WMO OSCAR

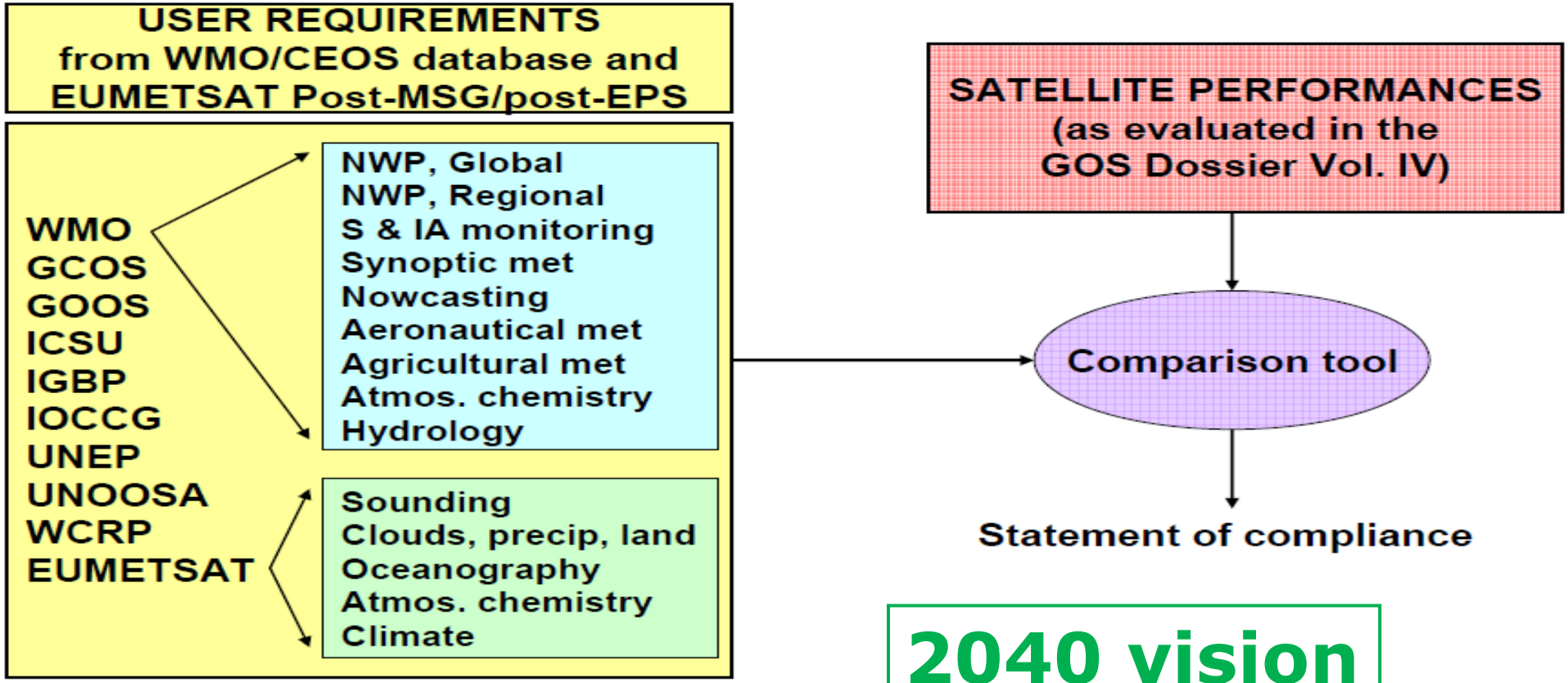
Observing Systems Capability Analysis and Review Tool

- Quantitative user-defined requirements for observation of physical variables in application areas of WMO
- Detailed information on all earth observation satellites and instruments
- Expert analyses of space-based capabilities
- Facilitates the Rolling Requirements Review process, comparing "what is required" with "what is, or will be available", in order to identify gaps and support the planning of integrated global observing systems (2040 vision)
- Future objective is to automatically generate first-level analyses of compliance between the quantitative requirements and the actual capabilities (space- or surface-based)

