3.1 User requirements for satellite data utilization, especially for new-generation satellites

A Questionnaire on the Utilization of Satellite Data from the New Generation of Geostationary Meteorological Satellites

The 3rd Meeting of the Coordinating of the WMO RA II WIGOS Project to Develop Support for NMHSs in Satellite Data, Products and Training
14 November 2015, Tokyo Japan

Back Ground

The new generation of geostationary meteorological satellites scheduled to become operational during between 2015 and 2019 are expected to provide WMO Members with unprecedented opportunities and challenges in key areas of application such as severe weather monitoring, nowcasting and short-range forecasting.

WMO's SATURN (SATellite User Readiness Navigator) online portal for these satellites provides up-to-date information supporting user-readiness work for Himawari-8, Electro-L, FY-4, GEO-KOMPSAT-2A, GOES-R, INSAT-3DR and MTG (http://www.wmo-sat.info/satellite-user-readiness/).

Purpose

- The prototype questionnaire was conducted as a “pilot study” by JMA through passing around NMHSs in AOMSUC-6 participants, which intended for the use of Himawari-8 data as a “precursor” of the new generation of geostationary meteorological satellite.
- The questionnaire is aimed at NMHSs in WMO RA-II and RA-V to extract and assess needs for the new generation of geostationary meteorological satellites.

Question Items

Q1: Hazards of concern

- Which three hazards are of the greatest concern to your service? Choose up to three items (in order of priority) from the following list of events that can be monitored by satellite:

Q2: Benefits of New Functions

- Which of the features of the new generation of geostationary meteorological satellites listed below do you expect will help to mitigate the hazards chosen for Q1?

Q3: Requirements for getting Benefits

- What are your requirements to get benefits from the new generation of geostationary meteorological satellites in light of the meteorological hazards chosen for Q1?

Q4: Utilization of “Rapid Scan” Observation

- Is 10-minute-interval full-disk observation enough for hazard monitoring? If not, please indicate how you plan to utilize data from very-short-interval observation such as 2.5-minute-interval target-area observation?

