



Status of WMO Core Satellite Data Activities

Presented to CGMS-50 Plenary: Agenda item 3

Abstract/Summary:

- The document provides an update of the WMO activities to establish core satellite data as per the new WMO Unified Policy for the International Exchange of Earth System Data (Res. 1)
- The process for establishing the core satellite data is presented
- The currently identified data types is introduced
- Status of Agency contacts

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WMO data policy for the international exchange of Earth system data

International data exchange is a major purpose of WMO, WMO Convention, Art. 2b

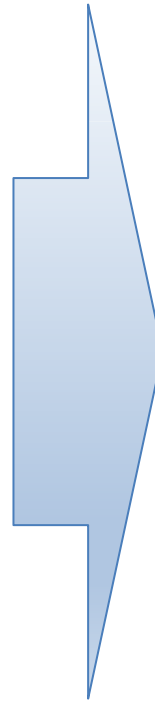
- WMO Unified Data Policy (Res. 1) approved by WMO members
- Replacing the old Res 40 (weather), 25(hydrology) and 60 (climate)
- Adopts the following policy on the international exchange of Earth system data:
 - *As a fundamental principle of WMO and in consonance with the expanding requirements for its scientific and technical expertise, **WMO commits itself to broadening and enhancing the free and unrestricted international exchange of Earth system data;***
- Single, overarching data policy resolution emphasis on the Earth System: Observations, Monitoring, Prediction and Services

New WMO Unified Data Policy Resolution (Ext Congress 2021)

Key changes with respect to Resolution 40 (Cg-XI, 1995)

Resolution 40; 1995

1. Covers weather data only;
2. Two main categories of data:
 - Essential (shall be exchanged);
 - Additional (should be exchanged);
3. Specific “essential” datasets listed directly in Annex I to the resolution (with some reference also to RBSN);
4. “Free and unrestricted” exchange (term not defined in the Resolution);
5. Covers exchange of data between NMHSs



Resolution 1; 2021

1. Covers all WMO Earth system data: weather, climate, hydrology, ...
2. Two main categories of data:
 - Core (shall be exchanged);
 - Recommended; (should be exchanged);
3. Specifics on **core and recommended** data referred to Technical Regulations, primarily Manuals on WIGOS, GDPFS;
4. “Free and unrestricted” exchange (term defined directly in the Resolution, literal interpretation);
5. Addressed to Members, but covers exchange of data between all partners, including private sector, academia, etc.

For some of the data types listed in Annex I to the draft data policy resolution, detailed Technical Regulations already exist, but for many data types these still need to be developed as requirements and agreements mature.



Specifically on satellite data in new Data Policy Resolution

- Vital importance of satellite data now clearly recognized. The concept of **core satellite data** is framed primarily in terms of importance to global NWP.
- No specific satellite datasets are listed as neither core nor recommended in current draft of policy. This is referred to the Manual on WIGOS.
- No particular position regarding provision of observational data by private sector
- The policy is addressed to national governments of WMO Members and cannot dictate what private sector entities should or should not do
- Reflecting guidance provided by the WMO Data Conference, exchange of **core data** is considered mandatory, irrespective of data origin;

Analysis of current and near future measurement capabilities

- An analysis of the current and near future measurement capabilities of the CGMS members meteorological satellite programmes was carried out
- Based on **WMO OSCAR/Space**, Vision 2040 for WIGOS, NWP Position Paper and other material as a reference aiming to capture user perspective
- Document for current core measurement capabilities of CGMS members was prepared
 - GEO measurements capability
 - Polar orbiter measurements capability
 - Space weather
- Analysis was consolidated with WMO Expert Teams

Orbit	Satellite	Sensors	Measurements	Frequency	Coverage	Spatial resolution km at ssp	Spectral Ranges	Spectral resolution	No. of channels	Timeliness	Application	Notes
Polar	Sentinel-3	OLCI	Top of atmosphere radiances	24 hrs	Global in 2 days	3 km	0.4-1.00 um	2.5-40 nm	21	< 3 hr	NWP, Ocean models, Land	Backup
	Sentinel-3	SRAL	Soil moisture, sea-ice thickness, Ocean and ice topography	12 hrs	Global in month	25 km	0.55-1.5 um	0.32-1 um	11	< 24hr	Ocean models	Backup
	Sentinel-5P	TROPOMI	Top of atmosphere radiances	24 hrs	Global	7 km	0.27-2.30 um	0.25-0.65 nm	2000	< 24 hrs	Atmospheric Chemistry	13/2021
	SMOS	MRAS	Soil moisture, salinity	24 hrs	Global in 3 days	50 km	1.413 GHz		1	< 24 hrs	Land and Ocean models	06/2021
	AWS	WV/RARS	Top of atmosphere radiances	< 6hrs	Global in 24 hrs	< 45km	50-325 GHz	100-3500 MHz	18		NWP	
	EarthCARE	ATD	Atmospheric lidar	12 hrs	Global in 16 days	10 m	355 nm				NWP, Climate	14/2021
		RRR	Top of atmosphere fluxes	12 hrs	Global in 16 days	10 km	5W and 10W		2		NWP, Climate	
		RSI	Multi-Spectral Imager	12 hrs	Global in 16 days	8.5 km	0.87 - 1.2 um	3.82-8.9 um	7		NWP, Climate	
Orbit	Andas	ALADIN	Radiocostered lidar pulse	12 hrs	Global in a week	87 km	355 nm			< 2 hr	NWP	

