

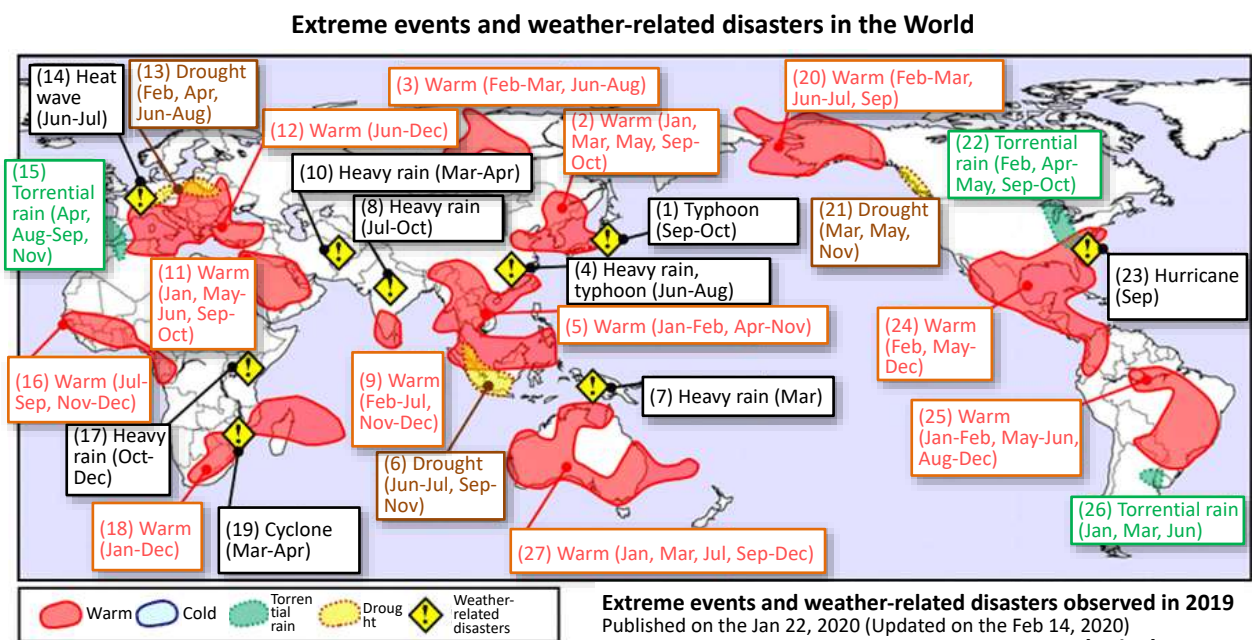
Special Feature

Catastrophic and Frequent Torrential Rain

In recent years, the world has been struck by frequent meteorological disasters. Even in 2019, torrential rain hit worldwide and caused major damage. From July to October 2019 meanwhile, heavy rain centered on India caused a major disaster and claimed 2,300 or more lives. The total precipitation in August and September 2019 for India was the highest since 1983 and ended up as record-breaking heavy rainfall. Even in Japan, starting from the July 2017 Northern Kyushu Torrential Rain and the Heavy Rain Event of July 2018, recent torrential rain caused major damage. Even in 2019, torrential rain, including disasters caused by Typhoons Hagibis in 2019, left major damage.

The yearly average temperature in 2019 was higher than normal over much of the world and extreme high temperatures occurred throughout, including the north-eastern portion of East Asia. Even in Japan, high temperatures continued nationwide and the yearly average was the highest ever recorded since records began in 1898. While as a general rule, extreme weather is a phenomenon which is very different from the phenomena experienced in the past and something rarely experienced, it is pointed out that extreme weather may proliferate worldwide due to climate change such as global warming.

For this purpose, the “Special Feature” of the 2020 White Paper on Disaster Management covers catastrophic and frequent torrential rain. Chapter 1, Section 1 reviews the damage and response measures taken by the government for incidents having caused particularly extensive damage among a series of major disasters that occurred in 2019, including the Heavy Rain Event of August 2019 related to the rain front and Faxai and Hagibis typhoons in 2019. Chapter 1, Section 2 outlines the expansion of targets of the Disaster Relief Act and the support package for affected people as measures based on response to these disasters. Chapter 2 outlines the steps being taken by the government and preparedness measures to be implemented in future on review and measures on typhoons Faxai and Hagibis in 2019 etc. (Chapter2 Section 1) and Evacuation measures for residents (Chapter2 Section 2). Chapter 3 outlines collaborative measures between climate action and disaster risk reduction.



Source: Japan Meteorological Agency website

(Reference: <https://www.data.jma.go.jp/gmd/cpd/monitor/annual/index.html>)