Number of Responses

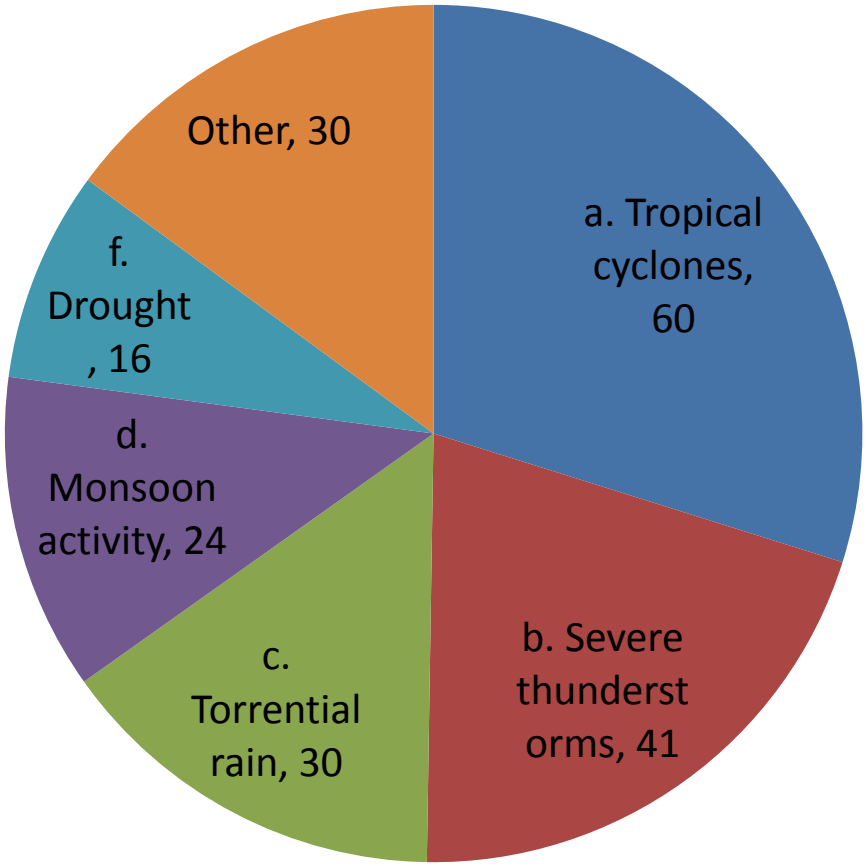
32 NMHSs

RA-II: 18

RA-V: 13

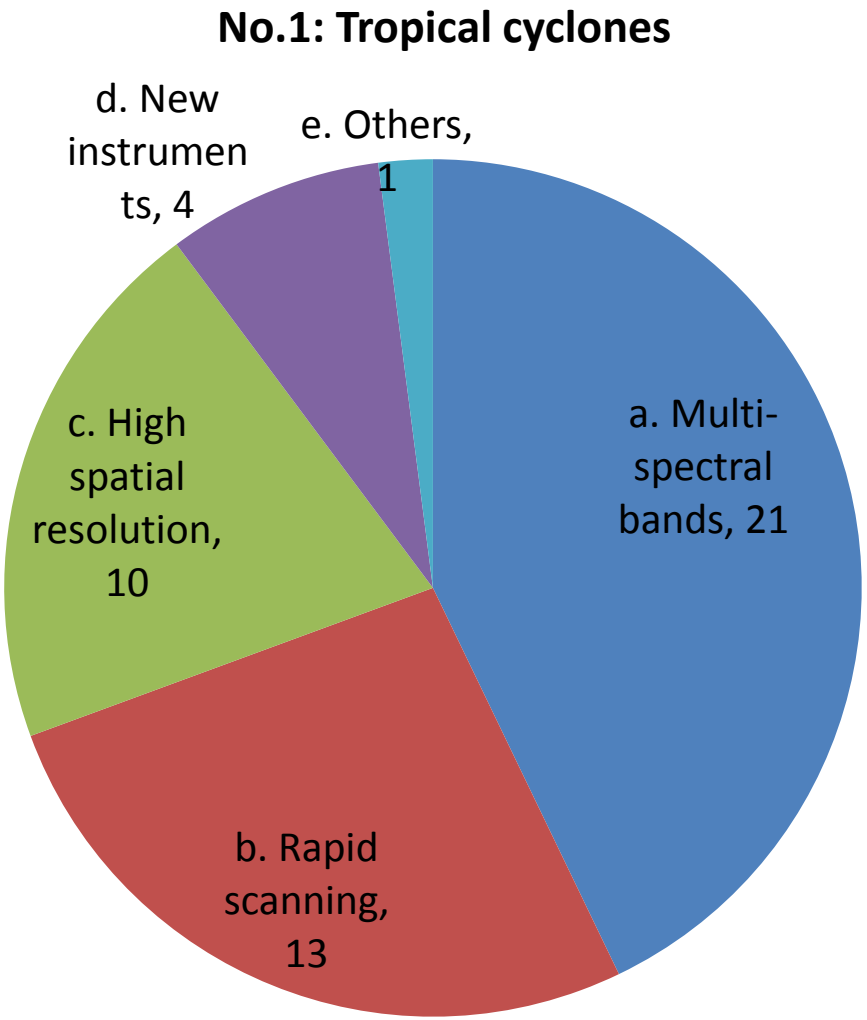
Other: 1

Q1: Hazards of concern

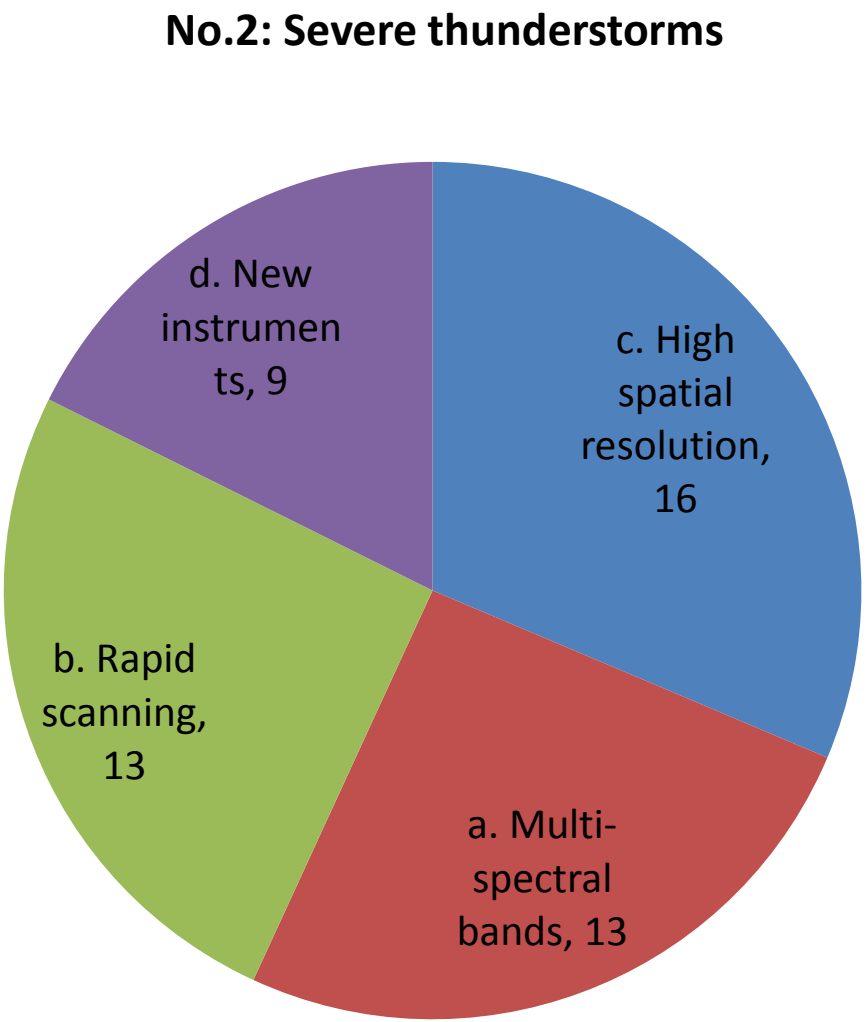


