

<p>WORLD METEOROLOGICAL ORGANIZATION</p> <hr/> <p>COMMISSION FOR BASIC SYSTEMS OPEN PROGRAMME AREA GROUP ON INTEGRATED OBSERVING SYSTEMS</p> <p>EXPERT TEAM ON SATELLITE UTILIZATION AND PRODUCTS</p> <p><b>SCOPE-Nowcasting Ad-hoc Steering Group, First Meeting</b></p> <p>GENEVA, SWITZERLAND, 19-22 NOVEMBER 2013</p>	<p>SCOPE-Nowcasting-1/Doc. 5(1) REV.1 (15.XI.2013)</p> <hr/> <p>ITEM: 5</p> <p>Original: ENGLISH</p>
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**UPDATED DESCRIPTION OF SCOPE-NOWCASTING  
PILOT PROJECTS  
WITH ANNOTATIONS BY THE SECRETARIAT**

*(Submitted by the Secretariat)*

**Summary and Purpose of Document**

To all Participants:

Please read this document carefully. Based on the current description of the Project, it contains additional information (on instrument characteristics, for example) and a number of annotations and questions by the Secretariat, highlighted in **yellow**.

Please take your time to read this document and to respond to the questions raised when presenting your Project to the meeting. Your feedback by email before arriving to the meeting is very welcome (the doc is available in Word format from the Secretariat if you wish to send in tracked changes).

In the session under item 5, when presenting your Project, it is important that you focus your attention on the following questions (use [PPT template](#)):

- 1. What are the user requirements for your nowcasting product?**
- 2. Where are current gaps?**
- 3. What are the current production and delivery mechanisms for “your” type of nowcasting product?**
- 4. Where is scope for harmonization?**
- 5. Which institutions could take commitments for generating and dissemination products on a sustained basis?**

In order to advance your Project within SCOPE-Nowcasting, the meeting needs a good appreciation of these points in order to devise a way forward.

**ACTION PROPOSED:**

To carefully read this document, and to respond accordingly in presentations under item 5.

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**UPDATED DESCRIPTION OF SCOPE-NOWCASTING**  
**PILOT PROJECTS**  
**WITH ANNOTATIONS BY THE SECRETARIAT**

**22 OCTOBER 2013 (WORKING DRAFT)**

**PILOT PROJECT 1: Basic Nowcasting**

Theme:	RGB composites and enhancements, visible and infrared imagery, precipitation potential products and cloud products
Lead:	Anthony Rea (BoM) and satellite operator representatives
Region of Coverage:	WMO Region II (Asia) and Region V (South-West Pacific) (area of coverage of MTSAT-2, FY-2)
Users/Clients:	NMSs in Region II and V
User requirements	- VIS/IR imagery, 10 min latency; RGB composites, 10 min latency; Cloud masks and products <b>To be refined</b>
Current needs & gaps	<ul style="list-style-type: none"> <li>No standard products available for region;</li> <li>Low volume products are inconsistent and limited.</li> </ul>
Providers:	JMA, CMA, <del>KMA</del>
Current Products and Access Points	<p><b>JMA</b></p> <p>JAMI (Japanese advance meteorological imager) operational on MTSAT-1R (140E)  5 channels: .55-.9 (.725), 3.5-4 (3.75), 6.5-7 (6.75), 10.3-11.3 (10.8), 11.5-12.5 (12.0)  HR 4km for IR, 1km for VIS; Full disk every 30min, half disk every 15min  Data rate 2.7Mbps  Dissemination: LRIT/HRIT</p> <p>IMAGER operational on MTSAT-2 (145E)  5 channels: .55-.8 (.675), 3.5-4 (3.75), 6.5-7 (6.75), 10.3-11.3 (10.8), 11.5-12.5 (12.0)  HR 4km for IR, 1km for VIS; Full disk every 30 min, half disk every 15min  Data rate 2.7Mbps  Dissemination: LRIT/HRIT ; details:  <a href="http://mscweb.kishou.go.jp/operation/type/index.htm">http://mscweb.kishou.go.jp/operation/type/index.htm</a></p> <p>- IR/VIS/WV/3.8 RT JPG imagery for Full disk and AUS/NZ/Pacific islands/SE Asia at  <a href="http://mscweb.kishou.go.jp/sat_dat/index.htm">http://mscweb.kishou.go.jp/sat_dat/index.htm</a></p> <p>- Heavy rainfall potential (based on WV, IR channels) RT JPG imagery in SE Asia and SW Pacific Islands, in support of SWFDP in RA II/V  <a href="http://mscweb.kishou.go.jp/sat_dat/index.htm">http://mscweb.kishou.go.jp/sat_dat/index.htm</a></p> <p>- Products include: Cloud grid information (total amount, upper layer amount, top height, amount of convection cloud, type)  - Description: <a href="http://mscweb.kishou.go.jp/product/index.htm">http://mscweb.kishou.go.jp/product/index.htm</a>  - Dissemination on CD-ROM;  - <b>Other channels of public dissemination?</b> (GTS: AMVs)</p>

