



Int'l Communication & Coordination
Related to Extreme Space Weather Events

From KSWC's perspective

April 18, 2013

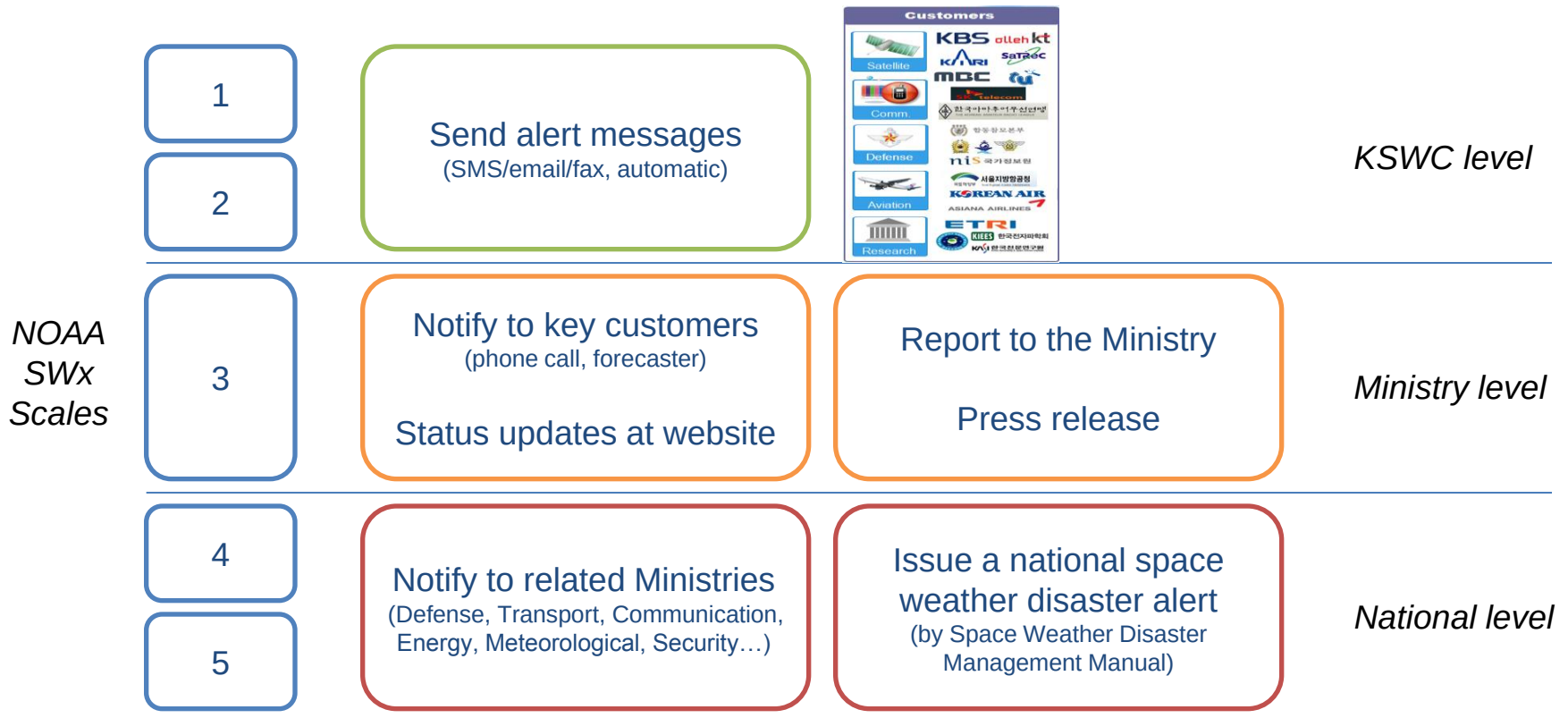
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Korean Space Weather Center

KSWC's Work Procedures

- ✓ We take actions according to NOAA SWx scales
- ✓ If level 3+ event occurs, we provide the press release for public