Hazard 1 : 3 points
Hazard 2 : 2 points
Hazard 3 : 1 point

Q2: Benefits of New Functions



Q2: Benefits of New Functions



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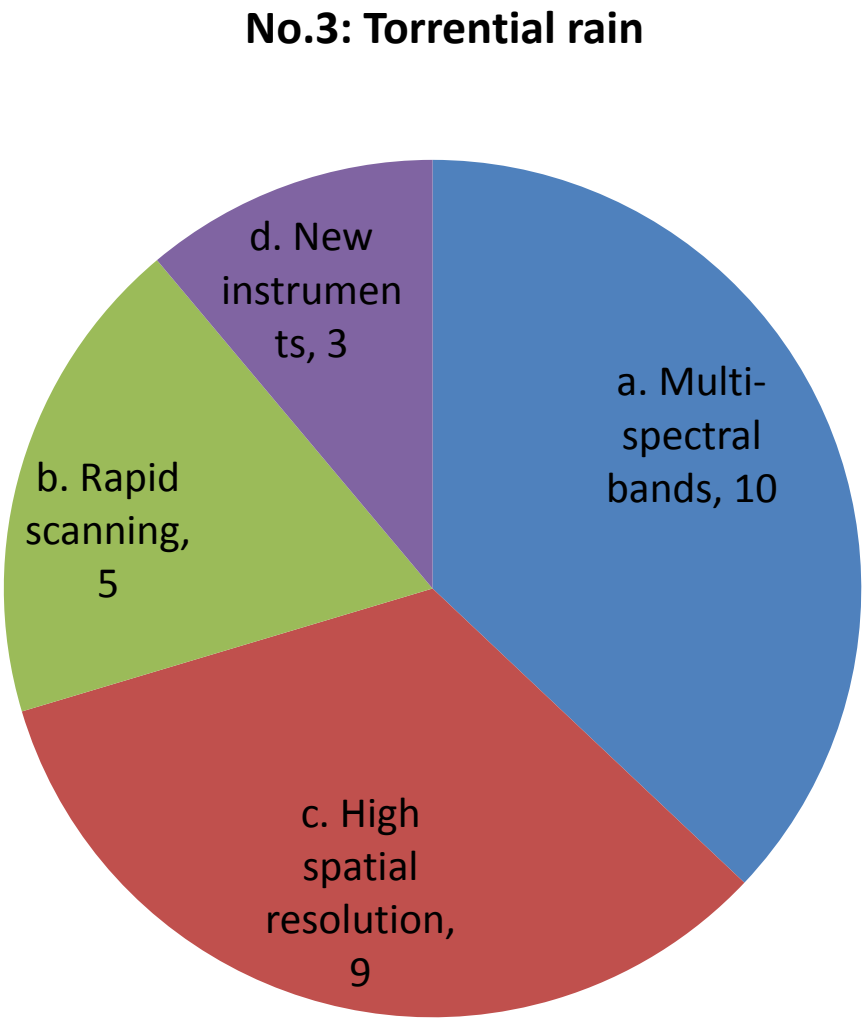

