

SCOPE-Nowcasting

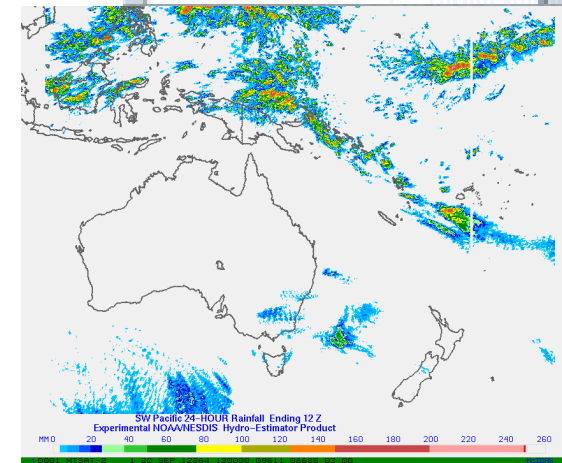
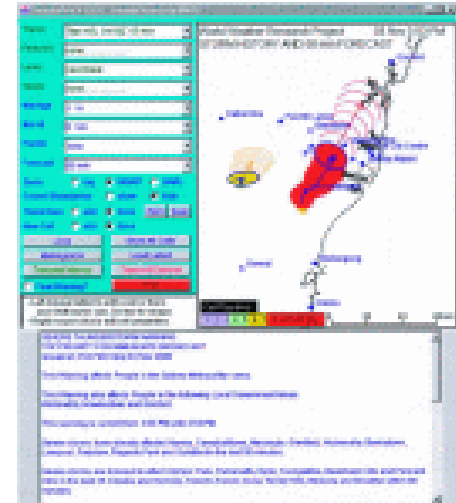
Sustained, Co-Ordinated Processing of Environmental Satellite Data for Nowcasting

by WMO

Presented to CGMS-41 plenary session, agenda item [E.3]

SCOPE-Nowcasting

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



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.
- http://www.wmo.int/pages/prog/sat/scope-cm_en.php

Rationale

- It was felt by ET-SUP-5 that the 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.

SCOPE-NWC 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.

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.

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 rep; 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

At ET-SUP-7 (May 2013), The following criteria for SCOPE-Nowcasting projects were suggested:

- 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 (TBD) | 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, KMA (TBD) | 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 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.

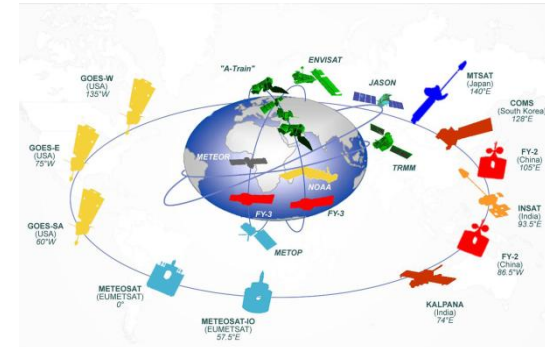
Next Steps

- Pilot project leads within ET-SUP have been asked to revise their project descriptions, based on the new criteria, by 1 September
- Concept paper to be revised by 1 September
- First meeting of SCOPE-Nowcasting Team – 19-22 November 2013, WMO Geneva

To be considered by CGMS:

Action/Recommendation proposed:

- CGMS members to nominate focal points for the SCOPE-Nowcasting initiative as appropriate.
- Feedback from CGMS members sought on the final makeup of the pilot projects by 1 September



Thank You

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**Coordination Group for
Meteorological Satellites**



Backup slides

Pilot Project 3: Advanced Nowcasting: Precipitation / Severe Rainfall Risk Reduction

- The group felt that this project has made good progress and that its efforts should be encouraged. In particular, the additional use of microwave data in an integrated product should be considered. Contingency measures should be developed with regard to the launch of GPM. Formal agreement from data providers (NOAA, NASA, and JAXA) should eventually be sought. A globally-consistent volcanic ash product (from GEO and LEO) :
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