MEMBER REPORT

Japan

ESCAP/WMO Typhoon Committee
12th Integrated Workshop
Jeju, Republic of Korea
30 October – 3 November 2017

CONTENTS

I. Overview of tropical cyclones which have affected/impacted Member’s area since the last Committee Session

1. Meteorological assessment (highlighting forecasting issues/impacts)

In 2017, six tropical cyclones (TCs) of tropical storm (TS) intensity or higher had come within 300 km of the Japanese islands as of 2 October. Japan was affected by five of these, with three making landfall. These five are described below, and their tracks are shown in Figure 1.

(1) STS Nanmadol (1703)
Nanmadol was upgraded to tropical storm (TS) intensity around the sea south of Okinawa Island at 00 UTC on 02 July 2017. It gradually turned northeastward and reached its peak intensity with maximum sustained winds of 55 kt and a central pressure of 985 hPa over the East China Sea at 06 UTC on 03 July. Nanmadol made landfall on Nagasaki City in Nagasaki Prefecture at around 23 UTC on 3 July and on Uwazima City in Ehime Prefecture just after 03 UTC the next day. It also made landfall on Tanabe City in Wakayama Prefecture just before 08 UTC on 4 July, then transformed into an extratropical cyclone around the sea east of Japan at 00 UTC on 5 July. A peak gust of 45.0 m/s was recorded at Murotomisaki (47899) and a 24-hour precipitation total of 118.5 mm was recorded at Unzendake (47818).

Nanmadol and an active seasonal rain front left 38 people dead, 5 missing and 28 injured in the northern Kyushu and Chugoku regions. Damage to houses and farm products, water outages and communication/transport disruptions were reported widely from western to eastern Japan.

(2) TY Noru (1705)
Noru was upgraded to tropical storm (TS) intensity northeast of Minamitorishima Island at 12 UTC on 20 July 2017. Shortly after turning counterclockwise, it was upgraded to typhoon (TY) intensity northwest of the island at 12 UTC on 23 July. Gradually turning southwestward, Noru weakened to severe tropical storm (STS) intensity northeast of Chichijima Island at 00 UTC on 28 July. Keeping its southwestward track, it gradually developed and was upgraded to TY intensity again at 00 UTC on 30 July. Gradually turning northwestward, Noru reached its peak intensity with maximum sustained winds of 95 kt and a central pressure of 935 hPa south-southwest of Chichijima Island at 00 UTC on 31 July. It subsequently remained almost stationary over the sea west of Yakushima Island on 5 August and weakened to STS intensity at 12 UTC on the same day. After moving northeastward, Noru passed over Yakushima Island with STS intensity just after 17 UTC on 5 August, then passed over Tanegashima Island with STS intensity at around 0030 UTC the next day. After passing around Cape Muroto just before 01 UTC on 7 August, it made landfall on the northern part of Wakayama Prefecture with STS intensity just after 06 UTC the same day. Keeping its northeastward track, Noru crossed central Honshu Island and moved out over the Sea of Japan on 8 August before transforming into an extratropical cyclone over the same waters at 12 UTC the same day. It remained at TS intensity or higher for 19.00 days, which was the joint second-longest period (along with TY Rita (7207)) after the 19.25-day duration of TY Wayne (8614) since 1951. A peak gust of 40.0 m/s was recorded at

Murotomisaki (47899), and a 24-hour precipitation total of 540.0 mm was recorded at Naze (47909).

Noru left 2 people dead and 51 injured. Damage to houses and water/communication outages were reported from Kyushu to the Tohoku region.

(3) TY Nesat (1709)
Nesat was upgraded to tropical storm (TS) intensity over the sea east of the Philippines at 18 UTC on 25 July 2017 and then to typhoon (TY) intensity at 06 UTC on 28 July southeast of Taiwan Island. It reached its peak intensity with maximum sustained winds of 80 kt and a central pressure of 960 hPa southeast of Taiwan Island at 18 UTC on 28 July before passing over Taiwan Island on 29 July and turning west-northwestward. After entering the Taiwan Strait, it hit the coast of southeastern China at around 00 UTC on 30 July and weakened to a tropical depression at 12 UTC the same day. A peak gust of 50.4 m/s and a 24-hour precipitation total of 50.5 mm were recorded at Yonagunijima (47912).

Power outages and cancellations of flights and ship departures were reported in Okinawa Prefecture.

(4) TY Sanvu (1715)
Sanvu was upgraded to tropical storm (TS) intensity around the Northern Mariana Islands at 06 UTC on 28 August 2017. After turning counterclockwise, it remained almost stationary around Chichijima Island from late 30 August to early 1 September. Sanvu was upgraded to typhoon (TY) intensity at 12 UTC on 31 August and reached its peak intensity with maximum sustained winds of 80 kt and a central pressure of 955 hPa at 00 UTC on 1 September. Accelerating northeastward, it transformed into an extratropical cyclone east of Hokkaido at 12 UTC on 3 September. A peak gust of 39.8 m/s and a 24-hour precipitation total of 270.5 mm were recorded at Chichijima (47971).

Power outages and cancellations of ship departures were reported in the Ogasawara Islands.

(5) TY Talim (1718)
Talim was upgraded to TS intensity around the Northern Mariana Islands at 12 UTC on 9 September. It moved northwestward and was upgraded to typhoon (TY) intensity far south of Japan at 00 UTC on 11 September before passing by Miyakojima Island and moving over the East China Sea. It reached its peak intensity with maximum sustained winds of 95 kt and a central pressure of 935 hPa at 00 UTC on 14 September, then turned northeastward and made landfall on Minamikyushu City in Kagoshima Prefecture, Sukumo City in Kochi Prefecture and Akashi City in Hyogo Prefecture with severe tropical storm (STS) intensity on 17 September. After making landfall on Hokkaido with STS intensity on 18 September, Talim transformed into an extratropical cyclone near Sakhalin Island the same day. A peak gust of 48.3 m/s and a 24-hour precipitation total of 479.0 mm were recorded at Miyakojima (47927).

Talim left 5 people dead and 59 injured from western to northern Japan. Damage to houses, water/communication outages and cancellations of flights and ship departures were reported.

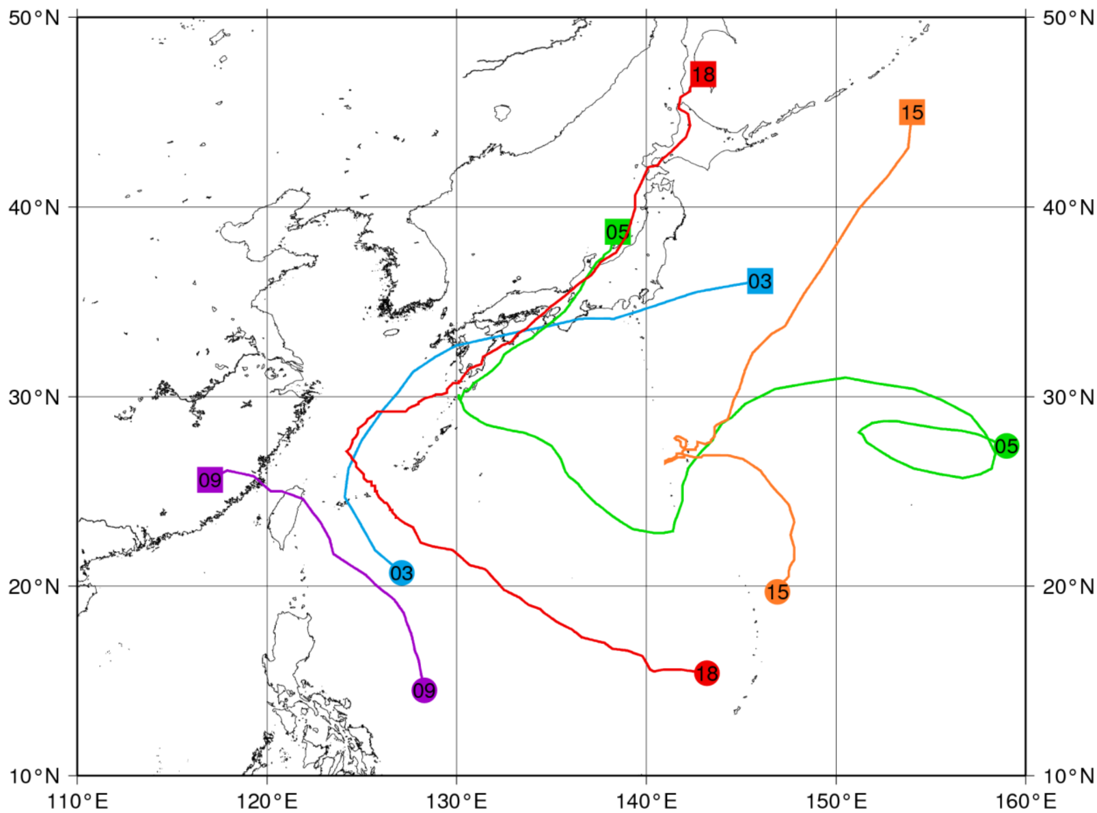


Figure 1 Tracks of the 5 named TCs affecting Japan in 2017
The numbered circles represent the genesis point of each named TC, while the squares show the dissipation point. The numbers indicate the last two digits of the identification number for each named TC.

