Outline

Opportunity: project background
Challenge: problem and solution
Preliminary Progress
Summarization
1. Opportunity: project background

30 years’ Chinese historical Satellite data (2018-2022)

- Meteorology: 16 satellites
- Ocean: 3 satellites
- Land: 9 satellites

Amount √ Quality ?
In 1998, Pathfinder project was proposed by NOAA and NASA for reprocessing AVHRR, TOVS, GEOS, SSM/I.

In 2010, GCOS proposed satellite observed ECV concept, ESA started CCI (Climate Change Initiative), including 14 ECV products.

CEOS WGCV proposed QA4ECV plan, aiming at an internationally recognized QA framework, providing understandable and traceable quality.

C3S was proposed coordinating with Copernicus space program, FIDUCEO and GAIA-CLIM were funded.

Satellite based climate dataset construction was supported by Chinese 11th and 12th Five-Year plans, mainly using overseas satellites.

Calibration is the core of data reprocessing.
Retrospective Calibration of Historical Chinese Earth Observation Satellite Data (RICH-CEOS)

National Key R&D Program of China
Founded since 2018

RICH-FY: Chinese Meteorological Satellites
RICH-ZY: Chinese Land Resources Satellites
RICH-HY: Chinese Marine Satellites

18 Institutions Involved

National Satellite Meteorological Centre (NSMC)
National Satellite Ocean Application Center (NSOAC)
China Center for Resources Satellite Date and Application (CRESDA)
### FY: 13 satellites and 7 instruments

