



SCOPE-Nowcasting

World Meteorological Organization

Weather • Climate • Water

Sustained, Co-Ordinated Processing of Environmental Satellite Data for Nowcasting

Presented to 4th Asia Oceania Meteorological Satellite Users Conference

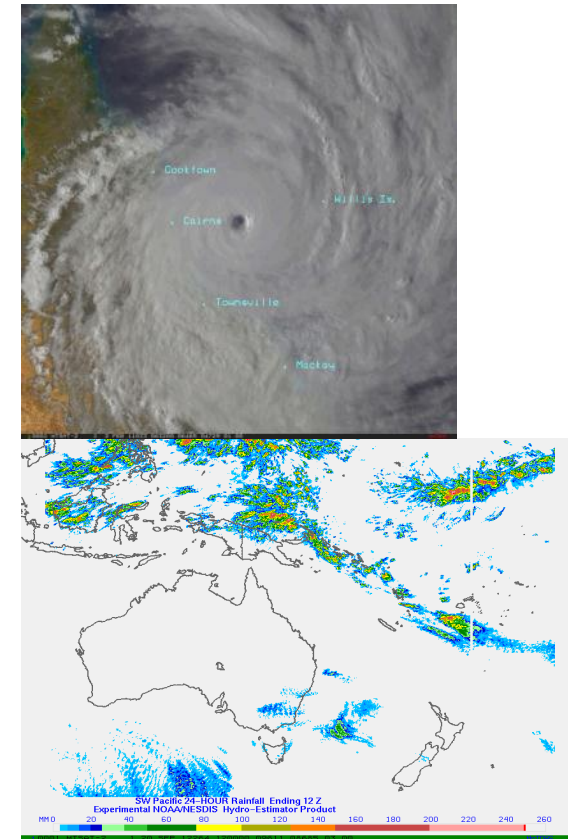
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SCOPE-Nowcasting

- Sustained,
- Co-Ordinated
- Processing of
- Environmental Satellite Data for
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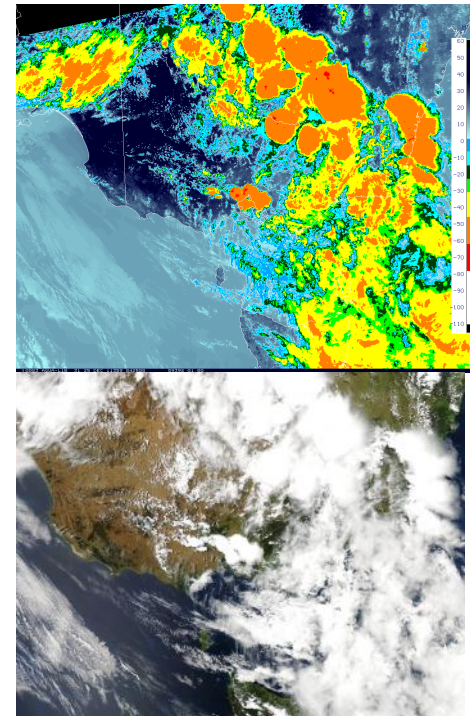
Background

- Concept arose from discussions in 2010 (in the 5th meeting of the WMO Expert Team on Satellite Utilization and Products – ET-SUP-5)
- Recognised the benefits of the SCOPE for Climate Monitoring (SCOPE-CM) initiative, where the value of different models of cooperation among satellite operators in generating satellite datasets for climate has been demonstrated through theme-driven pilot projects.
- SCOPE-CM information:
 - http://www.wmo.int/pages/prog/sat/scope-cm_en.php