Level	Effect	Physical measure	Average frequency (1.0 = once per year)
1	11111 – Time is more dependent on δ radio-convergence in space size, increased rate of radio-convergence 11112 – Radio-frequency navigation signals degraded by ground obstacles 11113 – Limited frequency of radio-convergence signals in space size, reduced control by ground obstacles 11114 – Longest radio-frequency navigation signals range of less than 100 km		0.0001 per cycle 0.0001 per cycle 0.001 per cycle 0.001 per cycle
2	11211 – Time proportional of δ radio-convergence, less than 100 km 11212 – Radio-frequency navigation signals degraded by ground obstacles in space size of Earth's surface 11213 – Limited frequency of radio-convergence signals in space size of Earth's surface		0.001 per cycle 0.001 per cycle 0.001 per cycle
3	11311 – Time proportional of δ radio-convergence to meet the space size of Earth's surface 11312 – Limited frequency of radio-convergence signals in space size of Earth's surface 11313 – Limited frequency of radio-convergence signals in space size of Earth's surface		0.001 per cycle 0.001 per cycle 0.001 per cycle
4	11411 – Limited frequency of radio-convergence signals in space size of Earth's surface 11412 – Limited frequency of radio-convergence signals in space size of Earth's surface 11413 – Limited frequency of radio-convergence signals in space size of Earth's surface		0.001 per cycle 0.001 per cycle 0.001 per cycle
5	11511 – Limited frequency of radio-convergence signals in space size of Earth's surface 11512 – Limited frequency of radio-convergence signals in space size of Earth's surface 11513 – Limited frequency of radio-convergence signals in space size of Earth's surface		0.001 per cycle 0.001 per cycle 0.001 per cycle
6	11611 – Limited frequency of radio-convergence signals in space size of Earth's surface 11612 – Limited frequency of radio-convergence signals in space size of Earth's surface 11613 – Limited frequency of radio-convergence signals in space size of Earth's surface		0.001 per cycle 0.001 per cycle 0.001 per cycle
7	11711 – Limited frequency of radio-convergence signals in space size of Earth's surface 11712 – Limited frequency of radio-convergence signals in space size of Earth's surface 11713 – Limited frequency of radio-convergence signals in space size of Earth's surface		0.001 per cycle 0.001 per cycle 0.001 per cycle
8	11811 – Limited frequency of radio-convergence signals in space size of Earth's surface 11812 – Limited frequency of radio-convergence signals in space size of Earth's surface 11813 – Limited frequency of radio-convergence signals in space size of Earth's surface		0.001 per cycle 0.001 per cycle 0.001 per cycle
9	11911 – Limited frequency of radio-convergence signals in space size of Earth's surface 11912 – Limited frequency of radio-convergence signals in space size of Earth's surface 11913 – Limited frequency of radio-convergence signals in space size of Earth's surface		0.001 per cycle 0.001 per cycle 0.001 per cycle
10	12011 – Limited frequency of radio-convergence signals in space size of Earth's surface 12012 – Limited frequency of radio-convergence signals in space size of Earth's surface 12013 – Limited frequency of radio-convergence signals in space size of Earth's surface		0.001 per cycle 0.001 per cycle 0.001 per cycle