**Comment [SB1]:** The Satellite Centres are all approved DCPCs

<p><b>CMA</b>  S-VISSR (stretched visible and infrared spin scan radiometer) operational on FY-2D (86.5E), FY-2E (105E) (inactive on FY-2C; standby on FY-2F)  5 channels: .55-.75, 3.5-4, 6.3-7.6, 10.3-11.3, 11.5-12.5  HR 5km for IR, 1.25km for VIS; Full disk every 30min + rapid scan areas  Data rate 14Mbps  Dissemination: LRIT, CMACast ; high vs low-res?</p> <p>VIS/IR/WV NRT imagery:  <a href="http://nsmc.cma.gov.cn/NewSite/NSMC_EN/Channels/100028.html?reg=LAN&amp;pas=CLC&amp;col=COL&amp;t=24">http://nsmc.cma.gov.cn/NewSite/NSMC_EN/Channels/100028.html?reg=LAN&amp;pas=CLC&amp;col=COL&amp;t=24</a>  What is "Two-satellite imagery" here?</p> <p>- Products (login required for download; AWX file format?):  GEO imagery:  <a href="http://satellite.cma.gov.cn/PortalSite/Data/DataView.aspx?SatelliteType=1&amp;DataCategoryCode=Image">http://satellite.cma.gov.cn/PortalSite/Data/DataView.aspx?SatelliteType=1&amp;DataCategoryCode=Image</a>  GEO atmosphere:  <a href="http://satellite.cma.gov.cn/PortalSite/Data/DataView.aspx?SatelliteType=1&amp;DataCategoryCode=Atmosphere">http://satellite.cma.gov.cn/PortalSite/Data/DataView.aspx?SatelliteType=1&amp;DataCategoryCode=Atmosphere</a>  GEO ocean:  <a href="http://satellite.cma.gov.cn/PortalSite/Data/DataView.aspx?SatelliteType=1&amp;DataCategoryCode=Ocean">http://satellite.cma.gov.cn/PortalSite/Data/DataView.aspx?SatelliteType=1&amp;DataCategoryCode=Ocean</a>  GEO land:  <a href="http://satellite.cma.gov.cn/PortalSite/Data/DataView.aspx?SatelliteType=1&amp;DataCategoryCode=Land">http://satellite.cma.gov.cn/PortalSite/Data/DataView.aspx?SatelliteType=1&amp;DataCategoryCode=Land</a>  GEO radiation:  <a href="http://satellite.cma.gov.cn/PortalSite/Data/DataView.aspx?SatelliteType=1&amp;DataCategoryCode=Radiation">http://satellite.cma.gov.cn/PortalSite/Data/DataView.aspx?SatelliteType=1&amp;DataCategoryCode=Radiation</a></p> <p>These products include:  Cloud Classification, Cloud Top Height, Cloud Top Temperature</p> <p>- Product description/ATBD?</p> <p><b>KMA</b>  Meteorological Imager (MI) operational on COMS (128.2E)  5 channels : .55-.8, 3.5-4, 6.5-7, 10.3-11.3, 11.5-12.5  HR 4km for IR, 1km for VIS ; full disk every 27min + rapid scan areas  Data rate 2.62Mbps  Dissemination : LRIT/HRIT ;</p> <p>VIS/IR/WV/SWIR NRT imagery :  <a href="http://web.kma.go.kr/eng/weather/images/satellite.jsp">http://web.kma.go.kr/eng/weather/images/satellite.jsp</a>  Products : Asian dust, fog</p> <p>- Products (visualization, incl cloud detection):  <a href="http://nmsc.kma.go.kr/html/homepage/en/satellite/searchSatelliteImage.do?data_type=1002">http://nmsc.kma.go.kr/html/homepage/en/satellite/searchSatelliteImage.do?data_type=1002</a></p> <p>- Full resolution products (login required):  <a href="http://nmsc.kma.go.kr/html/homepage/en/dataservice/satellite_search.do">http://nmsc.kma.go.kr/html/homepage/en/dataservice/satellite_search.do</a> (Needs registration)</p> <p>- Product description/ATBD?</p>
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	<b>Are there other providers?</b>
Products from future satellites and expected access Points	<p>JMA (Himawari-8/9 Advanced Himawari Imager (AHI), 16 channels)</p> <ul style="list-style-type: none"> <li>- Basic imagery, cloud products</li> <li>- Internet (full res), HRIT/LRIT via CTS (TBD; subset), JPG (low res)</li> </ul> <p>CMA (FY-4A Advanced Geostationary Radiation Imager (AGRI), 14 channels)</p> <ul style="list-style-type: none"> <li>- CMACast (full res), web-based solution (products)</li> </ul> <p>KMA (Geo-KOMPSAT-2A Advanced Meteorological Imager (AMI), 16 channels)</p> <ul style="list-style-type: none"> <li>- TBD</li> </ul>
Host:	JMA, CMA, KMA , BoM <u>Australia</u>
Expected benefits:	<ul style="list-style-type: none"> <li>• Uniform low-volume products available to NMHSs in Asia-Pacific Region</li> <li>• Consistency of products across different satellite coverages facilitates information sharing and cooperation</li> <li>• Implement recommendations from RGB Satellite Products Workshop Sep 2012</li> </ul>
Technical details of planned product/service	<p><b>Scope for harmonization?</b></p> <ul style="list-style-type: none"> <li>• Product content &amp; format: Graphics images, GeoTIFF, netCDF</li> <li>• Access and dissemination: http, ftp, Mapserver (ADDE, GIS)</li> <li>• Quality control: Intercalibration and cross-validation</li> <li>• Provisions for integration and sustainability: Through use of simple, standard data formats</li> </ul>
Facility for user feedback	To be maintained by the Data Providers; existing user feedback fora in RA II and V
Current status	Under development

