	Other Events
1500 /12 <sup>th</sup>	Suspension for RJAA from <b>Anchorage, Oakland, Manila, Taipei, Shanghai and cancelled.</b>	
1523 /12 <sup>th</sup>	Suspension for RJAA from <b>Incheon</b> cancelled	
1837 /12 <sup>th</sup>		<b>GS for RJTT by HQ</b> cancelled.



# The communication tools for CDM in the disaster

➤ **For Airlines and ATC facilities**  
 CDM conference system (IP VPN)

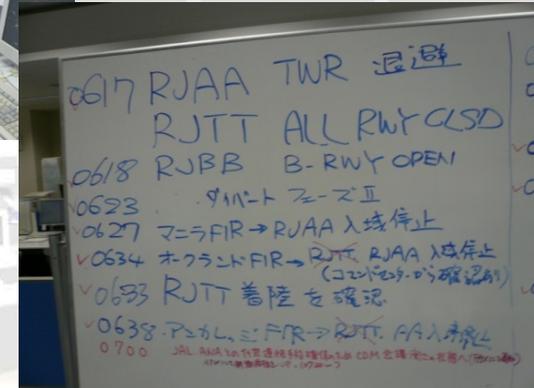
➤ **For FAA (ATCSCC)**  
 Hot Line  
 Tele-Conference

➤ **For JCAB Headquarters**  
 Commercial Line  
 \* remain connected

➤ **In ATMC**  
 Large-Screen Projectors  
 providing information on:

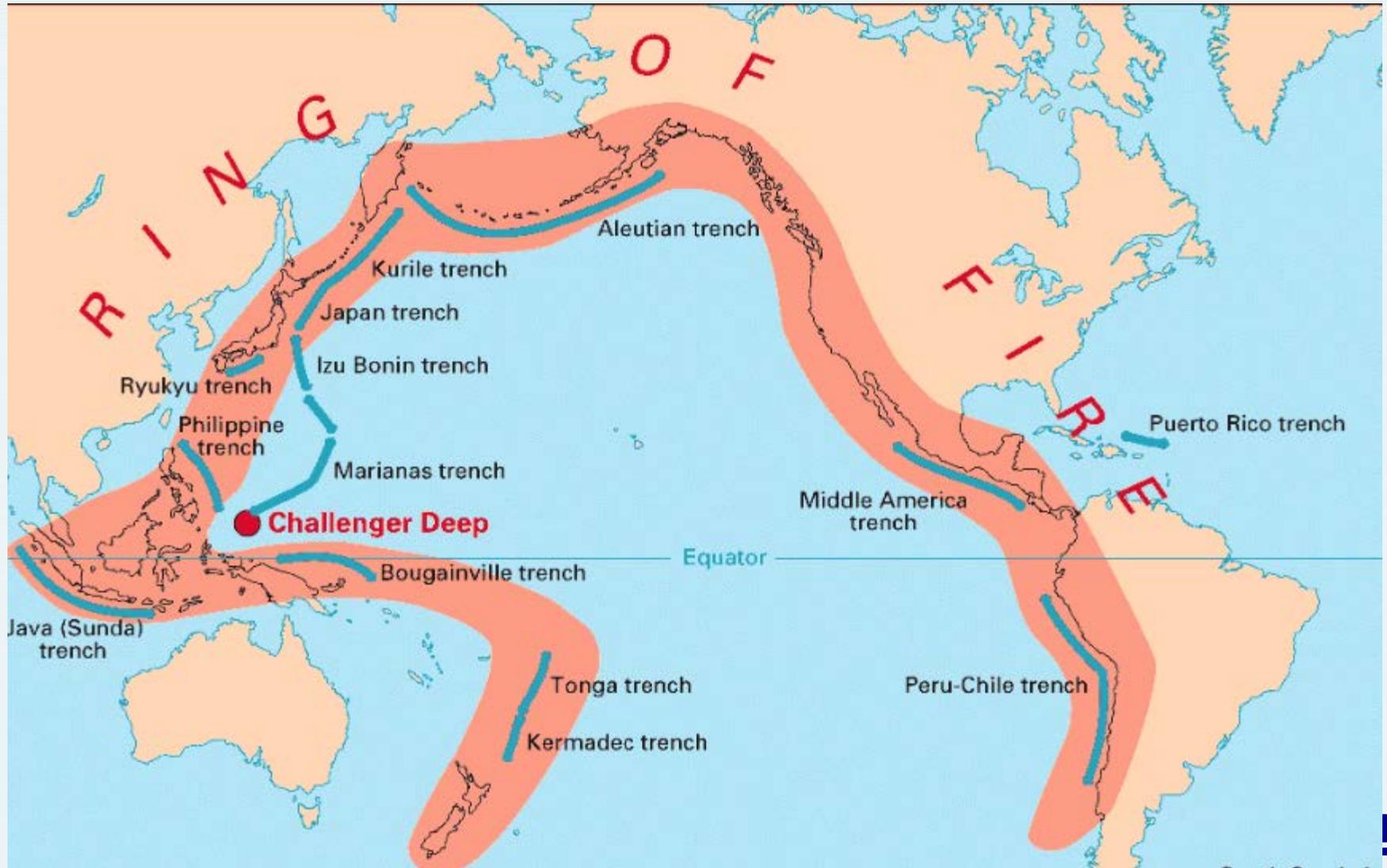
- Flow control and capacity
- Runway of major airports (wind factor)
- Live cameras in major airport ,etc.