Issues in SWx Services

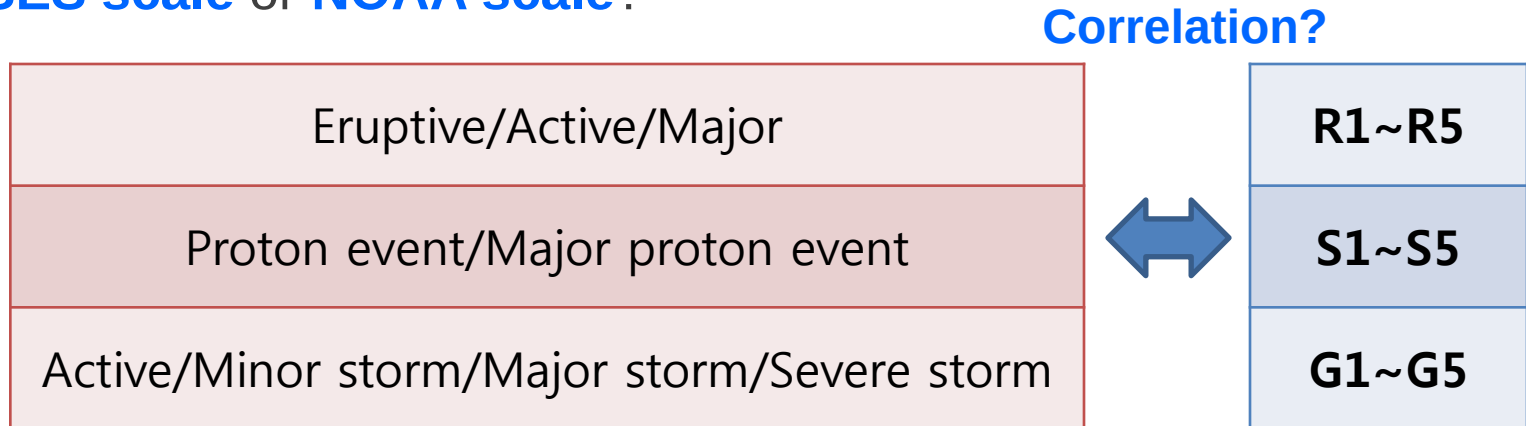
#1. Ambiguity in forecast information

#2. Too many frightened descriptions

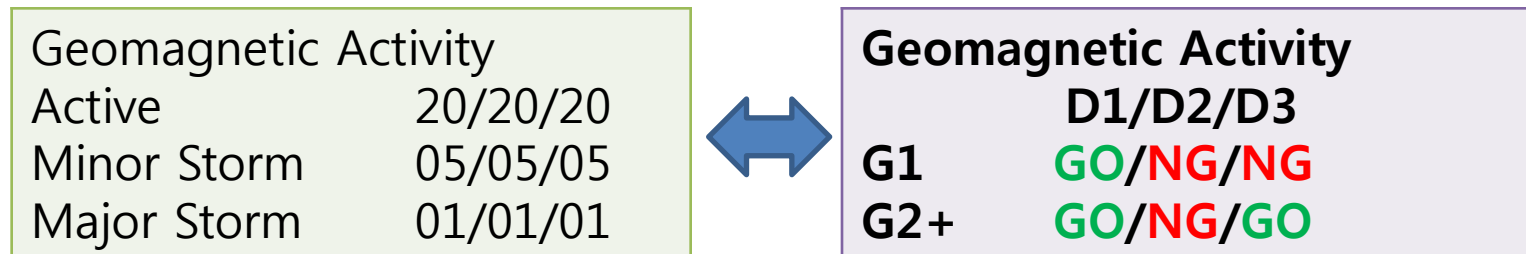
#3. Lack of post event analysis

Issue #1 : Ambiguity in forecasting

- ✓ **ISES scale** or **NOAA scale**?



- ✓ **Probability number** or **Stop sign**?



Issue #1 : Ambiguity in forecasting

How about using NOAA scale and probability for forecasting?

Institution (Input Time)	date	Radio Blackouts (%)		Solar radiation Strom (%)	Geomagnetic Storms (mid-latitude) (%)		notes
		R1~R2	R3 or higher	S1 or higher	G1	G2 or higher	
BAO (Input time, (UT))	17						
	18						
	19						
IPS (Input time, (UT))	17						
	18						
	19						
SWPC (12:30(UT))	17						
	18						
	19						
NICT (Input time, (UT))	17						
	18						
	19						
KSWC (02:00(UT))	17	30	1	5	10	1	
	18	30	1	5	10	1	
	19	20	1	1	30	5	
...							
...							

o KSWC : Geomagnetic warning, Valid From: 2013 Apr 29 0100 UTC, Valid To: 2013 Apr 30 0800 UTC

Issue #2 : Frightened descriptions



Huge solar flare shoots out particles at 3million mph
as scientists predict weekend of powerful sunstorms