**Comment [SB2]:** All institutions are recognized GISCs

**PILOT PROJECT 2: Advanced Nowcasting: “Aviation”**

Theme:	Globally-consistent volcanic ash products
Lead:	Anthony Rea (BoM) and CMA/JMA representatives
Region of Coverage:	Global
Users/Clients:	NMHSs globally, Volcanic Ash Advisory Centres
User requirements	<b>To be refined (type (detection; mass loading; etc.); uncertainty; latency; format; distribution...)</b>  NOAA has identified user requirements for quantitative volcanic ash detection, ash cloud height, and ash mass loading.
Current needs & gaps	Products inconsistent across operators Inconsistent user training is also a major issue
Providers:	CMA, JMA, KMA, NOAA, EUMETSAT
Current Products and Access Points	<p><b>JMA</b> Products: MTSAT-based split window channel difference (10.8-12) for VA detection (Prata algorithm) Product description: <a href="http://mscweb.kishou.go.jp/product/image/volcano/index.htm">http://mscweb.kishou.go.jp/product/image/volcano/index.htm</a> Use in VAAC Tokyo? Testbed results? (CGMS-41 Action1)</p> <p>JAMI (Japanese advance meteorological imager) operational on MTSAT-1R (140E); 5 channels: .55-.9 (.725), 3.5-4 (3.75), 6.5-7 (6.75), 10.3-11.3 (10.8), 11.5-12.5 (12.0) HR 4km for IR, 1km for VIS; Full disk every 30min, half disk every 15min Data rate 2.7Mbps Dissemination: LRIT/HRIT</p> <p>IMAGER operational on MTSAT-2 (145E); 5 channels: .55-.8 (.675), 3.5-4 (3.75), 6.5-7 (6.75), 10.3-11.3 (10.8), 11.5-12.5 (12.0) HR 4km for IR, 1km for VIS; Full disk every 30 min, half disk every 15min Data rate 2.7Mbps Dissemination: LRIT/HRIT ; details: <a href="http://mscweb.kishou.go.jp/operation/type/index.htm">http://mscweb.kishou.go.jp/operation/type/index.htm</a></p> <p><b>CMA:</b> No specific products identified;</p> <p><b>KMA</b> No specific products identified;</p> <p><b>NOAA</b> Volcanic ash imagery and products based on GOES-13/15 and MTSAT (see above): <a href="http://www.ospo.noaa.gov/Products/atmosphere/vaac/satellite_imagery.html">http://www.ospo.noaa.gov/Products/atmosphere/vaac/satellite_imagery.html</a></p>