<table>
<thead>
<tr>
<th>Satellite</th>
<th>Instrument</th>
<th>Wavelength</th>
<th>Total Channel No.</th>
<th>Spatial Resolution</th>
<th>Lifetime</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY-1A</td>
<td>VIRR</td>
<td>0.48 – 12.5 μm</td>
<td>5</td>
<td>1.1 km</td>
<td>1988.9.8 (1988.9.7) – 1988.10.17 (1988.10.17)</td>
</tr>
<tr>
<td>FY-1B</td>
<td>VIRR</td>
<td>0.48 – 12.5 μm</td>
<td>5</td>
<td>1.1 km</td>
<td>1990.9.3 (1990.9.3) – 1991.2.15 (1991.2.15)</td>
</tr>
<tr>
<td>FY-1C</td>
<td>VIRR</td>
<td>0.43 – 12.5 μm</td>
<td>10</td>
<td>1.1 km</td>
<td>1999.5.10 (1999.5.10) – 2004.4.26 (2004.4.26)</td>
</tr>
<tr>
<td>FY-1D</td>
<td>VIRR</td>
<td>0.43 – 12.5 μm</td>
<td>10</td>
<td>1.1 km</td>
<td>2002.5.15 (2002.5.15) – 2012.4.4 (2012.4.1)</td>
</tr>
<tr>
<td>FY-2A</td>
<td>VISSR</td>
<td>0.5 – 12.5 μm</td>
<td>3</td>
<td>1.25 km, 5 km</td>
<td>1997.6.10 (1997.6.10) – 1998.2.12 (1998.2.12)</td>
</tr>
<tr>
<td>FY-2B</td>
<td>VISSR</td>
<td>0.5 – 12.5 μm</td>
<td>3</td>
<td>1.25 km, 5 km</td>
<td>2000.5.27 (2000.5.27) – 2005.6.25 (2005.6.2)</td>
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<tr>
<td>FY-2C</td>
<td>VISSR</td>
<td>0.5 – 12.5 μm</td>
<td>5</td>
<td>1.25 km, 5 km</td>
<td>2004.10.27 (2004.10.19) – 2010.8.2 (2010.8.2)</td>
</tr>
<tr>
<td>FY-2D</td>
<td>VISSR</td>
<td>0.5 – 12.5 μm</td>
<td>5</td>
<td>1.25 km, 5 km</td>
<td>2006.12.19 (2006.12.8) – 2015.6.30 (2015.6.30)</td>
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<tr>
<td>FY-2E</td>
<td>VISSR</td>
<td>0.5 – 12.5 μm</td>
<td>5</td>
<td>1.25 km, 5 km</td>
<td>2009.2.17 (2008.12.23) – 今</td>
</tr>
<tr>
<td>FY-2G</td>
<td>VISSR</td>
<td>0.5 – 12.5 μm</td>
<td>5</td>
<td>1.25 km, 5 km</td>
<td>2016.6.3 (2014.12.31) – 今</td>
</tr>
<tr>
<td>FY-3A</td>
<td>VIRR</td>
<td>0.43 – 12.5 μm</td>
<td>10</td>
<td>1.1 km</td>
<td>2008.5.29 (2008.5.27) – 2018.3.6 (2018.3.6)</td>
</tr>
<tr>
<td>MERSI 1</td>
<td>0.41 – 11.25 μm</td>
<td>20</td>
<td>250 m, 1 km</td>
<td>2008.6.2 (2008.5.27) – 2018.2.11 (2018.3.6)</td>
<td></td>
</tr>
<tr>
<td>IRAS</td>
<td>0.69 – 1.6 μm &amp; 3.76 – 14.95 μm</td>
<td>26</td>
<td>17 km</td>
<td>2008.6.26 (2008.5.27) – 2016.8.13 (2018.3.6)</td>
<td></td>
</tr>
<tr>
<td>MWTS 1</td>
<td>50 – 57 GHz</td>
<td>4</td>
<td>50 – 60 km</td>
<td>2008.6.8 (2008.5.27) – 2013.5.6 (2018.3.6)</td>
<td></td>
</tr>
<tr>
<td>MWHS 1</td>
<td>150 GHz, 183 GHz</td>
<td>5</td>
<td>15 km</td>
<td>2008.5.31 (2008.5.27) – 2016.8.13 (2018.3.6)</td>
<td></td>
</tr>
<tr>
<td>MWRI</td>
<td>10 – 89 GHz</td>
<td>10</td>
<td>12 – 75 km</td>
<td>2008.6.6 (2008.5.27) – 2015.5.18 (2018.3.6)</td>
<td></td>
</tr>
<tr>
<td>FY-3B</td>
<td>VIRR</td>
<td>0.43 – 12.5 μm</td>
<td>10</td>
<td>1.1 km</td>
<td>2010.11.18 (2010.11.5) – 今</td>
</tr>
<tr>
<td>MERSI 1</td>
<td>0.41 – 11.25 μm</td>
<td>20</td>
<td>250 m, 1 km</td>
<td>2010.11.18 (2010.11.5) – 今</td>
<td></td>
</tr>
<tr>
<td>IRAS</td>
<td>0.69 – 1.64, 3.76 – 14.95 μm</td>
<td>26</td>
<td>17 km</td>
<td>2010.11.18 (2010.11.5) – 今</td>
<td></td>
</tr>
<tr>
<td>MWTS 1</td>
<td>50 – 57 GHz</td>
<td>4</td>
<td>50 – 60 km</td>
<td>2010.11.18 (2010.11.5) – 2014.2.21</td>
<td></td>
</tr>
<tr>
<td>MWHS 1</td>
<td>150 GHz, 183 GHz</td>
<td>5</td>
<td>15 km</td>
<td>2010.11.18 (2010.11.5) – 今</td>
<td></td>
</tr>
<tr>
<td>MWRI</td>
<td>10 – 89 GHz</td>
<td>10</td>
<td>12 – 75 km</td>
<td>2010.11.18 (2010.11.5) – 今</td>
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</tr>
<tr>
<td>FY-3C</td>
<td>VIRR</td>
<td>0.43 – 12.5 μm</td>
<td>10</td>
<td>1.1 km</td>
<td>2013.9.25 (2013.9.23) – 今</td>
</tr>
<tr>
<td>MERSI 1</td>
<td>0.41 – 11.25 μm</td>
<td>20</td>
<td>250 m, 1 km</td>
<td>2013.9.30 (2013.9.23) – 2015.5.30</td>
<td></td>
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<tr>
<td>IRAS</td>
<td>0.69 – 1.64, 3.76 – 14.95 μm</td>
<td>26</td>
<td>17 km</td>
<td>2013.9.29 (2013.9.23) – 今</td>
<td></td>
</tr>
<tr>
<td>MWTS 2</td>
<td>50 – 57 GHz</td>
<td>4</td>
<td>50 – 60 km</td>
<td>2013.9.30 (2013.9.23) – 今</td>
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<tr>
<td>MWHS 2</td>
<td>150 GHz, 183 GHz</td>
<td>5</td>
<td>15 km</td>
<td>2013.9.30 (2013.9.23) – 今</td>
<td></td>
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<tr>
<td>MWRI</td>
<td>10 – 89 GHz</td>
<td>10</td>
<td>12 – 75 km</td>
<td>2013.9.29 (2013.9.23) – 今</td>
<td></td>
</tr>
</tbody>
</table>
Goal for FY series: FCDR