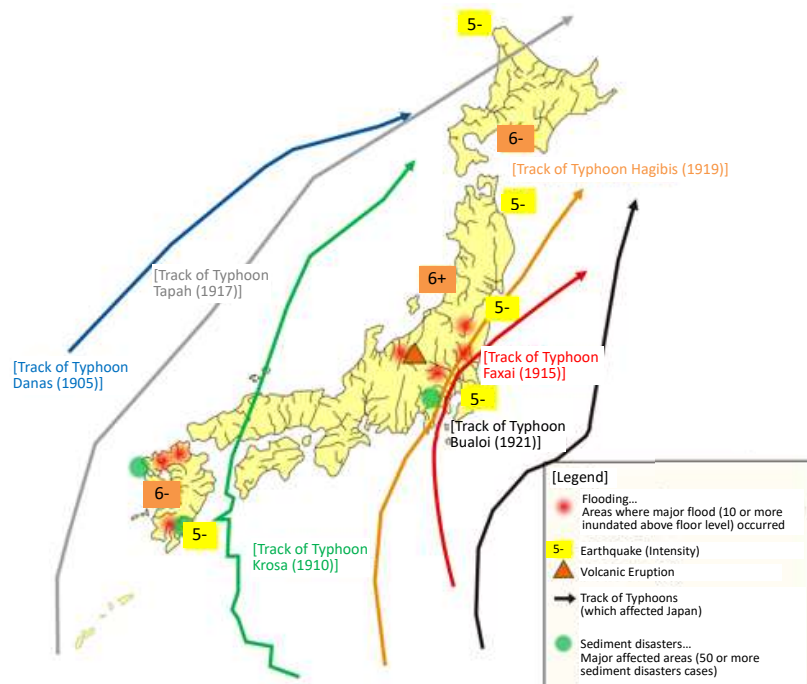
Chapter 1 Disasters in 2019

Section 1 Major disasters occurred in 2019

As Japan is prone to various types of disasters given its natural conditions, floods, sediment disasters, earthquakes and tsunamis occur annually. In the Heisei era, major disasters having occurred include the Great East Japan Earthquake, which remains fresh in the memory, the Kumamoto Earthquake and the Heavy Rain Event of July 2018. On May 1, 2019, the new Reiwa era started. In 2019, consecutive flood and sediment disasters occurred caused by the Earthquake centered offshore of Yamagata Prefecture in June (See Appendix 14-1 (A-32)), the Heavy Rain Event from the end of June, which mainly affected Kagoshima Prefecture, the Heavy Rain Event of August 2019 related to the rain front and Typhoons Danas (1905), Krosa (1910), Faxai (1915) and Tapah (1917). In particular, Typhoons Hagibis (1919) and Bualoi (1921) caused widespread damage.

Among these consecutive typhoons, Typhoons Faxai (1915) and Hagibis (1919) were natural phenomena which caused disasters impossible to ignore and were cited by the Japan Meteorological Agency to hand their experiences and lessons learnt on to the next generation.

Major disasters occurred in 2019



Source: Report of Water-Related Disaster in 2019 (Ministry of Land, Infrastructure, Transport and Tourism, Japan)

Torrential rains which cause flood and sediment disasters have certain attributes, which govern the frequency and intensity of such downpours (See Special Feature Section 1, 1-3, Page 12). These rainfall features are changing in the longer term.

Observations by the Japan Meteorological Agency have shown that the number of days on which heavy rain exceeding 200mm was recorded in our country has increased since chronological statistics were first compiled in 1901. When data for the most recent 30-year period and the 30-year period from the time statistics were first compiled are compared, the figure has increased around 1.6 fold. According to the

observation data of AMeDAS which has about 1,300 observation points across Japan, the frequency of such short-duration heavy rain exceeding 50mm per hour has increased since the time statistics were first compiled in 1976. When data for the most recent decade and the decade from the time statistics were first compiled are compared, the figure has increased around 1.4 fold (based on 1,300 or so nationwide observation points).

In addition to natural fluctuation, global warming is thought to be linked to variation in rainfall. According to calculations by the Japan Meteorological Agency, if greenhouse gas emissions continue at a high level, the number of days recording heavy rain exceeding 200mm and the frequency of short-duration heavy rains exceeding 50mm per hour will both double or more by the end of this century compared with the 20th century as a national average.

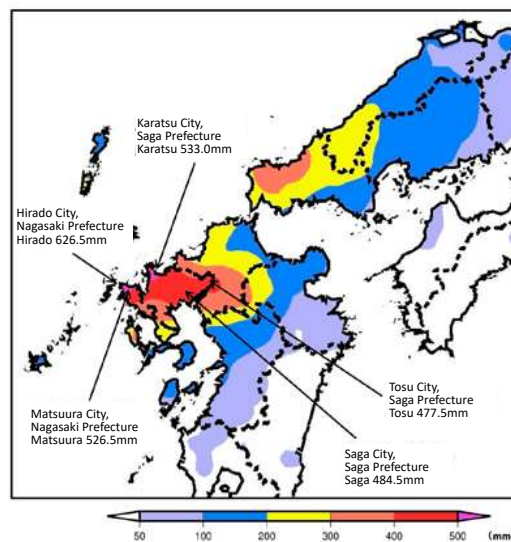
1-1 The Heavy Rain Event of August 2019 related to the rain front

(1) Overview

The rain front having moved from Central China up through southern Kyushu and up to southern Japan from August 26, 2019 then further moved east in Japan from around Tsushima Straits on August 27 and stalled until August 29. Because warm and very moist air kept flowing to this rain front, a series of rain clouds developed from the East China Sea to the northern Kyushu Region and line-shaped precipitation systems were formed and maintained.

This caused heavy rain centered on Northern Kyushu region. For example, the total precipitation from August 26 to August 29 exceeded 600mm in Hirado City, Nagasaki Prefecture.