<sup>1</sup> Action CGMS-41.26: “JMA to establish an environment to implement multiple algorithms to retrieve quantitative ash cloud parameters from operational satellites. This will serve as a test bed for the intercomparison of retrievals on an operational basis in the framework of SCOPE-Nowcasting. JMA is invited to perform an intercomparison based on historical data and report on this to CGMS-42.”

	<p>Product description: <a href="http://www.ospo.noaa.gov/Products/atmosphere/vaac/">http://www.ospo.noaa.gov/Products/atmosphere/vaac/</a></p> <p>Experimental quantitative volcanic cloud products and RGB's produced from a variety of LEO and GEO satellites on a global basis are available at <a href="http://volcano.ssec.wisc.edu">http://volcano.ssec.wisc.edu</a></p> <p>IMAGER on GOES-13/15: 5 channels: .55-.75 (.65), 3.8-4 (3.9), 5.8-7.3 (6.55), 10.2-11.2 (10.7), 13.0-13.7 (13.35) HR 4km for IR, 1km for VIS; Full disk every 30min; rapid scans Data rate: 2.62Mbps Dissemination: LRIT, PDR/GVAR</p> <p><b>EUMETSAT</b> Volcanic ash RGB based on data from a combination of the MSG SEVIRI IR8.7, IR10.8 and IR12.0 channels, including the split window channel difference (10.8-12) (Prata algorithm) RT imagery: <a href="http://oiswww.eumetsat.org/IPPS/html/MSG/RGB/ASH/">http://oiswww.eumetsat.org/IPPS/html/MSG/RGB/ASH/</a></p> <p>Archived: <a href="http://navigator.eumetsat.int/discovery/Start/DirectSearch/DetailResult.do?f%28r0%29=EO:EUM:DAT:MSG:VOLE">http://navigator.eumetsat.int/discovery/Start/DirectSearch/DetailResult.do?f%28r0%29=EO:EUM:DAT:MSG:VOLE</a></p> <p>Product description: <a href="http://www.eumetsat.int/website/wcm/idc/idcplg?IdcService=GET_FILE&amp;dDocName=PDF_VOL_FACTSHEET&amp;RevisionSelectionMethod=LatestReleased&amp;Rendition=Web">http://www.eumetsat.int/website/wcm/idc/idcplg?IdcService=GET_FILE&amp;dDocName=PDF_VOL_FACTSHEET&amp;RevisionSelectionMethod=LatestReleased&amp;Rendition=Web</a></p> <p>SEVIRI on Meteosat-8 (3.6E), -9 (9.4E, standby), -10 (0°): 12 channels: .6-.9 (broadband), .56-.71 (.635), .74-.88 (.81), 1.5-1.78 (1.64), 3.48-4.36 (3.92), 5.35-7.15 (6.25), 6.85-7.85 (7.35), 8.3-9.1 (8.7), 9.38-9.94 (9.66), 9.8-11.8 (10.8), 11-13 (12), 12.4-14.4 (13.4) HR 3km, 1km (broadband VIS); Full disk every 15min; rapid scans Data rate 3.26Mbps Dissemination: LRIT, EUMETCast, GTS (tbc)</p> <p><b>Other</b> - Support to Aviation Control Service (SACS), <a href="http://sacs.aeronomie.be">http://sacs.aeronomie.be</a> (SO2 , Absorbing Aerosol Index AAI using OMI, GOME-2, IASI, AIRS), funded by ESA - Other sensors (e.g., MODIS)</p>
Products from future satellites and expected access points	<p><b>JMA</b> (Himawari-8/9 AHI 16 channels) - AHI-based Volcanic Ash product - Internet (full res), HRIT/LRIT via CTS (TBD; subset), JPG (low res)</p> <p><b>KMA</b> (Geo-KOMPSAT-2A Advanced Meteorological Imager (AMI), 16 channels) - Volcanic ash detection and height product planned</p> <p><b>CMA</b> (FY-4A AGRI, 14 channels) - TBD</p> <p><b>NOAA</b> (GOES-R ABI, 16 channels) Volcanic ash detection and height product, Description: <a href="http://www.goes-r.gov/products/baseline-volcanic-ash.html">http://www.goes-r.gov/products/baseline-volcanic-ash.html</a></p>