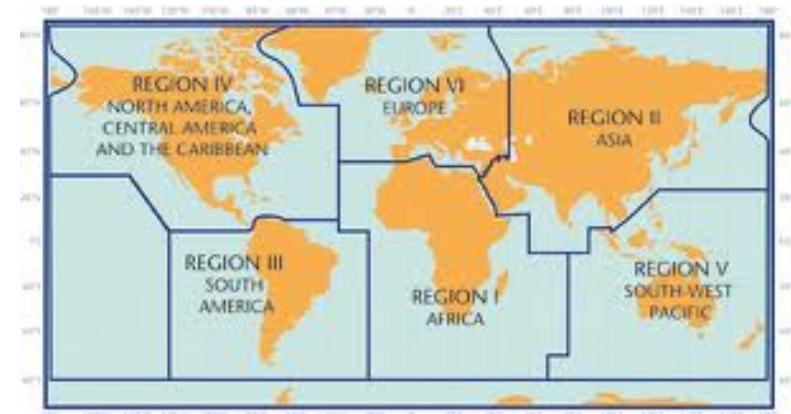
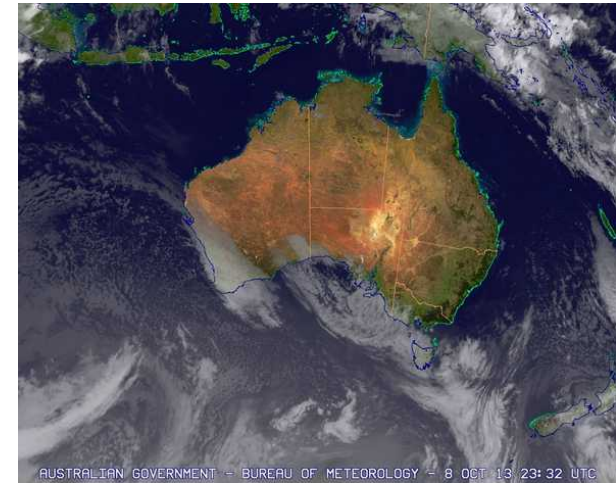
Rationale

- It was felt by ET-SUP-5 that the SCOPE concept could be usefully applied to the nowcasting domain, given that:
 - The related science is reasonably mature;
 - An organized user community is available;
 - An established description of the needs of this community exists; and
 - There are opportunities and synergy with other initiatives.



Requirements

- Particular relevance to Asia-Oceania (WMO Regions II and V)
 - 4 geostationary operators (to be 5 soon)
 - Multiplicity of products and formats
 - Multiple dissemination mechanisms
- Increasing cooperation
 - Aviation operations
 - Regional Forecast Forum



Aims

- Provide a mechanism through which satellite data can be made available simply and quickly
- Primarily for users in the NMHSs of smaller or developing nations, where expertise and facilities for processing and utilizing satellite data may be limited or non-existent
- Also for more advanced nations where there may be efficiencies possible through combining resources, expertise, and efforts



Desired Outcomes

- Ensuring continuous and sustained provision of consistent, well-characterized satellite products,
- Useful in the forecasting range zero to six hours where, in the case of NWP, current model forecasting capability is limited.
- To be demonstrated by pilot projects, and
- To be achieved through establishing a collaborative network among experts, user institutions and satellite operators, that can help sustain product dissemination and facilitate user uptake.



Expected Benefits

- The expected benefits of this approach are:
 - Improved access to satellite data by member states;
 - Improved confidence in products generated through SCOPE-Nowcasting;
 - Reduced operating costs associated with technological change and software upgrades;
 - Reduced training overheads;
 - Improved cooperation between NMHSs through access to shared products.



Project Plan

Phase I (2012-2014): Inception and Demonstration

- Establish ad-hoc Working Group:
 - ET-SUP Members
 - WWRP and SWFDP rep
 - WMO Space Programme
- Agree on concept and pilot project criteria
- Agree on pilot projects and individual providers, hosts, clients, schedules
 - Each pilot: Demonstration of impact; identify areas of synergy, collaboration, harmonization
- First meeting of all SCOPE-NWC initial partners
 - Establishment of initial network and structure, including governance and terms and conditions of all partners



SCOPE-Nowcasting Products

- Products need to be consistent across platforms and use standard formats
- Four broad categories of SCOPE-NWC products are envisaged
 - Basic Nowcasting Products
 - Advanced Nowcasting Products
 - Realtime Ocean Products
 - Realtime Atmospheric Composition Products: these include fire detection, smoke, sand and dust, aerosols



SCOPE-NWC Criteria

ET-SUP-7 (May 2013) outlined a number of criteria for SCOPE-Nowcasting projects. These are:

- a) use of multi-satellite data;
- b) dataset formats can be read by standard tools;
- c) concise product documentation;
- d) open and easy access;
- e) available in near-real time (<6h);
- f) availability of training information; and
- g) an official commitment from all agencies involved in the project.