Precipitation distribution during the event (between 00:00 on August 26 and 24:00 on August 29)

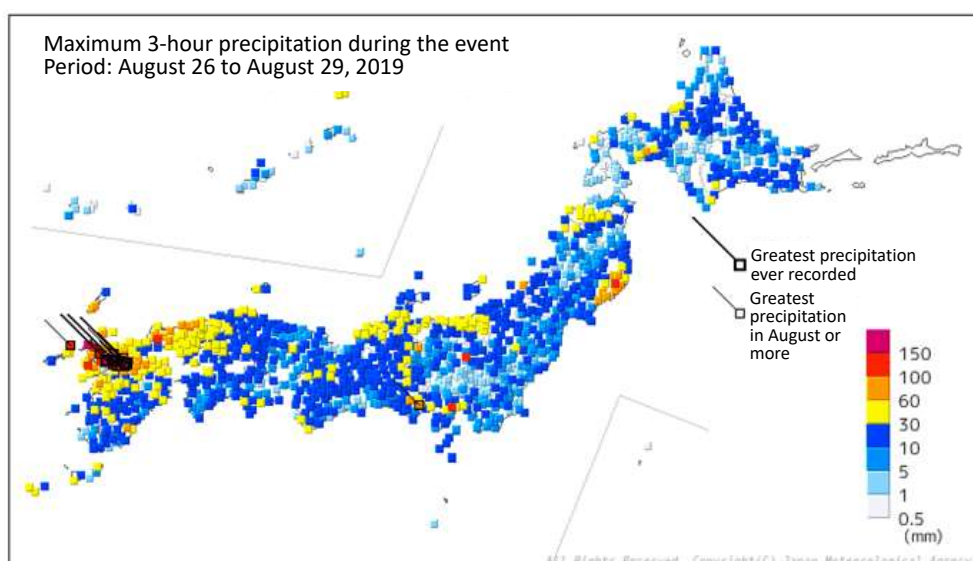


Source: Japan Meteorological Agency website

(Reference: <https://www.data.jma.go.jp/obd/stats/data/bosai/report/2019/20190826/20190826.html>)

Fukuoka and Saga Prefectures experienced record 3- and 6-hour precipitation levels as well as record-breaking heavy rains.

**Distribution of the maximum 3-hour precipitation during the event
(between 00:00 on August 26 and 24:00 on August 29)**



Source: Japan Meteorological Agency website

(Reference: <https://www.data.jma.go.jp/obd/stats/data/bosai/report/2019/20190826/20190826.html>)

(2) Damage

The Heavy Rain Event of August 2019 related to the rain front caused river flooding, inundation, and sediment and other disasters, which left 4 people dead (1 in Fukuoka Prefecture and 3 in Saga Prefecture) and 2 people seriously or lightly injured. (Information by the Fire and Disaster Management Agency, as of December 10, 2019. Reference: <https://www.fdma.go.jp/disaster/info/items/8gatu27ooame-30.pdf>)

Human casualties (as of December 10, 2019)

Prefecture	Fatality	Missing persons	Seriously injured	Lightly injured
Fukuoka	1			1
Saga	3		1	
Total	4	0	1	1

Source: Cabinet Office

Damage to houses included 95 completely destroyed, 936 half-destroyed and partially damaged and 5,656 inundated above and below floor level. (Information by the Fire and Disaster Management Agency, as of December 10, 2019. Reference: <https://www.fdma.go.jp/disaster/info/items/8gatu27ooame-30.pdf>)

Houses damaged (as of December 10, 2019)

Prefecture	Completely destroyed	Half-destroyed	Partially damaged	Above-floor flooding	Below-floor flooding
Fukuoka	6	24	26	120	349
Saga	87	858	24	760	4,301
Nagasaki			2	20	66
Others	2		2	5	35
Total	95	882	54	905	4,751

Source: Cabinet Office

This heavy rain damaged to lifeline utilities such as power and water outages and created a traffic hazard such as suspension of rail operations which caused big obstacles on residents' livings and the agriculture, forestry and fishing industries. Regarding shelters, evacuation instructions (emergency) and recommendations were issued in many municipalities of northern Kyushu Regions, to which a maximum of approximately 5,400 people evacuated (Information by the Fire and Disaster Management Agency, as of August 28, 2019.)

Moreover, this heavy rain caused quenching oils from the iron factory to spill (Saga Prefecture, Oomachi Cho), whereupon they were scattered widely into the Rokkaku River basin which damaged houses. In addition, innumerable floating objects hindering the safe navigation of sailing ships were found in the Ariake Sea.

Damage of the Heavy Rain Event of August 2019 related to the rain front



Inundation in Saga Prefecture (Oomachi Cho)
(spillage of quenching oils)
(Source: Ministry of Land, Infrastructure, Transport and Tourism)



Inundation in Saga Prefecture (Tekeo City)
(Source: Cabinet Office)



Damage to houses in Saga Prefecture (Takeo City)
(Source: Cabinet Office)



Damage to the agricultural industry in Saga Prefecture
(Oomachi Cho) (spillage of quenching oils)
(Source: Cabinet Office)

(3) Response of Government Ministries and Agencies

On August 28, 2019, the government established the Emergency Response Office in the Prime Minister's Office on the Heavy Rain Event of August 2019 related to the rain front. Immediately after the disaster, under the direction of Mr. Abe, Prime Minister, through Cabinet Meetings, the government took emergency disaster management measures in collaboration with affected local governments such as supporting their emergency disaster management measures. On August 31, 2019, a governmental investigation team led by Mr. Yamamoto, then Minister of State for Disaster Management, was deployed to Saga Prefecture and on September 24, Mr. Takeda, Minister of State for Disaster Management, visited some of the affected areas, Takeo City and Oomachi Cho, Saga Prefecture.