And the white boards



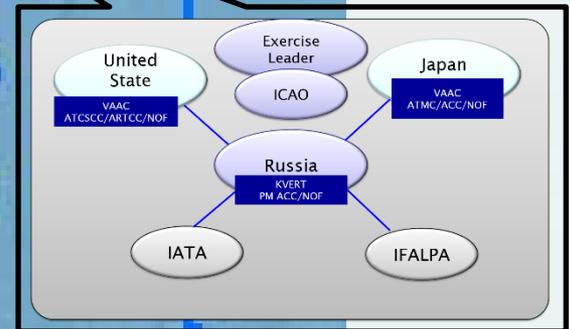
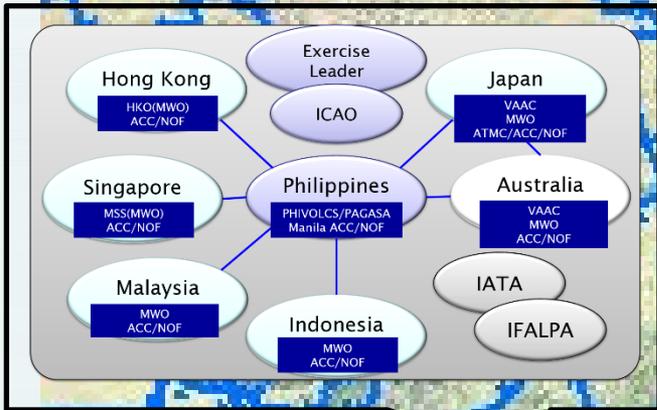
# 4. Volcanic ash exercise