2. Hydrological Assessment (highlighting water-related issues/impact)

Japan was hit by a series of tropical typhoons in 2017. Many made landfall at full force, causing significant damage nationwide.

I. Overview of flooding
As of October 6, 2017, the details of the floods were reported as follows:

1) Northern Kyusyu Rain Storm in July 2017

- Dates: 5 July, 2017
- Places: Fukuoka and Oita prefectures in the western part of Japan
- Damage: 36 fatalities, 5 missing, 21 injured, 276 houses destroyed, 1,065 houses half-destroyed, 76 houses damaged, 981 houses inundated above floor level, and 1,188 houses inundated below floor level
- Main causes of fatality: flooding

2) Heavy rainfall by the seasonal rain front from July 22, 2017

- Dates: 22 July, 2017
- Places: Akita prefecture
- Damage: 35 houses destroyed, 2,223 houses inundated
- Main causes of fatality: flooding

- From the noon to the evening of July 5, intense rainfall hit Fukuoka and Oita prefectures in the northern Kyushu region, registering a record rainfall in a short period of time. Inundation occurred along the rivers managed by the national and prefectural governments. Many slope failures produced a large amount of driftwood, which blocked rivers and caused other types of damage.
- The seasonal rain front started being active from July 22 on, causing highly intense rainfall over Akita Prefecture with a total rainfall of over 300 mm in some areas. Inundation damage was reported in areas along the rivers managed by the national and prefectural government. On August 24, intense rainfall again hit Akita and some neighboring areas with a 24-hour rainfall of over 200 mm and inundation in some areas. The region suffered from inundation twice in almost a month.

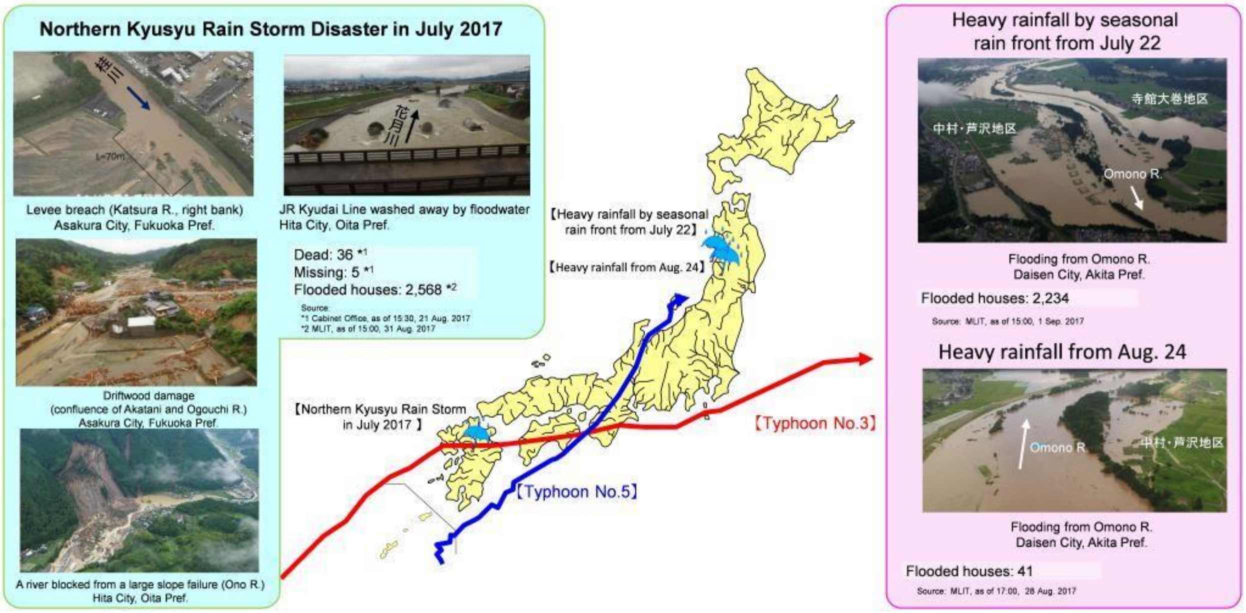


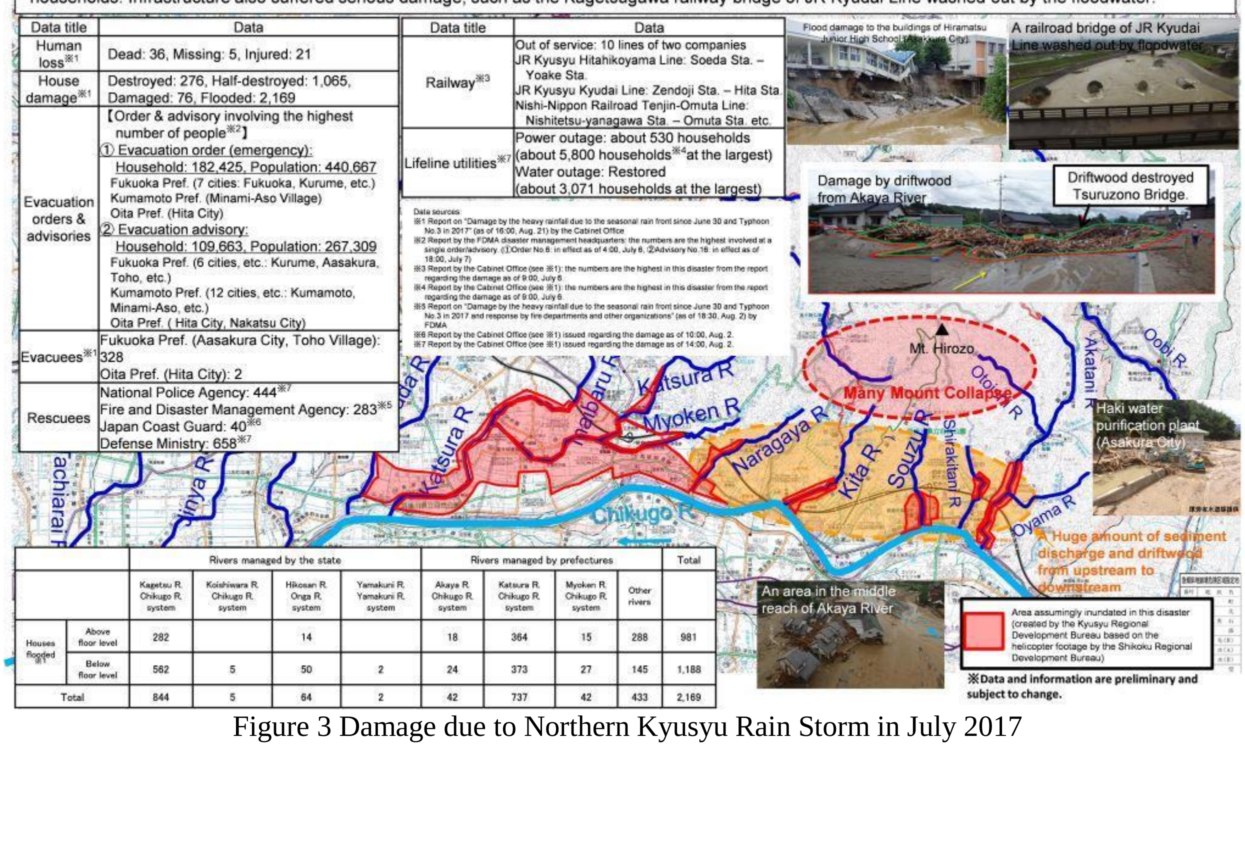
Figure 2 Major Natural Disasters in 2017(As of 6, October, 2017)

- The July 2017 Northern Kyusyu Rain Storm, referring to the heavy rainfall on July 5-6, 2017, caused flooding and slop failures. This disaster caused tremendous damage, leaving 36 people dead, 1,417 houses damaged or destroyed, and 2,169 houses flooded due to a huge volume of sediment discharge and driftwood.
- Evacuation orders (emergency) were issued to a total of 440,667 people of 182,425 households, and evacuation advisories to 267,309 people of 109,663 households. Infrastructure also suffered serious damage, such as the Kagetsugawa railway bridge of JR Kyudai Line washed out by the floodwater.