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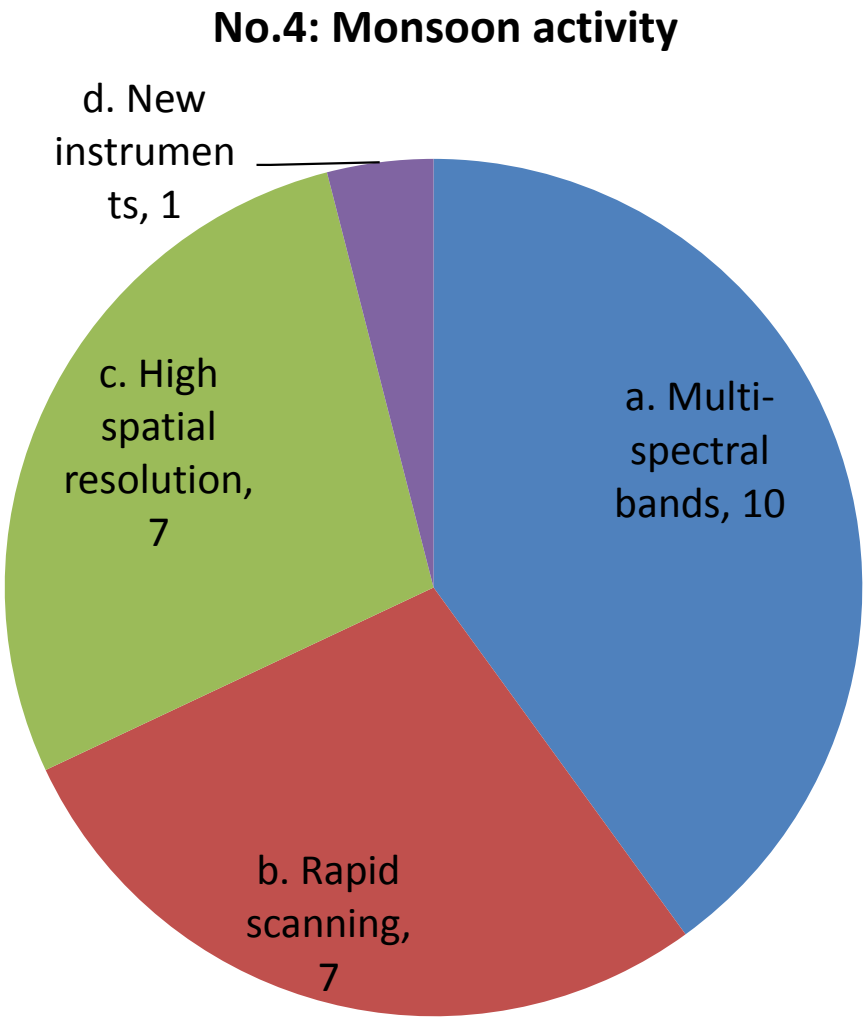
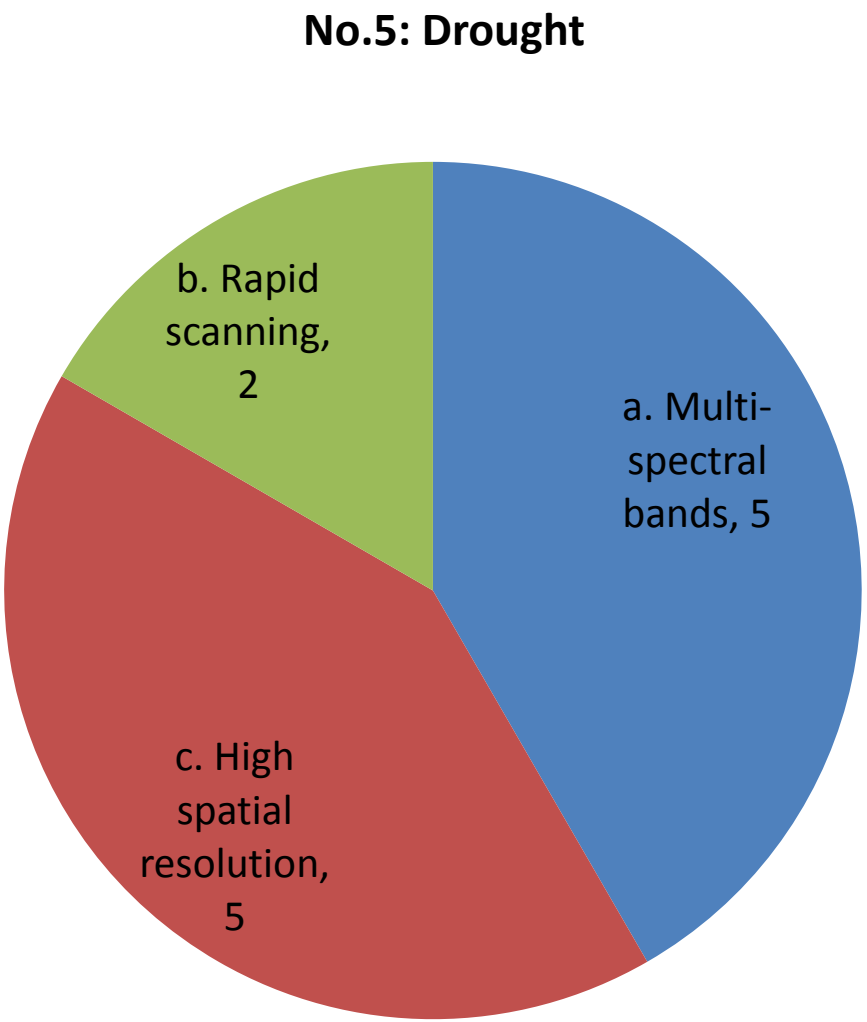
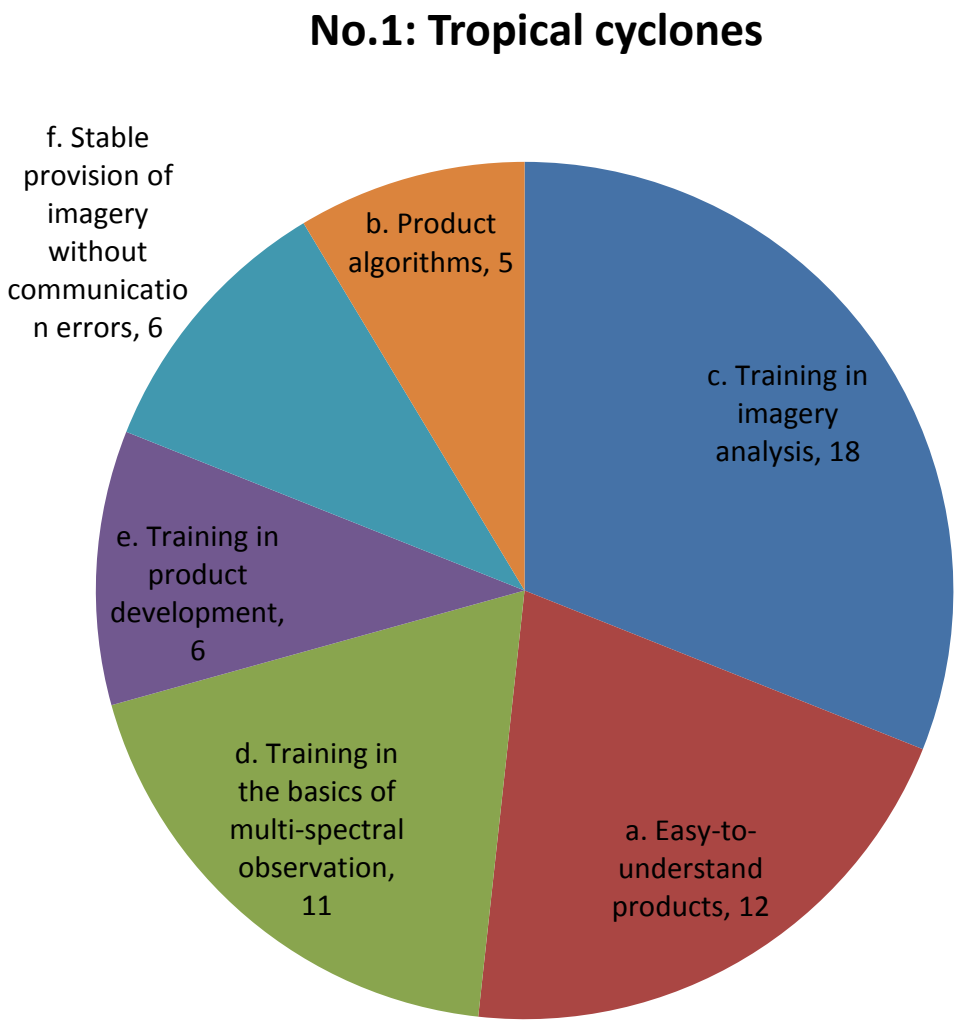