- **Observation Requirements**
- **Satellite Capabilties**
- **Surface-based capabilities**

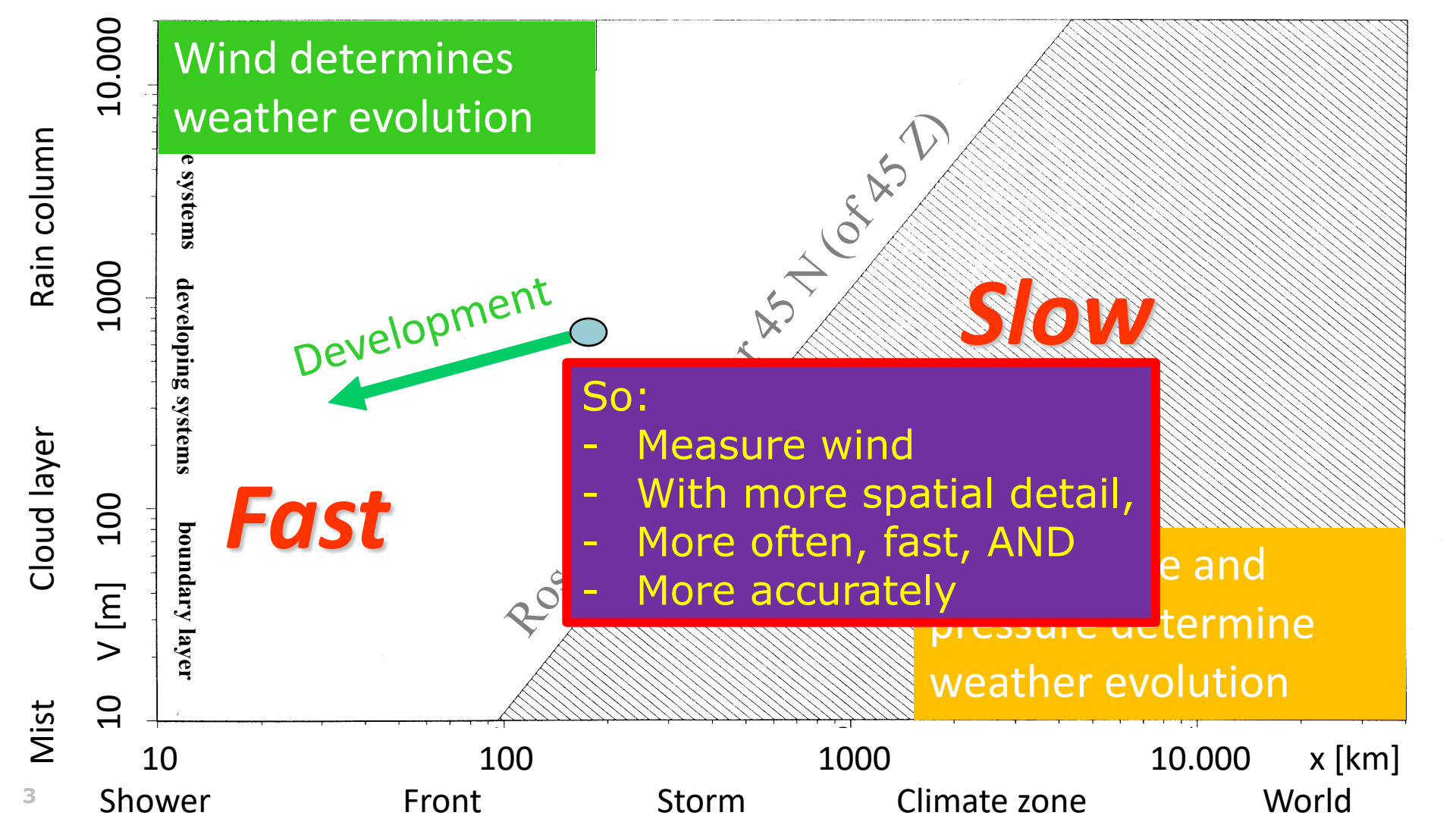
http://www.wmo-sat.info/oscar/

WMO G(C)(O)OS gap analysis



2040 vision

http://www.wmo-sat.info/oscar/


Wind determines weather evolution
Development
Slow
Fast
So:
- Measure wind
- With more spatial detail,
- More often, fast, AND
- More accurately
e and
termine
weather evolution
Rain column
Cloud layer
Mist
V [m]
10.000
1000
100
10
x [km]
10
100
1000
10.000
Shower
Front
Storm
Climate zone
World