Data title	Data
Human loss※1	Dead: 36, Missing: 5, Injured: 21
House damage※1	Destroyed: 276, Half-destroyed: 1,065, Damaged: 76, Flooded: 2,169
Evacuation orders & advisories	【Order & advisory involving the highest number of people※2】 ① Evacuation order (emergency): Household: 182,425, Population: 440,667 Fukuoka Pref. (7 cities: Fukuoka, Kurume, etc.) Kumamoto Pref. (Minami-Aso Village) Oita Pref. (Hita City) ② Evacuation advisory: Household: 109,663, Population: 267,309 Fukuoka Pref. (6 cities, etc.: Kurume, Aasakura, Toho, etc.) Kumamoto Pref. (12 cities, etc.: Kumamoto, Minami-Aso, etc.) Oita Pref. (Hita City, Nakatsu City)
Evacuees※1	Fukuoka Pref. (Aasakura City, Toho Village): 328 Oita Pref. (Hita City): 2
Rescuees	National Police Agency: 444※7 Fire and Disaster Management Agency: 283※5 Japan Coast Guard: 40※6 Defense Ministry: 658※7

Data title	Data
Railway※3	Out of service: 10 lines of two companies JR Kyusyu Hitahikoyama Line: Soeda Sta. – Yoake Sta. JR Kyusyu Kyudai Line: Zendoji Sta. – Hita Sta. Nishi-Nippon Railroad Tenjin-Omuta Line: Nishitetsu-yanagawa Sta. – Omuta Sta. etc.
Lifeline utilities※7	Power outage: about 530 households (about 5,800 households※4 at the largest) Water outage: Restored (about 3,071 households at the largest)

Data sources:
※1 Report on "Damage by the heavy rainfall due to the seasonal rain front since June 30 and Typhoon No.3 in 2017" (as of 16:00, Aug. 21) by the Cabinet Office
※2 Report by the FDMA disaster management headquarters: the numbers are the highest involved at a single order/advisory. (①Order No.8: in effect as of 4:00, July 6, ②Advisory No.18: in effect as of 18:00, July 7)
※3 Report by the Cabinet Office (see ※1): the numbers are the highest in this disaster from the report regarding the damage as of 9:00, July 6.
※4 Report by the Cabinet Office (see ※1): the numbers are the highest in this disaster from the report regarding the damage as of 9:00, July 6.
※5 Report on "Damage by the heavy rainfall due to the seasonal rain front since June 30 and Typhoon No.3 in 2017 and response by fire departments and other organizations" (as of 18:30, Aug. 2) by FDMA
※6 Report by the Cabinet Office (see ※1) issued regarding the damage as of 10:00, Aug. 2.
※7 Report by the Cabinet Office (see ※1) issued regarding the damage as of 14:00, Aug. 2.



		Rivers managed by the state				Rivers managed by prefectures				Total
		Kagetsu R. Chikugo R. system	Koishiwara R. Chikugo R. system	Hikosan R. Onga R. system	Yamakuni R. Yamakuni R. system	Akaya R. Chikugo R. system	Katsura R. Chikugo R. system	Myoken R. Chikugo R. system	Other rivers	
Houses flooded ※1	Above floor level	282		14		18	364	15	288	981
	Below floor level	562	5	50	2	24	373	27	145	1,188
Total		844	5	64	2	42	737	42	433	2,169

Figure 3 Damage due to Northern Kyusyu Rain Storm in July 2017

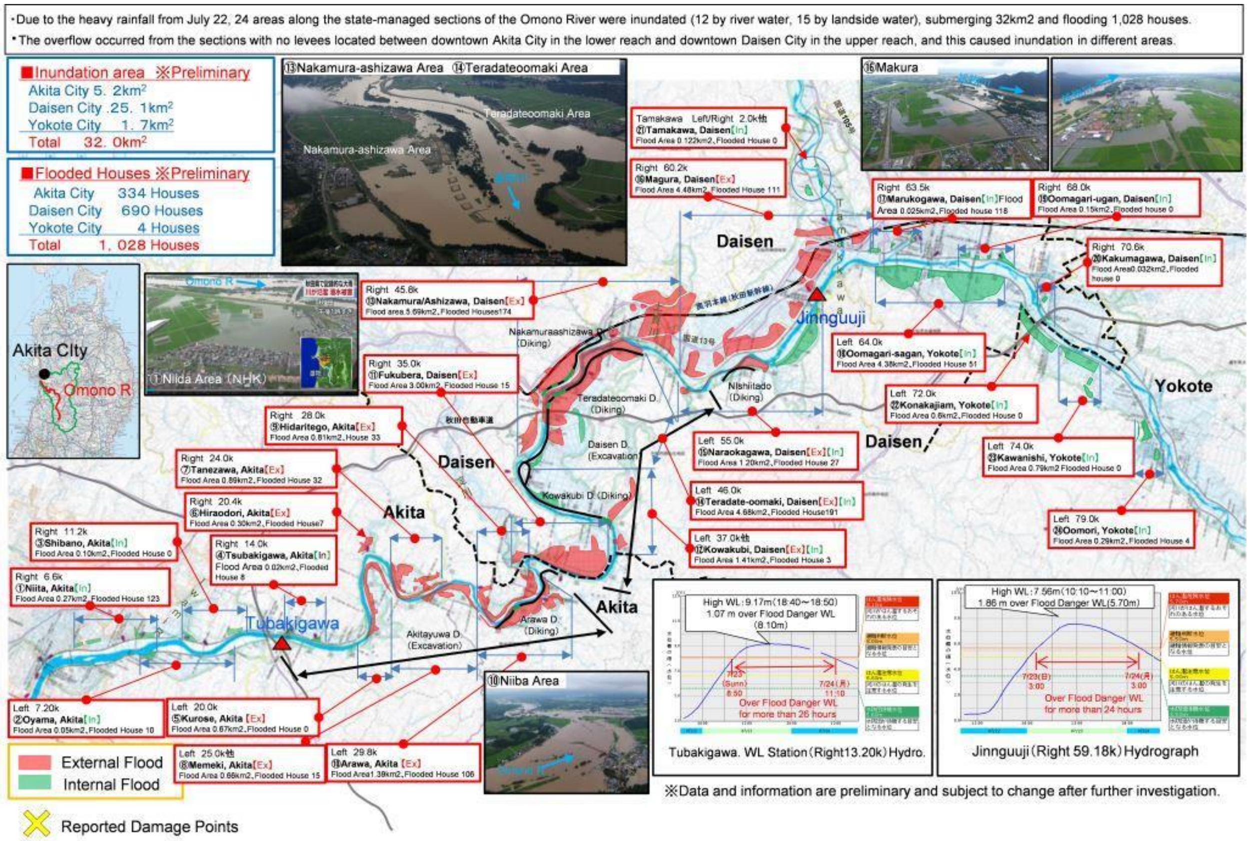


Figure 4 Heavy rainfall starting on July 22, 2017 and Damage along Omono river

II. Overview of 2017 sediment incidents

As of August 31, 2017, a total of 863 sediment-related events were reported (237 debris flows, 84 landslides and 542 slope failures). In those events, 20 people were killed and 6 injured. Many houses were also damaged; 99 were destroyed, 65 half damaged and 154 partially damaged.