Q2: Benefits of New Functions



Q3: Requirements for getting Benefits



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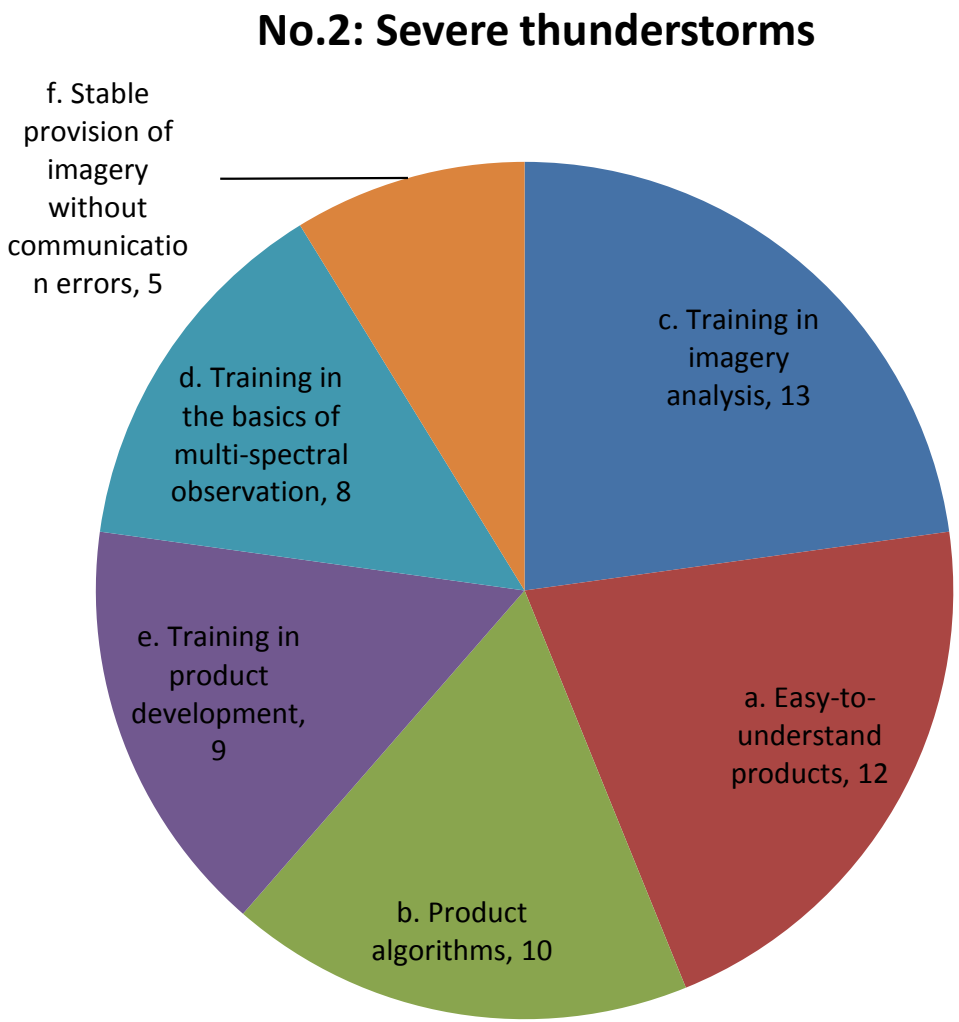

