McIDAS-X Software Development and Demonstration

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Overview

• McIDAS-X 2015.2, 2016.1, 2016.2
• McIDAS-XCD 2015.2, 2016.2
• Software development and plans for 2017 and beyond…
Imagery
GOES-R ABI

• ABI ADDE servers released
  • Level 1B
  • Level 2+ products
• Navigation routines support satellite and sun angles through NAVCALC
Imagery
Himawari

- HimawariCast ADDE server (*WARC*)
  - Himawari AHI data reshaped as MTSAT and broadcast by JMA in HRIT format
- Updates for Himawari data (*WARF*)
  - Correct time for Japan and Target sectors
  - SIZE=SAME with MAG= specification
  - Displays partial images
Imagery
Meteosat

- Updates to ADDE servers for Meteosat-11
- MSG Level 1.5 support (*MSGS*)
- First release of ADDE server for native format of current Meteosat data broadcast by EUMETSAT
Imagery
India

• Kalpana (KPH5) ADDE server released
• Updates for calibration for INSAT-3D Imager and Sounder ADDE servers
Imagery
TDWR radar products

- 256-level Base Reflectivity
- 16-level Base Velocity
- 8-level Base Spectrum Width
- 16-level long range Base Reflectivity
Imagery
NEXRAD Level III

• GINI server updated for NEXRAD Level III composite imagery
Imagery
Meteosat-7

- *MSAT* and *OMTP* ADDE servers

```
IMGLIST INDOEX/FD FORM=ALL
Image file directory listing for:INDOEX/FD
Pos Satellite/          Date       Time   Center    Res (km)   Image_Size
sensor
----- --------------- ------ ----- ------- ------ --------------
1560 METEOSAT7  2 JUN 16154 12:00:00 0 -57
Band: 1  0.75 um VIS Cloud and Surface Features  2.26 2.25  5000 x 5000
Band: 8  11.5 um IR Surface/Cloud-top Temp     4.52 4.49  2500 x 2500
Band: 10 6.9 um IR Mid-level Water Vapor        4.52 4.49  2500 x 2500
proj: 0 created: 2016154 120000 memo: Open MTP Format corrected time
type:MSAT cal type:RAW
offsets: data= 768 navigation= 256 calibration= 0 auxiliary= 0
doc length: 0 cal length: 0 lev length: 0 PREFIX= 0
valcod: 0 zcor: 1 avg-smp: A
start yyddd: 2016154 start time:120000 start scan: 1
lcor: 1 ecor: 1 bytes per pixel: 1 ss: 58
Resolution Factors (base=1): Line= 2.0 Element= 2.0
IMGLIST: done
```
FSD (LRIT) server update

MET7

DSSERVE ADD FSD/MET7 FSDX TYPE=IMAGE DIRFILE=/home/mcuser/inquiry-data/mcidas-x/15564/MET7/*

Adding the group FSD as a local dataset

<table>
<thead>
<tr>
<th>Group/Descriptor</th>
<th>Type</th>
<th>Format &amp; Range</th>
<th>RT Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSD/MET7</td>
<td>IMAGE FSDX</td>
<td>DIRFILE=/home/mcuser/inquiry-data/mcidas-x/15564/MET7/*</td>
<td></td>
</tr>
</tbody>
</table>

DSSERVE: done
Imagery
Multi-day requests GOES archive

• **IMGLIST** can span days for GOES archive requests

<table>
<thead>
<tr>
<th>Pos</th>
<th>Satellite/sensor</th>
<th>Date</th>
<th>Time</th>
<th>Center Lat</th>
<th>Center Lon</th>
<th>Band(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>G-13 IMG</td>
<td>5 Nov 16310</td>
<td>08:45:00</td>
<td>0</td>
<td>80</td>
<td>1-4,6</td>
</tr>
<tr>
<td>4</td>
<td>G-13 IMG</td>
<td>5 Nov 16310</td>
<td>11:45:00</td>
<td>0</td>
<td>80</td>
<td>1-4,6</td>
</tr>
<tr>
<td>5</td>
<td>G-13 IMG</td>
<td>5 Nov 16310</td>
<td>14:45:00</td>
<td>0</td>
<td>80</td>
<td>1-4,6</td>
</tr>
<tr>
<td>11</td>
<td>G-13 IMG</td>
<td>6 Nov 16311</td>
<td>08:45:00</td>
<td>0</td>
<td>80</td>
<td>1-4,6</td>
</tr>
<tr>
<td>12</td>
<td>G-13 IMG</td>
<td>6 Nov 16311</td>
<td>11:45:00</td>
<td>0</td>
<td>80</td>
<td>1-4,6</td>
</tr>
<tr>
<td>13</td>
<td>G-13 IMG</td>
<td>6 Nov 16311</td>
<td>14:45:00</td>
<td>0</td>
<td>80</td>
<td>1-4,6</td>
</tr>
</tbody>
</table>
Imagery

- IMGPROBE: Scan line time available for COMS and Himawari
  - Time are approximate; rectified images
- IMGCOPY SIZE=SAME MAG=-N
  - Example: 2500x2500 image MAG=-5 results in 500x500 image
Customize overlap region
– reduces parallax errors