In the affected areas, the SDF, etc. conducted life support activities and responded to the oil spill from the iron factory (by setting up of oil fence and setting up and collecting oil absorption mats, etc.). The Ministry of Land, Infrastructure, Transport and Tourism responded to inundation along the Rokkaku River (by pumping with a pumping car) and oil spill in the Ariake Sea (the agitation, etc. by an Ocean Environment Maintenance Ship, etc.) and collected floating objects.

On September 6 and 20, it was announced that this disaster could be designated as a Disaster of Extreme Severity as a series of major disasters caused by rain storms and heavy seasonal rain from August 13-September 24, 2019, including Typhoons Krosa (1910), Liwayway (1913), Faxai (1915) and Tapah (1917). On October 11, the Cabinet issued a Cabinet Order to collectively designate said set of disasters as a Disaster of Extreme Severity. (See Appendix 14-2 “The Heavy Rain Event of August 2019 related to the rain front” (A-32 to 33).)



Mr. Yamamoto, then Minister of State
for Disaster Management visiting the affected areas



Mr. Takeda, the Minister of State
for Disaster Management visiting the affected areas

1-2 Disaster caused by Typhoon Faxai (1915)

(1) Overview

Typhoon Faxai (1915) moved northern from Ogasawara inshore to an area around the Izu Island Chain from September 7 to 8. Before 3 on September 9, it passed Miura Peninsula and proceeded to Tokyo Bay and before 5 on September 3 it made landfall at Chiba City with very strong typhoon intensity. The same morning, it crossed over Ibaraki offshore while moving northeastward over the East Sea. During the approach and passage of the typhoon, very intense winds and rainfalls hit the Izu Island Chain and southern Kanto Regions.

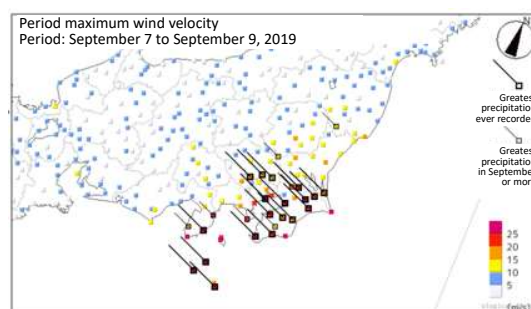
The winds were particularly intense in certain areas. For example, at six points of the Izu Island Chain and Kanto Region South, the wind velocity observed peaked at 30 or more meters a second, while at three points of the Izu Island Chain and Kanto Region South, the momentary wind velocity observed peaked at 50 or more meters a second. Moreover, 19 AMeDAS stations registered record-breaking maximum wind velocities centered in Kanto Regions, including Chiba City (maximum wind velocity: 35.9 m/s; maximum momentary wind velocity: 57.5 m/s) (registered record-breaking).

Top five AMeDAS stations registering the highest maximum
momentary wind velocity
(from 0:00 on September 7 to 24:00 on September 9)

Prefecture	Municipality	AMeDAS station	Wind velocity	Observation time
Tokyo	Kozushima Island Village	Kozushima	58.1	21:03 on 8th
Chiba	Chuo Ward, Chiba City	Chiba	57.5	04:28 on 9th
Tokyo	Niiijima Island Village	Niiijima	52.0	23:38 on 8th
Chiba	Kisarazu City	Kisarazu	49.0	02:48 on 9th
Chiba	Tateyama City	Tateyama	48.8	02:31 on 9th

Source: Japan Meteorological Agency

Period maximum wind velocity
(from 0:00 on September 7 to 24:00 on September 9)



(2) Damage

The heavy rain and windstorms caused by Typhoon Faxai left 3 people dead (2 in Chiba Prefecture and 1 in Tokyo), 13 people seriously injured and 137 lightly injured.

(Information by the Fire and Disaster Management Agency, as of December 23, 2019.

Reference: <https://www.fdma.go.jp/disaster/info/items/taihuu15gou40.pdf>)

Human casualties (as of December 23, 2019)

Prefecture	Fatality	Missing persons	Seriously injured	Lightly injured
Chiba	2		8	74
Tokyo	1			6
Others			5	57
Total	3	0	13	137

Source: Cabinet Office

Damage to houses included 391 completely destroyed, 76,483 half-destroyed and partially damaged and 230 inundated above and below floor level. (Information by the Fire and Disaster Management Agency, as of December 23, 2019. Reference: <https://www.fdma.go.jp/disaster/info/items/taihuu15gou40.pdf>)

Houses damaged (as of December 23, 2019)

Prefecture	Completely destroyed	Half-destroyed	Partially damaged	Above-floor flooding	Below-floor flooding
Chiba	363	3,929	62,986	34	57
Tokyo	12	68	1,425	13	11
Others	16	207	7,868	74	41
Total	391	4,204	72,279	121	109

Source: Cabinet Office

Damage to lifeline utilities by this record-breaking typhoon included the iron towers carrying electric lines and utility poles collapsing and power distribution equipment breaking down because of fallen trees and flying objects which led to power outages affecting a maximum of approximately 934,900 households centered on the Tokyo Metropolitan Area. Regarding power, recovery efforts were prolonged because assessing on-site damage, retrieving fallen trees and fixing the major damage caused all took considerable time. Due to the influence of prolonged power outages, as well as communication failures, many municipalities saw damage to lifelines such as water outages and traffic hazards such as suspension of railway operations, which seriously disrupted residents' lives. Additionally, unexpected high waves caused the bank protection to collapse and some companies located behind were flooded.