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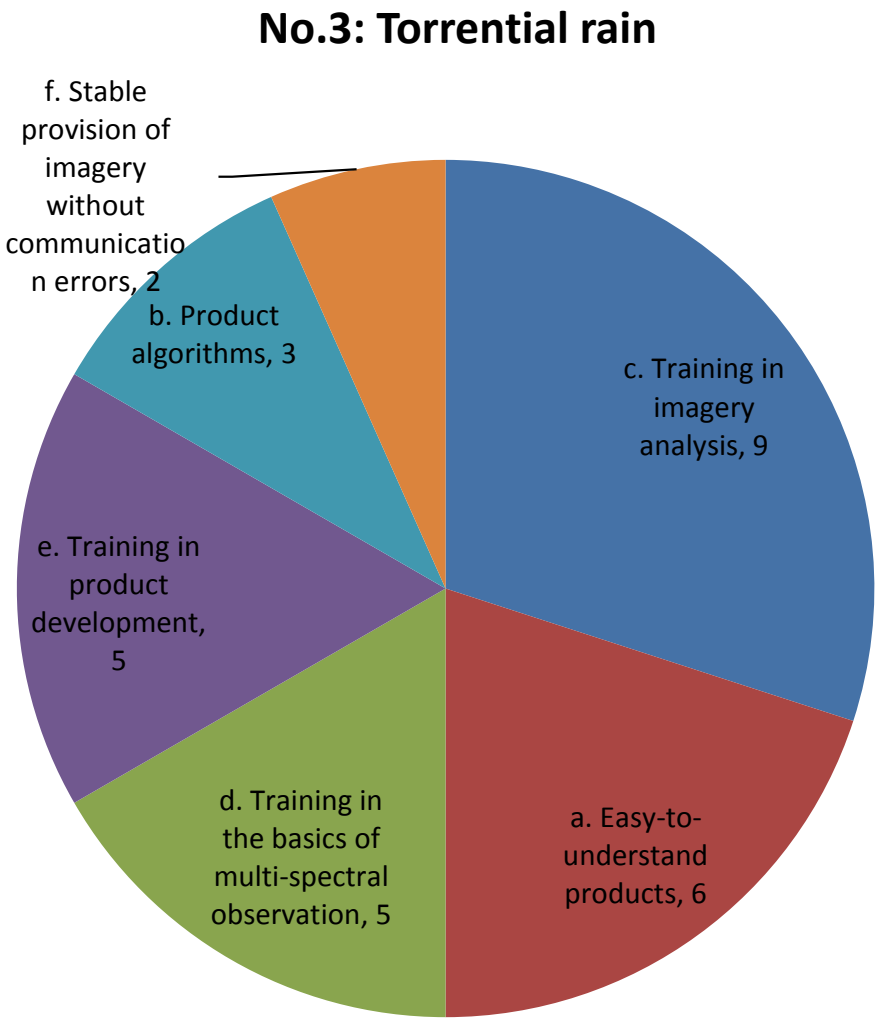