GOES-West/East
5km Parallax Overlap

Accurate Cloud Coverage
Imagery (XRD)
IMGCHECK

• Statistics on entire image (1-byte BRIT values)
• Average, standard deviation, variance, histogram
Grids
New models support

• Updates for HRR, GFS, NDF, PSS
• GRIB2 tables updated for RAP, NWPS, WPC, MOS, NAEF, NBGR
• Recognize MOS GRIB2 files from Storm Prediction Center
Grids
Updates

• PUNIT keyword
  • Preferred Unit when mixed mb and hPa
• CONTOUR.DEF
  • Handle grids correctly with units of Pa
• Native units
  • More Pa and hPa checking
Point
Cloud cover

• Use of cloud cover symbols with PTDISP and SFCPLOT:
  • Symbols using parameters CIGC, CC1, CC2 with FORMAT=SYMB
  • Default for station location
  • Open circle for no clouds reported
Point

Upper Air

- Correction to upper air calculations
  - When LFC is below the LCL, it is made equal to LCL
- Precipitable water (PW) calculation from SFC to 300 hPa (previously it was 500 hPa)
- Update to all upper air commands to use all significant level data
### LFC/LCL, Precipitable water calculation adjustments for UA* commands

<table>
<thead>
<tr>
<th>Parcel Definition for 100 mb Boundary Layer: 1200 UTC 01 May 1989121</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dewpoint Temperature (TD) = 19.6 C</td>
</tr>
<tr>
<td>Potential Temperature (Th) = 296.9 K</td>
</tr>
<tr>
<td>Equivalent Potential Temperature (ThE) = 336.7 K</td>
</tr>
<tr>
<td>Mixing Ratio (MIX) = 15.0 g/kg</td>
</tr>
</tbody>
</table>

**Stability Indices and Levels:**

**Lifted Condensation Level (LCL)** = 946 mb
Temperature at LCL (Tt) = 19.1 C
**Level of Free Convection (LFC)** = 946 mb
Equilibrium Level (EL) = 277 mb
Convective Temperature (CVT) = 22.4 C
Forecast Maximum Temperature (FMAX) = 28.5 C

- K Index (KI) = 5.2
- Lifted Index (LI) = -1.3
- Severe WEather Threat Index (SwI) = 277.7
- Showalter Index (ShI) = 12.6
- Total Totals Index (TTI) = 25.9

**Precipitable Water (PW)** = 29.7 mm

**Energy Analysis:**

- Helicity (HELI) = 600 m**2/s**2
- Convective Available Potential Energy (CAPE) = 591 J/kg
- Convective Inhibition (CIN) = 34 J/kg

**Theta-E for Forecast Maximum Temperature** = 340 K
**CAPE for Forecast Maximum Temperature** = 1100 J/kg

- Maximum Theta-E at or below 300 mb = 345 K
- Pressure Level of Maximum Theta-E = 1016 mb
- CAPE for Maximum Theta-E = 2042 J/kg
UACROSS with more than 100 levels

UACROSS KMIA KGRB SIG=YES PARAM=THA WINDB

New -XCD

Current -XCD
Point Updates

• Correctly interpret missing grid points with math calculations and contouring
• DAY= keyword added to RAOBPLOT, RAOBCON, SFCPLOT, SFCCON to access archive server
PTLIST computed parameters with missing values

<table>
<thead>
<tr>
<th>ID</th>
<th>ST TIME</th>
<th>CIGC</th>
<th>CC1</th>
<th>CC2</th>
<th>TCOV</th>
</tr>
</thead>
<tbody>
<tr>
<td>KMSN</td>
<td>WI 100000</td>
<td>2</td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>KMSN</td>
<td>WI 110000</td>
<td>5</td>
<td>1</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>KMSN</td>
<td>WI 120000</td>
<td>5</td>
<td>1</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>KMSN</td>
<td>WI 130000</td>
<td>2</td>
<td></td>
<td></td>
<td>8</td>
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<tr>
<td>KMSN</td>
<td>WI 140000</td>
<td>2</td>
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<td>WI 150000</td>
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<td>KMSN</td>
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<td>WI 180000</td>
<td>2</td>
<td></td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

Number of matches found = 9

PTLIST: Done
Miscellaneous

- WWDISP/WWLIST: Blizzard Watch enabled
- FRMLABEL/ZA: DESC placeholder added to list band description of an image
WXSYMB (-XRD)
Miscellaneous

- GZIP/GUNZIP included for ADDE
- Updated AWIPS servers for north pole projection
- Update to maps and station database (NOAA sources)
- Increased maximum number of points for PTCON to 10,000,000
Miscellaneous

• Improved handling of large grids
• Added display swath width to NAVDISP for Fengyun and Metop satellites
Access to large grids
Change in g2clib code vs. Using --ulimit
NAVDISP of Metop AVHRR
.....and beyond

• VIIRS ADDE Server to –XRD planned
  • Limited functionality
• Multi-band transfers for GOES-R ABI
• Increase maximum image size beyond 4096 elements (graphics limitation)
• Next generation ADDE servers
VIIRS ADDE Server

Left half of VIIRS granule with bowtie deletion