An Automated, Dynamic Threshold Cloud Detection Algorithm

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1. Data Set
2. Cloud detection method
3. Discussion

Data Set

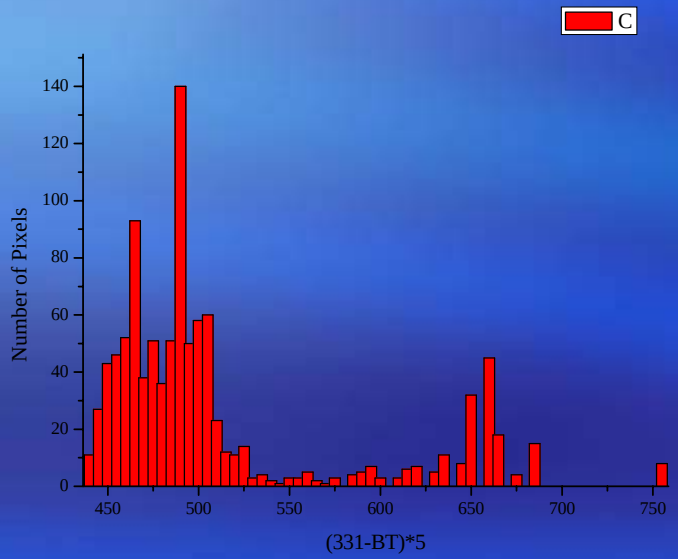
FY-2C data

CHANNEL ID	CHANNEL NAME	WAVELENGTH (μm)
IR1	Far infrared	10.3-11.3
IR2	Infrared split	11.5-12.5
IR3	Water vapor	6.5-7.3
Ir4	Near infrared	3.5-4.0
VIS	Visible	0.55-0.90

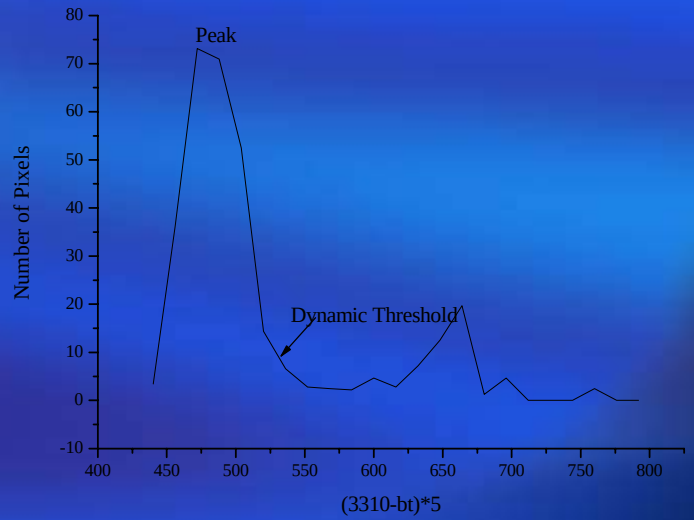
Cloud Detection Method

1. **Getting dynamic cloud detection threshold for 32*32 pixels area by histogram analysis**
   - Different surface type
   - DEM modify
2. **Cloud detection threshold validation**
   - Curve fit to check threshold
3. **Cloud detection**
   - Dynamic threshold
   - Multi-channel data