Satellite	Sensors	Measurements	Frequency	Coverage	Spatial resolution km at ssp	Spectral Ranges	Spectral resolution	No. of channels	Timeliness	Application	
Geostationary	TEMPO	TEMPO	10-380 nm	CONUS	2 km	0.3 - 0.8 um				Air quality	
Polar	TERRA	MODIS	Top of atmosphere radiances	12 hrs	Global in 24 hrs	0.25 - 1 km	0.645-14.2 um	0.01-0.3 um	36	< 3 hr	NWP, Nowcasting, Ocean, Land
	CEPES		Top of atmosphere fluxes	12 hrs	Global in 24 hrs	20 km	0.3 - 100 um				Climate
	AQUA	MODIS	Top of atmosphere radiances	12 hrs	Global in 12 hrs	0.25 - 1 km	0.645-14.2 um	0.01-0.3 um	36	< 3 hr	NWP, Nowcasting, Ocean, Land
	JERS		Top of atmosphere radiances	12 hrs	Global in 12 hrs	13 km	3.74-15.4 um	0.5-2 cm-1	2378	< 2 hr	NWP
	CANR		Top of atmosphere fluxes	12 hrs	Global in 24 hrs	20 km	0.3 - 100 um				Climate
	SARIA	NAE-X	1.5W class microwave radiometer	12 hrs	Global in 3 weeks	300 km	116-2900 GHz		6 bands		Atmospheric chemistry

Agency	0E	41E	76E	82E	105E	123E	128E	141E	137W	100W	75W	Application
Agency	EUMETSAT	EUMETSAT	Roscomos	ISRO	CMA	CMA	KOIST	JMA	NOAA	NASA	NOAA	
Orbiting	12	12	10	8	15	15	16	16	16	N	16	Nowcasting/NWP
Rapid scan (<5 mins)	12	N	N	8	15	15	16	16	16	N	16	Nowcasting
Sounder channels	N	N	N	19	1080	1080	N	N	N	N	N	Nowcasting/NWP
Lightning Flashes	N	N	N	N	Y	Y	N	N	Y	N	Y	Nowcasting/NWP
Radiation Budget	Y	Y	N	N	N	N	N	N	N	N	N	Climate
Ocean Colour	Y	Y	N	N	N	N	Y	N	N	N	N	Ocean monitoring
UV/Vis Sounder	N	N	N	N	N	N	N	N	N	N	N	Atmospheric Chem

Agency	0E	41E	76E	82E	105E	123E	128E	141E	137W	100W	75W	Application
Agency	EUMETSAT	EUMETSAT	Roshydromet	IMD	ISRO	CMA	CMA	KOIST	JMA	NOAA	NASA	NOAA
Orbiting	18	12	20	8	15	15	16	16	16	N	16	Nowcasting/NWP
Rapid scan (<5 mins)	18	N	20	8	7	7	16	16	16	N	16	Nowcasting
Sounder channels	1700	N	2528	19	1080	1080	N	N	N	N	N	Nowcasting/NWP
Lightning Flashes	Y	N	Y	N	Y	Y	N	N	Y	N	Y	Nowcasting/NWP
Radiation Budget	N	N	Y	N	N	N	N	N	N	N	N	Climate
Ocean Colour	Y	Y	N	N	N	N	Y	N	N	N	N	Ocean monitoring
UV/Vis Sounder	Y	N	N	N	N	N	N	N	N	Y	N	Atmospheric Chem

Agency	0E	41E	76E	82E	105E	123E	128E	141E	137W	100W	75W	Application
Agency	Roshydromet											
Orbiting	10											

Year	2022	2025	Notes
Orbiting			Imagers with more channels planned for 0E and 76E by 2025.
Rapid scan (<5 mins)			Status is yellow in 2022 as no RSS over Indian Ocean but will be green in 2025 as Electro-M is launched.
IR sounder channels			2025 status is yellow as no firm plans for a hyperspectral sounder for GOES satellites or Himawari.
Lightning Flashes			Status is yellow as no lightning coverage over Western Pacific planned.
Radiation Budget			Only 0E longitude with Meteosat-11. No future plans.
Ocean Colour			No plans for Geo coverage for ocean colour except at 128E. Limited coverage/products from MTG, FY-4, GOES.
UV/Vis Sounder			Only 0E and CONUS longitudes will have a UV/Vis sounder in Geo orbit.

Coverage	Color
Coverage from all 6 GEOs	Green
Coverage from 3-5 GEOs	Yellow
Coverage from 1-2 GEOs	Orange
No coverage from GEO	Red



Defining Core and Recommended satellite data for international data Exchange

- WMO has nominated a Data Policy Coordinator (Sue Barrell)
- Space Agencies have been invited to the bilateral discussions with WMO. Noting that:
 - It may not be in the mandate for all Agencies to commit to everything in the WMO analysis
 - They may need to consult stakeholders (which may take time)

- **Definition of core data does not imply commitments on:**
 - Technical implementation
 - Protocols
 - Quality

- Seek endorsement by INFCOM 2
- Consolidated commitments to be tabled in WMO WIGOS Manual for Executive Council Spring 2023, and again for Congress in Autumn 2023 for the decision of WMO members
- Will be reviewed and updated regularly (in consultation with the Space Agencies)



Status of Agency points of contacts

Agency	PoC established	Bilaterals commenced
CMA		
CNES		
CNSA		
ESA	✓	
EUMETSAT	✓	
IMD		
ISRO		
JAXA	✓	
JMA	✓	
KMA	✓	✓
NASA		
NOAA		
NSOAS	✓	
ROSCOSMOS		
ROSHYDROMET		

To be considered by CGMS:

- CGMS Plenary is invited to take note and comment on the current status of the WMO activities to establish core satellite data as per new WMO Unified Policy for the International Exchange of Earth System Data (Res. 1)
- CGMS Members are kindly requested to nominate points of contacts for bilateral discussions on core satellite data