	<p><b>EUMETSAT</b> (MTG FCI, 16 channels) - TBD</p> <p><b>Other:</b> Various GEO (Sentinel-4, TEMPO, SGLI,...) and LEO satellites planned (SLSTR, OLCI, OMPS...)</p>
Host:	Satellite operators
Expected benefits:	<ul style="list-style-type: none"> <li>• Improved confidence in products generated through SCOPE-Nowcasting;</li> <li>• Improved consistency of warnings from adjoining VAACs and better failover arrangements</li> <li>• Improved cooperation between NMHSs through access to shared products</li> </ul>
Technical details of planned product/service	<p><b>Scope for harmonization</b></p> <ul style="list-style-type: none"> <li>• Basic volcanic ash product (split window differencing)</li> <li>• Access and dissemination: TBD (web, ftp, Mapserver (ADDE, GIS))</li> <li>• Quality control: Through intercalibration and cross-validation</li> <li>• Provisions for integration and sustainability: Through use of simple, standard data formats</li> </ul>
Facility for user feedback	To be maintained by the Data Providers
Current status (date)	Under development

**PILOT PROJECT 3: Advanced Nowcasting: “Precipitation / Severe Rainfall Risk Reduction”**

Theme:	Blended satellite global precipitation product (GEO+LEO)
Lead:	Luiz Machado, Daniel Vila (INPE CPTEC)
Region of Coverage:	Global coverage
Users/Clients:	Civil authorities, NMHSs, Flash flood guidance systems, general users
User requirements:	Real Time Precipitation Intensity (2 to 4 hours latency) Nowcasting of precipitation Intensity (3 hours in Advance) Cumulated Precipitation in the last 24, 48 and 72 hours  <b>To be refined (uncertainty, latency, format, distribution...)</b> WMO observation requirements for 24h Accumulated Precipitation: <a href="http://www.wmo-sat.info/oscar/variables/view/1">http://www.wmo-sat.info/oscar/variables/view/1</a>
Current needs & gaps	Rapid, facilitated access to quantitative precipitation estimates
Providers:	NOAA, NASA
Current Products and Access Points	<p><b>NASA</b> Tropical Rainfall Measuring Mission (TRMM), Combined use of TMI (TRMM Microwave Imager), VIRS (Visible and IR Scanner) to adjust merged IR-based precipitation estimates from GEO imagers globally Product 3B42RT (v7): GEO DIS 3-hourly binary data: <a href="ftp://disc2.nascom.nasa.gov/data/TRMM/Gridded/3B42RT/">ftp://disc2.nascom.nasa.gov/data/TRMM/Gridded/3B42RT/</a>. HR: 0.25x0.25°, 3-hourly, 50N-50S</p> <p>Product description: <a href="http://disc.sci.gsfc.nasa.gov/precipitation/documentation/TRMM_README/TRMM_3B42_readme.shtml">http://disc.sci.gsfc.nasa.gov/precipitation/documentation/TRMM_README/TRMM_3B42_readme.shtml</a></p> <p><b>NOAA</b> - Global HydroEstimator Single channel (11um) rain rate algorithm Product: Instantaneous rain rate, 1 hour, 3 hour, 6 hour, 24 hour and also multi-day precipitation accumulation over both global land and ocean made available in GRIB, McIDAS and netCDF4 formats HR: 4km; 15 min (instantaneous); global, 65N-S Access: <a href="http://www.ospo.noaa.gov/Products/atmosphere/ghe">http://www.ospo.noaa.gov/Products/atmosphere/ghe</a> OSPO Data Distribution Server (DDS) and McIDAS ADDE servers</p> <p>Product description: <a href="http://www.ospo.noaa.gov/Products/atmosphere/ghe/algo.html">http://www.ospo.noaa.gov/Products/atmosphere/ghe/algo.html</a></p> <p>- <b>Real-time MW data used?</b></p> <p><b>Other</b> - INPE hosts the webGIS visualization tool SIGMA (GEarth-based) which displays the above-listed products: <a href="http://sigma.cptec.inpe.br/scope/">http://sigma.cptec.inpe.br/scope/</a> (<b>TMPA?</b>) HR: 0.25x.25°, Global,</p>