Instruments:
- **VIRR**: FY-1A/B/C/D FY-3A/B/C
- **MERSI/IRAS/MWTS/MWHS/MWRI**: FY-3A/B/C
- **VISSR**: FY-2A/B/C/D/E/G

Accuracy:
- **RSB**: 8%(R&D), 5%(O)
- **TIR**: 1K(R&D), 0.5K(O)
- **MW**: 1K(Absorption), 1.5K(Window)
2. Challenges: problem and solution

Calibration Procedure

- Prelaunch Calibration
  - laboratory test with linear & nonlinear characteristics of onboard calibration system

- Observed DN

- RT Calibration
  - On-orbit operational calibration

- SDR

- On-orbit Performance Monitoring system

- Offline Calibration/ Re-Calibration
  - Validation and Correction with traceable Reference

- FCDR

Peng Zhang, et al. A.A.S., 2019
Difficulties Faced:

Radiometric Traceability of satellite sensors

- Uncertainty of calibration source
- Detector Response (SNO, nonlinearity)
- Variation of satellite operation environment status
- Degradation of instrument performance
- Contamination of Instrument
Onboard Calibration System

- **State of art:** International: visible 2%, infrared 0.2K, stability <1%
- **Fengyun:** visible 7-10%, infrared 1-1.5K, stability?
- **Fengyun:** Large change before and after launch, poor in-orbit stability

### Onboard Calibration System on FY-2 and FY-3 satellites

<table>
<thead>
<tr>
<th>Spectral band</th>
<th>On-board calibration</th>
<th>Instrument</th>
<th>uncertainties</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UV bands</strong></td>
<td>Sun + diffuse reflector</td>
<td>TOU/FY-3</td>
<td>1) State change before and after launch</td>
</tr>
<tr>
<td></td>
<td>Mercury lamp + solar continuous spectrum</td>
<td>SBUS/FY-3</td>
<td>2) Attenuation of diffuse reflector</td>
</tr>
<tr>
<td><strong>Visible and NIR bands</strong></td>
<td>VOC: small integrating sphere with diameter of 6 cm, light beam expanding system, trap detector</td>
<td>MERSI/FY-3</td>
<td>1) State change before and after launch</td>
</tr>
<tr>
<td></td>
<td>Moon observation</td>
<td>MERSI/FY-3C</td>
<td>2) Degradation</td>
</tr>
<tr>
<td></td>
<td>Tungsten halogen lamp</td>
<td>ERM/FY-3</td>
<td>Moon model accuracy</td>
</tr>
<tr>
<td></td>
<td>Absolute radiometer</td>
<td>SIM/FY-3</td>
<td>1) State change before and after launch</td>
</tr>
<tr>
<td></td>
<td>Onboard blackbody + space view</td>
<td>VISSR/FY-2</td>
<td>2) Degradation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VIRR/FY-3</td>
<td>3) Accuracy and changes in blackbody emissivity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MERSI/FY-3</td>
<td>4) Extent of the cold space contaminated by radiation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IRAS/FY-3</td>
<td></td>
</tr>
<tr>
<td><strong>Infrared bands</strong></td>
<td>Onboard blackbody (two temperature points)</td>
<td>ERM/FY-3</td>
<td>1) State change before and after launch</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2) Blackbody temperature control accuracy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3) Accuracy and changes in blackbody emissivity</td>
</tr>
<tr>
<td><strong>Microwave bands</strong></td>
<td>Onboard blackbody + space view</td>
<td>MWTS/FY-3</td>
<td>1) State change before and after launch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MWHS/FY-3</td>
<td>2) Blackbody temperature control accuracy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MWRRI/FY-3</td>
<td>3) Accuracy and changes in blackbody emissivity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4) Extent of the cold space contaminated by radiation</td>
</tr>
</tbody>
</table>
FY-2 VISSR onboard calibration system

Semi-optical path calibration system

Calibration Uncertainty about 2~8K on TIR bands
FY-3 MWRI onboard Calibration System

