

Observational requirements from WMO and co-sponsored programmes and applications

Updated on 28 May 2010

This Excel workbook contains the observational requirements communicated by WMO, GCOS, WCRP and GOOS application areas, with one spreadsheet per application. These requirements are supposed to be technology-free, i.e. independent of any particular measurement technique or instrument, surface or space-based.

The application areas addressed in the following worksheets are:

Global NWP	78 requirements	GCOS (AOPC,OOPC,TOPC)	104 requirements
High Resolution NWP	59 requirements	WCRP (<i>GlobalModelling, SPARC,</i>	
Synoptic meteorology	23 requirements	<i>CLIVAR, ACSYS, GEWEX)</i>	83 requirements
Seasonal & Inter-Annual monitoring	11 requirements	GOOS	26 requirements
NWC-VSRF	35 requirements		
Atmospheric chemistry	72 requirements		
Aeronautical Meteorology	10 requirements		
Agricultural Meteorology	13 requirements		
Hydrology and Water resources	18 requirements		
TOTAL WMO: 319 requirements		TOTAL Co-sponsored programmes:	213 requirements

Contents description

Column A contains the name of the geophysical variable, possibly qualified by domain (e.g. Low Troposphere, Stratosphere, Coastal areas, etc)

Columns B to P contain the requirements for the geophysical variable expressed in terms of five criteria:

- Horizontal Resolution, - Vertical Resolution, - Observing Cycle, - Timeliness (Delay of Availability) and - Accuracy.

For each of these criteria the table indicates three values:

- the "Goal" is the first value listed and is an ideal requirement above which further improvements are not necessary

- the Breakthrough ("B/T") is an intermediate level between Threshold and Goal which, if achieved, would result in a significant improvement for the targeted application

- the Threshold ("T/H") is the minimum requirement to be met to ensure that data are useful

The Breakthrough level may be considered as an optimum, from a cost-benefit point of view, when planning or designing observing systems.

Note: the Breakthrough was introduced at a later stage. When no Breakthrough value was available, the Breakthrough columns have been initially populated in the table by default values derived from the Goal and the Threshold, as a provisional measure pending proper determination by experts.

Column Q "CF_NAME" contains the "Confidence level" and can only accept the following values: "Firm", "Reasonable", "Tentative", or "Speculative".

Column R recalls the application area, or a specific activity within this application area, generating the requirement.

Column S contains "Remarks"

Column T indicates the source of the current requirement (author of the proposed requirement, or reference and date of validation when relevant.)

"Requirement from Global NWP"	Horizontal Resolution			Vertical Resolution			Observing Cycle			Delay of availability			Accuracy			Confidence	Application		
Parameter name	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	CF_NAME	Use	Remarks	Source/Validation
Aerosol profile - Higher stratosphere & mesosphere (HS & M)	15 km	50 km	250 km	0.2 km	2.99 km	3 km	1 h	6 h	24 h	0.1 h	0.5 h	6 h	10 %	20 %	50 %	Tentative	Global NWP		10/02/2009, John Eyre
Aerosol profile - Higher troposphere (HT)	15 km	50 km	250 km	0.2 km	2.99 km	3 km	1 h	6 h	24 h	0.1 h	0.5 h	6 h	10 %	20 %	50 %	Tentative	Global NWP		10/02/2009, John Eyre
Aerosol profile - Lower stratosphere (LS)	15 km	50 km	250 km	0.2 km	2.99 km	3 km	1 h	6 h	24 h	0.1 h	0.5 h	6 h	10 %	20 %	50 %	Tentative	Global NWP		10/02/2009, John Eyre
Aerosol profile - Lower troposphere (LT)	15 km	50 km	250 km	0.2 km	2.99 km	3 km	1 h	6 h	24 h	0.1 h	0.5 h	6 h	10 %	20 %	50 %	Tentative	Global NWP		10/02/2009, John Eyre
Aerosol profile - Total column	15 km	50 km	250 km				1 h	6 h	24 h	0.1 h	0.5 h	6 h	10 %	20 %	50 %	Tentative	Global NWP		10/02/2009, John Eyre
Air pressure over land surface	15 km	100 km	500 km				1 h	6 h	12 h	0.1 h	0.5 h	6 h	0.5 hPa	.99 hPa	1 hPa	Firm	Global NWP		10/02/2009, John Eyre
Air pressure over sea surface	15 km	100 km	500 km				1 h	6 h	12 h	0.1 h	0.5 h	6 h	0.5 hPa	.99 hPa	1 hPa	Firm	Global NWP		10/02/2009, John Eyre
Air specific humidity (at surface)	15 km	50 km	250 km				1 h	3 h	12 h	0.1 h	0.5 h	6 h	2 %	5 %	10 %	Reasonable	Global NWP		10/02/2009, John Eyre
Air temperature (at surface)	15 km	50 km	250 km				1 h	6 h	12 h	0.1 h	0.5 h	6 h	0.5 K	1 K	2 K	Reasonable	Global NWP		10/02/2009, John Eyre
Atmospheric temperature profile - Higher stratosphere & mesosphere (HS & M)	50 km	100 km	500 km	0.3 km	1 km	3 km	1 h	6 h	24 h	0.1 h	0.5 h	6 h	0.5 K	3 K	5 K	Reasonable	Global NWP		10/02/2009, John Eyre
Atmospheric temperature profile - Higher troposphere (HT)	15 km	100 km	500 km	0.3 km	1 km	3 km	1 h	6 h	24 h	0.1 h	0.5 h	6 h	0.5 K	1 K	3 K	Firm	Global NWP		10/02/2009, John Eyre
Atmospheric temperature profile - Lower stratosphere (LS)	15 km	100 km	500 km	0.3 km	1 km	3 km	1 h	6 h	24 h	0.1 h	0.5 h	6 h	0.5 K	1 K	3 K	Firm	Global NWP		10/02/2009, John Eyre
Atmospheric temperature profile - Lower troposphere (LT)	15 km	100 km	500 km	0.3 km	1 km	3 km	1 h	6 h	24 h	0.1 h	0.5 h	6 h	0.5 K	1 K	3 K	Firm	Global NWP		10/02/2009, John Eyre
Cloud base height	5 km	15 km	50 km				1 h	3 h	12 h	0.1 h	0.5 h	6 h	0.2 km	.5 km	1 km	Reasonable	Global NWP		10/02/2009, John Eyre
Cloud cover	5 km	15 km	50 km				1 h	3 h	12 h	0.1 h	0.5 h	6 h	5 % (Max)	(Max)	(Max)	Reasonable	Global NWP		10/02/2009, John Eyre
Cloud drop size (at cloud top)	5 km	15 km	50 km				1 h	3 h	12 h	0.1 h	0.5 h	6 h	1 µm	2 µm	5 µm	Tentative	Global NWP		10/02/2009, John Eyre
Cloud ice profile - Higher troposphere (HT)	5 km	15 km	50 km	0.2 km	1 km	2 km	1 h	3 h	12 h	0.1 h	0.5 h	6 h	20 %	50 %	100 %	Reasonable	Global NWP		10/02/2009, John Eyre
Cloud ice profile - Lower troposphere (LT)	5 km	15 km	50 km	0.2 km	1 km	2 km	1 h	3 h	12 h	0.1 h	0.5 h	6 h	20 %	50 %	100 %	Reasonable	Global NWP		10/02/2009, John Eyre
Cloud ice profile - Total column	5 km	15 km	50 km				1 h	3 h	12 h	0.1 h	0.5 h	6 h	5 g/m2	10 g/m2	20 g/m2	Reasonable	Global NWP		10/02/2009, John Eyre
Cloud imagery	0.99 km	1 km	5 km				1 h	3 h	12 h	0.1 h	0.5 h	6 h				Firm	Global NWP		10/02/2009, John Eyre
Cloud top height	5 km	15 km	50 km				1 h	3 h	12 h	0.1 h	0.5 h	6 h	0.2 km	.5 km	1 km	Firm	Global NWP		10/02/2009, John Eyre
Cloud water profile (< 100 µm) - Higher troposphere (HT)	5 km	15 km	50 km	0.2 km	1 km	2 km	1 h	3 h	12 h	0.1 h	0.5 h	6 h	20 %	50 %	100 %	Reasonable	Global NWP		10/02/2009, John Eyre
Cloud water profile (< 100 µm) - Lower troposphere (LT)	5 km	15 km	50 km	0.2 km	1 km	2 km	1 h	3 h	12 h	0.1 h	0.5 h	6 h	20 %	50 %	100 %	Reasonable	Global NWP		10/02/2009, John Eyre
Cloud water profile (< 100 µm) - Total column	5 km	15 km	50 km				1 h	3 h	12 h	0.1 h	0.5 h	6 h	10 kg/m2	20 kg/m2	50 kg/m2	Reasonable	Global NWP		10/02/2009, John Eyre
Cloud water profile (> 100 µm) - Higher troposphere (HT)	5 km	15 km	50 km	0.2 km	1 km	2 km	1 h	3 h	12 h	0.1 h	0.5 h	6 h	20 %	50 %	100 %	Reasonable	Global NWP		10/02/2009, John Eyre
Cloud water profile (> 100 µm) - Lower troposphere (LT)	5 km	15 km	50 km	0.2 km	1 km	2 km	1 h	3 h	12 h	0.1 h	0.5 h	6 h	20 %	50 %	100 %	Reasonable	Global NWP		10/02/2009, John Eyre
Cloud water profile (> 100 µm) - Total column	5 km	15 km	50 km				1 h	3 h	12 h	0.1 h	0.5 h	6 h	10 kg/m2	kg/m2	50 kg/m2	Reasonable	Global NWP		10/02/2009, John Eyre
Dominant wave direction	15 km	50 km	250 km				1 h	3 h	12 h	0.1 h	0.5 h	6 h	degrees	degrees	degrees	Firm	Global NWP		10/02/2009, John Eyre
Dominant wave period	15 km	50 km	250 km				1 h	3 h	12 h	0.1 h	0.5 h	6 h	0.25 s	.5 s	1 s	Firm	Global NWP		10/02/2009, John Eyre
Downwelling long-wave radiation at the Earth surface	10 km	30 km	100 km				1 h	3 h	12 h	24 h	120 h	720 h	1 W/m2	10 W/m2	20 W/m2	Reasonable	Global NWP		10/02/2009, John Eyre
Downwelling short-wave radiation at the Earth surface	10 km	30 km	100 km				1 h	3 h	12 h	24 h	120 h	720 h	1 W/m2	10 W/m2	20 W/m2	Reasonable	Global NWP		10/02/2009, John Eyre
Fractional Photosynthetically Action Radiation (fAPAR)	2 km	10 km	50 km				1 d	5 d	10 d	0.125 d	1 d	10 d	5 % (Max)	(Max)	(Max)	Reasonable	Global NWP		10/02/2009, John Eyre
Land surface temperature	5 km	15 km	250 km				0.5 h	3 h	6 h	0.1 h	0.5 h	6 h	0.5 K	1 K	4 K	Firm	Global NWP		10/02/2009, John Eyre
Leaf Area Index (LAI)	2 km	10 km	50 km				1 d	5 d	10 d	0.125 d	1 d	10 d	5 % (Max)	(Max)	(Max)	Reasonable	Global NWP		10/02/2009, John Eyre
Long-wave Earth surface emissivity	5 km	15 km	50 km				24 h	120 h	720 h	24 h	120 h	720 h	(Max)	1 % (Max)	3 % (Max)	Reasonable	Global NWP		10/02/2009, John Eyre
Normalized Differential Vegetation Index (NDVI)	2 km	10 km	50 km				1 d	5 d	10 d	0.125 d	1 d	10 d	5 % (Max)	(Max)	(Max)	Reasonable	Global NWP		10/02/2009, John Eyre
Ocean salinity - upper ocean	5 km	100 km	250 km	1 m	2 m	10 m	1 d	30 d	60 d	3 h	24 h	120 h	0.1 psu	0.2 psu	0.3 psu	Tentative	Global NWP		10/02/2009, John Eyre
Ocean surface salinity	5 km	100 km	250 km				1 d	30 d	60 d	3 h	24 h	120 h	0.1 psu	0.2 psu	0.3 psu	Reasonable	Global NWP		10/02/2009, John Eyre
Ocean temperature - upper ocean	5 km	100 km	250 km	1 m	2 m	10 m	1 d	2 d	30 d	3 h	24 h	120 h	0.3 K	0.5 K	1 K	Reasonable	Global NWP		10/02/2009, John Eyre
Outgoing long-wave Earth surface	10 km	30 km	100 km				1 h	3 h	12 h	24 h	120 h	720 h	1 W/m2	10 W/m2	20 W/m2	Reasonable	Global NWP		10/02/2009, John Eyre
Outgoing long-wave radiation at TOA	10 km	30 km	100 km				1 h	3 h	12 h	24 h	120 h	720 h	5 W/m2	10 W/m2	20 W/m2	Firm	Global NWP		10/02/2009, John Eyre
Outgoing short-wave radiation at TOA	10 km	30 km	100 km				1 h	3 h	12 h	24 h	120 h	720 h	5 W/m2	10 W/m2	20 W/m2	Firm	Global NWP		10/02/2009, John Eyre
Outgoing spectral radiance at TOA	10 km	30 km	100 km				0.004 d	0.0125 d	5 d	24 h	120 h	720 h	5 % (Max)	(Max)	(Max)	Reasonable	Global NWP		10/02/2009, John Eyre
Ozone profile - Higher stratosphere & mesosphere (HS & M)	15 km	100 km	250 km	1 km	2.2 km	10 km	1 h	6 h	12 h	0.1 h	0.5 h	6 h	5 %	10 %	20 %	Reasonable	Global NWP		10/02/2009, John Eyre
Ozone profile - Higher troposphere (HT)	15 km	100 km	250 km	1 km	2.2 km	10 km	1 h	6 h	12 h	0.1 h	0.5 h	6 h	5 %	10 %	20 %	Firm	Global NWP		10/02/2009, John Eyre
Ozone profile - Lower stratosphere (LS)	15 km	100 km	250 km	1 km	2.2 km	10 km	1 h	6 h	12 h	0.1 h	0.5 h	6 h	5 %	10 %	20 %	Firm	Global NWP		10/02/2009, John Eyre
Ozone profile - Lower troposphere (LT)	15 km	100 km	250 km	1 km	2.2 km	10 km	1 h	6 h	12 h	0.1 h	0.5 h	6 h	5 %	10 %	20 %	Firm	Global NWP		10/02/2009, John Eyre
Ozone profile - Total column	15 km	100 km	250 km				1 h	6 h	12 h	0.1 h	0.5 h	6 h	5 DU	10 DU	20 DU	Firm	Global NWP		10/02/2009, John Eyre
Precipitation index (daily cumulative)	10 km	30 km	100 km				1 h	3 h	12 h	24 h	120 h	720 h	0.5 mm/d	2 mm/d	5 mm/d	Firm	Global NWP		10/02/2009, John Eyre
Precipitation rate (liquid) at the surface	5 km	15 km	50 km				1 h	3 h	12 h	0.1 h	0.5 h	6 h	0.1 mm/h	.5 mm/h	1 mm/h	Reasonable	Global NWP		10/02/2009, John Eyre
Precipitation rate (solid) at the surface	5 km	15 km	50 km				1 h	3 h	12 h	0.1 h	0.5 h	6 h	0.1 mm/h	.5 mm/h	1 mm/h	Reasonable	Global NWP		10/02/2009, John Eyre
Sea surface temperature	5 km	15 km	250 km				3 h	24 h	120 h	3 h	24 h	120 h	0.3 K	.5 K	1 K	Firm	Global NWP		10/02/2009, John Eyre
Sea-ice cover	5 km	15 km	100 km				0.125 d	1 d	5 d	0.125 d	1 d	5 d	5 % (Max)	(Max)	(Max)	Firm	Global NWP		10/02/2009, John Eyre
Sea-ice surface temperature	5 km	15 km	250 km				1 h	3 h	12 h	0.1 h	0.5 h	6 h	0.5 K	1 K	4 K	Reasonable	Global NWP		10/02/2009, John Eyre
Sea-ice thickness	15 km	50 km	250 km				1 d	5 d	30 d	1 d	5 d	30 d	20 cm	50 cm	100 cm	Tentative	Global NWP		10/02/2009, John Eyre
Sea-ice type	10 km	25 km	100 km				0.125 d	1 d	5 d	0.125 d	1 d	5 d	4 classes	3 classes	2 classes	Tentative	Global NWP		10/02/2009, John Eyre
Short-wave cloud reflectance	10 km	30 km	100 km				1 h	3 h	12 h	24 h	120 h	720 h	1 % (Max)	3 % (Max)	(Max)	Reasonable	Global NWP		10/02/2009, John Eyre
Short-wave Earth surface bi-directional reflectance	10 km	30 km	100 km				1 h	3 h	12 h	24 h	120 h	720 h	1 % (Max)	2 % (Max)	5 % (Max)	Reasonable	Global NWP		10/02/2009, John Eyre
Significant wave height	15 km	50 km	250 km				1 h	3 h	12 h	0.1 h	0.5 h	6 h	0.1 m	.3 m	0.5 m	Firm	Global NWP		10/02/2009, John Eyre
Snow cover	5 km	15 km	100 km				3 h	24 h	120 h	3 h	24 h	120 h	(Max)	(Max)	(Max)	Firm	Global NWP		10/02/2009, John Eyre
Snow water equivalent	5 km	15 km	100 km				3 h	24 h	120 h	3 h	24 h	120 h	2 mm	10 mm	20 mm	Reasonable	Global NWP		10/02/2009, John Eyre
Soil moisture	5 km	15 km	100 km				0.125 d	1 d	5 d	0.125 d	1 d	5 d	10 g/kg	20 g/kg	50 g/kg	Reasonable	Global NWP		10/02/2009, John Eyre
Specific humidity profile - Higher troposphere (HT)	15 km	50 km	250 km	0.5 km	1 km	3 km	1 h	6 h	12 h	0.1 h	0.5 h	6 h	2 %	5 %	10 %	Firm	Global NWP	Accuracy 5%	10/02/2009, John Eyre
Specific humidity profile - Lower troposphere (LT)	15 km	50 km	250 km	0.3 km	1 km	3 km	1 h	6 h	12 h	0.1 h	0.5 h	6 h	2 %	5 %	10 %	Firm	Global NWP	Accuracy 5%	10/02/2009, John Eyre
Specific humidity profile - Total column	15 km	50 km	250 km				1 h	6 h	12 h	0.1 h	0.5 h	6 h	1 kg/m2	2 kg/m2	5 kg/m2	Firm	Global NWP		10/02/2009, John Eyre
Vegetation type	2000 m	10000 m	50000 m				7 d	15 d	30 d	1 d	2 d	7 d	18 classes	12 classes	9 classes	Reasonable	Global NWP		10/02/2009, John Eyre
Wind profile (horizontal component) - Higher stratosphere & mesosphere (HS & M)	50 km	100 km	500 km	1 km	2 km	3 km	1 h	6 h	12 h	0.1 h	0.5 h	6 h	1 m/s	5 m/s	10 m/s	Firm	Global NWP		10/02/2009, John Eyre
Wind profile (horizontal component) - Higher troposphere (HT)	15 km	100 km	500 km	0.5 km	1 km	3 km	1 h	6 h	12 h	0.1 h	0.5 h	6 h	1 m/s	3 m/s	8 m/s	Firm	Global NWP		10/02/2009, John Eyre
Wind profile (horizontal component) - Lower stratosphere (LS)	15 km	100 km	500 km	0.5 km	1 km	3 km	1 h	6 h	12 h	0.1 h	0.5 h	6 h	1 m/s	3 m/s	5 m/s	Firm	Global NWP		10/02/2009, John Eyre
Wind profile (horizontal component) - Lower troposphere (LT)	15 km	100 km	500 km	0.5 km	1 km	3 km	1 h	6 h	12 h	0.1 h	0.5 h	6 h	1 m/s	3 m/s	5 m/s	Firm	Global NWP		10/02/2009, John Eyre
Wind profile (vertical component) - Higher stratosphere & mesosphere (HS & M)	15 km	200 km	500 km	0.5 km	2 km	3 km	1 h	6 h	12 h	0.1 h	0.5 h	6 h	1 cm/s	4.99 cm/s	5 cm/s	Tentative	Global NWP		10/02/2009, John Eyre
Wind profile (vertical component) - Higher troposphere (HT)	15 km	200 km	500 km	0.5 km	2 km	3 km	1 h												