Id	Variable	Layer	App Area	Uncertainty	Stability / decade	Hor Res	Ver Res	Obs Cyc	Timeliness	Coverage	Conf Level	Val Date	Source
123	Wind vector over the surface (horizontal)	Near Surface	Climate-AOPC (deprecated)	0.5 m/s 1 m/s 5 m/s		10 km 50 km 500 km		60 min 3 h 6 h	3 h 6 h 12 h	Global ocean	firm	2007-07-19	AOPC
14	Wind vector over the surface (horizontal)	Near Surface	CLIC (deprecated)	1 m/s 1.7 m/s 5 m/s		25 km 39.7 km 100 km		12 h 15 h 24 h	30 d 38 d 60 d	Global ocean	reasonable	1998-10-29	WCRP
203	Wind vector over the surface (horizontal)	Near Surface	CLIVAR (deprecated)	1 m/s 2 m/s 5 m/s		50 km 100 km 250 km		12 h 18 h 24 h	3 d 4 d 7 d	Global ocean	reasonable	1998-10-29	WCRP
243	Wind vector over the surface (horizontal)	Near Surface	Climate Modelling Research (deprecated)	1 m/s 2 m/s 5 m/s		50 km 100 km 250 km		12 h 18 h 24 h	30 d 45 d 60 d	Global ocean	reasonable	1998-10-29	WCRP
321	Wind vector over the surface (horizontal)	Near Surface	Global NWP	0.5 m/s 2 m/s 3 m/s		15 km 100 km 250 km		60 min 6 h 12 h	6 min 30 min 6 h	Global ocean	firm	2009-02-10	John Eyre
545	Wind vector over the surface (horizontal)	Near Surface	Ocean Applications	0.5 m/s 2 m/s 5 m/s		10 km 25 km 50 km		60 min 3 h 6 h	12 h 24 h 2 d	Global ocean	firm	2011-03-07	JCOMM (Ali Mafimbo)
546	Wind vector over the surface (horizontal)	Near Surface	Ocean Applications	0.5 m/s 2 m/s 5 m/s		5 km 10 km 60 km	10	6 min 3 h 24 h	5 min 60 min 6 h	Global ocean	reasonable	2011-03-07	JCOMM (Ali Mafimbo)
547	Wind vector over the surface (horizontal)	Near Surface	Ocean Applications	0.5 m/s 2 m/s 5 m/s		0.1 km 5 km 20 km	10	6 min 3 h 24 h	5 min 60 min 6 h	Global ocean	firm	2011-03-07	JCOMM (Ali Mafimbo)
548	Wind vector over the surface (horizontal)		Ocean Applications	0.5 m/s 2 m/s 5 m/s		1 km 10 km 25 km		60 min 3 h 6 h	3 h 6 h 12 h	Global	firm	2011-03-07	JCOMM (Ali Mafimbo)
549	Wind vector over the surface (horizontal)		Ocean Applications	0.5 m/s 2 m/s 5 m/s		1 km 5 km 25 km	10	6 min 3 h 24 h	5 min 60 min 6 h	Global	reasonable	2011-03-07	JCOMM (Ali Mafimbo)
564	Wind vector over the surface (horizontal)	Near Surface	Climate-OOPC (deprecated)	0.5 m/s 1 m/s 5 m/s		10 km 20 km 100 km		60 min 3 h 24 h	3 h 5 h 12 h	Global ocean	firm	2007-07-19	OOPC