SCOPE-Nowcasting - Pilot project outlines

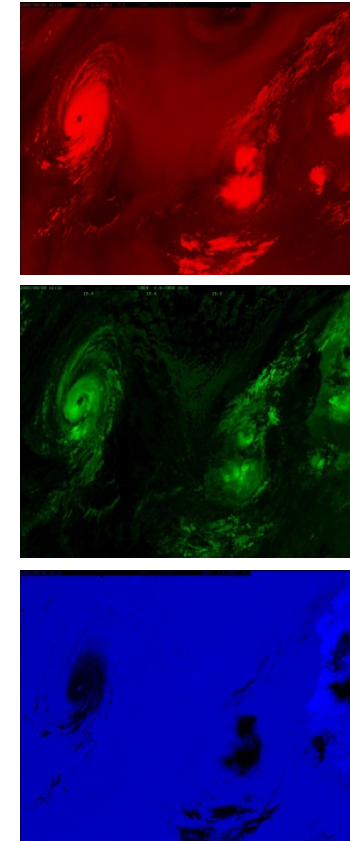
Category	Product	Region	Provider	User	Gaps
Basic nowcasting	RGB composites	WMO Region II (Asia) and Region V (SW Pacific)	JMA, CMA, KMA	NMSs in Region II and V	No standard products available; products limited
Advanced nowcasting	Volcanic Ash Products	Global	TBD (CMA, JMA, KMA, EUMETSAT, NOAA)	NMHSs, VAACs	No standard products available; products limited
Advanced nowcasting	Blended satellite global precipitation product (GEO +LEO)	Global coverage	Hydro Estimator, NASA TRMM (3B42), NOAA (real-time MW)	Civil authorities, NMHSs, Flash flood guidance systems, general users	Rapid, facilitated access to quantitative precipitation estimates
RT Ocean Products	Near-Real-Time (3-hourly) Ocean surface winds Under review	Initially Indian Ocean	IMD/ISRO (Oceansat-2) and EUMETSAT OSI-SAF	NWP Centres, Marine Forecasters	OSVW not fully exploited
RT Atmospheric Composition products	Dust Monitoring and Prediction Products	WMO Region II (Asia) and V (South-West Pacific)	CMA, JMA	SDS-WDCs, NMSs (to issue results and warnings) in RA II and RA V	Regional diversity of aerosol-related products not harmonized



Pilot Project 1: Basic Nowcasting

Regionally-consistent RGB composites :

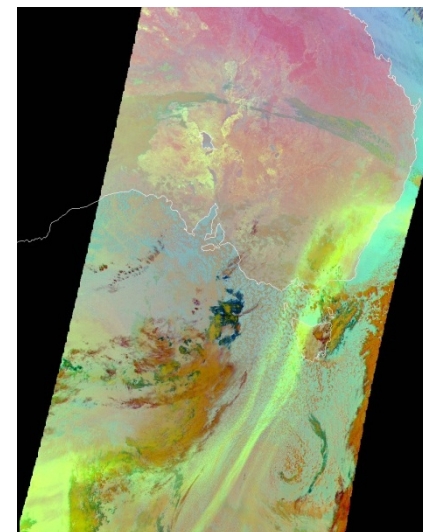
- i. There is a de facto standard for RGBs in existence which has been generated by EUMETSAT and endorsed by WMO
- ii. None of the satellite operators in RA II and RA V currently deliver RGB products in real time
- iii. The next generation of geostationary satellites in the region - Himawari-8, FY-4A and Geo-KOMPSAT-2A – will provide an appropriate platform for delivery of these products.



Pilot Project 2: Advanced Nowcasting

A globally-consistent volcanic ash product (from GEO and LEO):

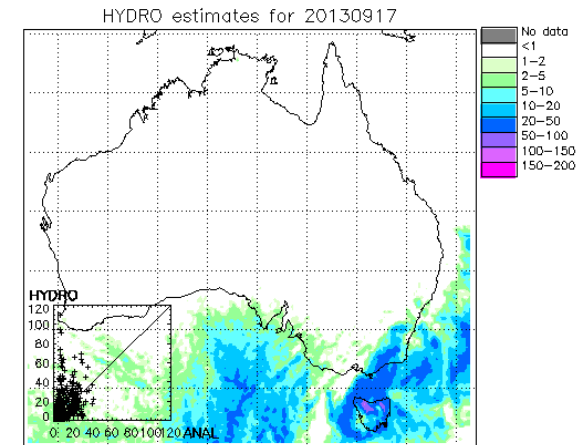
- i. There is a clear need expressed by ICAO for a consistent product to be made available globally
- ii. A number of centres have made recent advances in developing satellite-based volcanic ash products; these could form the basis of a standard
- iii. More global coordination is required;
- iv. The need for this activity has been recognized by CGMS



