ANNEX I. LIST OF APPLICATION AREAS IN EACH EARTH SYSTEM APPLICATION CATEGORY

The concept of an Application Area was explained in Section 3 as follows: an Application Area is an activity involving primary use of Earth System observations which allows National Meteorological and Hydrological Services or other organizations to render services related to weather, climate and water, and other environmental events, contributing to public safety, socio-economic well-being and development in their respective countries. The concept of a WMO Application Area is used in the framework of the WMO RRR and describes a homogeneous activity for which it is possible to compile a consistent set of observational user requirements agreed by community experts working in this area.

The list of Application Areas below represents a balance between granularity/detail and the practical feasibility of maintaining the RRR process. However, it is important to note that Application Areas may be proposed by their owners for addition to or deletion from the list as required.

This table lists all the Application Areas which currently form part of the RRR process, against the Earth System Application Categories in which they are grouped. This list is kept up-to-date online at https://community.wmo.int/rolling-review-requirements-process.

Earth System Application Category	***Application Area[1,2]***	***Observations are primarily used for …..***			***Ownership***
		Forecasting	***Monitoring***	***Other uses[7]***	
1. Space Weather Applications	1.1 Space Weather	☒	☒	☐	INFCOM/ET-SWx
	1.2 Energetic Particle Forecasting & Monitoring	☒	☒	☐	INFCOM/ET-SWx
2. Atmospheric Applications	2.1 Global NWP & Real-time Monitoring	☒	☒	☐	INFCOM/SC-ESMP
	2.2 High-Resolution NWP	☒	☐	☐	INFCOM/SC-ESMP
	2.3 Nowcasting / Very Short Range Forecasting (VSRF)	☒	☐	☒	INFCOM/SC-ESMP
	2.4 Sub-Seasonal to Longer Predictions (SSLP)	☒	☐	☐	INFCOM/SC-ESMP
	2.5 Atmospheric Climate Monitoring and Forecasting	☒	☒	☐	GCOS/AOPC
	2.6 Atmospheric Composition Forecasting & Monitoring[3]	☒	☒	☐	RB/EPAC SSC
	2.7 Atmospheric Composition information services in urban and populated areas[3]	☐	☐	☒	SERCOM/SG-URB
	2.8 Aviation Meteorology	☐	☐	☒	SERCOM/SC-AVI

Earth System Application Category	*Application Area*[1,2]	*Observations are primarily used for …..*			*Ownership*
		Forecasting	*Monitoring*	*Other uses*[7]	
	2.9 Agricultural Meteorology[3]	☐	☐	☒	SERCOM/SC-AGR
	2.10 Atmospheric Disaster Risk Reduction	☐	☐	☒	SERCOM/SC-DRR
3. Oceanic Applications	3.1 Ocean Mesoscale Forecasting & Real-Time Monitoring	☒	☒	☐	GOOS/ETOOFS
	3.2 Wave Forecasting	☒	☐	☐	SERCOM/SC-MMO/ET-MOR
	3.3 Oceanic Climate Monitoring	☐	☒	☐	GCOS/OOPC
	3.4 Tsunami Monitoring & Detection	☐	☒	☒	SERCOM/SC-MMO/ET-MOR
	3.5 Oceanic Disaster Risk Reduction	☒	☐	☒	SERCOM/SC-DRR
4. Hydrological & Terrestrial Applications	4.1 Hydrology Forecasting & Real-Time Monitoring	☒	☒	☐	INFCOM/JET-HYDMON
	4.2 Hydrological and Terrestrial Climate Monitoring	☐	☒	☐	GCOS/TOPC, alternative GTN-H
	4.3 Hydrological and Terrestrial Disaster Risk Reduction	☐	☐	☒	SERCOM/SC-DRR
5. Cryospheric Applications	5.1 Terrestrial Cryosphere Forecasting and Monitoring[4]	☒	☒	☒	INFCOM/GCW-AG
	5.2 Sea-Ice Forecasting and Monitoring[5]	☒	☒	☒	INFCOM/GCW-AG
	5.3 Cryospheric Climate Monitoring	☐	☒	☐	GCOS/TOPC and OOPC
	5.4 Cryospheric Disaster Risk Reduction	☐	☐	☒	SERCOM/SC-DRR
6. Integrated Earth System Applications	6.1 Earth System Forecasting & Monitoring[6]	☒	☒	☐	INFCOM/SC-ESMP
	6.2 Understanding Earth System processes[1]	☒	☒	☐	RB/WWRP