"Requirement from High-Resolution NWP"	Horizontal Resolution			Vertical Resolution			Observing Cycle			Delay of availability			Accuracy			Confidence	Application		
Parameter name	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	CF_NAME	Use	Remarks	Source/Validation
Air pressure over land surface	1.0 km	5.0 km	20 km				0.5 h	1.0 h	3 h	0.25 h	0.5 h	2 h	0.5 hPa	0.63 hPa	1 hPa	Firm	High Res NWP		T Montmerle (Feb 2010)
Air pressure over sea surface	1.0 km	5.0 km	20 km				0.5 h	1.0 h	6 h	0.25 h	0.5 h	2 h	0.5 hPa	0.63 hPa	1 hPa	Firm	High Res NWP		T Montmerle (Feb 2010)
Air specific humidity (at surface)	1.0 km	5.0 km	20 km				0.50 h	1.0 h	6 h	0.25 h	0.5 h	2 h	5%	7.2 %	15%	Firm	High Res NWP		JF Mahfouf (Feb 2010)
Air temperature (at surface)	1.0 km	5.0 km	20 km				0.5 h	1.0 h	6 h	0.50 h	1.0 h	2 h	0.5 K	0.794 K	2 K	Firm	High Res NWP		JF Mahfouf (Feb 2010)
Atmospheric temperature profile - Higher troposphere (HT)	2.0 km	10.0 km	50 km	0.3 km	0.4 km	1.0 km	0.25 h	1.0 h	6 h	0.25 h	0.5 h	2 h	0.5 K	0.909 K	3 K	Firm	High Res NWP		T Montmerle (Feb 2010)
Atmospheric temperature profile - Lower stratosphere (LS)	10.0 km	25.0 km	100 km	1.0 km	1.5 km	3.0 km	0.25 h	1.0 h	6 h	0.25 h	0.5 h	2 h	0.5 K	0.909 K	3 K	Firm	High Res NWP		T Montmerle (Feb 2010)
Atmospheric temperature profile - Lower troposphere (LT)	0.5 km	2.0 km	30 km	0.1 km	0.2 km	1.0 km	0.25 h	1.0 h	6 h	0.25 h	0.5 h	2 h	0.5 K	0.909 K	3 K	Firm	High Res NWP		T Montmerle (Feb 2010)
Cloud base height	0.5 km	2.0 km	10 km				0.25 h	1.0 h	3 h	0.25 h	0.5 h	2 h	0.5 km	0.63 km	1 km	Tentative	High Res NWP		T Montmerle (Feb 2010)
Cloud cover	0.5 km	2.0 km	10 km				0.25 h	0.5 h	3 h	0.25 h	0.5 h	2 h	5 % (Max)	7.9 % (Ma 20 % (Max)		Tentative	High Res NWP		T Montmerle (Feb 2010)
Cloud drop size (at cloud top)	0.5 km	2.0 km	10 km				0.25 h	1.0 h	3 h	0.25 h	0.5 h	2 h	0.5 µm	0.794 µm	2 µm	Speculative	High Res NWP		T Montmerle (Feb 2010)
Cloud ice profile - Higher troposphere (HT)	0.5 km	2.0																	