Dynamic Threshold

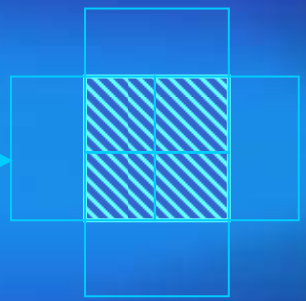


original histogram analysis



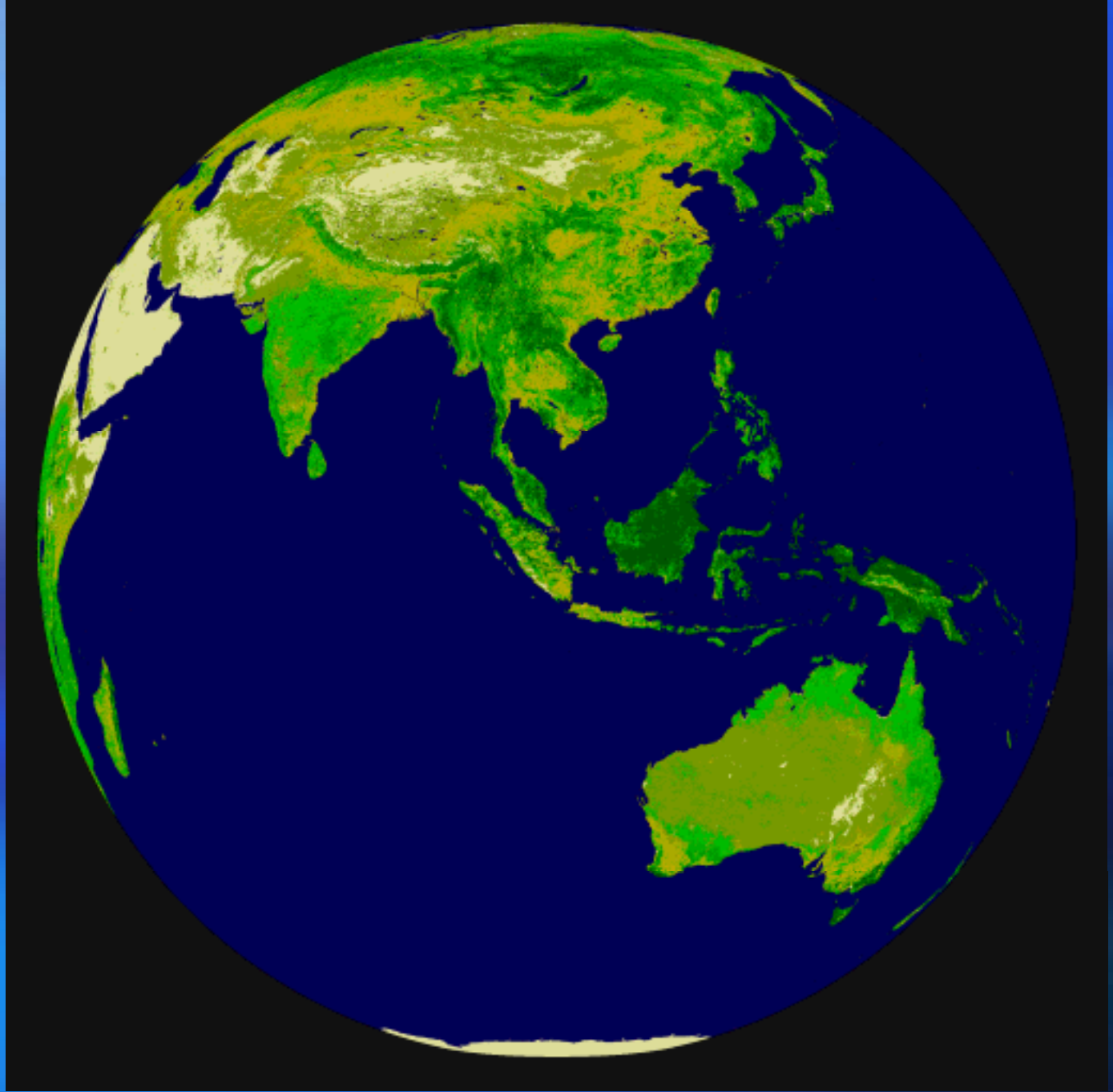
smoothed histogram

- area average processing

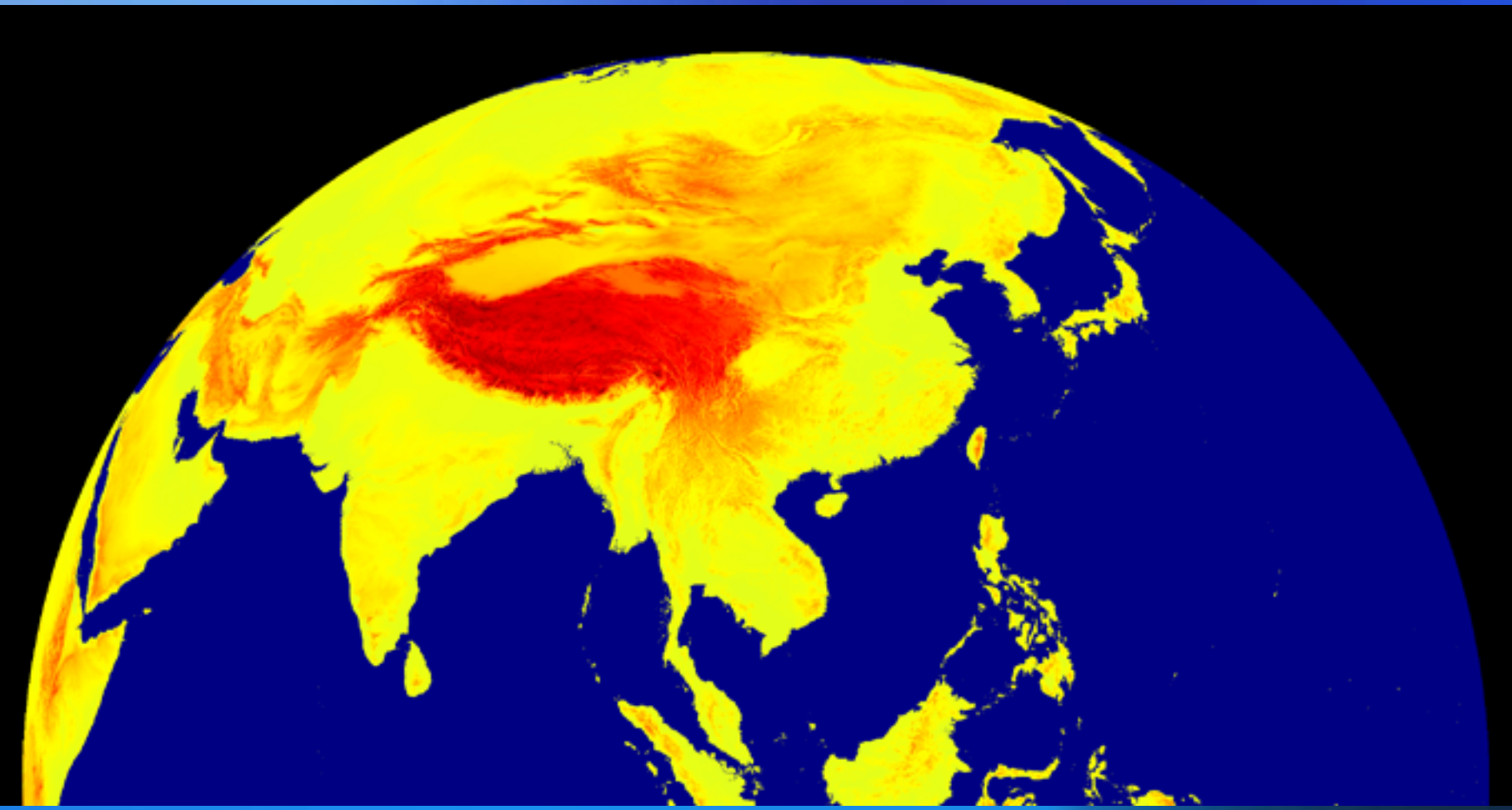


Land

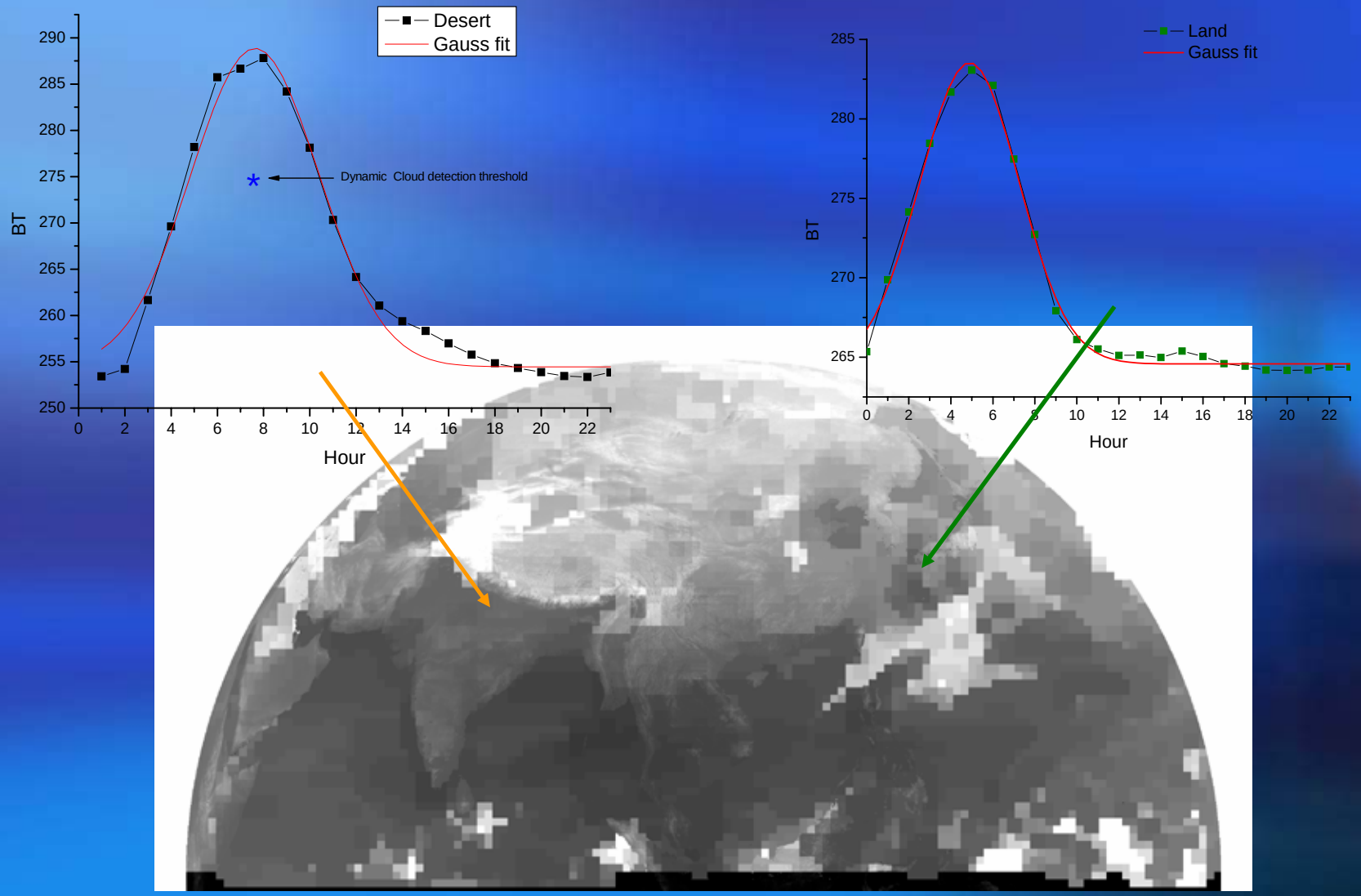
Mask



