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

<table>
<thead>
<tr>
<th>CHANNEL ID</th>
<th>CHANNEL NAME</th>
<th>WAVELENGTH (μm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IR1</td>
<td>Far infrared</td>
<td>10.3-11.3</td>
</tr>
<tr>
<td>IR2</td>
<td>Infrared split</td>
<td>11.5-12.5</td>
</tr>
<tr>
<td>IR3</td>
<td>Water vapor</td>
<td>6.5-7.3</td>
</tr>
<tr>
<td>Ir4</td>
<td>Near infrared</td>
<td>3.5-4.0</td>
</tr>
<tr>
<td>VIS</td>
<td>Visible</td>
<td>0.55-0.90</td>
</tr>
</tbody>
</table>
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

Dynamic Threshold area average processing
Using DEM data to modify dynamic threshold
threshold validation_update dynamic threshold

Desert
Gauss fit

Dynamic Cloud detection threshold

Land
Gauss fit

Hour
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