# Ring of Fire

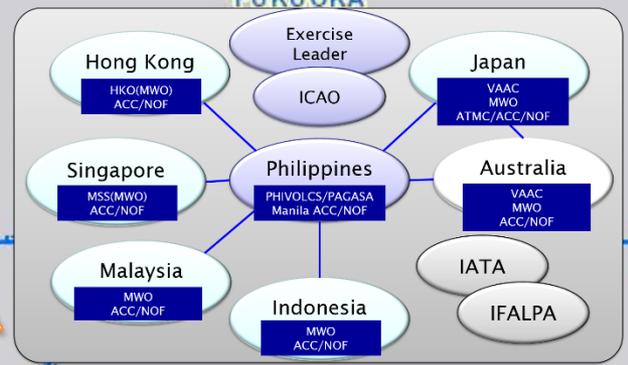
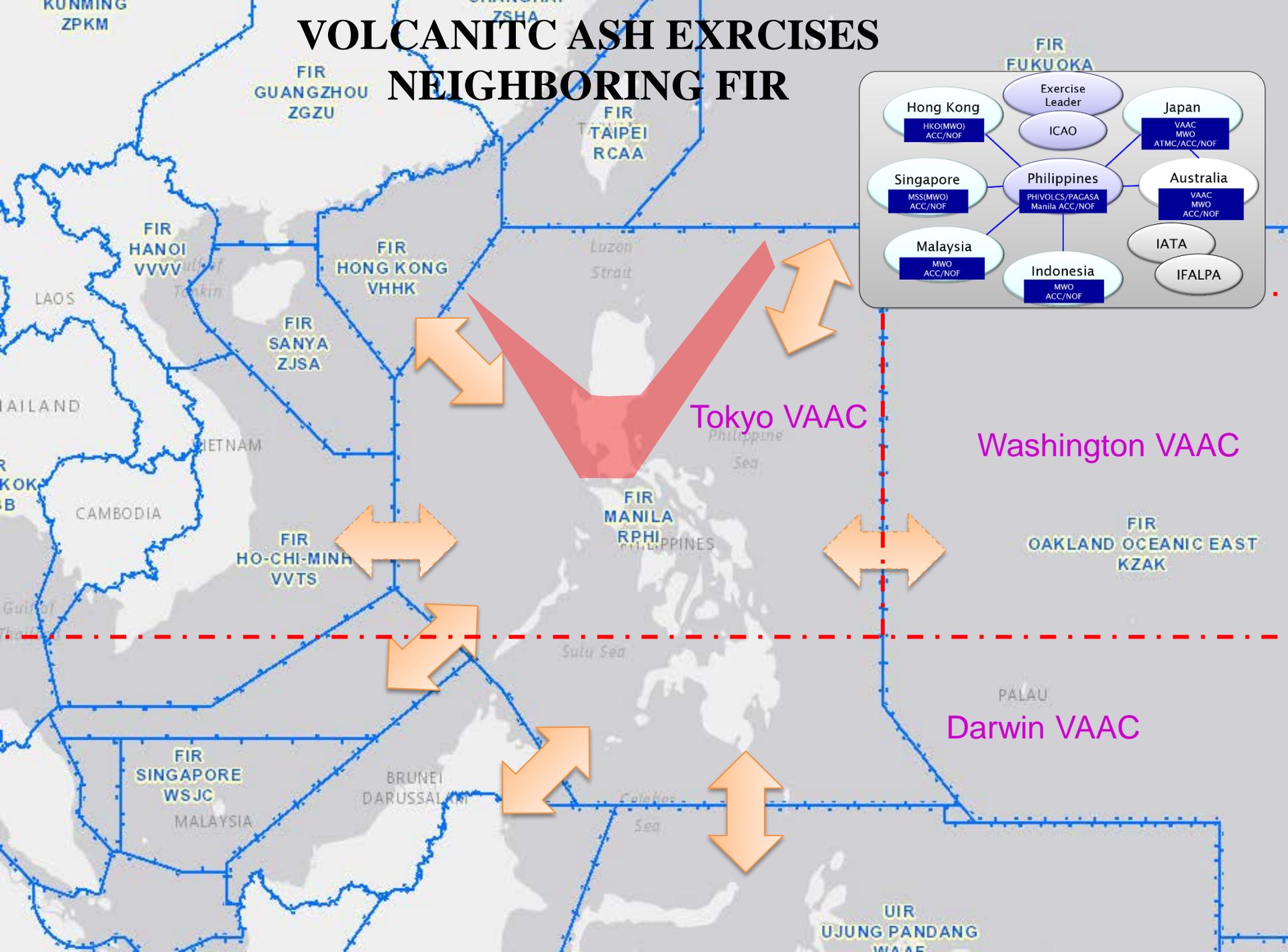