	- Inclusion of other datasets recognized by IPWG? ( <a href="http://www.isac.cnr.it/~ipwg/data/datasets1.html">http://www.isac.cnr.it/~ipwg/data/datasets1.html</a> )
Products from future satellites and expected access points	<b>NASA/JAXA</b> GPM-based products (DPR – Dual-frequency Precipitation Radar; GMI – GPM Microwave Imager)  <b>DoD</b> SSMIS-based products
Host:	INPE CPTEC
Expected benefits:	<ul style="list-style-type: none"> <li>• Improved confidence in products generated through SCOPE-Nowcasting;</li> <li>• Reduced operating costs associated with technological change and software upgrades;</li> <li>• Fast delivery of severe rainfall information to decision-makers and disaster response authorities (2h extrapolation forecast and ex-post 24h/48h/72h QPEs)</li> </ul>
Technical details of planned product/service	<b>Scope for harmonization?</b> <ul style="list-style-type: none"> <li>• Product content &amp; format: Precipitation intensity (real-time and nowcasting), Cumulated precipitation</li> <li>• Access and dissemination: WebGIS</li> <li>• Quality control: Adherence to code standards</li> <li>• Provisions for integration and sustainability: TBD</li> <li>• Facility for user feedback: TBD</li> </ul>
Facility for user feedback	TBD
Current status (date)	Under development

**PILOT PROJECT 4: Real-time Ocean Products**

Theme:	Near-Real-Time (3-hourly) Ocean surface winds for NWP
Lead:	Suman Goyal (IMD) and Volker Gärtner (EUMETSAT); M Mahapatra (IMD)
Region of Coverage:	Initially Indian Ocean
Users/Clients:	NWP Centres, Marine Forecasters
User requirements:	<p>- Full validation of Oceansat-2 using buoys, ships, model fields in order to generate 3-hourly ocean surface wind product  [COMMENT: check OSCAT EUMETSAT product suite at : <a href="http://www.knmi.nl/scatterometer/oscat_50_prod/oscat_app.cgi#description%23description">http://www.knmi.nl/scatterometer/oscat_50_prod/oscat_app.cgi#description%23description</a> and validation reports at <a href="http://www.knmi.nl/scatterometer/publications/pdf/OSCAT_validation.pdf">http://www.knmi.nl/scatterometer/publications/pdf/OSCAT_validation.pdf</a> whether these address your concerns]</p> <p>- To be refined (which products should be generated, harmonized, distributed?)</p>
Current needs & gaps	- OSVW from Oceansat-2 not fully exploited in marine severe weather warnings, and in NWP initialization and assimilation in tropical ocean areas [COMMENT :Question whether this meets SCOPE-Nowcasting criteria]
Providers:	IMD/ISRO (Oceansat-2) and EUMETSAT OSI-SAF
Current Products and Access Points	<p><b>IMD</b> Oceansat-2 OSCAT instrument  Sun-synchronous orbit, 12.00 desc  Ku-band conical scanner, two beams  HR 45km for best quality; Global coverage every day</p> <p>Products NRT: ? <a href="http://218.248.0.134:8080/OCMWebSCAT/html/controller.jsp">http://218.248.0.134:8080/OCMWebSCAT/html/controller.jsp</a>  Archive: MOSDAC data centre <a href="http://www.mosdac.gov.in/">http://www.mosdac.gov.in/</a>  Product description: ?</p> <p><b>EUMETSAT</b> OSI-SAF-distributed OSCAT products:  <a href="http://www.knmi.nl/scatterometer/oscat_50_prod/oscat_app.cgi#description%23description">http://www.knmi.nl/scatterometer/oscat_50_prod/oscat_app.cgi#description%23description</a>  Dissemination: NRT and archive, GTS (tbc)</p>
Future Products and Access Points	EUMETSAT: ASCAT on Metop-C NSOA CAST: SCAT on HY-2A, -2B
Host:	TBD
Expected benefits:	<ul style="list-style-type: none"> <li>• Availability of validated OSVWs for NWP</li> <li>• Improved nowcasting of timing, positioning and wind distribution associated with severe weather.</li> <li>• Validation of model results and more accurate initial conditions for meso-scale models.</li> <li>• Improved confidence in products generated through SCOPE-Nowcasting;</li> <li>• Improved cooperation between NMHSs through access to shared products</li> </ul>
Technical details of planned product/service	<p><b>Scope for harmonization?</b></p> <ul style="list-style-type: none"> <li>• Product content &amp; format: TBD</li> <li>• Access and dissemination: TBD</li> <li>• Quality control: TBD</li> <li>• Provisions for integration and sustainability: TBD</li> </ul>