"Requirement from Synoptic Meteorology"			Horizontal Resolution			Vertical Resolution			Observing Cycle			Delay of availability			Accuracy			Confidence		Application	
			Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	CF_NAME	Use	Remarks	Source/Validation
Parameter name																					
Air temperature (at surface)			10 km	21.5 km	100 km				1 h	2.3 h	12 h	1 h	1.6 h	4 h	0.5 K	0.794 K	2 K	Firm	Synoptic Meteor	20/10/2003, ET ODRRGOS, Geneva, Nov	
Atmospheric stability index			20 km	43.1 km	200 km				1 h	1.8 h	6 h	1 h	1.4 h	3 h	Missing	K	Missing	Firm	Synoptic Meteor	20/10/2003, ET ODRRGOS, Geneva, Nov	
Atmospheric temperature profile - Higher troposphere (HT)			20 km	43.1 km	200 km	0.1 km	0.271 km	2 km	3 h	4.8 h	12 h	1 h	1.4 h	3 h	0.5 K	0.909 K	3 K	Firm	Synoptic Meteor	20/10/2003, ET ODRRGOS, Geneva, Nov	
Atmospheric temperature profile - Lower stratosphere (LS)			20 km	43.1 km	200 km	0.1 km	0.271 km	2 km	3 h	4.8 h	12 h	1 h	1.4 h	3 h	0.5 K	0.909 K	3 K	Firm	Synoptic Meteor	20/10/2003, ET ODRRGOS, Geneva, Nov	
Atmospheric temperature profile - Lower troposphere (LT)			20 km	43.1 km	200 km	0.1 km	0.27														

Requirement from Seasonal and Inter-annual Forecasting			Horizontal Resolution			Vertical Resolution			Observing Cycle			Delay of availability			Accuracy			Confidence	Application	Remarks	Source/Validation
Parameter name			Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	CF_NAME	Use		
Fractional Photosynthetically Active Radiation (fPAR)			50 km	107.7 km	500 km				7 d	11.5 d	30 d	1 d	3.1 d	30 d	5 % (Max)	(Max)	(Max)	Firm	S & I A		19/01/2009, Laura Ferranti
Geoid			100 km	171 km	500 km				240 mo	300 mo	360 mo	12 y	15.1 y	24 y	1 cm	1.7 cm	5 cm	Firm	S & I A		19/01/2009, Laura Ferranti
Ocean chlorophyll			25 km	39.7 km	100 km				1 d	1.5 d	3 d	1 d	1.5 d	3 d	5 % (Max)	(Max)	(Max)	Firm	S & I A		19/01/2009, Laura Ferranti
Ocean dynamic topography			25 km	39.7 km	100 km				7 d	15 d	30 d	2 d	5 d	15 d	1 cm	1.6 cm	4 cm	Firm	S & I A		19/01/2009, Laura Ferranti
Ocean surface salinity			100 km	135.7 km	250 km				30 d	40 d	60 d	9 d	21.3 d	120 d	0.1 psu	0.144 psu	0.3 psu	Reasonable	S & I A		19/01/2009, Laura Ferranti
Ocean suspended sediment concentration			100 km	171 km	500 km				1 d	2 d	6 d	30 d	45 d	90 d	5 % (Max)	(Max)	(Max)	Speculative	S & I A		19/01/2009, Laura Ferranti
Ocean yellow substance absorbance			100 km	171 km	500 km				1 d	2 d	6 d	30 d	45 d	90 d	5 % (Max)	(Max)	(Max)	Speculative	S & I A		19/01/2009, Laura Ferranti
Sea surface temperature			50 km	85.5 km	250 km				3 h	6 h	12 h	3 h	6 h	24 h	0.1 K	0.171 K	0.5 K	Firm	S & I A	Tropical oce	19/01/2009, Laura Ferranti
Snow water equivalent			50 km	107.7 km	500 km				24 h		48 168 h	24 h	48 h	168 h	5 mm	7.9 mm	20 mm	Tentative	S & I A		19/01/2009, Laura Ferranti
Soil moisture			50 km	107.7 km	500 km				1 d	2 d	7 d	1 d	2 d	7 d	10 g/kg	17.1 g/kg	50 g/kg	Reasonable	S & I A		19/01/2009, Laura Ferranti
Vegetation type			50 km	107.7 km	500 km				7 d	15 d	30 d	1 d	2 d	7 d	classes	classes	9 classes	Firm	S & I A		19/01/2009, Laura Ferranti

"Requirement from Nowcasting and Very Short Range Forecasting"	Horizontal Resolution			Vertical Resolution			Observing Cycle			Delay of availability				Accuracy			Confidence	Application	Remarks	Source/Validation
	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	CF_NAME	Use			
Aerosol profile - Total column	5 km	10.8 km	50 km				0.25 h	0.909 h	12 h	0.25 h	0.5 h	2 h	10 %	12.6 %	20 %	Firm	Nowcasting	19/7/2007, ET EGOS-3		
Air temperature (at surface)	5 km	7.9 km	20 km				0.25 h	0.397 h	1 h	0.25 h	0.315 h	0.5 h	0.5 K	0.63 K	1 K	Reasonable	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Atmospheric stability index	5 km	10.8 km	50 km				0.08 h	0.147 h	0.5 h	0.25 h	0.397 h	1 h	Missing	K	Missing	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Atmospheric temperature profile - Higher troposphere (HT)	5 km	17.1 km	200 km	1 km	1.4 km	3 km	0.25 h	0.397 h	1 h	0.08 h	0.147 h	0.5 h	1 K	1.3 K	2 K	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Atmospheric temperature profile - Lower troposphere (LT)	5 km	17.1 km	200 km	0.5 km	0.63 km	1 km	0.25 h	0.397 h	1 h	0.08 h	0.147 h	0.5 h	0.5 K	0.794 K	2 K	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Cloud cover	1 km	2.7 km	20 km				0.0083 h	0.041 h	1 h	0.016 h	0.05 h	0.5 h	5 % (Max)	(Max)	(Max)	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Cloud imagery	1 km	1.7 km	5 km				0.05 h	0.108 h	0.5 h	0.25 h	0.397 h	1 h				Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Cloud top height	1 km	2.2 km	10 km				0.01 h	0.037 h	0.5 h	0.02 h	0.058 h	0.5 h	0.1 km	0.215 km	1 km	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Cloud top temperature	1 km	2.2 km	10 km				0.01 h	0.037 h	0.5 h	0.02 h	0.058 h	0.5 h	0.5 K	0.794 K	2 K	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Cloud type	1 km	2.2 km	10 km				0.01 h	0.037 h	0.5 h	0.02 h	0.058 h	0.5 h	classes	classes	5 classes	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Fire area	5 km	18.4 km	250 km				0.25 d	0.909 d	12 d	1 d	1.6 d	4 d	5 % (Max)	(Max)	(Max)	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Fire temperature	5 km	18.4 km	250 km				0.25 d	0.909 d	12 d	1 d	1.6 d	4 d	500 K	630 K	1000 K	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Height of the top of the Planetary Boundary Layer	5 km	10.8 km	50 km				0.25 h	0.397 h	1 h	0.08 h	0.147 h	0.5 h	50 m	107.7 m	500 m	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Height of tropopause	10 km	27.1 km	200 km				0.5 h	1.145 h	6 h	0.5 h	0.794 h	2 h	0.1 km	0.215 km	1 km	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Land surface temperature	1 km	3.7 km	50 km				0.25 h	0.397 h	1 h	0.08 h	0.147 h	0.5 h	0.5 K	0.909 K	3 K	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Normalized Differential Vegetation Index (NDVI)	5 km	6.3 km	10 km				1 d	2.3 d	12 d	1 d	1.7 d	5 d	5 % (Max)	(Max)	(Max)	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Ocean surface currents (vector)	10 km	17.1 km	50 km				0.25 d	0.721 d	6 d	0.25 d	0.63 d	4 d	0.5 cm/s	0.63 cm/s	1 cm/s	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Precipitation rate (liquid) at the surface	5 km	10.8 km	50 km				0.08 h	0.186 h	1 h	0.08 h	0.147 h	0.5 h	0.1 mm/h	mm/h	1 mm/h	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Precipitation rate (solid) at the surface	5 km	10.8 km	50 km				0.25 h	0.397 h	1 h	0.5 h	0.79 h	2 h	0.1 mm/h	mm/h	1 mm/h	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Sea surface temperature	5 km	10.8 km	50 km				1 h	1.8 h	6 h	1 h	1.3 h	2 h	0.5 K	0.794 K	2 K	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Sea-ice cover	5 km	10.8 km	50 km				1 d	2.9 d	24 d	1 d	1.8 d	6 d	(Max)	(Max)	(Max)	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Snow cover	5 km	10.8 km	50 km				1 h	5.2 h	144 h	1 h	1.8 h	6 h	(Max)	(Max)	(Max)	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Soil moisture	5 km	10.8 km	50 km				0.5 d	0.794 d	2 d	0.25 d	0.397 d	1 d	10 g/kg	17.1 g/kg	50 g/kg	Reasonable	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Specific humidity profile - Higher troposphere (HT)	5 km	17.1 km	200 km	1 km	1.4 km	3 km	0.25 h	0.397 h	1 h	0.08 h	0.147 h	0.5 h	5 %	7.9 %	20 %	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003	Accuracy 10	
Specific humidity profile - Lower troposphere (LT)	5 km	17.1 km	200 km	0.5 km	0.63 km	1 km	0.25 h	0.397 h	1 h	0.08 h	0.147 h	0.5 h	5 %	7.9 %	20 %	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003	Accuracy 5	
Specific humidity profile - Total column	5 km	10.8 km	50 km				0.25 h	0.397 h	1 h	0.08 h	0.147 h	0.5 h	1 kg/m2	1.7 kg/m2	5 kg/m2	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Temperature of tropopause	10 km	27.1 km	200 km				0.5 h	1.145 h	6 h	0.5 h	0.794 h	2 h	0.5 K	0.794 K	2 K	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Wind profile (horizontal component) - Higher troposphere (HT)	5 km	17.1 km	200 km	0.5 km	0.63 km	1 km	0.25 h	0.63 h	4 h	0.08 h	0.147 h	0.5 h	1 m/s	2 m/s	8 m/s	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Wind profile (horizontal component) - Lower stratosphere (LS)	5 km	17.1 km	200 km	0.5 km	0.63 km	1 km	0.25 h	0.721 h	6 h	0.25 h	0.5 h	2 h	1 m/s	1.7 m/s	5 m/s	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Wind profile (horizontal component) - Lower troposphere (LT)	5 km	17.1 km	200 km	0.5 km	0.63 km	1 km	0.25 h	0.721 h	6 h	0.25 h	0.5 h	2 h	1 m/s	1.7 m/s	5 m/s	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Wind profile (vertical component) - Lower troposphere (LT)	5 km	17.1 km	200 km	0.5 km	0.794 km	2 km	0.25 h	0.397 h	1 h	0.08 h	0.147 h	0.5 h	1 cm/s	1.7 m/s	5 cm/s	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Wind speed over land surface (horizontal)	5 km	10.8 km	50 km				0.25 h	0.572 h	3 h	0.25 h	0.397 h	1 h	1 m/s	1.7 m/s	5 m/s	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Wind speed over sea surface (horizontal)	5 km	10.8 km	50 km				0.25 h	0.572 h	3 h	0.25 h	0.397 h	1 h	1 m/s	1.7 m/s	5 m/s	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Wind vector over land surface (horizontal)	5 km	10.8 km	50 km				0.25 h	0.572 h	3 h	0.25 h	0.397 h	1 h	1 m/s	1.7 m/s	5 m/s	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		
Wind vector over sea surface (horizontal)	5 km	10.8 km	50 km				0.25 h	0.572 h	3 h	0.25 h	0.397 h	1 h	1 m/s	1.7 m/s	5 m/s	Firm	Nowcasting	20/10/2003, ET ODRRGOS, Geneva, Nov 2003		