Damage to lifeline utilities

	Maximum number of households affected	Recovery
Power	Approx. 934,900	Recovered on September 27 (excluding the areas where recovery was difficult, etc.)
Water	139,744	Recovered on September 25

Source: Cabinet Office

Due to this disaster, the Disaster Relief Act was invoked, with consequences for 42 municipalities in 2 prefectures. Regarding shelters, evacuation instructions (emergency) and recommendations were issued in many municipalities in Chiba Prefecture, which saw up to 2,200 or so people evacuated (Information by the Fire and Disaster Management Agency, as of September 9, 2019.)

[Column]

Scheduled Suspension of Railway Operation

Typhoon Faxai made landfall at dawn on September 9 (Mon.) around Chiba City. As it was windy around commuting time, many railway companies initiated a scheduled suspension from September 8. While the function of Narita Airport located at Narita City, Chiba Prefecture was unaffected and runways were used normally, traffic access between cities and the airport was cut because of the scheduled suspension of railway operations and road closures. About 13,000 people were stuck at night on September 9.

Regarding the scheduled suspension of railway operation, after Typhoons Jebi (1821) and Trami (1824), the Ministry of Land, Infrastructure, Transport and Tourism held an Investigative Committee on the scheduled suspension of railway operation and released an interim report showing that such scheduled suspension was necessary with passengers' safety in mind. In July 2019, the report on the implementation of scheduled suspension of railway operation was released, stating that concrete information should be provided on a timely basis so that passengers can select appropriate actions. Based on the scheduled suspension implemented during Typhoon Faxai, on October 11, 2019 before Typhoon Hagibis made landfall, the Ministry of Land, Infrastructure, Transport and Tourism updated this report. It included that railway companies who have access lines to airports should collaborate with airports and provide information appropriately, when operation restarts, railway companies should provide detailed information not to confuse passengers, the Ministry shall strive to ensure social understanding of telecommuting, staggered commuting and others. The Ministry informed railway companies to implement the measures of this report during scheduled suspension during Typhoon Hagibis. Therefore, during Typhoon Hagibis, many railway companies implemented scheduled suspensions and Narita Airport limited the number of airplanes landing to reduce the number of people having to sleep at the airport learning from lessons learnt during Typhoon Faxai.

Moreover, Narita Airport revised its BCP (Business Continuity Plan) during disasters to add that a Disaster Management Headquarters set up with railway companies etc., should be established at an early stage. Even other airports intend to include identical contents into their BCPs.

[Column (2)]

Response to damage at Yokohama Port

Typhoon Faxai caused damage centered on Yokohama Port such as the collapse of bank protection, the inundation at hinterland, the crash of an anchored ship to a bridge due to windstorm and the scattering of containers. In recent years, there has been consecutive damage by unexpected storm surges, high waves and intense winds. In September 2019, after the Intergovernmental Panel on Climate Change (IPCC) released a Special Report on the Ocean and Cryosphere in a Changing Climate, the Ministry of Land, Infrastructure, Transport and Tourism established an Investigative Committee on measures for unexpected storm surges, high wave and intense winds attacking ports etc. in October 2019. This committee reviewed structural and non-structural comprehensive measures to protect and mitigate disasters, such as implementation of performance verification against waves of main facilities and establishment of port BCP taking preventive measures considering vulnerable points into account, and published a final report in May 2020.



Damage to bank protection at Kanazawa District, Yokohama City



Investigative Committee on measures for unexpected storm surges, high waves and intense winds attacking ports etc.

Damage of Typhoon Faxai (2019)



Damage to houses in Chiba Prefecture (Futtsu City)
(Source: Cabinet Office)



Damage caused by fallen trees in Chiba Prefecture
(Katori City) (Source: Cabinet Office)



Damage to houses in Chiba Prefecture (Kyonan Town)
(Source: Cabinet Office)



Damage to houses in Tokyo (Oshima Town)
(Source: Cabinet Office)

(3) Response of Government Ministries and Agencies

On September 6, 2019 before the typhoon made landfall, the government held a series of Inter-Agency Disaster Alert Meetings to prepare for the oncoming emergency. On September 8, the Japan Meteorological Agency gave a press conference and called for swift lifesaving actions. From September 9, the government deployed liaison officers to Chiba Prefectural Government and municipalities, established a collaborative system and held the first Inter-Agency Disaster Alert Meeting on September 10 with Mr. Yamamoto, then Minister of State for Disaster Management, in attendance (a total of 16 meetings were held until October 11). In September, Mr. Takeda, Minister of State for Disaster Management, visited Chiba Prefecture and Tokyo (Chiba Prefectural Government, Katori City, Tako Machi on September 12, Tokyo Oshima and Nijima on September 15 and Chiba Prefecture, Tateyama City, Kyonan Machi, Kimitsu City on September 16) and Ms. Imai, Parliamentary Vice-Minister of Cabinet Office, visited Chiba Prefecture (Chiba Prefectural Government, Kimitsu City, Futtsu

City on September 19 and Tateyama City and Sodegaura City on September 27).

For many evacuees forced to flee due to power and water outages, on September 17, the Cabinet approved the use of contingency reserves (approx. 1.32 billion yen) and procured and delivered essential goods to support affected people (push-mode support). Moreover, the government worked as one to provide support. For example, the SDR supported water supplies and bathing, the Japan Coast Guard supported bathing, water supply and power supply via patrol vessels and craft and the Japan Tourism Agency requested collaboration on bathing support and food distribution from hotels in Chiba Prefecture.