Calibration Uncertainty about 0.2~0.4K on MW bands
Nonlinearity comparison among Microwave sounding instruments (vacuum calibration test)

<table>
<thead>
<tr>
<th>CH</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fre. (GHz)</td>
<td>23.8</td>
<td>31.4</td>
<td>50.3</td>
<td>51.76</td>
<td>52.8</td>
<td>53.596±0.115</td>
<td>54.4</td>
<td>54.94</td>
<td>55.5</td>
<td>f0±57.29</td>
<td>f0±0.322</td>
<td>f0±0.3222±0.048</td>
</tr>
<tr>
<td>SNPP ATMS (K)</td>
<td>0.3</td>
<td>0.4</td>
<td>0.1</td>
<td>-0.08</td>
<td>-0.05</td>
<td>-0.08</td>
<td>0.07</td>
<td>0.1</td>
<td>0.1</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>FY-3D MWTS MWHS (K)</td>
<td>-0.48</td>
<td>-0.99</td>
<td>-0.73</td>
<td>-0.59</td>
<td>-0.65</td>
<td>-0.64</td>
<td>-0.58</td>
<td>-0.80</td>
<td>-0.82</td>
<td>-0.80</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CH</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fre. (GHz)</td>
<td>f0±0.3222±0.022</td>
<td>f0±0.3222±0.010</td>
<td>f0±0.3222±0.0045</td>
<td>88.2</td>
<td>165.5</td>
<td>183.31±7</td>
<td>183.31±4.5</td>
<td>183.31±3</td>
<td>183.31±1.8</td>
<td>183.31±1</td>
</tr>
<tr>
<td>SNPP ATMS (K)</td>
<td>0.5</td>
<td>0.4</td>
<td>0.5</td>
<td>0.2</td>
<td>0.4</td>
<td>0.2</td>
<td>0.2</td>
<td>0.3</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>FY-3D MWTS MWHS (K)</td>
<td>-0.96</td>
<td>-0.75</td>
<td>-0.58</td>
<td>2.7</td>
<td>0.9</td>
<td>3.4</td>
<td>1.9</td>
<td>0.9</td>
<td>0.2</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Satellite Environment Status:

VISSR/FY-2 radiometric uncertainty affected by relay mirror temperature

Note that the ct'=1023-ct
Satellite Environment Status: all-life-time model

Temperature Status of IRAS/FY-3b

- deck temperature variation of FY-3B satellite
- temperature variation of FY-3B IRAS optical system
FY Polar orbit drift (Local time at descending node)
How to make the historic data traceable to the reference?

SI Traceability
Solution

- Historic Status Document Re-building
- Onboard Calibration Model Re-building
- Reference/Bench mark Collection (model reanalysis dataset, PICs, Lunar, DCC, reference instrument, Gruan, etc.)

Re-building

Re-procedure
Onboard Calibration Model Re-building

Passive Microwave Sensor

- Theoretical modeling
- Experiment testing
- Application testing and iteration improvement
### Calibration Reference

<table>
<thead>
<tr>
<th>Calibration Reference</th>
<th>Accuracy</th>
<th>Source</th>
</tr>
</thead>
</table>
| **CRCS** *(China Remote Sensing Satellite Radiometric Calibration Site)* | Reflectance: 15-30%  
Stability: 1-2%  
Directional effect: Yes  
Spectral: Smooth but not flat  
Accuracy: 3-5% | **Hu et al, 2010**  
**Chen et al, 2017**                                      |
| **PICS (Pseudo Invariant Calibration Site)**               | Reflectance: 15~50%  
Stability:  
Directional effect: Yes  
Spectral:  
Accuracy: 3%±2% | **H. Cosnafroy, 1996**  
**Y. M. Govaerts, 2004**  
**G. Chander, 2007**;  
**P. M. Teillet, 2007**  
**Sun et al., 2012**  
**Mishra et al., 2014**  
**Wang et al., 2018**                       |
| **DCC (Deep convective cloud)**                            | Reflectance: 80-90%  
Stability: 1-2%  
Directional effect: Yes  
Spectral: flat  
Accuracy: 3-5% | **B. Fougnie, 2009**  
**B. J. Sohn, 2009**                       |
| **Liquid Water Cloud (LWC)**                              | Reflectance: 20-70%  
Stability: 3%  
Directional effect: obvious  
Spectral: flat  
Accuracy: 5% | **Ham & Sohn, 2010**  
**B.J. Soh, 2013**                                      |
### Passive optical instruments: radiometric reference (2/3)