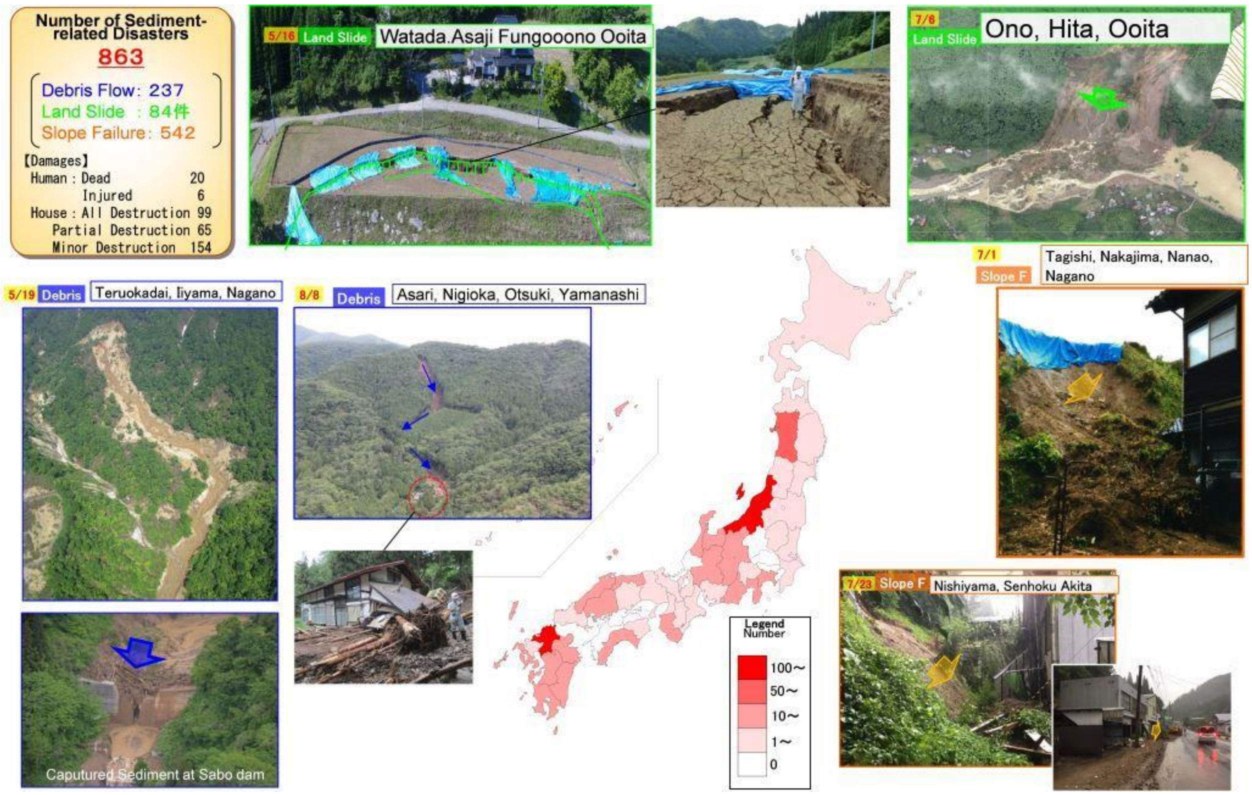


Figure 5 Sediment Disaster in Japan, 2017(As of 31 August, 2017)

3. Socio-Economic Assessment

Damage from major typhoons in 2017 (as of September 19, 2017)

As of September 19, 2017, 19 typhoons had formed, with 6 approaching the country and 3 (nos. 3, 5 and 18) making landfall.

Typhoon No. 3 (*Nanmadol*) made landfall on Nagasaki City at 8 a.m. on July 4 before heading east and changing into an extratropical cyclone over the sea east of the Japanese archipelago at 9 a.m. on July 5. A seasonal rain front active from June 30 onward and Typhoon No. 3 brought torrential isolated rain to northern Kyushu and elsewhere. From 5 to 6 July, a warm and very moist air mass flowed into the stagnant seasonal rain front near the Tsushima Strait, causing record-heavy rain in northern Kyushu. The series of heavy rain events brought by the seasonal rain front and Typhoon No. 3 had caused significant damage by August 21 as detailed below. Heavy rain continued to fall in northern Kyushu and elsewhere even after the passage of Typhoon No. 3, leaving 38 people dead in the prefectures of Fukuoka, Oita and Hiroshima, 5 missing, 4 seriously injured and 24 slightly injured in Kyushu, Chugoku and elsewhere. The massive residential damage brought by these conditions affected 3,281 buildings, including 276 houses destroyed, 1,066 seriously damaged, 98 damaged, 199 flooded above floor level and 1,642 flooded below floor level. A total of 119 non-residential properties were also damaged. No damage to utility infrastructure (e.g., for electricity, gas and oil) was reported, but up to 3,086 houses were left without water in the prefectures of Kumamoto, Fukuoka and Oita. Telephone lines were down in Fukuoka and Oita, and mobile-phone radio signals were lost at 120 base stations in Fukuoka Prefecture. Services were quickly restored except in areas where severe damage hindered recovery work (e.g., Asakura City in Fukuoka Prefecture). Damage related to agriculture, forestry and fisheries amounted to 93.16 billion yen (84.7 billion US dollars) in Tohoku, Chubu, Chugoku, Kyushu and other areas affected by the torrential seasonal rain front and typhoon. On July 19, the event observed in northern Kyushu from July 5 to 6 was given the official name *The Heavy Rain in the Northern Area of Kyushu of July 2017*.

Typhoon No. 5 (*Noru*) passed off the coast of Kochi Prefecture on August 7 before making landfall on Wakayama Prefecture, crossing Japan's main island of Honshu and changing into an extratropical cyclone over the sea off Yamagata Prefecture at 3 a.m. on August 9. Heavy rain accompanying the landfall was recorded over wide areas including the Amami region and locations from western to eastern Japan. The typhoon had caused significant damage by August 10, leaving 2 people dead, 2 seriously injured and 49 slightly injured by August 9 across a wide region from Kagoshima Prefecture in Kyushu to Miyagi Prefecture in Tohoku. River flooding also caused residential inundation and strong winds overturned trucks and damaged roofs in the Chubu region of Honshu and elsewhere. Residential damage included 2 houses destroyed, 14 seriously damaged, 208 damaged, 48 flooded above floor level and 306 flooded below floor level. A total of 11 non-residential properties were also damaged. No damage to utility infrastructure (e.g., for electricity, gas and oil) was reported, but up to 426 houses were left without water in the prefectures of Kagoshima and Mie. Mobile-phone radio signals were lost at 116 base stations in nine prefectures from Kagoshima to Ishikawa where Typhoon No. 5 passed through or made landfall.

Typhoon No. 18 (Talim) headed northward near Miyakojima on September 13, made landfall in the vicinity of Minami Kyushu City in Kagoshima Prefecture at 11:30 a.m. on the 17th, moved north along the Japanese archipelago and changed into an extratropical cyclone above Sakhalin at 9 p.m. on the 18th. This was the first typhoon in JMA records to make landfall on all of Japan's four main islands (Hokkaido, Honshu, Shikoku and Kyushu). Very strong winds exceeding 20 meters per second were recorded over wide regions from Okinawa to Hokkaido, while speeds of up to 30 meters per second were recorded in the south-western islands and western Japan. The typhoon had caused significant damage by September 19, leaving 1 person dead, 1 missing, 4 seriously injured and 42 slightly injured in the Kyushu, Shikoku and Kinki regions. Residential damage included 2 houses destroyed, 2 seriously damaged, 195 damaged, 496 flooded above floor level and 1,015 flooded below floor level. A total of 12 non-residential properties were also damaged. No damage to utility infrastructure (e.g., for electricity, gas and oil) was reported, but up to 8,027 houses were left without water in the prefectures of Miyazaki and Oita (7,528 as of September 17). A total of 286 fixed-line phones were down in Oita Prefecture, and mobile-phone radio waves were lost at 374 base stations in 37 Prefectures where the typhoon passed through or made landfall. Damage related to agriculture, forestry and fisheries stood at 600 million yen (5.45 million US dollars) as of September 17, including destruction of crops in Okinawa Prefecture.

In response to the disasters brought by these typhoons, the government held inter-ministerial meetings and dispatched investigation teams (collectively chaired by Minister of State for Disaster Management Jun Matsumoto) to the prefectures of Oita and Fukuoka for discussions with the local governments concerned and inspection of evacuation shelters and affected areas. The government applied the Disaster Relief Act to three municipalities in Fukuoka Prefecture and two cities in Oita Prefecture, and also applied the Natural Disaster Victims Relief Law to Fukuoka Prefecture and one city in Oita Prefecture that was particularly affected. The disasters were officially classed as extremely severe on a nationwide basis, triggering special measures for subsidies to support reconstruction projects in agricultural and other areas toward early recovery.

II. Summary of Progress in Priorities supporting Key Result Areas

1. Upgrade of JMA's global numerical weather prediction (NWP) system

Main text:
In January 2017, JMA unified its Typhoon Ensemble Prediction System (TEPS) and One-week EPS (WEPS) to create the Global Ensemble Prediction System (GEPS). At the same time, GEPS was upgraded with a revision of its physical processes, a greater number of vertical layers (increased from 60 to 100) and a change in the top-level pressure from 0.1 to 0.01 hPa, along with a revision of the initial perturbation production method via the introduction of a Local Ensemble Transform Kalman Filter (LETKF) and perturbations to sea surface temperature.

In May 2017, JMA also upgraded its Global Spectral Model (GSM). Its parameterization schemes, including those for land/sea surfaces, deep convection, cloud and radiation, were revised to improve the representation of atmospheric characteristics.

The results of experiments performed to evaluate these upgrades showed a positive impact on tropical cyclone (TC) track forecasts over the western North Pacific (Figures 6 and 7). Further verification additionally showed better accuracy in TC prediction.

