Advanced Image Compositing Techniques

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Outline

- Project overview
- IMGPARM
- COMP_ALLBAND
- Current results
Project Overview

• Combine data from polar and geostationary satellites to track clouds in high latitudes
  • Geostationary satellites are good up to 50°-60° latitude
  • Polar orbiting satellites are good poleward of 70° latitude
• This technique is designed to ‘fill the gap’
Project Issues

- Accounting for inter-satellite calibration differences
- Correcting for parallax in viewing the cloud tracers from different satellites and instruments
- Using the pixel time within the composite that corresponds to the viewing by each satellite when computing cloud velocity
## IMGParm: Create multi-band files

<table>
<thead>
<tr>
<th>Band</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Grayscale values (brightness temperature)</td>
</tr>
<tr>
<td>2</td>
<td>Time difference from nominal time (sec)</td>
</tr>
<tr>
<td>3</td>
<td>Distance from satellite subpoint (km)</td>
</tr>
<tr>
<td>4</td>
<td>Pixel area (km$^2$)</td>
</tr>
<tr>
<td>5</td>
<td>McIDAS Satellite Sensor number (SS)</td>
</tr>
<tr>
<td>6</td>
<td>Wavelength</td>
</tr>
<tr>
<td>7</td>
<td>Parallax distance (km*10)</td>
</tr>
<tr>
<td>8</td>
<td>Parallax direction (degrees)</td>
</tr>
</tbody>
</table>
COMP_ALLBAND

- All IMGPARM files are remapped with REMAP2 into a common projection.
- COMP_ALLBAND then combines many IMGPARM files into a single file.
- Choose highest resolution pixel.
- Ensure pixels are in time range.
- Retain all IMGPARM bands.
Example composite

Satellite ID number

Infrared composite
Pixel Time (Difference from a nominal time)

- Blue: 0 to 15 minutes before nominal time
- Green: 0 to 15 minutes after nominal time
Pixel Distance (km) from Subpoint
Pixel Area (km$^2$)
Parallax Distance (km)
Satellite-derived winds

- Triplets of ½ hourly composites
- Composite building delayed by 3 hours
- Wind flags (blue) at all levels
- Potential targets (green) not tracked due to overlapping satellite data

Arctic for 21 October 2010
Summary

- **IMGPARM, REMAP2, COMP_ALLBAND process:**
  - 3-hour delay before running process
  - Up to 60 input files every 15 minutes
  - Each polar region takes about 3 minutes
  - ADDE dataset (images and winds)
    - DATALOC ADD LEOGEO LEOGEO.SSEC.WISC.EDU
  - Composite with winds overlayed (LEO-GEO):
    - [http://stratus.ssec.wisc.edu/products/rtpolarwinds/](http://stratus.ssec.wisc.edu/products/rtpolarwinds/)
- **IMGPARM and COMP_ALLBAND** will be in McIDAS-XRD