On September 20, 2019, it was announced that this disaster could be designated as a Disaster of Extreme Severity as a series of major disasters caused by rain storms and heavy seasonal rain from August 13-September 24, 2019, including Typhoons Krosa (1910), Lingling (1913), Faxai (1915) and Tapah (1917). On October 11, the Cabinet issued a Cabinet Order to collectively designate said set of disasters as a Disaster of Extreme Severity (See Appendix 14-3 “Typhoon Faxai (1915)” (A-33 to 35)). In addition, since this typhoon damaged the roofs of many houses due to storms and caused indoor inundation by rainfall associated with the strong wind immediately after a typhoon, the Fire and Disaster Management Agency and the SDF conducted support to seal damaged roofs with blue tarps (See “Special Feature” Section 1, Page 18) and expanded the targets of emergency repair of houses by the Disaster Relief Act (See “Special Feature” Section 2, Page 23).

Meanwhile, under the staff allocation system to support local governments in affected areas which started to operate from March 2018, government staff were deployed to the affected municipalities. To support the disaster management of the nine affected municipalities, a General Advisor Team comprising around 310 employees from nine prefectures was deployed and supported to direct the National On-Site Disaster Management Office, etc. Supporting counterparts were also allocated to the nine affected municipalities and a total of around 3,500 employees from 16 prefectures were deployed to help the issuance of Disaster Affected Certificates, the management of shelters and other administrative tasks.



Mr. Takeda, Minister of State
for Disaster Management visiting the affected areas



Ms. Imai, Parliamentary Vice-Minister
of Cabinet Office visiting the affected areas

1-3 Disasters by Typhoon Hagibis (1919)

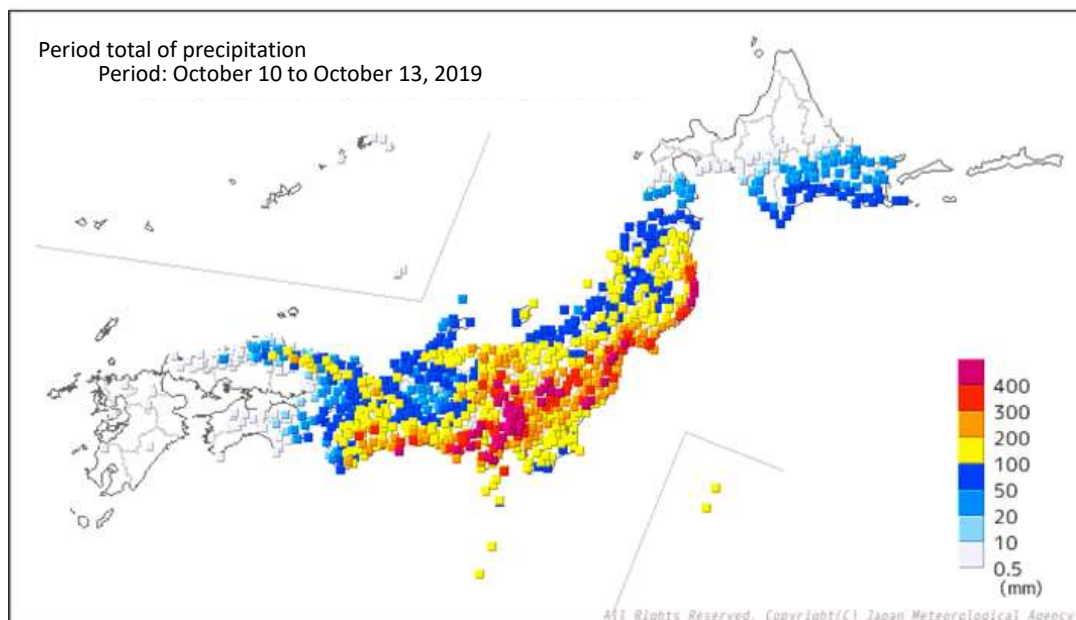
(1) Overview

Typhoon Hagibis (1919) formed as a tropical storm around the Minamitori Islands on October 6, 2019, then moved around the sea east of the Mariana Islands. After it was upgraded to typhoon intensity, it moved northward over the sea, south of Japan and made landfall on the Izu Peninsula before 19:00 October 12 with very strong typhoon intensity. The typhoon crossed the Kanto Region and then transformed into an extratropical cyclone east of Japan at noon on October 13.

During the approach and passage of the typhoon, the rain cloud itself developed into a typhoon and surrounding moist air caused record-breaking downpours across a wide area, particularly in Shizuoka and Niigata Prefectures, Kanto-Koshin and Tohoku regions. The total precipitation from October 10 to 13, 2019

reached 1,000mm in Hakone Town, Kanagawa Prefecture and exceeded 500mm at 17 points centered on East Japan. In addition, the largest 3-, 6-, 12- and 24-hour precipitations in recorded history were observed at many observation points in Shizuoka and Niigata Prefectures and Kanto-Koshin and Tohoku regions.