<table>
<thead>
<tr>
<th>Calibration Reference</th>
<th>Accuracy</th>
<th>Source</th>
</tr>
</thead>
</table>
| **Rayleigh Scattering** | Reflectance: 5~10%  
Stability: 1~2%  
Directional effect: Yes  
Accuracy: 3~5% | E. Vermote, 1992  
E. Dilligeard, 1997  
O. Hagolle, 1999 |
| **Sun glint** | Reflectance: 5~50%  
Stability: 1%  
Directional effect: Yes  
Accuracy: 1~2%  
High degree of polarization; Fat spectrum;  
Reflectance depends on observation geometry and sea surface roughness | C. Cox and W. Munk, 1954;  
B. Toubbé, 1999;  
O. Hagolle, 2004; |
| **Snow** | Reflectance: >90%(300-700 nm)  
Stability: 1.5%  
Directional effect: Yes  
Spectral: flat (<700)  
Accuracy: 2% | Masonis et al., 2001  
Wu et al., 2009  
Wang et al., 2019 |
| **Moon** | Reflectance: ~7%  
Stability: 10^-8/year  
Directional effect: Yes  
Spectral: flat  
Uncertainty: 5-10% (ROLO) | Kieffer and Stone, 2005  
Miller and Turner, 2009  
Zhang, et al., 2017 |
## Passive optical instruments: radiometric reference (3/3)

<table>
<thead>
<tr>
<th>Reference Instrument</th>
<th>Accuracy</th>
<th>Source</th>
</tr>
</thead>
</table>
| HIRS                 | Stability: 0.2K  
Number of channels: 20  
Accuracy: 0.5K | L. Shi, 2013 |
| IASI                 | Stability: 0.2K  
Spectral resolution: 0.25cm⁻¹  
Accuracy: 0.2K | T. J. Hewison, 2013 |
| AIRS                 | Stability: 0.2K  
Spectral resolution: 0.625cm⁻¹  
Accuracy: 0.2K | L. Wang, 2011 |
| CrIS                 | Stability: 0.2K  
Spectral resolution: 0.625cm⁻¹  
Accuracy: 0.2K | Hui Xu, 2018  
Likun Wang, 2017 |
| MODIS                | Stability: 0.1K/1%  
Number of channels: 36  
Accuracy: 0.2K (IR); 2% (RSB) | A. K. Heidinger, 2002  
X. J. Xiong, 2010;  
C. Cao, 2008 |
| VIIRS                | Stability: 0.1K/1%  
Number of channels: 36  
Accuracy: 0.2K (IR); 2% (RSB) |        |
# Passive Microwave Sensor: Radiation Reference

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ERA5</strong></td>
<td>&lt;2.5K</td>
</tr>
<tr>
<td><strong>GRUAN</strong></td>
<td>0.6K, 6%</td>
</tr>
<tr>
<td><strong>GNSS/OR</strong></td>
<td>0.02%/5 yrs, 0.06 K/5 yrs</td>
</tr>
<tr>
<td><strong>GMI</strong></td>
<td>Accuracy&lt;0.4K, Stability &lt; 0.2K</td>
</tr>
<tr>
<td><strong>ATMS</strong></td>
<td>Channel 3-15&lt;0.75K, Other Channel &lt;1.0K</td>
</tr>
<tr>
<td><strong>AMSU</strong></td>
<td>0.5-1K</td>
</tr>
<tr>
<td><strong>MHS</strong></td>
<td>1K</td>
</tr>
<tr>
<td><strong>SSM/I FCDR</strong></td>
<td>0.5K</td>
</tr>
<tr>
<td><strong>Cool Ocean Surface</strong></td>
<td>0.27K/yr (18GHz)</td>
</tr>
<tr>
<td><strong>Cold Space</strong></td>
<td>2.72548±0.00057K, Peak wavelength 1.063mm, radiation intensity change &lt;0.2%-0.3%</td>
</tr>
<tr>
<td><strong>Microwave Calibration Field (Simao)</strong></td>
<td>Bt Change in 30d(Dry season)&lt;0.4K; Horizontal heterogeneity&lt;0.15K.</td>
</tr>
</tbody>
</table>
Pseudo-invariant sites (PICs)

Desert (19)
Salt Lake (9)
Snow (4)
Rayleigh (7)

Filled: In Use; Open: Unused
Blend Calibration

Blend Calibration was implemented for historic data re-procedure to get wide radiometric dynamic range and multiple samples.