Footnotes:

[1] Each Application Area considers its requirements for observations, not only for operational activities but also for the research that will enable its future activities and evolving usage of observations. Application Area "6.2 Understanding Earth System processes" considers the requirements for observations of all WMO research activities not covered in any other Application Area;

[2] The list of Application Areas is intended to include all WMO uses of observations where it is practicable to collect observational user requirements with a community of experts behind; it needs to be checked periodically and updated accordingly;
[3] The Atmospheric Composition and Agricultural Meteorology application areas, numbered 2.6, 2.7 and 2.9, have some activities which may have an affinity with other Categories. Each application area may consider whether to split into components to belong in different Categories, in the way that Disaster Risk Reduction and Climate Monitoring are split into different Categories;
[4] Application area 5.1 "Terrestrial Cryosphere Forecasting and Monitoring" includes snow, glaciers and permafrost, ice caps, glaciers;
[5] Application area 5.2 includes glaciers;
[6] Application area 6.1 deals with the Integrated Earth System, including all domain interfaces between components of the Integrated Earth System;
[7] The column "Other uses" applies to for example Integrated products, direct use of observations for services, post-processing for verification or validation.

Explanatory notes:

(a) Earth System Application Categories are intended to provide groupings of Application Areas of similar types which have related disciplines and professional communities. The concept is not directly based on having common geographical domains; it is intended to provide a pragmatic and workable approach that will enable groups of applications with similar needs for observations to collaborate in preparing their joint SoG on priorities for evolving the capabilities of WIGOS observing systems;

The Integrated Earth System, in accordance with the WMO Strategic Plan 2020-2023, is considered as an integrated system of atmosphere, ocean, cryosphere, hydrosphere, biosphere and geosphere;

An Application Area can belong to only one Category. If an application has two or more components that are so different from each other that they are best located in different Categories, and cannot be considered collectively as an Integrated Earth System Application, then they must have distinct names. Examples of this are provided by the components of Disaster Risk Reduction and Climate Monitoring;

In any case, the relevant applications community should lead the management of their Application Area/s (creation, naming, deletion);

Each Application Area is shown with attributes indicating whether it uses observations for:

Forecasting: that is numerical prediction or other means of projection forwards in time;

Monitoring: that is description of conditions at the time of observation by numerical analysis, modelling or other means of integration and interpretation of the available data;

Integrated products and direct use of observations for services: that is direct use of observational data alone or as an integrated dataset;

The "Ownership" of each Application Area is important because the owner has authority and responsibility to create, name, delete and nominate their PoC, for the specification of observation requirements, and for contributions to SoG.

Abbreviations used in this table (those not explained above or in Annex XI):

ET-SWx	Expert Team on Space Weather;
SC-ESMP	Standing Committee on Data Processing for Applied Earth System Modelling and Prediction & Projection;
AOPC	Atmospheric Observation Panel for Climate;
RB / EPAC SSC	Research Board / Environmental Pollution and Atmospheric Chemistry Scientific Steering Committee;
SERCOM	Commission for Weather, Climate, Water and Related Environmental Services and Applications;
SG-URB	Study Group on Integrated Urban Services;
SC-AVI	Standing Committee on Services for Aviation;
SC-AGR	Standing Committee on Services for Agriculture;
SC-DRR	Standing Committee on Services for Disaster Risk Reduction and Public Services;
GOOS / ETOOFS	Global Ocean Observing System / Expert Team on Operational Ocean Forecast Systems;
SC-MMO / ET-MOR	Standing Committee on Marine Meteorological and Oceanographic Services / Expert Team on MetOcean Requirements;
OOPC	Ocean Observations Physics and Climate Panel;
JET-HYDMON	Joint Expert Team on Hydrological Monitoring;
TOPC	Terrestrial Observation Panel for Climate;
GTN-H	Global Terrestrial Network for Hydrology;
GCW-AG	Global Cryosphere Watch Advisory Group;
WWRP	World Weather Research Scientific Steering Committee.