Facility for user feedback	TBD
Current status (date)	Under review

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## **PILOT PROJECT 5: Real-time Atmospheric Composition Products: Sand and Dust Forecasting**

Theme:	Dust Monitoring and Prediction Products
Lead:	Fang Xiang (CMA) and Hiroshi Kunimatsu (JMA)
Region of Coverage:	WMO Region II (Asia) and V (South-West Pacific)
Users/Clients :	SDS-WDCs, NMSs (to issue results and warnings) in RA II and RA V
User requirements:	To be refined (product type (detection; optical thickness; density; etc.); uncertainty; latency; format, distribution...)
Current needs & gaps	Regional diversity of aerosol-related products that are mostly not harmonized, and not always sustained
Providers:	CMA, JMA
Current Products and Access Points	<ul style="list-style-type: none"> <li>- Sand and dust monitoring imagery</li> <li>- Aerosol optical thickness, effective particle radius, and column density</li> </ul> <p><b>JMA</b>  <b>MTSAT</b>  <b>JAMI</b> (Japanese advance meteorological imager) operational on MTSAT-1R (140E);  5 channels: .55-.9 (.725), 3.5-4 (3.75), 6.5-7 (6.75), 10.3-11.3 (10.8), 11.5-12.5 (12.0)  HR 4km for IR, 1km for VIS; Full disk every 30min, half disk every 15min  Data rate 2.7Mbps  Dissemination: LRIT/HRIT</p> <p><b>IMAGER</b> operational on MTSAT-2 (145E);  5 channels: .55-.8 (.675), 3.5-4 (3.75), 6.5-7 (6.75), 10.3-11.3 (10.8), 11.5-12.5 (12.0)  HR 4km for IR, 1km for VIS; Full disk every 30 min, half disk every 15min  Data rate 2.7Mbps  Dissemination: LRIT/HRIT ;  details: <a href="http://mscweb.kishou.go.jp/operation/type/index.htm">http://mscweb.kishou.go.jp/operation/type/index.htm</a></p> <p>MTSAT-2 split window (10.8-12) used for qualitative information on dust extent</p> <p><b>NOAA AVHRR/3</b> (e.g. on NOAA-19, Metop):  6 channels: .58-.68 (.63), .725-1 (.862), 1.58-1.64 (1.61), 3.55-3.93 (3.74), 10.3-11.3 (10.8), 11.5-12.5 (12)  HR 1.1km sub-satellite point  Data rate 621kbps  Dissemination: HRPT, DVB-S services</p> <p>Product access: ?</p> <p>Product description:  “JMA has produced Aerosol Optical Thickness (AOT) in the vicinity of Japan over cloud-free sea in daytime using visible channel data of MTSAT since December 2002 for internal use. AOT is defined at 500 nm wavelength and retrieved using visible channel referring to Look Up Tables generated by radiative transfer calculations at fixed Ångström exponents. AOT is calculated in 0.25 degree(longitude) x 0.20 degree(latitude) grid seven times a day, from 00 UTC to 06 UTC, hourly. JMA also</p>

retrieves AOT and Ångström exponent by a similar method from visible and near infrared data of NOAA/AVHRR 1-3 times a day. Figure A-II-9 (a) shows calculation example; Yellow Sand Dust in the vicinity of Japan was detected, and Figure A-II-9 (b) shows the comparison of AOT between ground observations and the nearest grid values of satellite products (see SCOPE-Nowcasting Concept paper for Figures).

In addition, JMA uses difference between MTSAT infrared 11 micron and 12 micron data as qualitative information for monitoring the spread of dust events at cloud free pixels even over the land and in the night time (Figure A-II-10).

JMA uses these results to early grasp and monitor the distribution and the density of dust (Yellow sand) in Japan, and to issue dust information.”