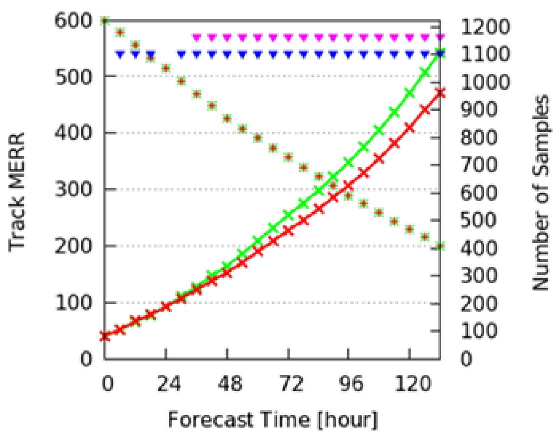


Figure 6 Average TC track forecast errors of ensemble mean forecasts for the western North Pacific as a function of forecast time up to 132 hours. The red and green lines represent positional errors for GEPS and WEPS, respectively. Red plus marks and green x-marks indicate the number of cases included in the statistics. The pink/blue triangles at the top indicate a statistically significant difference at a significance level of 0.05 with/without consideration of temporal correlation between the cases.

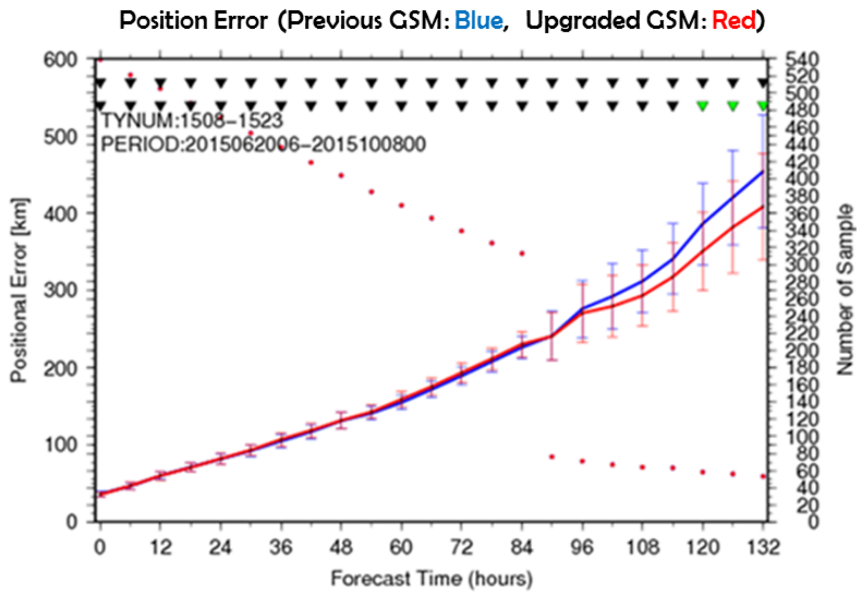


Figure 7 Average TC track forecast errors of the GSM for the western North Pacific as a function of forecast time up to 132 hours. The red and blue lines represent positional errors for the upgraded and previous GSMs, respectively, and the error bars represent a 95% confidence interval. Red dots indicate the number of cases included in the statistics. The upper/lower triangles in green at the top indicate a statistically significant difference at a significance level of 0.05 with/without consideration of temporal correlation between the cases.

Identified opportunities/challenges, if any, for further development or collaboration:

Priority Areas Addressed:

Enhance the capacity to monitor and forecast typhoon activities particularly in genesis intensity, and structure change.

Develop and enhance typhoon analysis and forecast technique from short to long term.

Promote communication among typhoon operational forecast and research communities in Typhoon Committee region.

Enhance, in cooperation with TRCG, training activities in accordance with Typhoon Committee forecast competency, knowledge sharing, and exchange of latest development and new techniques.

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2. Resizing of typhoon forecast circles

Main text:
Based on typhoon track forecast improvements made in recent years via numerical prediction model enhancement and other techniques, JMA reduced the radius of the circles in its official forecasts by 20 – 40% (depending on typhoon direction and speed) in June 2016. This change addressed the issue of over-dispersiveness in warning areas.

Forecast circles are sized to contain forecast tracks with a probability of about 70%. Based on forecast results from 2011 – 2015, their size was reviewed for all forecast times (3, 6, 9, 12, 15, 18, 21, 24, 48, 72, 96 and 120 hours). More than one size is defined for all times depending on typhoon speed and direction, and those for 96 and 120 hours have even more depending on forecast reliability based on the results of ensemble forecasting for each typhoon. Changes in forecast circle size for typhoons with two directions are shown in Figure 8.

In June 2017, the sizes of forecast circles for 96 and 120 hours were reviewed based on the latest forecast results from JMA's new Global Ensemble Prediction System (GEPS), which was introduced in January 2017 to replace the Typhoon Ensemble Prediction System (TEPS) and One-week EPS (WEPS).

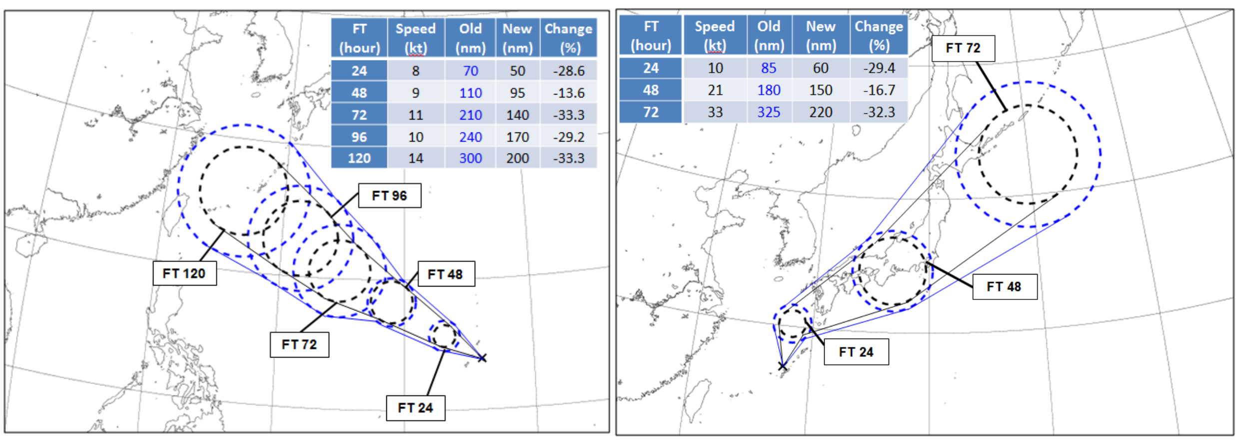

Figure 8 (Left) changes in forecast circle size with northwestward movement; blue: previous; black: new. The figure shows forecasts for T1509 (Chan-hom) with an initial time of 18 UTC on 4 July 2015. (Right) changes in forecast circle size with northeastward movement; blue: previous; black: new. The figure shows forecasts for T1419 (Vongfong) with an initial time of 18 UTC on 11 October 2014.

Identified opportunities/challenges, if any, for further development or collaboration:
JMA will continue to improve forecast circles based on statistical analysis of forecast results.

Priority Areas Addressed:
Enhance the capacity to monitor and forecast typhoon activities particularly in genesis intensity, and structure change.
Develop and enhance typhoon analysis and forecast technique from short to long term.

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3. New decision-making support products: Expected Warnings and Advisories, Probability of Warnings and real-time landslide, inundation and flood risk maps

Main text:
JMA began providing new decision-making support products related to meteorological warnings (called *Expected Warnings and Advisories,* and *Probability of Warnings*; (https://www.jma.go.jp/en/warn/f_1310100.html (example for Chiyoda-ku, Tokyo)) in May 2017 as part of a project to improve risk-based warnings in response to the localization, concentration and intensification of heavy-rain phenomena associated with tropical cyclones and other events. The products were developed in line with recommendations from the Meteorological Service Subcommittee of the Advisory Council for Land and Transport Policy to 1) proactively convey the risk (regardless of likelihood) of hazardous phenomena with significant social impact, and 2) develop information formats that highlight the risks of such phenomena and related urgency.

Expected Warnings and Advisories are provided in a colored table indicating three-hour time windows when advisories (yellow) and warnings (red) are expected. For gales, high waves and storm surge warnings, expected wind speeds and directions, wave heights and tide levels are also shown.

Probability of Warnings shows the risk of warning-level phenomena with the categories of *high* and *middle*, specifying the phenomenon and time frame in an alert with a 6-hour window from the current time to the next day and a 24-hour window from the next day to five days ahead.

These products are expected to alert people to forecast hazardous phenomena at a glance and provide time for appropriate action. Examples are given in Figure 9.

Identified opportunities/challenges, if any, for further development or collaboration:
Positive feedback has been received from local governments in the demonstration phase. JMA will continue its efforts to verify the validity of the products and improve their effectiveness/delivery.

Priority Areas Addressed:
Strengthen the cooperation with WGH and WGDRR to develop impact-based forecast and risk-based warning.