"Requirement from Aeronautical Meteorology"			Horizontal Resolution			Vertical Resolution			Observing Cycle			Delay of availability			Accuracy			Confidence		Application		Remarks
			Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	CF_NAME	Use			
Atmospheric temperature profile - Lower troposphere (LT)			50 km	63 km	100 km	0.15 km	0.238 km	0.6 km	1 h	1.4 h	3 h	1 h	1.3 h	2 h	2 K	2.7 K	5 K	Firm	Aero Met		23/6/2000, ETODRRGOS-3	
Cloud drop size (at cloud top)			50 km	63 km	100 km				1 h	1.4 h	3 h	1 h	1.3 h	2 h	15 µm	18.9 µm	30 µm	Firm	Aero Met	gnd - FI 260	23/6/2000, ETODRRGOS-3	
Cloud ice profile - Higher troposphere (HT)			50 km	63 km	100 km	0.15 km	0.238 km	0.6 km	1 h	1.4 h	3 h	1 h	1.3 h	2 h	10 %	13.6 %	25 %	Firm	Aero Met		23/6/2000, ETODRRGOS-3	
Cloud ice profile - Lower troposphere (LT)			50 km	63 km	100 km	0.15 km	0.238 km	0.6 km	1 h	1.4 h	3 h	1 h	1.3 h	2 h	10 %	13.6 %	25 %	Firm	Aero Met		23/6/2000, ETODRRGOS-3	
Cloud water profile (< 100 µm) - Lower troposphere (LT)			50 km	63 km	100 km	0.15 km	0.238 km	0.6 km	1 h	1.4 h	3 h	1 h	1.3 h	2 h	10 %	13.6 %	25 %	Firm	Aero Met		23/6/2000, ETODRRGOS-3	
Cloud water profile (> 100 µm) - Lower troposphere (LT)			50 km	63 km	100 km	0.15 km	0.238 km	0.6 km	1 h	1.4 h	3 h	1 h	1.3 h	2 h	10 %	13.6 %	25 %	Firm	Aero Met		23/6/2000, ETODRRGOS-3	
Specific humidity profile - Lower troposphere (LT)			50 km	63 km	100 km	0.15 km	0.238 km	0.6 km	1 h	1.4 h	3 h	1 h	1.3 h	2 h	5 %	6.3 %	10 %	Firm	Aero Met		23/6/2000, ETODRRGOS-3	
Wind profile (horizontal component) - Higher troposphere (HT)			50 km	63 km	100 km	0.15 km	0.238 km	0.6 km	0.0833 h	0.105 h	0.167 h	1 h	1.4 h	3 h	2 m/s	2.7 m/s	5 m/s	Firm	Aero Met	Near steep topography or jet streams min requirements	23/6/2000, ETODRRGOS-3	
Wind profile (horizontal component) - Lower stratosphere (LS)			50 km	63 km	100 km	0.15 km	0.238 km	0.6 km	0.0833 h	0.105 h	0.167 h	1 h	1.4 h	3 h	2 m/s	2.7 m/s	5 m/s	Firm	Aero Met	Near steep topography or jet streams min requirements	23/6/2000, ETODRRGOS-3	
Wind profile (horizontal component) - Lower troposphere (LT)			50 km	63 km	100 km	0.15 km	0.238 km	0.6 km	0.0833 h	0.105 h	0.167 h	1 h	1.4 h	3 h	2 m/s	2.7 m/s	5 m/s	Firm	Aero Met	Near steep topography or jet streams min requirements	23/6/2000, ETODRRGOS-3	

"Requirement from Agriculture Meteorology"			Horizontal Resolution			Vertical Resolution			Observing Cycle			Delay of availability			Accuracy			Confidence	Application	Remarks	Source/Validation
Parameter name			Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	CF_NAME	Use		
Fire area	0.01 km	0.1 km	10 km						0.25 d	0.397 d	1 d	0.0416 d	0.076 d	0.25 d	5 % (Max)	(Max)	(Max)	Reasonable	Agricultural Meteor	Saturation lvi not reached	20/10/2003, ET ODRRGOS, Geneva, Nov 2003
Fire temperature	0.01 km	0.1 km	10 km						0.25 d	0.397 d	1 d	0.0416 d	0.076 d	0.25 d	50 K	79.4 K	200 K	Reasonable	Agricultural Meteor	Saturation lvi not reached	20/10/2003, ET ODRRGOS, Geneva, Nov 2003
Fractional Photosynthetically Active Radiation (fAPAR)	5 km	13.6 km	100 km						0.0416 d	0.23 d	7 d	1 d	1.7 d	5 d	5 % (Max)	(Max)	(Max)	Reasonable	Agricultural Meteor	Photosynthesis estimation	20/10/2003, ET ODRRGOS, Geneva, Nov 2003
Land cover	100 m	215.4 m	1000 m						1 y	1.3 y	2 y	10 d	14.4 d	30 d	10 classes	classes	4 classes	Reasonable	Agricultural Meteor	Land utilization map com	20/10/2003, ET ODRRGOS, Geneva, Nov 2003
Land surface temperature	0.1 km	0.464 km	10 km						1 h	4.2 h	72 h	3 h	6 h	24 h	0.3 K	0.565 K	2 K	Reasonable	Agricultural Meteor	Detection of areas affect	20/10/2003, ET ODRRGOS, Geneva, Nov 2003
Leaf Area Index (LAI)	0.01 km	0.1 km	10 km						5 d	5.6 d	7 d	1 d	1.7 d	5 d	5 % (Max)	(Max)	(Max)	Reasonable	Agricultural Meteor	Evapotranspiration estim	20/10/2003, ET ODRRGOS, Geneva, Nov 2003
Normalized Differential Vegetation Index (NDVI)	1 km	2.2 km	10 km						1 d	1.9 d	7 d	1 d	1.7 d	5 d	5 % (Max)	(Max)	(Max)	Reasonable	Agricultural Meteor	Event detection; crop sta	20/10/2003, ET ODRRGOS, Geneva, Nov 2003
Precipitation index (daily cumulative)	10 km	17.1 km	50 km						24 h	34.6 h	72 h	24 h	30.2 h	48 h	2 mm/d	3.4 mm/d	10 mm/d	Reasonable	Agricultural Meteor	Evaluation of soil moistur	20/10/2003, ET ODRRGOS, Geneva, Nov 2003
Snow cover	1 km	2.2 km	10 km						120 h	134.2 h	168 h	24 h	43.6 h	144 h	2 % (Max)	(Max)	(Max)	Reasonable	Agricultural Meteor	Evaluation of crop winter	20/10/2003, ET ODRRGOS, Geneva, Nov 2003
Snow water equivalent	1 km	2.2 km	10 km						168 h	272.9 h	720 h	24 h	45.9 h	168 h	5 mm	23.2 mm	500 mm	Reasonable	Agricultural Meteor	Evaluation of soil water s	20/10/2003, ET ODRRGOS, Geneva, Nov 2003
Soil moisture	0.1 km	0.215 km	1 km						1 d	1.9 d	7 d	1 d	1.7 d	5 d	10 g/kg	17.1 g/kg	50 g/kg	Reasonable	Agricultural Meteor	Crop state and productiv	20/10/2003, ET ODRRGOS, Geneva, Nov 2003
Soil type	0.1 km	0.464 km	10 km						1 y	1.3 y	2 y	10 d	14.4 d	30 d	15 classes	classes	5 classes	Reasonable	Agricultural Meteor	Crop state estimation, so	20/10/2003, ET ODRRGOS, Geneva, Nov 2003
Vegetation type	50 m	107.7 m	500 m						30 d	37.8 d	60 d	1 d	1.9 d	7 d	30 classes	classes	5 classes	Reasonable	Agricultural Meteor	Land utilization map com	20/10/2003, ET ODRRGOS, Geneva, Nov 2003