- DCC: > 90%
- Glacier: 50-80%
- Desert: 20-30%
- Moon: 5-10%
- Ocean: < 5%
Inter-calibration with reference sensors

Direct Inter-calibration with global data matching
- Space
- Time
- Geometry
- Spectral

Indirect Inter-calibration with PICS
RSB Channels Degradation monitoring by polar glacier

FY3-A/MERSI polar RGB images
(a) Greenland; (b) DomeC

Spectral reflectance of glacier at south pole
(Grenfell et al., 1994)

FY3-A/MERSI response degradation
(Polar glacier)

FY3-A/MERSI RSB total degradation rates
RSB channels Degradation monitoring by PICS

VIRR Harmonization Check with Libya 4

Band1 (605 nm) @ Libya4

view angle <= 20 deg

TOA reflectance

Time


FY-1C
FY-1D
FY-3A
FY-3B
FY-3C
Sounding Channels Monitoring by O-B method

IRAS Data Quality Monitoring
3. Preliminary Progress

FY-3/MWHS Sounding Ch. Re-calibration by SNO

Before

MWHS . VS. MHS

After V1

Brightness Temperature of MWHS versus MHS @183±3GHz

Time


Diff T (K)

-4 -2 0 2 4 6

183 ± 3GHz

MWHS

VS. MHS

Brightnes Temperature of MWHS versus MHS @183±7GHz

Time


Diff T (K)

-14 -12 -10 -8 -6 -4 -2 0 2 4 6

183 ± 7GHz

MWHS

VS. MHS

Before

After V1

FY3A

FY3B

FY3C
FY-3/MWTS Sounding Ch. by SNO

Before

MWTS . VS. AMSUA ATMS

After Re-calibration V1

54.29GHz

54.29GHz

54.94GHz

54.94GHz
FY-3/MWRI Window Ch. By SNO

Before After Re-calibration V1
Ascending

10H

Descending

10V

Obviously improved
FY-1C/D/3 VIRR & FY-3 MERSI

Before

VIRR B2  MERSI B4 865nm

After re-calibartion V1

VIRR B2  MERSI B4 865nm
Re-calibration of FY2 VISSR RSB

Before re-calibration

Maximum Difference: 50% to 10%

FY2C~G Re-processed V1 Normalized DCC Ref

After re-calibration

# 项目计划

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## 项目1
- **光射数据历史数据再分类共性技术研发试验**
- **地球静止目标历史再标准化的建立与关键特性验证**
- **月球资源新数据的建立及序列历史实践**
- **光射数据基于多物理参数的精细应用**
- **遥感仪器长时序列变化规律与机理分析**

## 项目2
- **地球数据变化历史数据再分类共性技术研发**
- **地球资源数据再分类与再标准化应用**
- **卫星资源数据再分类共性技术研发**
- **海洋资源数据变化历史数据再分类共性技术研发**
- **海洋资源数据变化历史数据再分类共性技术研发**
- **海洋资源数据变化历史数据再分类共性技术研发**

## 项目3
- **陆地卫星数据再分类共性技术研发**
- **陆地卫星数据再分类共性技术研发**
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## 项目4
- **海洋卫星数据再分类共性技术研发**
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## 项目5
- **气象卫星数据再分类共性技术研发**
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## 总结
- **试验**
- **测试**
- **正式**
- **试验**
- **试验**

ITSC-22, Saint-Sauveur, Canada
There are 7 instruments of 13 Fengyun satellites archived data is under re-calibration.

First version of FCDR of these 7 instruments is planning to be released in the middle of 2020.

Refined onboard calibration model, multiple calibration reference or benchmark (PICS, Lunar, DCC, Reference instrument, GRUAN, NWP re-analysis, etc.) are the kernel of re-calibration procedure.

The users are encouraged to contact us and feedback are appreciated.

Inter-comparisons are expected with the similar independent space-based FCDR.
Make the data better and easier to use!