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Updated at 13:08 JST, 27 September 2017
Expected Warnings, Advisories

Rishiri-fuji-cho:[Announcement]
Flood, Heavy rain
[Continuation]
Thunderstorm, Gale, High waves

Rishiri-fuji-cho			Phenomenon development (Warnings Advisories)									Remarks
Current Warnings and Advisories			27 Wed				28 Thu					
			12-15	15-18	18-21	21-24	0-3	3-6	6-9	9-12	12-15	
Heavy rain	(Ground-loosening)											Ground-loosening
Flood	(Flood)											Flooding
Gale	Wind direction/speed (arrows/m/s)	Land	13	13								
		Sea	15	15								
High waves	Wave height (m)		3	3								
Thunderstorm												Flurries,Hail

Advisories with a high probability of Warnings

Updated at 11:00 JST, 27 September 2017
Probability of warnings (Hokkaido Soya Chiho)

Hokkaido Soya Chiho	Probability of warnings						
Target	27 Wed	28 Thu		29 Fri	30 Sat	1 Sun	2 Mon
	12-18	18-6	6-24				
Heavy rain	[Mid]	-	-	-	-	-	-
Heavy snow	-	-	-	-	-	-	-
Snow Storm	-	-	-	-	-	-	-
High waves	-	-	-	-	-	-	-

[High]:A warning is currently in effect, or phenomena with levels of intensity exceeding the warning criteria are expected.
[Mid]:Phenomena may have levels of intensity exceeding the warning criteria.

Figure 9 Expected warnings/advisories and probability of warnings for Rishiri-fuji-cho in Hokkaido's Soya Chiho area on 27 September 2017

4. New decision-making support products: real-time risk maps

Main text:
To supplement the above warning-related products (in particular, Landslide Alert Information, Heavy Rain (landslide), Heavy Rain (inundation) and Flood advisories/warnings), JMA began to provide three types of real-time risk maps for landslides, inundation and flooding in May 2017.

The maps provide information on such risks with a standardized color code of violet (extreme risk), light violet (high risk), orange (warning) and yellow (caution). The map for floods shows rivers with the same color code.

JMA sets warning criteria using its own indices (soil water index, surface water index and run-off index for landslides, inundation and flooding) to quantify the risk of water-related hazards in consideration of hydrological processes and observed/forecast precipitation. Risk levels represent the proximity of observed/forecast index values to pre-determined warning criteria.

Identified opportunities/challenges, if any, for further development or collaboration:
Risk maps were used during the approach of T1718 (Talim). Below are three for 19 JST (Japan Standard Time) on 17 September 2017 with current precipitation analysis based on quantitative estimation.

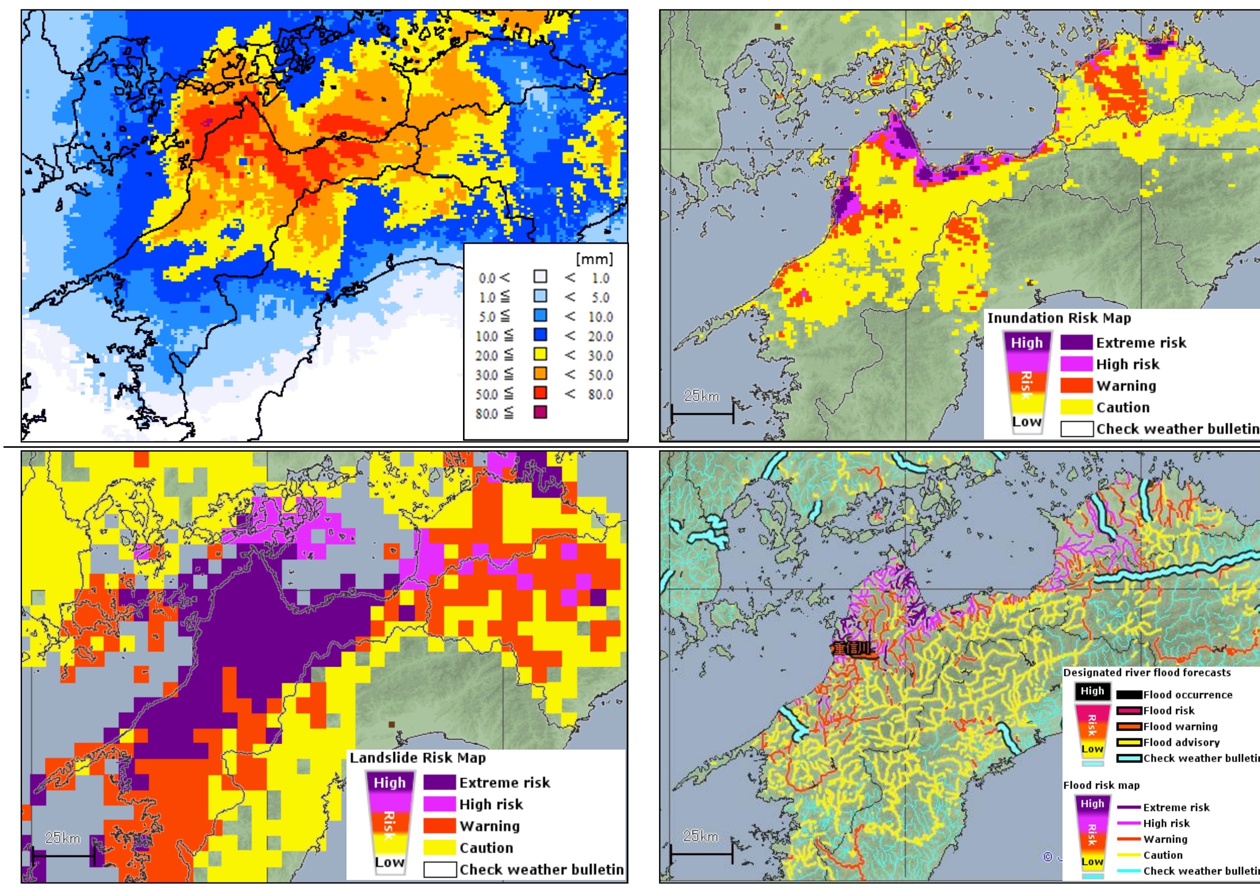

Figure 10 Precipitation analysis (top left) and risk maps for inundation (top right), landslides (bottom left) and flooding (bottom right) at 19 JST (Japan Standard Time) on 17 September 2017

Priority Areas Addressed:
Strengthen the cooperation with WGH and WGDRR to develop impact-based forecast and risk-based warning.

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5. New products on the RSMC Tokyo-Typhoon Center Numerical Typhoon Prediction Website

Main Text:
Since October 2004, RSMC Tokyo has operated the Numerical Typhoon Prediction (NTP) website (https://tynwp-web.kishou.go.jp/) as part of its contribution to the WMO/ESCAP Typhoon Committee. On 30 March 2017, the products detailed below were added.

1) New stations of Cambodia and Singapore for Storm Surge Time Series Charts
2) Vorticity at 850 hPa and wind field divergence at 200 hPa as used to identify lower-layer winds that could develop into tropical cyclones and upper-layer areas with divergence

In addition, chart areas showing stream line content at 850 and 200 hPa, vertical wind shear, sea surface temperature (SST) and tropical cyclone heat potential (TCHP) were expanded to cover all Typhoon Committee Member areas.

Identified opportunities/challenges, if any, for further development or collaboration:
Continuous improvement of the NTP website is considered beneficial to Members. Accordingly, Member feedback should be solicited for site enhancement and development.

Priority Areas Addressed:
Enhance the capacity to monitor and forecast typhoon activities particularly in genesis intensity, and structure change.
Develop and enhance typhoon analysis and forecast technique from short to long term.

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6. Collaborative Activity for Enhancing Satellite Product Utilization

Main Text:

JMA organized a two-week hands-on training course to enhance satellite product utilization with the Malaysian Meteorological Department (MMD), hosting two experts from MMD at its Meteorological Satellite Center (MSC) from 13 to 24 March 2017.

MSC produces Convective Cloud Information (CCI) using Himawari-8 rapid-scan observation data for the Japan area. CCI includes the Rapidly Developing Cumulus Area (RDCA) product utilized to monitor convective activity for air traffic safety in Japan and elsewhere. MSC has also developed a new CCI extended to encompass Asia and the Western Pacific based on Full-Disk observation data. This domain-extended product is expected to support the early detection of severe weather in these regions.

During the course, MSC experts gave an introduction to CCI and provided the MMD experts with RDCA information including:

1. RDCA detection using a statistical model;
2. Adjustment of statistical model parameters using ground-based lightning data
3. RDCA validation using lightning data

The MMD experts also learned how to install the RDCA program and optimize the parameters for their country. Staff from both organizations additionally discussed the operational use of satellite data and products at MMD.