**Precipitation distribution during the event
(between 00:00 on October 10 and 24:00 on October 13)**



Period maximum precipitation for 24 hours (October 10 0:00-October 13 0:00)

Ranking	Prefecture	Municipality	AMeDAS station	Period maximum precipitation	
				mm	(by) Year/Month/Day
1	Kanagawa	Hakone Town, Ashigarashimo District	Hakone *1	942.5	2019/10/12 21:00
2	Shizuoka	Izu City	Yugashima *1	717.5	2019/10/12 18:50
3	Saitama	Chichibu City	Urashima *1	647.5	2019/10/12 22:00
4	Tokyo	Hinohara Village, Nishitama District	Ozawa *1	627.0	2019/10/12 21:20
5	Shizuoka	Aoi Ward, Shizuoka City	Umegashima *2	613.5	2019/10/12 20:00
6	Kanagawa	Midori Ward, Sagami City	Sagami Lake *1	604.5	2019/10/12 21:20
7	Saitama	Tokigawa Town, Hiki District	Tokigawa *1	587.0	2019/10/12 22:10
8	Tokyo	Okutama Town, Nishitama District	Ogouchi *1	580.0	2019/10/12 21:20
9	Saitama	Chichibu City	Mitsumine *1	561.5	2019/10/12 21:40
10	Miyagi	Marumori Town, Igu District	Hippo *1	558.0	2019/10/13 0:00

*1: Greatest precipitation ever recorded *2: Greatest precipitation in October

Source: Compiled by Cabinet Office from information of the Japan Meteorological Agency website

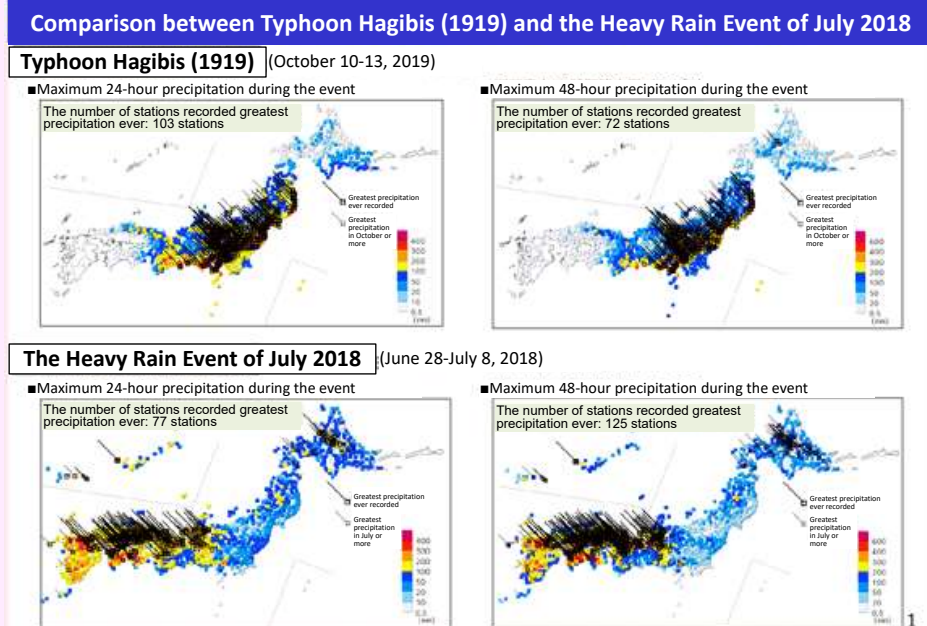
The JMA issued an emergency heavy rain warning for 13 prefectures (Shizuoka, Kanagawa, Tokyo, Saitama, Gunma, Yamanashi, Nagano, Ibaraki, Tochigi, Niigata, Fukushima, Miyagi, Iwate Prefectures) from 15:30 on October 12, calling for maximum alert (all were called off by 8:40 on October 13). As for winds, at Seaside Edogawa, Tokyo, the maximum momentary wind velocity was 43.8 meters, with record-breaking totals recorded at 7 points in the Kanto region, where the maximum momentary wind velocity exceeded 40 meters.

[Column]

Features of Rainfalls of Typhoon Hagibis (Comparison with the Heavy Rain Event of July 2018)

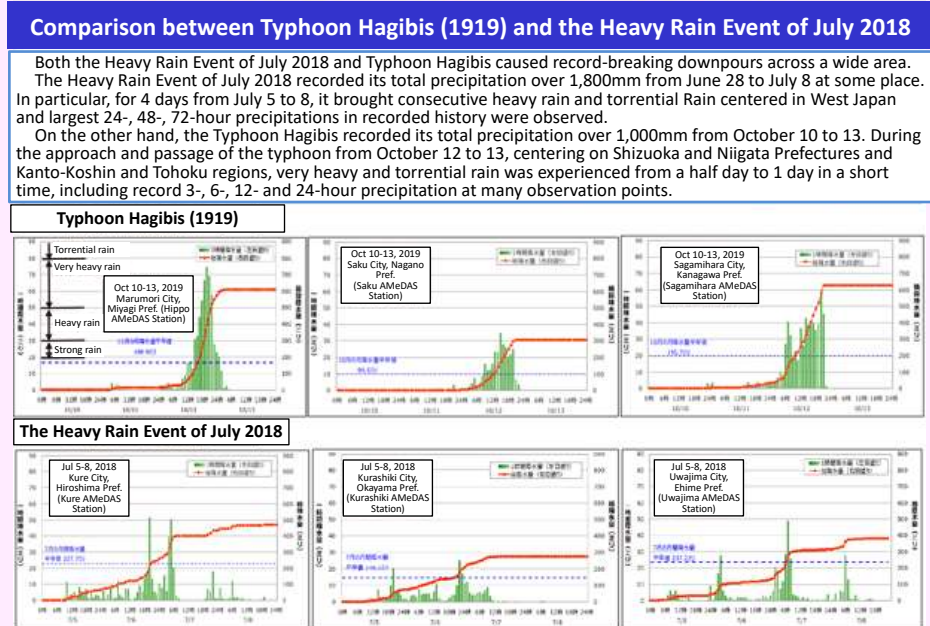
Typhoon Hagibis caused total precipitation in some areas exceeding 1,000mm from October 10 to 13. In particular, during the approach and passage of the typhoon from October 12 to 13, centering on Shizuoka and Niigata Prefectures and Kanto-Koshin and Tohoku regions, very heavy and torrential rain was experienced in a short time, including record 12- and 24-hour precipitation at many observation points. Conversely, the Heavy Rain Event of July 2018 (Western Japan Torrential Rains) saw total precipitation in some areas exceed 1,800mm from June 28 to July 8. For the 4 days from July 5 to 8 in particular, centering on West Japan, we experienced heavy and torrential rain consecutively and the largest 48- and 72-hour precipitations in recorded history were observed at many observation points.