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Requirement from GCOS	Horizontal Resolution			Vertical Resolution			Observing Cycle			Delay of availability			Accuracy			Confidence	Application
Parameter name	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	CF_NAME	Use
Aerosol absorption optical depth (VIS) - Higher Stratosphere & Mesosphere column	1 km	2 km	10 km				1 d	2 d	7 d	7 d	14 d	60 d	0.004 1/km	0.01 1/km	0.02 1/km	Reasonable	AOPC
Aerosol absorption optical depth (VIS) - Higher Troposphere column	1 km	2 km	10 km				1 d	2 d	7 d	7 d	14 d	60 d	0.004 1/km	0.01 1/km	0.02 1/km	Reasonable	AOPC
Aerosol absorption optical depth (VIS) - Lower Stratosphere column	1 km	2 km	10 km				1 d	2 d	7 d	7 d	14 d	60 d	0.004 1/km	0.01 1/km	0.02 1/km	Reasonable	AOPC
Aerosol absorption optical depth (VIS) - Lower Troposphere column	1 km	2 km	10 km				1 d	2 d	7 d	7 d	14 d	60 d	0.004 1/km	0.01 1/km	0.02 1/km	Reasonable	AOPC
Aerosol extinction coefficient (VIS) - Higher stratosphere & mesosphere (HS & M)	10 km	20 km	100 km	0.5 km	0.65 km	1 km	1 d	2 d	7 d	7 d	14 d	60 d	0.01 1/km	0.015 1/km	0.02 1/km	Reasonable	AOPC
Aerosol extinction coefficient (VIS) - Higher troposphere (HT)	10 km	20 km	100 km	0.5 km	0.65 km	1 km	1 d	2 d	7 d	7 d	14 d	60 d	0.01 1/km	0.015 1/km	0.02 1/km	Reasonable	AOPC
Aerosol extinction coefficient (VIS) - Lower stratosphere (LS)	10 km	20 km	100 km	0.5 km	0.65 km	1 km	1 d	2 d	7 d	7 d	14 d	60 d	0.01 1/km	0.015 1/km	0.02 1/km	Reasonable	AOPC
Aerosol extinction coefficient (VIS) - Lower troposphere (LT)	10 km	20 km	100 km	0.5 km	0.65 km	1 km	1 d	2 d	7 d	7 d	14 d	60 d	0.01 1/km	0.015 1/km	0.02 1/km	Reasonable	AOPC
Aerosol optical depth (VIS+IR) - Higher Stratosphere & Mesosphere column	1 km	2 km	10 km				1 d	2 d	7 d	7 d	14 d	60 d	0.01 1/km	0.015 1/km	0.02 1/km	Reasonable	AOPC
Aerosol optical depth (VIS+IR) - Higher Troposphere column	1 km	2 km	10 km				1 d	2 d	7 d	7 d	14 d	60 d	0.01 1/km	0.015 1/km	0.02 1/km	Reasonable	AOPC
Aerosol optical depth (VIS+IR) - Lower Stratosphere column	1 km	2 km	10 km				1 d	2 d	7 d	7 d	14 d	60 d	0.01 1/km	0.015 1/km	0.02 1/km	Reasonable	AOPC
Aerosol optical depth (VIS+IR) - Lower Troposphere column	1 km	2 km	10 km				1 d	2 d	7 d	7 d	14 d	60 d	0.01 1/km	0.015 1/km	0.02 1/km	Reasonable	AOPC
Air pressure over land surface	200 km	300 km	500 km				3 h	6 h	24 h	3 h	6 h	12 h	0.5 hPa	0.65 hPa	1 hPa	Reasonable	AOPC
Air pressure over sea surface	200 km	300 km	500 km				3 h	6 h	24 h	3 h	6 h	12 h	0.5 hPa	0.65 hPa	1 hPa	Reasonable	AOPC
Air specific humidity (at surface)	25 km	50 km	100 km				3 h	4 h	6 h	24 h	48 h	72 h	1%	1.3 %	2 %	Speculative	AOPC
Air temperature (at surface)	25 km	50 km	100 km				3 h	6 h	12 h	24 h	36 h	48 h	0.1 K	0.15 K	0.3 K	Firm	AOPC
Air-sea delta pCO2	5 km	10 km	50 km				1 d	3 d	30 d	30 d	70 d	360 d	1 microatm	microatm	3 microatm	Reasonable	OOPC
Albedo	1 km	2 km	10 km				1 d	3 d	30 d	30 d	45 d	90 d	5 % (Max)	7 % (Max)	(Max)	Reasonable	TOPC
Atmospheric temperature profile - Higher stratosphere & mesosphere (HS & M)	100 km	200 km	500 km	2 km	2.5 km	3 km	3 h	4 h	6 h	3 h	6 h	12 h	0.5 K	1 K	3 K	Firm	AOPC
Atmospheric temperature profile - Higher troposphere (HT)	100 km	200 km	500 km	0.1 km	0.2 km	0.5 km	3 h	4 h	6 h	3 h	6 h	12 h	0.5 K	1 K	2 K	Firm	AOPC
Atmospheric temperature profile - Lower stratosphere (LS)	100 km	200 km	500 km	2 km	2.5 km	3 km	3 h	4 h	6 h	3 h	6 h	12 h	0.5 K	1 K	2 K	Firm	AOPC
Atmospheric temperature profile - Lower troposphere (LT)	100 km	200 km	500 km	0.1 km	0.2 km	0.5 km	3 h	4 h	6 h	3 h	6 h	12 h	0.5 K	1 K	2 K	Firm	AOPC
Biomass	0.01 km	0.1 km	10 km				360 d	450 d	720 d	30 d	45 d	90 d	5 t/ha	7 t/ha	10 t/ha	Reasonable	TOPC
Cloud cover	99 km	100 km	500 km				3 h	4 h	6 h	3 h	6 h	12 h	(Max)	(Max)	(Max)	Firm	AOPC
Cloud ice profile - Total column	100 km	200 km	500 km				3 h	4 h	6 h	3 h	6 h	12 h	0 g/m2	15 g/m2	20 g/m2	Firm	AOPC
Cloud top height	100 km	200 km	500 km				3 h	4 h	6 h	3 h	6 h	12 h	0.5 km	1 km	2 km	Firm	AOPC
Cloud top temperature	100 km	200 km	500 km				3 h	4 h	6 h	3 h	6 h	12 h	0.3 K	0.4 K	0.6 K	Firm	AOPC
Cloud water profile (< 100 µm) - Total column	100 km	200 km	500 km				3 h	4 h	6 h	3 h	6 h	12 h	10 kg/m2	20 kg/m2	50 kg/m2	Firm	AOPC
Cloud water profile (> 100 µm) - Total column	100 km	200 km	500 km				3 h	4 h	6 h	3 h	6 h	12 h	5 kg/m2	10 kg/m2	20 kg/m2	Firm	AOPC
Coastal sea level change	25 km	100 km	1000 km				24 h	50 h	240 h	1 h	3 h	24 h	1 cm	2 cm	10 cm	Reasonable	OOPC
Downwelling long-wave radiation at the Earth surface	25 km	50 km	100 km				3 h	4 h	6 h	24 h	48 h	120 h	5 W/m2	6.5 W/m2	10 W/m2	Firm	AOPC
Downwelling short-wave radiation at the Earth surface	25 km	50 km	100 km				24 h	48 h	120 h	24 h	72 h	720 h	5 W/m2	6.5 W/m2	10 W/m2	Firm	AOPC
Downwelling solar radiation at TOA	100 km	200 km	500 km				3 d	4 d	6 d	3 d	7 d	24 d	1 W/m2	1.3 W/m2	2 W/m2	Reasonable	AOPC
Fire area	0.25 km	0.85 km	10 km				1 d	1.5 d	3 d	360 d	450 d	720 d	5 % (Max)	7 % (Max)	(Max)	Reasonable	TOPC
Fractional Photosynthetically Active Radiation (FAPAR)	0.25 km	0.5 km	2 km				1 d	3 d	30 d	10 d	15 d	30 d	5 % (Max)	7 % (Max)	(Max)	Firm	TOPC
Glacier cover	30 m	45 m	100 m				1 y	1.5 y	5 y	360 d	450 d	720 d	5 % (Max)	7 % (Max)	(Max)	Firm	TOPC
Glacier topography	30 m	45 m	100 m				1 y	1.5 y	5 y	360 d	450 d	720 d	10 cm	22 cm	100 cm	Firm	TOPC
Ground water	1 km	2 km	10 km				30 d	70 d	360 d	30 d	45 d	90 d	5 % (Max)	7 % (Max)	(Max)	Firm	TOPC
Ice-sheet topography	0.01 km	0.015 km	0.05 km				1 y	2 y	10 y	360 d	450 d	720 d	(vert.)	(vert.)	(vert.)	Speculative	TOPC
Lake level	4 km	8 km	40 km				30 d	45 d	90 d	30 d	45 d	90 d	10 cm	15 cm	20 cm	Reasonable	TOPC
Lake surface temperature	1 km	2 km	10 km				1 d	2 d	10 d	30 d	45 d	90 d	0.2 K	0.3 K	0.4 K	Firm	TOPC
Land cover	250 m	400 m	1000 m				1 y	1.5 y	5 y	1 d	7 d	360 d	50 classes	25 classes	5 classes	Firm	TOPC
Land surface imagery	250 m	550 m	2500 m				30 d	45 d	90 d	30 d	45 d	90 d				Firm	TOPC
Land surface temperature	1 km	10 km	500 km				24 h	48 h	72 h	3 h	4 h	6 h	1 K	1.3 K	2 K	Firm	AOPC
Land surface topography	250 m	850 m	10000 m				5 y	6 y	10 y	360 d	450 d	720 d	1 m (vert.)	2 m (vert.)	1 m (vert.)	Firm	TOPC
Leaf Area Index (LAI)	0.25 km	0.85 km	10 km				1 d	3 d	30 d	30 d	45 d	90 d	5 % (Max)	7 % (Max)	(Max)	Tentative	TOPC
Ocean carbon content change	50 km	60 km	100 km	10	13	20	5 y	6 y	10 y	1 y	1.3 y	2 y	DiC/umol/k	DiC/umol/k	DiC/umol/k	Reasonable	OOPC
Ocean chlorophyll	1 km	5 km	100 km				1 d	1.5 d	3 d	1 d	1.5 d	3 d	5 % (Max)	(Max)	(Max)	Firm	OOPC
Ocean dynamic topography	25 km	50 km	250 km				1 d	3 d	30 d	0.125 d	0.25 d	1 d	1 cm	1.5 cm	5 cm	Firm	OOPC
Ocean salinity - Deep-ocean	50 km	60 km	100 km	2	2.5	4	30 d	70 d	360 d	60 d	110 d	360 d	0.002 psu	0.003 psu	0.005 psu	Reasonable	OOPC
Ocean salinity - Upper-ocean	15 km	40 km	300 km	1 m	2 m	10 m	1 d	2 d	10 d	0.5 h	0.6 h	1 h	0.001 psu	0.002 psu	0.01 psu	Reasonable	OOPC
Ocean surface salinity	100 km	170 km	500 km				7 d	11 d	30 d	10 d	15 d	30 d	0.05 psu	0.09 psu	0.3 psu	Firm	OOPC
Ocean temperature - Deep-ocean	50 km	60 km	100 km	2	2.5	4	30 d	150 d	3600 d	60 d	110 d	360 d	0.002 K	0.003 K	0.005 K	Reasonable	OOPC
Ocean temperature - Upper-ocean	1 km	6 km	300 km	1 m	2 m	10 m	1 d	2 d	10 d	0.5 h	0.6 h	1 h	0.001 K	0.002 K	0.01 K	Reasonable	OOPC
Outgoing long-wave Earth surface	25 km	50 km	100 km				3 h	4 h	6 h	24 h	48 h	120 h	5 W/m2	6.5 W/m2	10 W/m2	Speculative	AOPC
Outgoing long-wave radiation at TOA	100 km	200 km	500 km				3 h	4 h	6 h	3 h	6 h	24 h	5 W/m2	6.5 W/m2	10 W/m2	Firm	AOPC
Outgoing short-wave radiation at TOA	100 km	200 km	500 km				3 h	4 h	6 h	3 h	6 h	24 h	5 W/m2	6.5 W/m2	10 W/m2	Firm	AOPC
Ozone profile - Higher stratosphere & mesosphere (HS & M)	50 km	100 km	500 km	0.5 km	1 km	3 km	3 h	9 h	48 h	720 h	1440 h	4520 h	5 %	8 %	20 %	Firm	AOPC
Ozone profile - Higher troposphere (HT)	5 km	20 km	100 km	0.5 km	1 km	2 km	3 h	9 h	72 h	720 h	1440 h	4520 h	10 %	15 %	30 %	Firm	AOPC
Ozone profile - Lower stratosphere (LS)	50 km	75 km	100 km	0.5 km	1 km	3 km	3 h	9 h	72 h	720 h	1440 h	4520 h	5 %	8 %	20 %	Firm	AOPC
Ozone profile - Lower troposphere (LT)	5 km	10 km	50 km	0.5 km	1 km	2 km	3 h	9 h	72 h	720 h	1440 h	4520 h	10 %	13 %	20 %	Firm	AOPC
Ozone profile - Total column	5 km	10 km	50 km				3 h	9 h	72 h	720 h	1440 h	4520 h	5 DU	8 DU	15 DU	Firm	AOPC
Ozone profile - Troposphere column	5 km	10 km	50 km				3 h	9 h	72 h	720 h	1440 h	4520 h	5 DU	8 DU	15 DU	Firm	AOPC
Permafrost	0.25 km	0.85 km	10 km				1 d	1.5 d	5 d	1 d	1.5 d	5 d	5 % (Max)	7 % (Max)	(Max)	Firm	TOPC
Precipitation index (daily cumulative)	100 km	200 km	500 km				12 h	16 h	24 h	24 h	72 h	288 h	1 mm/d	1.3 mm/d	2 mm/d	Firm	AOPC
Precipitation rate (liquid) at the surface	100 km	200 km	500 km				3 h	4 h	6 h	3 h	6 h	12 h	0.1 mm/h	0.3 mm/h	2 mm/h	Firm	AOPC
Precipitation rate (solid) at the surface	100 km	200 km	500 km				3 h	4 h	6 h	3 h	6 h	12 h	0.1 mm/h	0.3 mm/h	2 mm/h	Firm	AOPC
River discharge	10 km	20 km	100 km				1 d	2 d	7 d	30 d	45 d	90 d	5 % (Max)	7 % (Max)	(Max)	Reasonable	TOPC
Sea surface temperature	10 km	50 km	500 km				3 h	6 h	24 h	3 h	6 h	12 h	0.25 K	0.4 K	1 K	Firm	AOPC
Sea surface temperature	1 km	8 km	500 km				1 h	3 h	24 h	3 h	5 h	12 h	0.1 K	0.126 K	0.2 K	Reasonable	OOPC
Sea-ice cover	12 km	25 km	100 km				1 d	2 d	7 d	0.125 d	0.25 d	1 d	5 % (Max)	6 % (Max)	(Max)	Firm	OOPC
Sea-ice thickness	100 km	170 km	500 km				1 d	2 d	7 d	1 d	3 d	24 d	0.1 cm	0.2 cm	1 cm	Reasonable	OOPC
Short-wave Earth surface bi-directional reflectance	25 km	50 km	100 km				3 h	4 h	6 h	24 h	48 h	120 h	5 % (Max)	(Max)	(Max)	Speculative	AOPC
Significant wave height	25 km	50 km	250 km				3 h	4 h	6 h	3 h	6 h	12 h	0.1 m	0.3 m	2 m	Firm	AOPC
Snow cover	100 km	200 km	500 km				24 h	48 h	168 h	6 h	12 h	24 h	(Max)	(Max)	(Max)	Firm	AOPC
Snow cover	0.1 km	0.45 km	10 km				24 h	75 h	720 h	30 h	70 h	360 h	5 % (Max)	7 % (Max)	(Max)	Firm	TOPC
Snow water equivalent	100 km	200 km	500 km				24 h	48 h	168 h	6 h	12 h	24 h	5 mm	6.5 mm	10 mm	Firm	AOPC
Soil moisture	50 km	60 km	100 km				7 d	11 d	30 d	380 d	450 d	720 d	5 g/kg	7 g/kg	10 g/kg	Speculative	TOPC