Pilot Project 3: Advanced Nowcasting

A globally-available consistent precipitation estimation and nowcasting product :

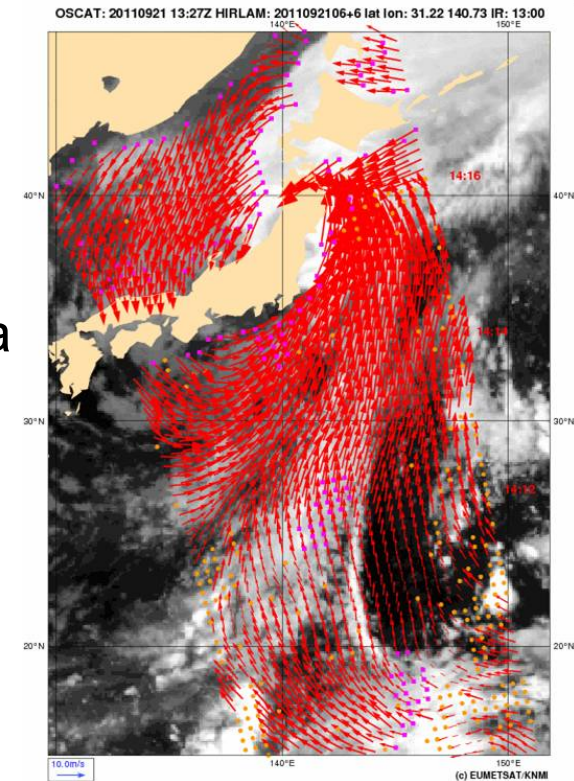
- Users would include civil authorities, flash flood guidance systems
- A clear requirement exists for rapid, facilitated access to quantitative precipitation estimates
- Products will include:
 - Precipitation Intensity (2 to 4 hours latency)
 - Nowcasting of precipitation Intensity (3 hours in Advance)
 - Cumulated Precipitation in the last 24, 48 and 72 hours



Pilot Project 4: Real-time Ocean Products

A real-time product based on all available scatterometer data (ASCAT, Oceansat-2):

- i. This project was proposed by IMD and would initially target the Indian Ocean
- ii. There is a clear user requirement for these data for tropical cyclone analysis
- iii. The pilot is currently under review in relation to the pilot project criteria agreed at ET-SUP-7



Pilot Project 5: Sand and Dust Forecasting

Regionally consistent Aeolian dust products based on a common algorithm.

- i. There is currently inconsistency of products available in the region
- ii. JMA have conducted experiments applying the GOES-R dust algorithm to the provisional response function of Himawari-8/AHI with closest MODIS channels as pseudo data.
- iii. JMA will validate the algorithm with surface observation data using Himawari-8 data after the launch of Himawari-8.
- iv. It was agreed that this approach could also be adopted by CMA for FY-4A.



Progress to Date

- Presentation to ET-SAT during joint session with ET-SUP-7
- Presentation to CGMS-41 in Tsukuba
 - Actions arising:
 - CGMS members to nominate focal points for the SCOPE-Nowcasting (NWC) initiative as appropriate (by 15 August)
 - Feedback from CGMS members sought on the final makeup of the SCOPE-NWC pilot projects by 1 September 2013
- Concept paper has been revised
 - Incorporating feedback from ET-SUP-7 and refinements to pilot projects



Next Steps

- Pilot project leads within ET-SUP were asked to revise their project descriptions, based on the new criteria, by 1 September
- First meeting of SCOPE-Nowcasting Team – 19-22 November 2013, WMO Geneva
 - Participation from CMA, JMA, KMA, EUMETSAT, NOAA and Bureau of Meteorology
- Concept paper:
- http://www.wmo.int/pages/prog/sat/meetings/documents/ET-SUP-7_Doc_09-02-01_SCOPE-Nowcasting-Rea.pdf





**World
Meteorological
Organization**

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Thank you for your attention

www.wmo.int/sat

Related Initiatives

- There will be links to both related scientific communities and governance arrangements within WMO, such as:
 - the World Weather Research Project (WWRP); and
 - the Severe Weather Forecasting Demonstration Project (SWFDP).
- Also links to CGMS Working Groups
 - For example, for precipitation products there would be a clear link to the International Precipitation Working Group.