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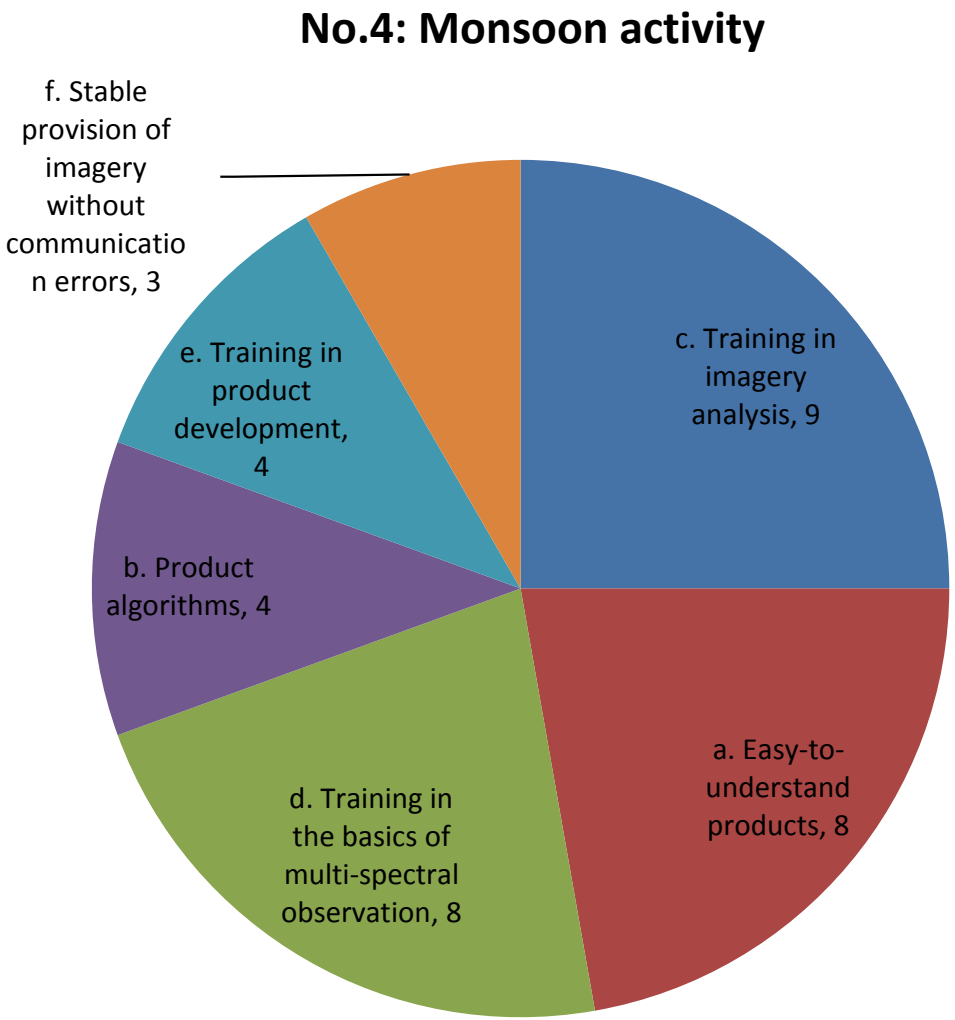
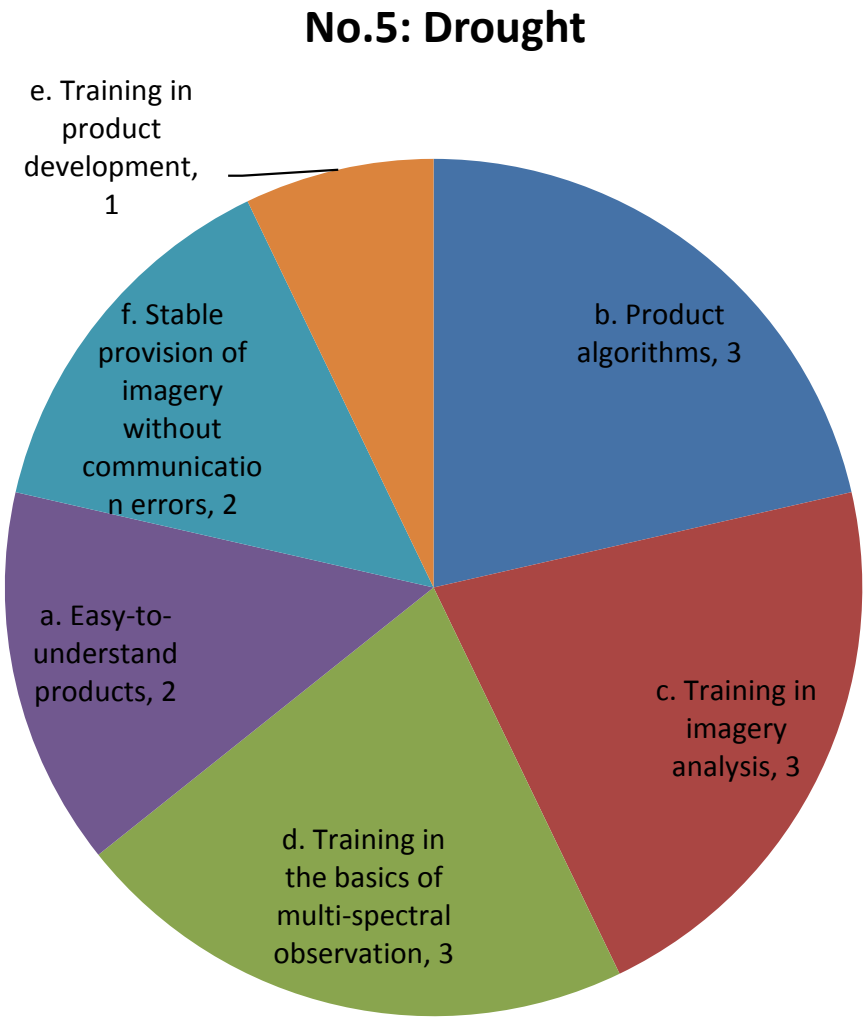
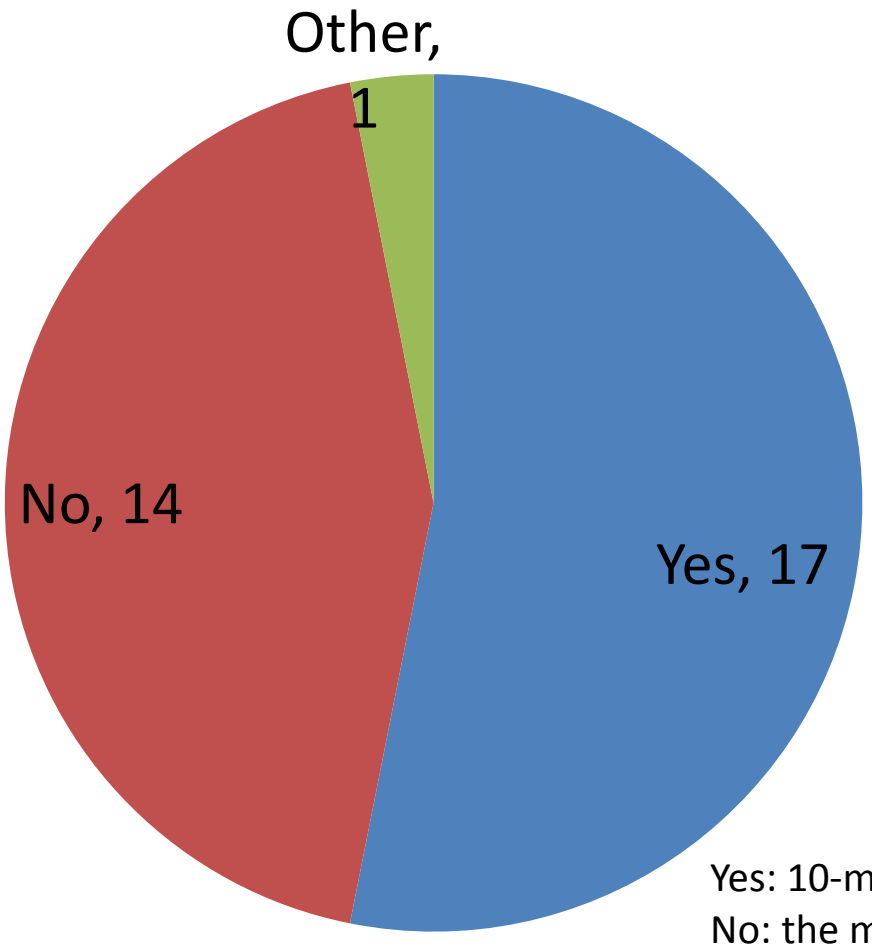


Q3: Requirements for getting Benefits



Q4: Utilization of “Rapid Scan” Observation



Yes: 10-minute Observation is enough
No: the more frequent “Rapid Scan” Observation is needed

