



Development of Instability Indices for Early Detection of Severe Weather Phenomena

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Background

- Himawari-8, 9 will be launched in 2014, 2016.
- AHI (Advanced Himawari Imager)
 - higher spatial resolution
 - higher temporal resolution
 - more channels
 - To sustain and improve the satellite observation for disaster prevention and weather forecast.
 - To enrich capabilities for “Nowcasting,” particularly for the detection and prediction of severe weather.
 - To improve the accuracy of Numerical Weather Prediction.
 - To enhance climate and environment monitoring.

Instability indices

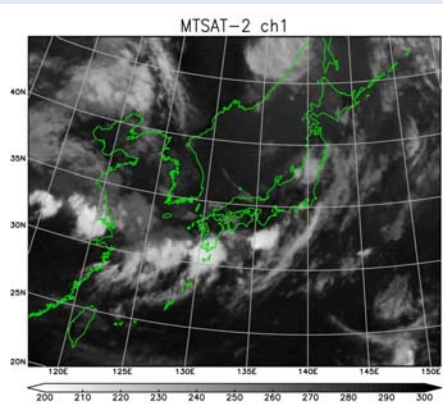
- Object
 - Early Detection of Severe Weather Phenomena
- Method
 - 1D-Var
 - RTTOV10.2
 - Input
 - JMA NWP
 - AHI (simulated from IASI)

Advanced Himawari Imager (AHI)

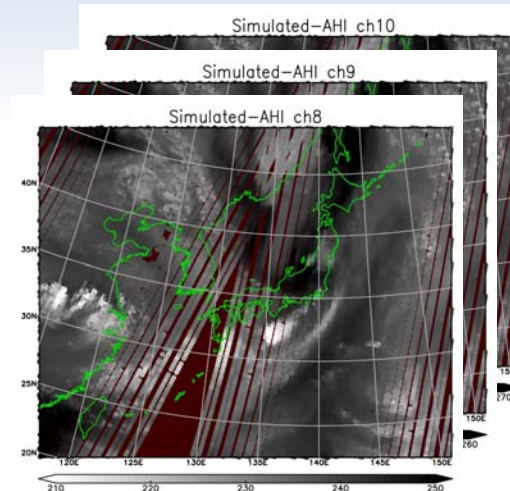
Band	Central Wavelength [μm]	Spatial Resolution[km]
1	0.43 - 0.48	1
2	0.50 - 0.52	1
3	0.63 - 0.66	0.5
4	0.85 - 0.87	1
5	1.60 - 1.62	2
6	2.25 - 2.27	2
7	3.74 - 3.96	2
8	6.06 - 6.43	2
9	6.89 - 7.01	2
10	7.26 - 7.43	2
11	8.44 - 8.76	2
12	9.54 - 9.72	2
13	10.3 - 10.6	2
14	11.1- 11.3	2
15	12.2 - 12.5	2
16	13.2 - 13.4	2

Experiment of the Instability Index

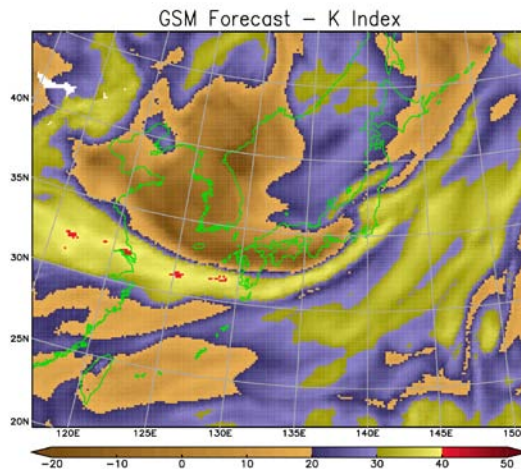
00UTC
Jan 5, 2011



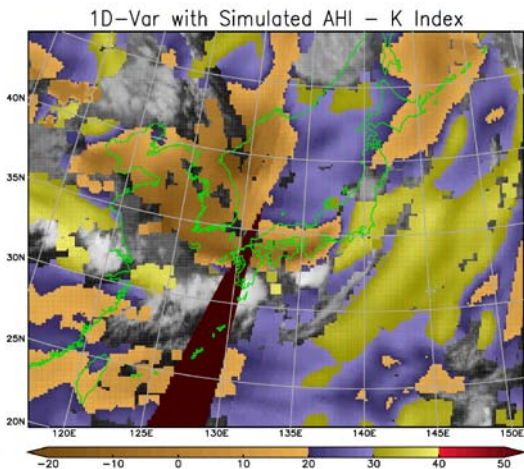
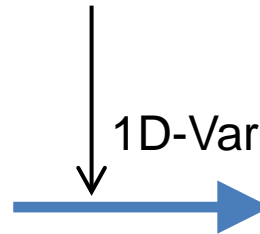
(for Comparison)
MTSAT-2 IR1



Simulated AHI from IASI



Forecast Model K-Index



K-Index with Simulated AHI

Under Development

- Verification
 - against sonde observation, MWRI TCPW, LIDEN (lighting detection network system), etc.
- Cloud screening
- Emissivity on the land
- Observation error and background error
- Channels (not only water vapor channels)
- Bias collection
- Other instability indices

END

Thank you for your attention.