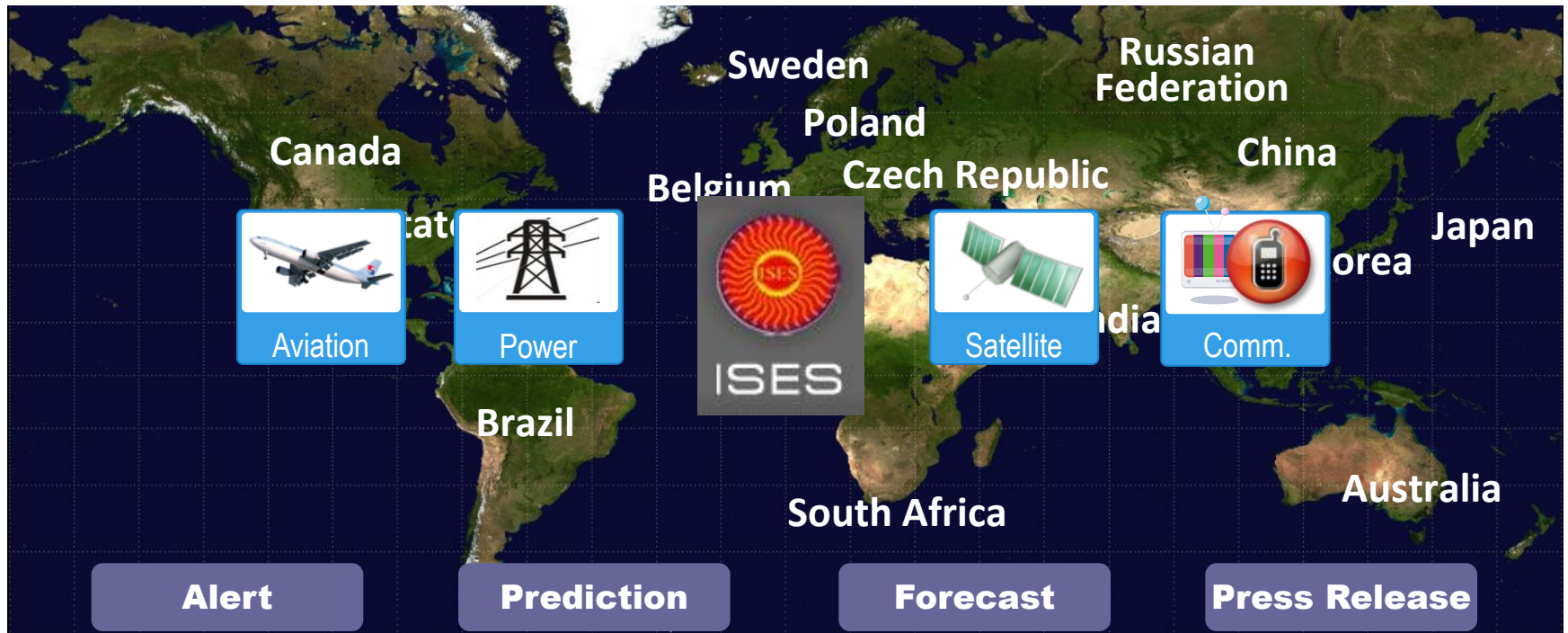
Scientists braced for 'solar tsunami' to hit earth

Scientists On High Alert: Massive Solar Flare Could **Huge and Severe**
Damage The Power Grid

A Huge Solar Flare Will Bring The **End Of The World** In Months...

Issue #3 : Post event analysis

- ✓ Collect disruption & damage information on the user sectors
- ✓ Evaluate the forecast & alert service quality on each event
- ✓ Share the information between RWCs



A composite image showing a view of Earth from space. The Earth's horizon is visible, with a thin blue line of the atmosphere. Below the horizon, the Earth's surface is covered in clouds and landmasses. In the background, the Milky Way galaxy is visible, stretching across the dark sky. The text "Thank you" is overlaid in the center of the image.

Thank you