### **CMA NSMC**

FY-3 and FY-2-based product

FY-2: S-VISSR (stretched visible and infrared spin scan radiometer) operational on FY-2D (86.5E), FY-2E (105E) (inactive on FY-2C; standby on FY-2F)

5 channels: .55-.75, 3.5-4, 6.3-7.6, 10.3-11.3, 11.5-12.5

HR 5km for IR, 1.25km for VIS; Full disk every 30min + rapid scan areas

Data rate 14Mbps

Dissemination: LRIT, CMACast ; high vs low-res?

FY-3: VIRR (Visible and IR Radiometer) operational on FY-3A,B,C

10 channels: .43-.48 (.455), .48-.53 (.505), .53-.58 (.555), .84-.89 (.865), 1.325-1.395 (1.36), 1.55-1.64 (1.6), 3.55-3.93 (3.74), 10.3-11.3 (10.8), 11.5-12.5 (12)

HR 1.1km at sub-satellite point;

Data rate 1.23Mbps

Dissemination: HRPT, CMACast

Product access (to Dust Storm Monitoring product):

FY-3 (LEO) based:

<http://satellite.cma.gov.cn/PortalSite/Data/DataView.aspx?SatelliteType=0&DataCategoryCode=Atmosphere&DataTypeCode=DST>

FY-2 (GEO) based:

<http://satellite.cma.gov.cn/PortalSite/Data/DataView.aspx?SatelliteType=1&DataCategoryCode=Atmosphere&DataTypeCode=DST>

Product description:

“The thresholds of dust in satellite image were investigated by the probability dense function (PDF) and cumulative distribution function (CDF). The sampled targets include clouds, clear sky over land, clear sky over ocean, dust. 11 thresholds were used in visible and infrared band.

The optical thickness, particle radius, and density of dust can be retrieved from this algorithm. Aerosol physical parameters (complex refraction index and particle size distribution) were pre-selected for the dust retrieval in the algorithm. Radiances of 8.7  $\mu\text{m}$ , 11 $\mu\text{m}$  and 12  $\mu\text{m}$  in IR window spectral bands are calculated with a radiative transfer model that includes Mie scattering and the Discrete Ordinates Radiative Transfer (DISORT). Aerosol microphysical parameters (complex refraction index and particle size distribution), surface temperature, and dust layer top temperature are a priori inputs. The background land surface temperature is derived from previous day clear sky 11  $\mu\text{m}$  BT observation in the same area and the same UTC time. Only two layers (surface and dust) are assumed in the forward model. Therefore, temperature profile is not necessary, only surface temperature and effective dust layer temperature is required. Infrared window brightness temperatures (BT) at 11  $\mu\text{m}$  show a quasi-linear relationship with dust optical thicknesses and the split window BT

	<p>difference (BTD) between 11 and 12 <math>\mu\text{m}</math> shows a quasi-linear relationship with the particle radius. The 8.7 <math>\mu\text{m}</math> band is very useful to infer the dust property over desert. However, it is not used in retrieval yet because the variation and uncertainty of surface emissivity is large over desert. Look-up tables (LUT) have been generated with the radiative transfer model to create a relationship between the dust microphysical properties and BT as well as BTD. Retrieval uses two spectral bands to derive two parameters (optical thickness and particle radius). The dust density is derived from the two parameters.”</p>
Future Products and Access Points	<p>JMA: Himawari-8/9 AHI based dust monitoring products (density, height) to be generated using GOES-R ABI algorithm:</p> <p>CMA: FY-4A AGRI based aerosol detection and AOD products planned</p>
Host:	CMA, JMA
Expected benefits:	<ul style="list-style-type: none"> <li>• More consistent products across satellite platforms and providers, e.g. through shared use of validation data and techniques</li> <li>• Product providers can create synergies and sustain their activities while avoiding duplication of effort through facilitating themselves to share information of product development and validation</li> <li>• Better dialogue between users and providers</li> <li>• Improved confidence in products generated through SCOPE-Nowcasting;</li> <li>• Improved cooperation between NMHSs through access to shared products</li> </ul>
Technical details of planned product/service	<p>Scope for harmonization</p> <ul style="list-style-type: none"> <li>• Product content &amp; format: Aerosol optical thickness, effective particle radius, column density, over land and ocean</li> <li>• Access and dissemination: TBD</li> <li>• Quality control: Through sharing of validation data and techniques</li> <li>• Provisions for integration and sustainability: TBD</li> </ul>
Facility for user feedback	TBD
Current status (date)	Draft concept available (8 Jun 2012)