Instrument	NRT?	Relevance	Satellite	Orbit	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	20
RapidScat		2 - very high	ISS RapidScat	51.6 °	X	X																											
SCAT (HY-2A)		2 - very high	HY-2C	66 °					X	X	X	X	X	X																			
SCAT (HY-2A)		2 - very high	HY-2D	66 °						X	X	X	X	X	X																		
SCAT (HY-2A)		2 - very high	HY-2F	66 °								X	X	X	X	X	X																
SCAT (HY-2A)		2 - very high	HY-2G	66 °								X	X	X	X	X	X																
MTVZA-OK (MW)		3 - high	SICH-1M	82.5 °																													
SASS		2 - very high	SeaSat	108 °																													
SeaWinds		2 - very high	QuikSCAT	06:00 asc																													
SCAT (Meteor-M N3)		2 - very high	Meteor-M N3	12:00 asc							X	X	X	X	X	X																	
WindRAD		1 - primary	FY-3E	06:00 desc					X	X	X	X	X	X																			
WindRAD		1 - primary	FY-3H	06:00 desc										X	X	X	X	X	X														
SCAT (HY-2A)		2 - very high	HY-2A	06:00 desc	X	X	X	X	X																								
SCAT (HY-2A)		2 - very high	HY-2B	06:00 desc				X	X	X	X	X	X																				
SCAT (HY-2A)		2 - very high	HY-2E	06:00 desc						X	X	X	X	X	X																		
WindSat	No	3 - high	Coriolis	06:10 desc	X	X	X	X	X																								
SCAT (CFOSAT)		2 - very high	CFOSAT	07:00 desc				X	X	X	X	X																					
SCAT (CFOSAT)		2 - very high	CFOSAT follow-on	07:00 desc								X	X	X	X	X	X																
OSCAT		2 - very high	ScatSat-1	08:45 desc			X	X	X	X	X																						
ASCAT	Yes	2 - very high	Metop-A	09:30 desc	X	X	X	X	X																								
ASCAT	Yes	2 - very high	Metop-B	09:30 desc	X	X	X	X	X																								
ASCAT		2 - very high	Metop-C	09:30 desc				X	X	X	X	X	X	X																			
SCA (Scatterometer)		2 - very high	Metop-SG-B1	09:30 desc								X	X	X	X	X	X	X	X														
SCA (Scatterometer)		2 - very high	Metop-SG-B2	09:30 desc															X	X	X	X	X	X	X	X							
SCA (Scatterometer)		2 - very high	Metop-SG-B3	09:30 desc																						X	X	X	X	X	X	X	X
AMI-SCAT		2 - very high	ERS-1	10:30 desc																													
AMI-SCAT		2 - very high	ERS-2	10:30 desc																													
NSCAT		2 - very high	ADEOS	10:30 desc																													
SeaWinds		2 - very high	ADEOS-2	10:30 desc																													
OSCAT		2 - very high	OceanSat-2	11:50 desc																													
OSCAT		2 - very high	OceanSat-3	12:00 desc					X	X	X	X	X	X																			
OSCAT		2 - very high	OceanSat-3A	12:00 desc					X	X	X	X	X	X																			

Summary/discussion

Measurement timeline for *Ocean surface currents (vector)*

Definition: Water flow on ocean surface - Physical unit: [cm/s] - Accuracy unit: [cm/s] intended as vector error, i.e. the module of the vector difference between the observed vector and the true vector.

Measurement timeline for *Wind stress*

Definition: The shear force per unit area exerted by wind blowing over the sea surface -

Measurement timeline for *Turbulence*

Definition:

3D field of kinetic energy density of turbulent motion of the air

No matching instruments

- Wind requirements/capabilities all right? Collect review items?
- Time gap from 0:00-6:00 LST (& 12:00-18:00 LST) is evident
- Relate “Wind stress” to u10s, stress-equivalent winds?
- Wind derivative requirements?
- Define ocean current requirements? Drifts, Ekman current, . . . ?
- Define Ocean Motion Vector capability?
- Link MLE to turbulence?