Main traffic flow between Japan and North America

Main traffic flow between Japan and South east Asia



# VOLCANIC ASH EXERCISES NEIGHBORING FIR



Tokyo VAAC

Washington VAAC

Darwin VAAC

FIR  
GUANGZHOU  
ZGZU

FIR  
TAIPEI  
RCAA

FIR  
FUKUOKA

FIR  
HANOI  
VVVV

FIR  
HONG KONG  
VHHK

FIR  
SANYA  
ZJSA

Luzon  
Strait

THAILAND

VIETNAM

Tokyo VAAC

Washington VAAC

CAMBODIA

FIR  
HO-CHI-MINH  
VVTS

FIR  
MANILA  
RPHI  
PHILIPPINES

FIR  
OAKLAND OCEANIC EAST  
KZAK

Sulu Sea

PALAU

Darwin VAAC

FIR  
SINGAPORE  
WSJC  
MALAYSIA

BRUNEI  
DARUSSALAM

Celebes  
Sea

FIR  
UJUNG PANDANG  
WAAF

# 5. Conclusion

# How ATFM Assists with Disaster Recovery

**11<sup>th</sup> Mar.** (mainly response to earthquake)

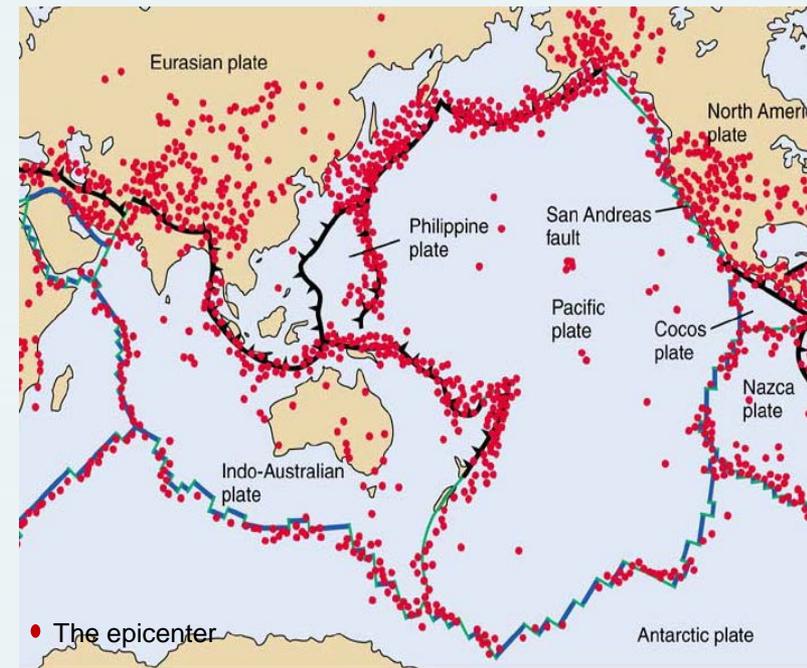
14 of 86 diverted aircraft declared emergency. ⇒ **All landed safely.**

1. To Balance Demand and Capacity
  - Domestic ATFM
  - **Cross-Border ATFM**



# Lessons

- In such a disaster, unforeseen problems come about one after another. For instance, infrastructure was crippled, including many forms of communication. It is difficult to manage air traffic properly only by domestic ATFM. Cross-Border ATFM will adequately assist other ATFM.
- Between Japan and Korea, and between Japan and Taipei, there is a Letter of Agreement on ATFM to implement cross-border ATFM smoothly. It is necessary for us to make an arrangement from a contingency point of view.
- Since there are a great deal of earthquakes in the APAC region, it is important to develop cross-border ATFM even in non-emergency situations and prepare for any contingency.



THANK YOU VERY MUCH!!



Jun.2013  
RJSS

Any questions?