Specific humidity profile - Higher stratosphere & mesosphere (HS & M)	50 km	100 km	200 km	2 km	3 km	5 km	3 h	4 h	6 h	168 h	336 h	1440 h	2 %	5 %	20 %	Firm	AOPC	Signal sizes in section 3.3.7 of N. Nicholls et al.	19/7/2007, AOPC
Specific humidity profile - Higher troposphere (HT)	20 km	50 km	100 km	0.1 km	0.5 km	2 km	3 h	4 h	6 h	168 h	336 h	1440 h	2 %	5 %	20 %	Firm	AOPC	Signal sizes in section 3.3.7 of N. Nicholls et al.	19/7/2007, AOPC
Specific humidity profile - Lower stratosphere (LS)	50 km	100 km	200 km	2 km	2.5 km	3 km	3 h	4 h	6 h	168 h	336 h	1440 h	2 %	5 %	20 %	Firm	AOPC	Signal sizes in section 3.3.7 of N. Nicholls et al.	19/7/2007, AOPC
Specific humidity profile - Lower troposphere (LT)	10 km	15 km	25 km	0.1 km	0.2 km	1 km	3 h	4 h	6 h	168 h	336 h	1440 h	2 %	4 %	15 %	Firm	AOPC	Signal sizes in section 3.3.7 of N. Nicholls et al.	19/7/2007, AOPC
Specific humidity profile - Total column	50 km	100 km	200 km				3 h	4 h	6 h	168 h	336 h	1440 h	1 kg/m2	1.4 kg/m2	3 kg/m2	Firm	AOPC		19/7/2007, AOPC
Specific humidity profile - Troposphere column	10 km	25 km	200 km				3 h	4 h	6 h	168 h	336 h	1440 h	1 kg/m2	1.4 kg/m2	3 kg/m2	Reasonable	AOPC		19/7/2007, AOPC
Trace gas profile CH4 - Higher stratosphere & mesosphere (HS & M)	50 km	100 km	250 km	2 km	2.5 km	4 km	3 h	4 h	6 h	720 h	1440 h	4320 h	2 %	4 %	10 %	Firm	AOPC	20 ppb Acc goal and 120 ppb Acc Min	19/7/2007, AOPC
Trace gas profile CH4 - Higher troposphere (HT)	50 km	100 km	250 km	2 km	2.5 km	4 km	3 h	4 h	6 h	720 h	1440 h	4320 h	2 %	4 %	10 %	Firm	AOPC	20 ppb Acc goal and 120 ppb Acc Min	19/7/2007, AOPC
Trace gas profile CH4 - Lower stratosphere (LS)	50 km	100 km	250 km	2 km	2.5 km	4 km	3 h	4 h	6 h	720 h	1440 h	4320 h	2 %	4 %	10 %	Firm	AOPC	20 ppb Acc goal and 120 ppb Acc Min	19/7/2007, AOPC
Trace gas profile CH4 - Lower troposphere (LT)	10 km	20 km	50 km	2 km	2.5 km	3 km	3 h	4 h	6 h	720 h	1440 h	4320 h	2 %	4 %	10 %	Firm	AOPC	20 ppb Acc goal and 120 ppb Acc Min	19/7/2007, AOPC
Trace gas profile CH4 - Total column	10 km	50 km	250 km				3 h	4 h	6 h	720 h	1440 h	4320 h	2 %	4 %	10 %	Reasonable	AOPC	20 ppb Acc goal and 120 ppb Acc Min	19/7/2007, AOPC
Trace gas profile CH4 - Troposphere column	10 km	20 km	50 km				3 h	4 h	6 h	720 h	1440 h	4320 h	2 %	4 %	10 %	Reasonable	AOPC	20 ppb Acc goal and 120 ppb Acc Min	19/7/2007, AOPC
Trace gas profile CO2 - Higher troposphere (HT)	50 km	100 km	250 km	1 km	1.5 km	2 km	3 h	4 h	6 h	168 h	336 h	1440 h	1 %	1.3 %	2 %	Reasonable	AOPC	3 ppm Acc goal and 6 ppm Acc Min	19/7/2007, AOPC
Trace gas profile CO2 - Higher stratosphere & mesosphere (HS & M)	250 km	350 km	500 km	2 km	3 km	4 km	3 h	4 h	6 h	720 h	1440 h	4320 h	1 %	1.3 %	2 %	Reasonable	AOPC	3 ppm Acc goal and 6 ppm Acc Min	19/7/2007, AOPC
Trace gas profile CO2 - Lower stratosphere (LS)	250 km	350 km	500 km	1 km	2 km	4 km	3 h	4 h	6 h	720 h	1440 h	4320 h	1 %	1.3 %	2 %	Reasonable	AOPC	3 ppm Acc goal and 6 ppm Acc Min	19/7/2007, AOPC
Trace gas profile CO2 - Lower troposphere (LT)	10 km	50 km	500 km	0.5 km	1 km	2 km	3 h	6 h	12 h	168 h	336 h	1440 h	1 %	1.3 %	2 %	Firm	AOPC	3 ppm Acc goal and 6 ppm Acc Min	19/7/2007, AOPC
Trace gas profile CO2 - Total column	50 km	100 km	500 km				3 h	4 h	6 h	720 h	1440 h	4320 h	1 %	1.3 %	2 %	Reasonable	AOPC		19/7/2007, AOPC
Trace gas profile CO2 - Troposphere column	10 km	50 km	500 km				3 h	4 h	6 h	168 h	336 h	1440 h	1 %	1.3 %	2 %	Reasonable	AOPC		19/7/2007, AOPC
Wetland extent	0.25 km	0.85 km	10 km				7 d	11 d	30 d	30 d	45 d	90 d	5 % (Max)	7 % (Max)	(Max)	Reasonable	TOPC		19/7/2007, TOPC
Wind profile (horizontal component) - Higher stratosphere & mesosphere (HS & M)	100 km	200 km	500 km	0.5 km	1 km	3 km	3 h	3.8 h	6 h	3 h	6 h	12 h	2 m/s	3 m/s	7 m/s	Firm	AOPC	1m/s is typically several % of climatological	19/7/2007, AOPC
Wind profile (horizontal component) - Higher troposphere (HT)	100 km	200 km	500 km	0.5 km	0.65 km	1 km	3 h	4 h	6 h	3 h	6 h	12 h	2 m/s	3 m/s	5 m/s	Firm	AOPC	1m/s is typically several % of climatological	19/7/2007, AOPC
Wind profile (horizontal component) - Lower stratosphere (LS)	100 km	200 km	500 km	0.5 km	0.65 km	1 km	3 h	4 h	6 h	3 h	6 h	12 h	2 m/s	3 m/s	5 m/s	Firm	AOPC	1m/s is typically several % of climatological	19/7/2007, AOPC
Wind profile (horizontal component) - Lower troposphere (LT)	100 km	200 km	500 km	0.5 km	1 km	2 km	3 h	4 h	6 h	3 h	6 h	12 h	2 m/s	3 m/s	5 m/s	Firm	AOPC	1m/s is typically several % of climatological	19/7/2007, AOPC
Wind speed over sea surface (horizontal)	10 km	40 km	500 km				1 h	3 h	24 h	1 h	2 h	12 h	0.5 m/s	0.6 m/s	1 m/s	Reasonable	OOPC		19/7/2007, OOPC
Wind vector over sea surface (horizontal)	10 km	50 km	500 km				1 h	3 h	6 h	3 h	6 h	12 h	0.5 m/s	1 m/s	5 m/s	Firm	AOPC	Trend signal shown in Fig. 3.19 of N. Nicholls et al.	19/7/2007, AOPC
Wind vector over sea surface (horizontal)	10 km	20 km	100 km				1 h	3 h	24 h	3 h	5 h	12 h	0.5 m/s	1 m/s	5 m/s	Firm	OOPC		19/7/2007, OOPC