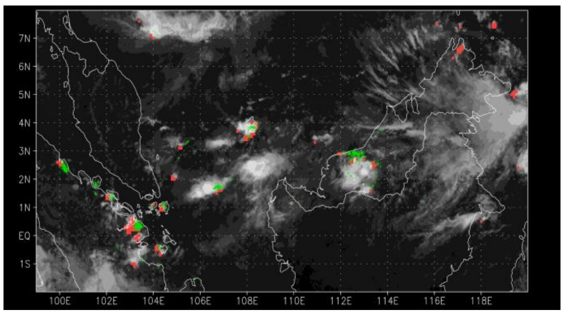
MMD and JMA will continue to work toward the operationalization of the RDCA product in Malaysia.

Identified opportunities/challenges, if any, for further development or collaboration:

Optimization of the RDCA product, which is derived from a statistical model, is expected to enhance its quality and utilization in individual countries. Accordingly, JMA plans to expand such collaborative activities to include other Typhoon Committee Members.

MMD experts, and MSC experts and executives

MMD presentations



MMD's RDCA product for Malaysia, 04:00 UTC on 21 September 2015. Green marks show observed lightning and red marks show rapidly developing cumulus areas.

Priority Areas Addressed:

Promote communication among typhoon operational forecast and research communities in Typhoon Committee region.

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7. TCC products and publications related to tropical cyclones

Main text:
The Tokyo Climate Center (TCC) issues weekly reports on extreme climate events around the world, including extremely heavy precipitation and/or weather-related disasters caused by tropical cyclones (http://ds.data.jma.go.jp/gmd/tcc/tcc/products/climate/).

The Center also issues a quarterly newsletter called TCC News via its website, covering various climate-related areas including the El Niño outlook, JMA's seasonal numerical prediction for the coming summer/winter, summaries of Asian summer/winter monsoons, reports on extreme climate events around the world, and introductions to new TCC services. The next issue, TCC News No. 50 (to be published in December), will include a summary of the 2017 western North Pacific typhoon season (http://ds.data.jma.go.jp/tcc/tcc/news/).

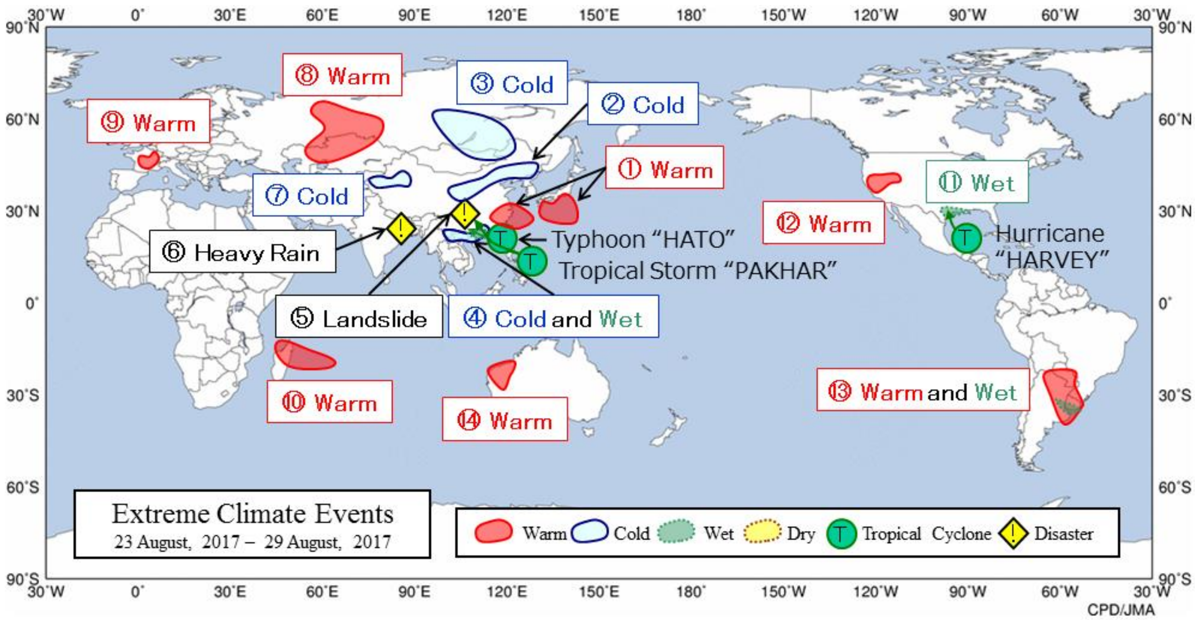

Figure 11 Distribution of global extreme climate events (23 – 29 August, 2017)
The figure highlights areas where extreme climate events were identified from SYNOP messages, and also shows the tracks of tropical cyclones based on preliminary data from tropical cyclone centers worldwide.

Identified opportunities/challenges, if any, for further development or collaboration:

Priority Areas Addressed:
Enhance capacity to monitor mortality and direct economic loss caused by typhoon-related disasters

Contact Information:

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JMA's Climate Change Monitoring Report

JMA describes inter-annual variability and long-term trends regarding typhoon activity in its Climate Change Monitoring Report every year. The report is distributed to the Japanese public and to NMHSs via the Tokyo Climate Center website (http://www.jma.go.jp/jma/en/NMHS/indexe_ccmr.html).

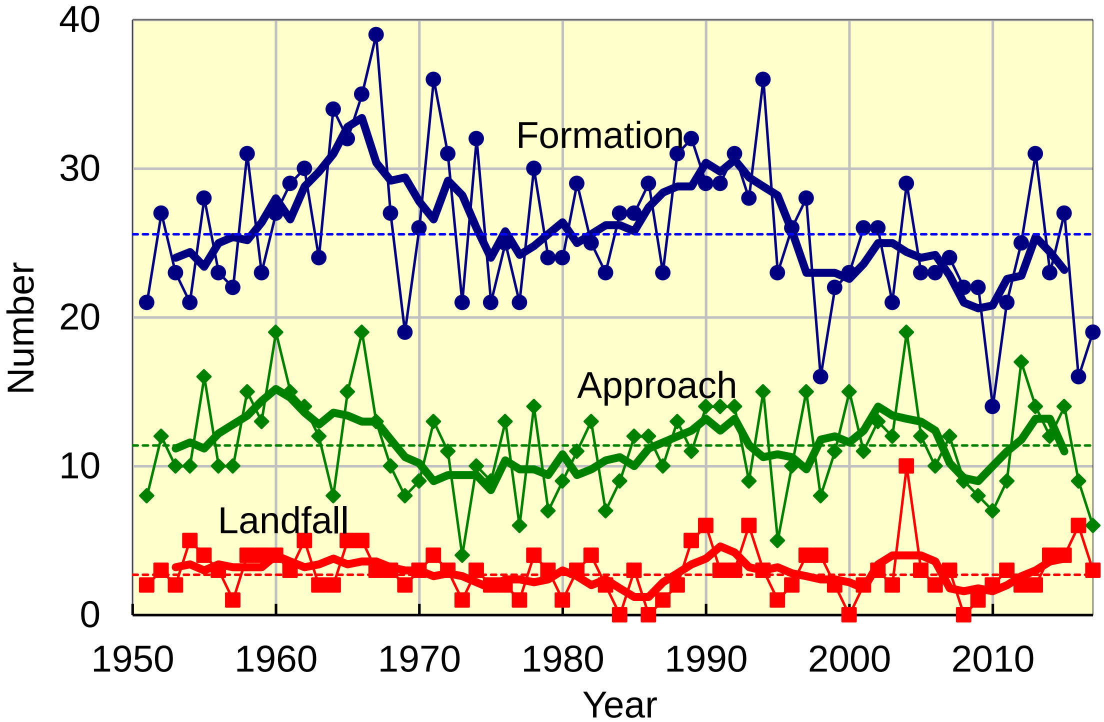

Figure 12 Numbers of tropical cyclones (TS intensity or higher) forming in the western North Pacific (top), those approaching Japan (middle) and those making landfall on Japan (bottom) as of 18 September, 2017. The thin, thick and dashed lines represent annual values, five-year running means and normal values (1981 – 2010 averages), respectively.

8. The Third UN Special Thematic Session on Water and Disasters

Main text:
Rationale and objectives
During the past decade, climate and water-related disasters have not only struck more frequently but have also been more severe. Over 90% of disasters in the world are water-related in terms of number of affected people. Disaster risk levels are driven by factors such as climate variability, poverty, poor land-use planning and management, as well as ecosystem degradation, and are increasing as more people and assets are located in areas of high risk.

The economic loss risk associated with water-related disasters such as floods and tropical cyclones is increasing in all regions, and the poor are suffering the most. The recent mega-water disasters have demonstrated that the issue of water and disasters is no longer a local issue, but is a global one, and cooperation and solidarity among nations is the only rational way forward.