Using DEM data to modify dynamic threshold



❖ threshold validation_update dynamic threshold

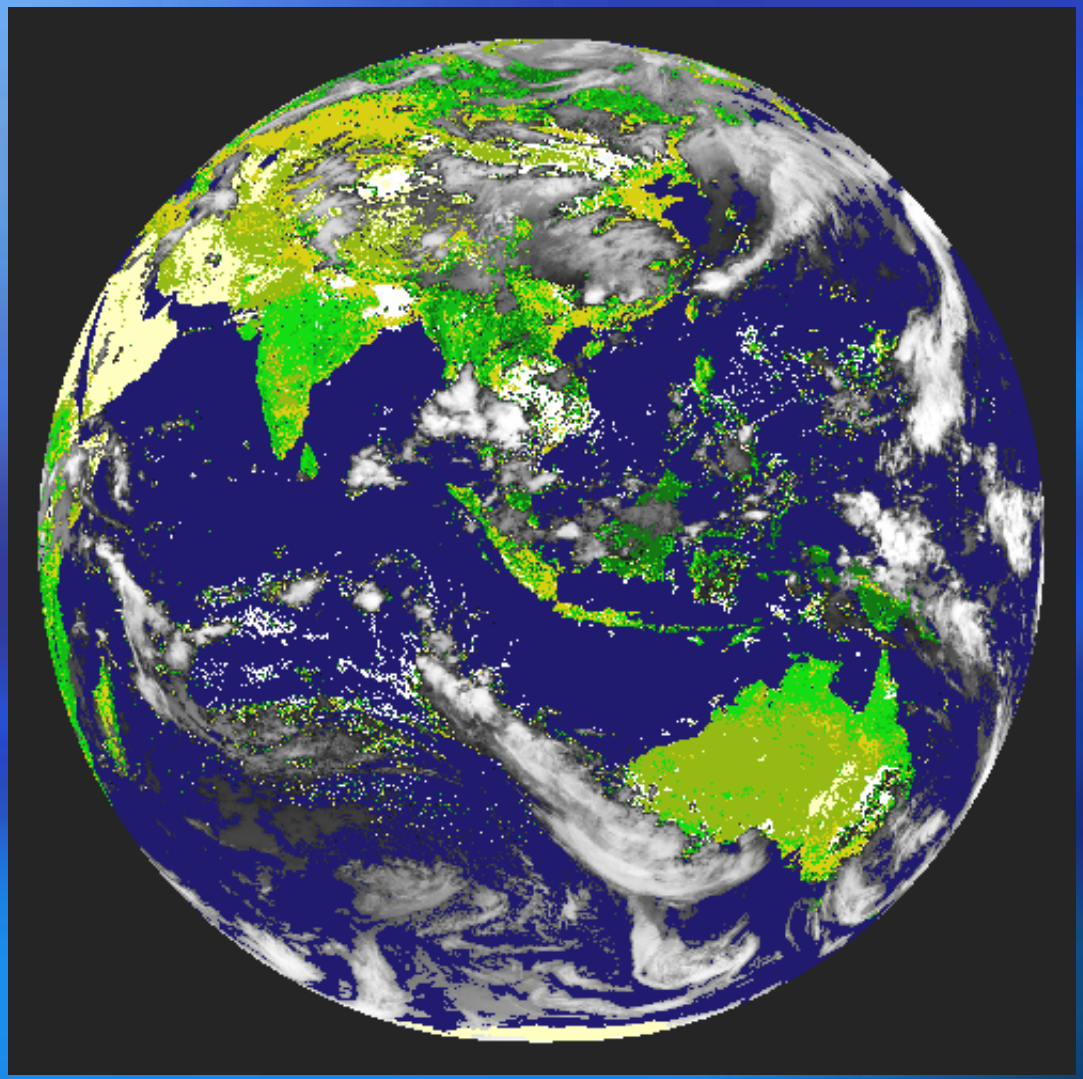


Cloud Detection

1. Dynamic threshold method
2. Visible channel data
3. Deviation analysis
4. Relationship analysis _Brightness difference
   - infrared & water vapor channel
   - infrared split channel
4. Multi-day composed brightness temperature

Case study

CLD image



Discussion

1. The algorithm performs well for most area.
2. In high latitude regions, the cloud detecting methods failed sometimes due to strong surface temperature inversions.
3. Some surface conditions may make this approach inappropriate, most notably over snow and ice condition.
4. Some cloud types such as thin cirrus, low stratus at night, and small cumulus are difficult to detect because of insufficient contrast with the surface radiance.

Thanks