"Requirement from WCRP"	Horizontal Resolution			Vertical Resolution			Observing Cycle			Delay of availability			Accuracy			Confidence	Application	Remarks	Source/Validation
	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	CF_NAME	Use		
Aerosol profile - Higher stratosphere & mesosphere (HS & M)	100 km	171 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	10 %	12.6 %	20 %	Tentative	SPARC		29/10/1998, WCRP
Aerosol profile - Higher troposphere (HT)	50 km	107.7 km	500 km	1 km	1.7 km	5 km	6 h	18.2 h	168 h	720 h	907.1 h	1440 h	10 %	12.6 %	20 %	Tentative	Global Modelling		29/10/1998, WCRP
Aerosol profile - Higher troposphere (HT)	100 km	171 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	10 %	12.6 %	20 %	Tentative	SPARC		29/10/1998, WCRP
Aerosol profile - Lower stratosphere (LS)	50 km	107.7 km	500 km	1 km	2.2 km	10 km	6 h	18.2 h	168 h	720 h	907.1 h	1440 h	10 %	12.6 %	20 %	Tentative	Global Modelling		29/10/1998, WCRP
Aerosol profile - Lower stratosphere (LS)	100 km	171 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	10 %	12.6 %	20 %	Tentative	SPARC		29/10/1998, WCRP
Aerosol profile - Lower troposphere (LT)	50 km	107.7 km	500 km	0.1 km	0.215 km	1 km	6 h	18.2 h	168 h	720 h	907.1 h	1440 h	10 %	12.6 %	20 %	Tentative	Global Modelling		29/10/1998, WCRP
Aerosol profile - Lower troposphere (LT)	100 km	171 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	10 %	12.6 %	20 %	Tentative	SPARC		29/10/1998, WCRP
Air specific humidity (at surface)	100 km	171 km	500 km				12 h	15.1 h	24 h	24 h	30.2 h	48 h	10 %	12.6 %	20 %	Tentative	ACSYS		29/10/1998, WCRP
Air temperature (at surface)	100 km	171 km	500 km				12 h	15.1 h	24 h	24 h	30.2 h	48 h	0.2 K	0.271 K	0.5 K	Tentative	ACSYS		29/10/1998, WCRP
Atmospheric temperature profile - Higher stratosphere & mesosphere (HS & M)	50 km	107.7 km	500 km	5 km	6.3 km	10 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	1 K	1.4 K	3 K	Reasonable	Global Modelling		29/10/1998, WCRP
Atmospheric temperature profile - Higher stratosphere & mesosphere (HS & M)	50 km	107.7 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	0.5 K	0.63 K	1 K	Reasonable	SPARC		29/10/1998, WCRP
Atmospheric temperature profile - Higher troposphere (HT)	50 km	107.7 km	500 km	1 km	1.4 km	3 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	0.5 K	0.909 K	3 K	Reasonable	Global Modelling		29/10/1998, WCRP
Atmospheric temperature profile - Higher troposphere (HT)	50 km	107.7 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	0.5 K	0.63 K	1 K	Reasonable	SPARC		29/10/1998, WCRP
Atmospheric temperature profile - Lower stratosphere (LS)	50 km	107.7 km	500 km	1 km	1.4 km	3 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	0.5 K	0.909 K	3 K	Reasonable	Global Modelling		29/10/1998, WCRP
Atmospheric temperature profile - Lower stratosphere (LS)	50 km	107.7 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	0.5 K	0.63 K	1 K	Reasonable	SPARC		29/10/1998, WCRP
Atmospheric temperature profile - Lower troposphere (LT)	50 km	107.7 km	500 km	0.3 km	0.646 km	3 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	0.5 K	0.909 K	3 K	Reasonable	Global Modelling		29/10/1998, WCRP
Atmospheric temperature profile - Lower troposphere (LT)	50 km	107.7 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	0.5 K	0.63 K	1 K	Reasonable	SPARC		29/10/1998, WCRP
Cloud base height	50 km	85.5 km	250 km				3 h	4.8 h	12 h	720 h	907.1 h	1440 h	0.5 km	0.794 km	2 km	Tentative	GEWEX		29/10/1998, WCRP
Cloud cover	50 km	85.5 km	250 km				3 h	4.8 h	12 h	720 h	907.1 h	1440 h	5 % (Max)	(Max)	(Max)	Reasonable	GEWEX		29/10/1998, WCRP
Cloud ice profile - Higher stratosphere & mesosphere (HS & M)	50 km	85.5 km	250 km	1 km	1.7 km	5 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	5 %	7.9 %	20 %	Tentative	GEWEX		29/10/1998, WCRP
Cloud ice profile - Higher troposphere (HT)	50 km	85.5 km	250 km	1 km	1.7 km	5 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	5 %	7.9 %	20 %	Tentative	GEWEX		29/10/1998, WCRP
Cloud ice profile - Lower stratosphere (LS)	50 km	85.5 km	250 km	1 km	1.7 km	5 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	5 %	7.9 %	20 %	Tentative	GEWEX		29/10/1998, WCRP
Cloud ice profile - Lower troposphere (LT)	50 km	85.5 km	250 km	1 km	1.3 km	2 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	5 %	7.9 %	20 %	Tentative	GEWEX		29/10/1998, WCRP
Cloud ice profile - Total column	50 km	85.5 km	250 km				3 h	4.8 h	12 h	720 h	907.1 h	1440 h	10 g/m2	12.6 g/m2	20 g/m2	Tentative	GEWEX		29/10/1998, WCRP
Cloud optical thickness	100 km	171 km	500 km				12 h	15.1 h	24 h	24 h	30.2 h	48 h	15 %	18.9 %	30 %	Reasonable	ACSYS		29/10/1998, WCRP
Cloud top height	100 km	171 km	500 km				12 h	15.1 h	24 h	24 h	30.2 h	48 h	0.5 km	0.63 km	1 km	Reasonable	ACSYS		29/10/1998, WCRP
Cloud top temperature	50 km	85.5 km	250 km				3 h	4.8 h	12 h	720 h	907.1 h	1440 h	0.5 K	0.794 K	2 K	Reasonable	GEWEX		29/10/1998, WCRP
Cloud water profile (< 100 µm) - Higher troposphere (HT)	50 km	85.5 km	250 km	1 km	2.2 km	10 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	5 %	7.9 %	20 %	Tentative	GEWEX		29/10/1998, WCRP
Cloud water profile (< 100 µm) - Lower troposphere (LT)	50 km	85.5 km	250 km	1 km	1.7 km	5 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	5 %	7.9 %	20 %	Tentative	GEWEX		29/10/1998, WCRP
Cloud water profile (< 100 µm) - Total column	50 km	85.5 km	250 km				3 h	4.8 h	12 h	720 h	907.1 h	1440 h	10 kg/m2	kg/m2	50 kg/m2	Tentative	GEWEX		29/10/1998, WCRP
Cloud water profile (> 100 µm) - Higher troposphere (HT)	50 km	85.5 km	250 km	1 km	2.2 km	10 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	5 %	7.9 %	20 %	Tentative	GEWEX		29/10/1998, WCRP
Cloud water profile (> 100 µm) - Lower troposphere (LT)	50 km	85.5 km	250 km	1 km	1.7 km	5 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	5 %	7.9 %	20 %	Tentative	GEWEX		29/10/1998, WCRP
Cloud water profile (> 100 µm) - Total column	50 km	85.5 km	250 km				3 h	4.8 h	12 h	720 h	907.1 h	1440 h	10 kg/m2	kg/m2	50 kg/m2	Tentative	GEWEX		29/10/1998, WCRP
Downwelling solar radiation at TOA	25 km	39.7 km	100 km				1 d	1.8 d	6 d	30 d	43.3 d	90 d	0.1 W/m2	W/m2	1 W/m2	Reasonable	Global Modelling		29/10/1998, WCRP
Iceberg fractional cover	1 km	2.2 km	10 km				365 d	584.6 d	1500 d	30 d	43.3 d	90 d	(Max)	(Max)	(Max)	Tentative	ACSYS		29/10/1998, WCRP
Iceberg height	1 km	2.2 km	10 km				365 d	584.6 d	1500 d	30 d	43.3 d	90 d	1 m	1.4 m	3 m	Tentative	ACSYS		29/10/1998, WCRP
Ice-sheet topography	0.1 km	0.171 km	0.5 km				10 y	11.4 y	15 y	30 d	43.3 d	90 d	(vert.)	(vert.)	(vert.)	Tentative	ACSYS		29/10/1998, WCRP
Land surface temperature	50 km	85.5 km	250 km				3 h	4.8 h	12 h	720 h	907.1 h	1440 h	1 K	1.6 K	4 K	Reasonable	GEWEX		29/10/1998, WCRP
Ocean chlorophyll	100 km	171 km	500 km				1 d	1.8 d	6 d	30 d	43.3 d	90 d	5 % (Max)	(Max)	(Max)	Speculative	CLIVAR		29/10/1998, WCRP
Ocean dynamic topography	100 km	126 km	200 km				5 d	6.3 d	10 d	10 d	14.4 d	30 d	2 cm	2.7 cm	5 cm	Speculative	CLIVAR	Gravity mission needed	29/10/1998, WCRP
Ocean surface salinity	100 km	135.7 km	250 km				30 d	37.8 d	60 d	9 d	21.3 d	120 d	0.1 psu	0.144 psu	0.3 psu	Reasonable	CLIVAR		29/10/1998, WCRP
Ocean suspended sediment concentration	100 km	171 km	500 km				1 d	1.8 d	6 d	30 d	43.3 d	90 d	5 % (Max)	(Max)	(Max)	Speculative	CLIVAR		29/10/1998, WCRP
Ocean yellow substance absorbance	100 km	171 km	500 km				1 d	1.8 d	6 d	30 d	43.3 d	90 d	5 % (Max)	(Max)	(Max)	Speculative	CLIVAR		29/10/1998, WCRP
Outgoing long-wave radiation at TOA	50 km	85.5 km	250 km				3 h	3.8 h	6 h	720 h	1038.4 h	2160 h	5 W/m2	6.3 W/m2	10 W/m2	Reasonable	SPARC		29/10/1998, WCRP
Outgoing short-wave radiation at TOA	50 km	85.5 km	250 km				3 h	3.8 h	6 h	720 h	1038.4 h	2160 h	5 W/m2	6.3 W/m2	10 W/m2	Reasonable	SPARC		29/10/1998, WCRP
Ozone profile - Higher stratosphere & mesosphere (HS & M)	50 km	107.7 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	5 %	6.3 %	10 %	Reasonable	SPARC		29/10/1998, WCRP
Ozone profile - Higher troposphere (HT)	50 km	107.7 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	5 %	6.3 %	10 %	Reasonable	SPARC		29/10/1998, WCRP
Ozone profile - Lower stratosphere (LS)	50 km	107.7 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	5 %	6.3 %	10 %	Reasonable	SPARC		29/10/1998, WCRP
Ozone profile - Lower troposphere (LT)	50 km	107.7 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	5 %	6.3 %	10 %	Reasonable	SPARC		29/10/1998, WCRP
Precipitation index (daily cumulative)	50 km	85.5 km	250 km				1 h	2.3 h	12 h	720 h	907.1 h	1440 h	0.5 mm/d	mm/d	5 mm/d	Reasonable	GEWEX		29/10/1998, WCRP
Sea surface temperature	50 km	85.5 km	250 km				1 h	2.3 h	12 h	720 h	907.1 h	1440 h	0.5 K	0.794 K	2 K	Reasonable	Global Modelling		29/10/1998, WCRP
Sea surface temperature	25 km	39.7 km	100 km				24 h	30.2 h	48 h	720 h	907.1 h	1440 h	0.5 K	0.794 K	2 K	Reasonable	ACSYS		29/10/1998, WCRP
Sea surface temperature	10 km	17.1 km	50 km				3 h	3.8 h	6 h	24 h	34.6 h	72 h	0.1 K	0.144 K	0.3 K	Reasonable	CLIVAR		29/10/1998, WCRP
Sea-ice cover	15 km	38.3 km	250 km				1 d	2.5 d	15 d	30 d	43.3 d	90 d	5 % (Max)	(Max)	(Max)	Reasonable	Global Modelling		29/10/1998, WCRP
Sea-ice cover	25 km	39.7 km	100 km				1 d	1.9 d	7 d	7 d	11.4 d	30 d	5 % (Max)	(Max)	(Max)	Reasonable	ACSYS		29/10/1998, WCRP
Sea-ice cover	15 km	22.4 km	50 km				1 d	1.4 d	3 d	3 d	4 d	7 d	2 % (Max)	(Max)	5 % (Max)	Reasonable	CLIVAR		29/10/1998, WCRP
Sea-ice surface temperature	100 km	171 km	500 km				12 h	15.1 h	24 h	24 h	30.2 h	48 h	1 K	1.3 K	2 K	Reasonable	ACSYS		29/10/1998, WCRP
Sea-ice thickness	200 km	271.4 km	500 km				7 d	11.4 d	30 d	30 d	43.3 d	90 d	100 cm	126 cm	200 cm	Tentative	ACSYS		29/10/1998, WCRP
Significant wave height	100 km	135.7 km	250 km				12 h	15.1 h	24 h	720 h	907.1 h	1440 h	0.5 m	0.63 m	1 m	Reasonable	Global Modelling		29/10/1998, WCRP
Snow cover	15 km	38.3 km	250 km				24 h	45.9 h	168 h	720 h	1038.4 h	2160 h	(Max)	(Max)	(Max)	Reasonable	GEWEX		29/10/1998, WCRP
Snow cover	1 km	2.9 km	25 km				24 h	41 h	120 h	168 h	272.9 h	720 h	(Max)	(Max)	(Max)	Reasonable	ACSYS		29/10/1998, WCRP
Snow water equivalent	15 km	38.3 km	250 km				12 h	28.9 h	168 h	720 h	1038.4 h	2160 h	5 mm	7.9 mm	20 mm	Tentative	GEWEX		29/10/1998, WCRP
Snow water equivalent	10 km	13.6 km	25 km				24 h	41 h	120 h	168 h	272.9 h	720 h	5 mm	7.9 mm	20 mm	Tentative	ACSYS		29/10/1998, WCRP
Soil moisture	15 km	38.3 km	250 km				1 d	2.2 d	10 d	10 d	14.4 d	30 d	10 g/kg	17.1 g/kg	50 g/kg	Tentative	GEWEX		29/10/1998, WCRP
Specific humidity profile - Higher stratosphere & mesosphere (HS & M)	50 km	85.5 km	250 km	1 km	1.4 km	3 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	5 %	7.9 %	20 %	Reasonable	Global Modelling	5%, Threshold	29/10/1998, WCRP