The issue of "Water and Disasters" must be addressed with firm determination and without delay if we hope to make sustainable development a reality. It is high time to accelerate our efforts to share our experiences and lessons learned, strengthen regional coordination and collaboration, set common goals and targets in order to lay a foundation for weathering the water-related disasters to come, and make progress towards creating a better-prepared and resilient society.

Date: Thursday, July 20, 2017
Place: Conference Room 4, The UN Headquarters, New York
Organizers
・UN Secretary-Generals' Special Envoy on Disaster Risk Reduction and Water
・High-level Experts and Leaders Panel on Water and Disasters (HELP)
Co-organizer
・UN-WB High Level Panel on Water (HLPW)

Opening Plenary
Opening Remarks, Dr. Han Seung-Soo, the Special Envoy of the Secretary-General on Disaster Risk Reduction and Water; Former Prime Minister of the Republic of Korea and Chair of the High-level Experts and Leaders Panel on Water and Disasters (HELP)
Opening Remarks, H.E. Mr. Peter Thomson, President of the 71st Session of the United Nations General Assembly

Keynote Speeches
Keynote Speech by H.E. Dr. János Áder, President, Hungary
Keynote Speech by H.E. Dr. Ameenah Gurib-Fakim, President, the Republic of Mauritius
Keynote Speech by H.E. Mr. Henry Van Thio, Vice President of the Republic of the Union of Myanmar
Keynote Speech by H.E. Mr. Toshihiro Nikai, Secretary General of Liberal Democratic Party, Japan, representative of Prime Minister

Keynote Lecture through Video
Keynote Lecture through Video by His Imperial Highness Crown Prince Naruhito of Japan

Closing
Remarks, Mr. Wu Hongbo, United Nations Under-Secretary-General for Economic and Social Affairs
Closing by Dr. Han Seung-soo

Keynote lecture by His Imperial Highness Crown Prince of Japan

Keynote speech by Mr. Nikai, the secretary general of LDP, Japan

Speech by Mr. Mori, the vice minister for Engineering Affairs

Conference room for the session

9. International Flood Initiatives

Main text:
The International Flood Initiatives (IFI) is a joint initiative organized by UNESCO (IHP), WMO, UN-ISDR, and UNU in collaboration with other international organizations such as IAHS, IAHR, and ICHARM. IFI was officially launched in January 2005 at the second World Conference of Disaster Reduction (WCDR) in Kobe, Japan.

ICHARM has been serving as the IFI Secretariat, providing various types of support such as maintaining the IFI website (http://www.ifi-home.info/) and promoting information networking among IFI-related and other organizations.

The overall aim of IFI is to build capacity in countries to understand and better respond to floods by taking advantage of their benefits while at the same time minimizing their social, economic and environmental risks.

In October 2016, the Jakarta Statement was adopted by the organizations participating in IFI to establish interdisciplinary cooperation for further promoting flood risk reduction and sustainable development. Based on this agreement, IFI, while keeping close ties with countries and other organizations, will proceed with activities to implement integrated flood management by incrementally moving from "Phase 1: Demonstration,", to "Phase 2: Prototyping," and finally to "Phase 3: Operation."

Now IFI is formulating a "Platform on Water and Disasters" in the Philippines, Sri Lanka, Pakistan, and Myanmar and promoting it to other countries to achieve the purpose of the Jakarta Statement.

Recent representative activities are:
-Global-
1. IFI Side Event to the 8th Meeting of the High-Level Experts and Leaders Panel on Water and Disaster (HELP), Jakarta, Indonesia, October 31, 2016
2. Special Session on Science and Technology in the 3rd UN Special Thematic Session on Water and Disasters, New York, United State, July 20, 2017
3. IFI Special Session in the Seventh International Conference of Flood Management (ICFM7), Leeds, UK, September 7, 2017

-Asia-
4. IFI Side Event to the 9th GEOSS Asia-Pacific Symposium, Tokyo, Japan, January 10, 2017
5. AWCI Session in 10th GEOSS-AP, Hanoi, Vietnam, September 19, 2017

-National-
6. IFI Platform Meeting in Pakistan, Islamabad, Pakistan, March 2-3, 2017
7. High Level Consultation Meeting on IFI Coordination in Myanmar, Nay Pyi Daw, May 9, 2017
8. IFI Platform Meeting in the Philippines, Manila, Philippine, July 15, 2017
9. IFI Platform Meeting in Sri Lanka, Colombo, Sri Lanka, August 24, 2017

IFI Side Event of the 8th Meeting of the High-Level Experts and Leaders Panel on Water and Disaster (HELP), Jakarta, Indonesia, October 31, 2016

IFI Side Event of the 9th GEOSS Asia-Pacific Symposium, Tokyo, Japan, January 10, 2017

High Level Consultation Meeting on IFI Coordination in Myanmar, Nay Pyi Daw, May 9, 2017

Identified opportunities/challenges, if any, for further development or collaboration:
It would be expected the WGH AOPs collaborate with IFI's activities.

Priority Areas Addressed:
Improve typhoon-related flood (including river flood, urban flood, mountainous flood and storm surge, etc.) monitoring date collection, quality control, transmission and processing

Enhance capacity in flood risk (hazard, inundation) information, mapping and its application

Enhance capacity in advanced technology (including satellite data, GIS, RS, QPE/QPF, ensemble, parallel computing) utilization in typhoon-related flood forecasting and early warning, and hydrological modeling

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10. Urban Search-and-Rescue Training in Singapore as an ADRC activity for disaster reduction

Main text:
The Singaporean Government holds a training course every year for search and rescue officers. The course has hosted trainees from outside Singapore for the past ten years and provided training on the search-and-rescue expertise required in urban disaster situations. The training facility complex of the Civil Defense Academy (CDA) run by the Singapore Civil Defense Force (SCDF) is one of the highest-level facilities of its kind in Asia. In an effort to utilize its expertise and facilities, the ADRC has been welcoming relevant officers from member countries to the training course since 2001. As of March 2017, 54 people had undergone the training. One officer from Cambodia is attending the October 2017 course.

Attendees over the past 5 years
FY 2011 (2): Bangladesh, Russia
FY 2012 (2): Mongolia, Thailand
FY 2014 (2): Bhutan, Maldives *
FY 2015 (1): Azerbaijan
FY 2016 (1): Mongolia

Urban Search-and-Rescue Training in Singapore (2016)

** The FY 2013 event was postponed to April 2014 due to an attendee selection delay.*

11. Asian Conference on Disaster Reduction (ACDR) 2017

Main text:
The Asian Disaster Reduction Center (ADRC) annual international conference is attended by disaster risk management officials from member countries and disaster experts from international organizations to promote sharing of information and ideas, and to enhance partnerships among participating countries and organizations.
The Asian Conference on Disaster Reduction (ACDR) 2017 was held in Baku, Azerbaijan, on 2 and 3 October 2017. The event was organized jointly by the Government of Azerbaijan, the Government of Japan and ADRC, and was attended by 58 people including high-level government officials from 18 countries as well as representatives of international and regional organizations, the academic community and the private sector.
The key areas addressed were:

1. Implementation of SFDRR
2. Effective emergency response for survival in mega disasters
3. Advanced technology facilitating DRR and CCA

ACDR2017 began with opening remarks from Dr. Masanori Hamda (ADRC Chairman), which were followed by words from Kamaladdin Hydrae (Minister of Emergency Situations of Azerbaijan), Mamoru Maekawa (Vice-Minister for Policy Coordination of the Cabinet Office of Japan) and Timothy Wilcox (UNISDR Regional Office for Asia and the Pacific). A special report titled “The Policy of Risk Reduction and Emergency Response for the Last 10 Years in Azerbaijan” was delivered by Jalil Gullied (Head, Organization of Rescue Work Department, Ministry of Emergency Situations of Azerbaijan).

ACDR 2017 attendees

12. Visiting Researchers from ADRC Member Countries

Main text:
The Asian Disaster Reduction Center (ADRC) has hosted Visiting Researchers (VRs) from member countries since 1999. To date, 102 officials from 26 member countries have taken part in this program.

The Visiting Researcher Program is intended to strengthen VRs' capacity for disaster risk reduction (DRR) in their countries and to further promote collaboration between these countries and ADRC. After finishing the program, attendees are expected to help develop and improve disaster reduction capacity in their home nations.

During the program, VRs learn about DRR and related technology from Japan and member countries through exchanges with DRR experts and the use of facilities.

FY	Organization	Country
2017	Survey for Seismic Protection Agency	Armenia
	District Administration	Bhutan
	Office of Civil Defense	Philippines
	National Disaster Management Authority	Iran
	Department of Disaster Prevention and Mitigation	Thailand
	Disaster Management Center	Vietnam