Answers for Q4

In most cases, yes, but for severe thunderstorms, higher temporal resolution is required. Forest fire hot spots at high spatial and temporal resolution would also be beneficial.
(Australia)

Yes, 10-minute-interval full-disk observation is enough for hazard monitoring e.g Tropical cyclones, Monsoon activity.
But , I think 10-minute-interval full-disk observation is not enough for severe thunder storm monitoring . For the best observation of severe thunder storm, very-short-interval observation such as 2.5-minute-interval target-area observation is required.
Because Tornado is a local storm of short duration (usually 5–10 minutes). Severe Thunderstorm/Tornado forms rapidly and it also dissipate rapidly. Although the whole process (formation and dissipation of severe thunder thunderstorm) usually goes by rather quickly and lasts about 30 minutes to an hour.
(Bangladish)

Yes.
(Bhutan)

No. Very-short-interval observation can provides more information than 10-minute-interval full-disk observation.
(China)

No. HKO would utilize the data to monitor explosive development of convective clouds and tropical cyclone.
(HongKong)

No. For Torrential rain at rainy season for Capital City (Jakarta) area from Desember until March.
(Indonesia)

Yes. I personally think that 10-minute-interval full-disk observation is enough for hazard monitoring. I think that to get data from satellite is more important than temporal resolution.
(Korea)

Yes. 10-minute-interval of full-disk observation is enough for hazard monitoring.
(Kyrgyz)

Yes.
(Malaysia)

Yes. 10-minute interval is enough if it covers the Maldives area of responsibility.
However, for complex hazards like severe thunderstorms and flash flood 2.5-minute interval would be very useful.
(Maldives)

Yes.
(Micronasia)

Yes. DMH would like to acknowledge every (10) minute images. These products are very supportive to improve our forecast products and monitoring.
(Myanmar)

Yes.
(NewZealand)

Yes.
(Pakistan)

We want to utilize data from 2.5-minute-interval… for tropical cyclone monitoring, convective clouds, etc.
(Palau)

No. PNG National Weather Service would employ the 2.5-minute-interval observation data to effectively monitor convective cloud development, volcanic activities and tropical cyclone events.
(PapuaNewGuinea)

No. PAGASA will utilize the data to monitor the rapidly developing convective cells that will likely bring heavy precipitation to specific area.
(Philippines)

(No.) FEC SRC “Planeta” would utilize data from 2.5-minute-interval observation for monitoring of explosive-extrusive eruption of the volcano in Kamchatka
(Russia)

Yes. 10-minute-interval is generally sufficient for smoke haze and volcanic ash but may still be limited in some cases for rapidly developing local thunderstorms.
(Singapore)

No. It would be best to use the 2.5-minute- interval target observation along with the 10-minute-interval observation to monitor rapid convections developing over the islands, tropical cyclones as well cloud activity during the monsoon season. Also this would be an advantage since we do not have radar in the country.
(Solomon)

No. DOM of Sri-Lanka would prefer to have data from 2.5-minute-interval observations for monitoring of rapidly developing convective clouds over Sri-Lanka, With that convective activity forecast can be issued with much accuracy.
(SriLanka)

Yes. This is the new generation of higher spatial and temporal resolution information for created innovation on multi hazard monitoring and prediction as nowcasting approach.
(Thailand)

Yes.
(TimorLeste)

Yes.
(Tonga)

No. We would like to utilize data from very-short-interval observation such as 2.5-minute-interval on a target area in terms of squally areas which may have severe impact on our coastal and marine forecast areas during times when local ships are out in open waters and also at times when local effects are severe at a particular area or islands that was not seen in previous models or satellite pictures. This will thus give us a quality timely and accurate weather forecasting to the public.
(Tuvalu)

Yes. It is enough for current Uzhydromet needs.
(Uzbekistan)

No.
(Vietnam)

Yes.
(Bahrain)

No. If we can get the data from 2.5-minute-interval observations for monitoring of rapidly developing convective clouds over Cambodia, and target-area for typhoon, TC, TD maybe suitable for improve our forecaster monitoring and analysis.
(Cambodia)

No. For the Fiji Meteorological Service products are normally issued hourly, 3 hourly, 4 hourly and 6 hourly. The vast geographic land distances and sizes for the moment does not require 10 minute-interval full disk observation.
(Fiji)

Yes.
(Laos)

No. Oman met Office will use data from 2.5-minute-interval observations for monitoring thunderstorms cells over Al-hajar mountains during orographic activities or frontal systems(troughs) to predicts flashfloods. Also can be used to tropical cyclone monitoring in Northern Indian Ocean and Arabian sea.
(Oman)

Summary

1. Answers for Q1

There are a lot of choice about rain.

No.1 Tropical cyclones
No.2 Severe thunderstorms
No.3 Torrential rain
No.4 Monsoon activity
No.5 Drought

2. Answers for Q2

The following three abilities are expected as well.

Multi-spectral bands
Rapid scanning
High spatial resolution

3. Answers for Q3

Various choice

4. Answers for Q4

"Yes" is the majority.
However, there are many expectations for 2.5-minute-interval observation.
(Convective clouds, Tropical cyclones, Severe thunderstorms, Volcanic Ash, etc.)

Prospects and Goal

- Based on the results from the prototype questionnaire, the more comprehensive questionnaire will be developed to assess requirements, expectations and challenges for covering the new generation of geostationary meteorological satellites in WMO RA-II and RA-V Members.

- The results of the questionnaire will be shared in all WMO Members.