Specific humidity profile - Higher stratosphere & mesosphere (HS & M)	50 km	107.7 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	2 %	2.7 %	5 %	Reasonable	SPARC	1%, Threshold	29/10/1998, WCRP
Specific humidity profile - Higher troposphere (HT)	50 km	63 km	100 km	0.5 km	0.794 km	2 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	5 %	7.9 %	20 %	Reasonable	Global Modelling	5%, Threshold	29/10/1998, WCRP
Specific humidity profile - Higher troposphere (HT)	50 km	107.7 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	2 %	2.7 %	5 %	Reasonable	SPARC	1%, Threshold	29/10/1998, WCRP
Specific humidity profile - Lower stratosphere (LS)	50 km	85.5 km	250 km	0.5 km	0.794 km	2 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	5 %	7.9 %	20 %	Reasonable	Global Modelling	5%, Threshold	29/10/1998, WCRP
Specific humidity profile - Lower stratosphere (LS)	50 km	107.7 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	2 %	2.7 %	5 %	Reasonable	SPARC	1%, Threshold	29/10/1998, WCRP
Specific humidity profile - Lower troposphere (LT)	50 km	63 km	100 km	0.5 km	0.794 km	2 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	5 %	7.9 %	20 %	Reasonable	Global Modelling	5%, Threshold	29/10/1998, WCRP
Specific humidity profile - Lower troposphere (LT)	50 km	107.7 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	2 %	2.7 %	5 %	Reasonable	SPARC	1%, Threshold	29/10/1998, WCRP
Wind profile (horizontal component) - Higher stratosphere & mesosphere (HS & M)	50 km	107.7 km	500 km	2 km	2.7 km	5 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	3 m/s	3.6 m/s	5 m/s	Reasonable	Global Modelling		29/10/1998, WCRP
Wind profile (horizontal component) - Higher stratosphere & mesosphere (HS & M)	200 km	271.4 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	3 m/s	3.6 m/s	5 m/s	Reasonable	SPARC		29/10/1998, WCRP
Wind profile (horizontal component) - Higher troposphere (HT)	50 km	107.7 km	500 km	1 km	1.7 km	5 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	2 m/s	2.7 m/s	5 m/s	Reasonable	Global Modelling		29/10/1998, WCRP
Wind profile (horizontal component) - Higher troposphere (HT)	200 km	271.4 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	3 m/s	3.6 m/s	5 m/s	Reasonable	SPARC		29/10/1998, WCRP
Wind profile (horizontal component) - Lower stratosphere (LS)	50 km	107.7 km	500 km	1 km	1.7 km	5 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	2 m/s	2.7 m/s	5 m/s	Reasonable	Global Modelling		29/10/1998, WCRP
Wind profile (horizontal component) - Lower stratosphere (LS)	200 km	271.4 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	3 m/s	3.6 m/s	5 m/s	Reasonable	SPARC		29/10/1998, WCRP
Wind profile (horizontal component) - Lower troposphere (LT)	50 km	107.7 km	500 km	0.3 km	0.766 km	5 km	3 h	4.8 h	12 h	720 h	907.1 h	1440 h	2 m/s	2.7 m/s	5 m/s	Reasonable	Global Modelling		28/5/1997, WCRP, Paris
Wind profile (horizontal component) - Lower troposphere (LT)	200 km	271.4 km	500 km	0.5 km	0.794 km	2 km	6 h	13.7 h	72 h	24 h	45.9 h	168 h	3 m/s	3.6 m/s	5 m/s	Reasonable	SPARC		29/10/1998, WCRP
Wind vector over sea surface (horizontal)	50 km	85.5 km	250 km				12 h	15.1 h	24 h	720 h	907.1 h	1440 h	1 m/s	1.7 m/s	5 m/s	Reasonable	Global Modelling		29/10/1998, WCRP
Wind vector over sea surface (horizontal)	25 km	39.7 km	100 km				12 h	15.1 h	24 h	720 h	907.1 h	1440 h	1 m/s	1.7 m/s	5 m/s	Reasonable	ACSYS		29/10/1998, WCRP
Wind vector over sea surface (horizontal)	50 km	85.5 km	250 km				12 h	15.1 h	24 h	72 h	95.5 h	168 h	1 m/s	1.7 m/s	5 m/s	Reasonable	CLIVAR		29/10/1998, WCRP

Requirements from GOOS			Horizontal Resolution			Vertical Resolution			Observing Cycle			Delay of availability			Accuracy			Confidence	Application	Remarks	Source/Validation
Parameter name			Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	Goal	Breakthrough	Threshold	CF_NAME	Use		
Aerosol (total column) size			4 km	9.3 km	50 km				24 h	30.2 h	48 h	3 h	4 h	7 h	0.1 µm	0.215 µm	1 µm	Firm	Marine biology (open ocean)		20/10/2003, GOOS JPO
Aerosol (total column) size			1 km	2.2 km	10 km				24 h	30.2 h	48 h	3 h	4 h	7 h	0.1 µm	0.215 µm	1 µm	Firm	Marine biology (coastal water)		20/10/2003, GOOS JPO
Air pressure over sea surface			50 km	63 km	100 km				24 h	30.2 h	48 h	3 h	4 h	7 h	10 hPa	11.4 hPa	15 hPa	Firm	Marine biology (open ocean)		20/10/2003, GOOS JPO
Dominant wave direction			10 km	14.4 km	30 km				1 h	1.8 h	6 h	2 h	2.5 h	4 h	degrees	degrees	degrees	Firm	GOOS Surface		20/10/2003, GOOS JPO
Dominant wave period			10 km	14.4 km	30 km				1 h	1.8 h	6 h	2 h	2.5 h	4 h	0.5 s	0.63 s	1 s	Firm	GOOS Surface		20/10/2003, GOOS JPO
Fractional Photosynthetically Active Radiation (fAPAR)			10 km	17.1 km	50 km				0.04 d	0.117 d	1 d	3 d	4 d	7 d	5 % (Max)	(Max)	(Max)	Firm	Marine biology (open ocean)		20/10/2003, GOOS JPO
Fractional Photosynthetically Active Radiation (fAPAR)			1 km	1.7 km	5 km				0.04 d	0.117 d	1 d	3 d	4 d	7 d	5 % (Max)	(Max)	(Max)	Firm	Marine biology (coastal water)		20/10/2003, GOOS JPO
Geoid			250 km	315 km	500 km				240 mo	274.7 mo	360 mo	12 y	15.1 y	24 y	2 cm	2.7 cm	5 cm	Firm	JGOOS-III		20/10/2003, GOOS JPO
Ocean chlorophyll			10 km	17.1 km	50 km				1 d	1.4 d	3 d	3 d	4 d	7 d	(Max)	(Max)	(Max)	Firm	Marine biology (open ocean)		20/10/2003, GOOS JPO
Ocean chlorophyll			1 km	1.7 km	5 km				1 d	1.4 d	3 d	3 d	4 d	7 d	5 % (Max)	(Max)	(Max)	Firm	Marine biology (coastal water)		20/10/2003, GOOS JPO
Ocean chlorophyll			25 km	39.7 km	100 km				1 d	1.4 d	3 d	1 d	1.4 d	3 d	(Max)	(Max)	(Max)	Firm	GOOS Climate - large scale		20/10/2003, GOOS JPO
Ocean dynamic topography			100 km	144.2 km	300 km				10 d	14.4 d	30 d	10 d	14.4 d	30 d	2 cm	2.7 cm	5 cm	Firm	GOOS Climate - large scale		20/10/2003, GOOS JPO
Ocean dynamic topography			25 km	39.7 km	100 km				7 d	11.4 d	30 d	2 d	3.9 d	15 d	2 cm	3.4 cm	10 cm	Firm	GOOS Climate - mesoscale		20/10/2003, GOOS JPO
Ocean surface salinity			200 km	271.4 km	500 km				10 d	14.4 d	30 d	10 d	14.4 d	30 d	0.1 psu	0.215 psu	1 psu	Firm	GOOS Climate - large scale		20/10/2003, GOOS JPO
Ocean yellow substance absorbance			1 km	1.7 km	5 km				1 d	1.3 d	2 d	3 d	4 d	7 d	5 % (Max)	(Max)	(Max)	Firm	Marine biology (open ocean)		20/10/2003, GOOS JPO
Ozone profile - Total column			50 km	79.4 km	200 km				24 h	30.2 h	48 h	3 h	4 h	7 h	10 DU	12.6 DU	20 DU	Firm	Marine biology (open ocean)		20/10/2003, GOOS JPO
Sea surface temperature			10 km	17.1 km	50 km				24 h	30.2 h	48 h	3 h	4 h	7 h	0.1 K	0.171 K	0.5 K	Firm	Marine biology (open ocean)		20/10/2003, GOOS JPO
Sea surface temperature			1 km	1.7 km	5 km				24 h	30.2 h	48 h	3 h	4 h	7 h	0.1 K	0.171 K	0.5 K	Firm	Marine biology (coastal water)		20/10/2003, GOOS JPO
Sea surface temperature			10 km	31.1 km	300 km				6 h	29.6 h	720 h	6 h	29.6 h	720 h	0.1 K	0.215 K	1 K	Firm	GOOS Climate - large scale		20/10/2003, GOOS JPO
Sea surface temperature			1 km	2.2 km	10 km				6 h	7.6 h	12 h	2 h	2.5 h	4 h	0.1 K	0.271 K	2 K	Firm	GOOS Surface		20/10/2003, GOOS JPO
Sea-ice cover			10 km	21.5 km	100 km				1 d	1.8 d	6 d	0.125 d	0.25 d	1 d	2 % (Max)	(Max)	(Max)	Firm	GOOS Climate - large scale		20/10/2003, GOOS JPO
Sea-ice thickness			25 km	39.7 km	100 km				1 d	1.8 d	6 d	1 d	1.8 d	6 d	50 cm	63 cm	100 cm	Firm	GOOS Surface		20/10/2003, GOOS JPO
Specific humidity profile - Total column			25 km	39.7 km	100 km				24 h	45.9 h	168 h	3 h	4 h	7 h	5 kg/m2	6.3 kg/m2	10 kg/m2	Firm	Marine biology (open ocean)		20/10/2003, GOOS JPO
Wind speed over sea surface (horizontal)			25 km	39.7 km	100 km				24 h	45.9 h	168 h	24 h	45.9 h	168 h	1 m/s	1.3 m/s	2 m/s	Firm	GOOS Climate - large scale		20/10/2003, GOOS JPO
Wind vector over sea surface (horizontal)			4 km	9.3 km	50 km				24 h	30.2 h	48 h	3 h	4 h	7 h	2 m/s	2.7 m/s	5 m/s	Firm	Marine biology (open ocean)		20/10/2003, GOOS JPO
Wind vector over sea surface (horizontal)			25 km	39.7 km	100 km				24 h	45.9 h	168 h	24 h	45.9 h	168 h	1 m/s	1.3 m/s	2 m/s	Firm	GOOS Climate - large scale		20/10/2003, GOOS JPO