Maximum precipitation distribution during the event



While the Heavy Rain Event of July 2018 saw record-breaking heavy rain for longer, Typhoon Hagibis saw record-breaking heavy rain from half a day to one day.

1-hour precipitation and alternation of total precipitation from moment to moment



Source: Materials from the 1st Working Group on evacuation of disasters caused by Typhoon Hagibis (1919)
(Reference: <http://www.bousai.go.jp/fusuigai/typhoonworking/index.html>)

(2) Damage

Typhoon Hagibis (1919) caused consecutive river inundation over a wide area, floods and sediment disasters which left 91 people dead (35 in Fukushima Prefecture, 19 in Miyagi Prefecture, 9 in Kanagawa Prefecture, 5 in Nagano Prefecture, 4 each in Tochigi, Gunma and Saitama Prefectures, 3 in Iwate and Shizuoka Prefectures, 2 in Ibaraki Prefecture and 1 in Chiba Prefecture, Tokyo and Hyogo Prefectures.), 3 people missing, 42 people seriously injured and 334 people lightly injured (Information by the Fire and Disaster Management Agency, as of April 10, 2020. Reference: <https://www.fdma.go.jp/disaster/info/items/3d299a3cc95529be73f32e6e793b4969d04a0da5.pdf>). Damage to houses included 3,273 completely destroyed, 63,743 half-destroyed and partially damaged and 29,556 inundated. (Information by the Fire and Disaster Management Agency, as of April 10, 2020. Reference: <https://www.fdma.go.jp/disaster/info/items/3d299a3cc95529be73f32e6e793b4969d04a0da5.pdf>)

Damage to people and houses (As of April 10, 2020)

Typhoon Hagibis (1919) (Damage)												
<ul style="list-style-type: none"> ○ As of April 10, typhoon Hagibis (1919) caused various damage centered on the Tohoku and Kanto Regions which left 94 people dead or missing, 42 people seriously injured, while damage to houses included 3,273 completely destroyed, 28,306 half-destroyed and 7,666 inundated. ○ It caused damage to lifeline utilities such as power and water outages, infrastructure such as roads and railways and affected the economic activities of the agriculture, forestry and fishing industries. ○ At 14 points in seven government-administered rivers and at 128 points in prefectural government-administered rivers breaches occurred. 												

○ Damage to people and houses (As of April 10, 2020)

Prefecture	Human casualties					Houses damaged					Damage to non-residential houses	
	Fatalities	Out of that, disaster-related dead people	Missing Persons	seriously injured	lightly injured	Completely destroyed	Half-destroyed	Partially damaged	Above-floor flooding	Below-floor flooding	Public buildings	Others
	People		People	People	People	House/Building	House/Building	House/Building	House/Building	House/Building	House/Building	House/Building
Iwate	3			4	3	41	790	788	144	953		1,363
Miyagi	19		2	8	35	302	2,997	2,860	1,614	12,151	17	61
Fukushima	35	5		1	56	1,489	12,560	6,977	1,161	443	42	8,812
Ibaraki	2		1		20	146	1,599	1,461	13	350		944
Tochigi	4			4	19	83	5,223	8,666	2	133	14	1,098
Gunma	4			1	8	22	296	572	22	112	3	76
Saitama	4	1		1	32	134	541	699	2,369	3,387		105
Chiba	1			3	23	32	270	5,665	25	70		11
Tokyo	1				10	36	661	1,034	318	532	25	32
Kanagawa	9			3	35	54	826	2,499	877	579	21	192
Nagano	5			6	39	920	2,505	3,479	5	1,407	24	937
Shizuoka	3	1		2	5	8	12	495	967	1,312	36	98
Others	1			9	49	6	26	242	149	461	5	40
Total	91	7	3	42	334	3,273	28,306	35,437	7,666	21,890	187	13,769

Source: Cabinet Office Note: Excludes damage of the heavy rain from October 25.

This heavy rain caused damage to lifeline utilities such as power and water outages centered on the Kanto-koshin and Tohoku regions, affecting up to 520,000 or so households and water outages affecting a maximum of around 168,000 households. As well as traffic hazards such as suspension of rail operations, many areas were isolated because of collapsed roads, landslides and bridges washed out, which were major headaches for residents and affected the economic activities of the agriculture, forestry and fishing industries.

Damage to lifeline utilities

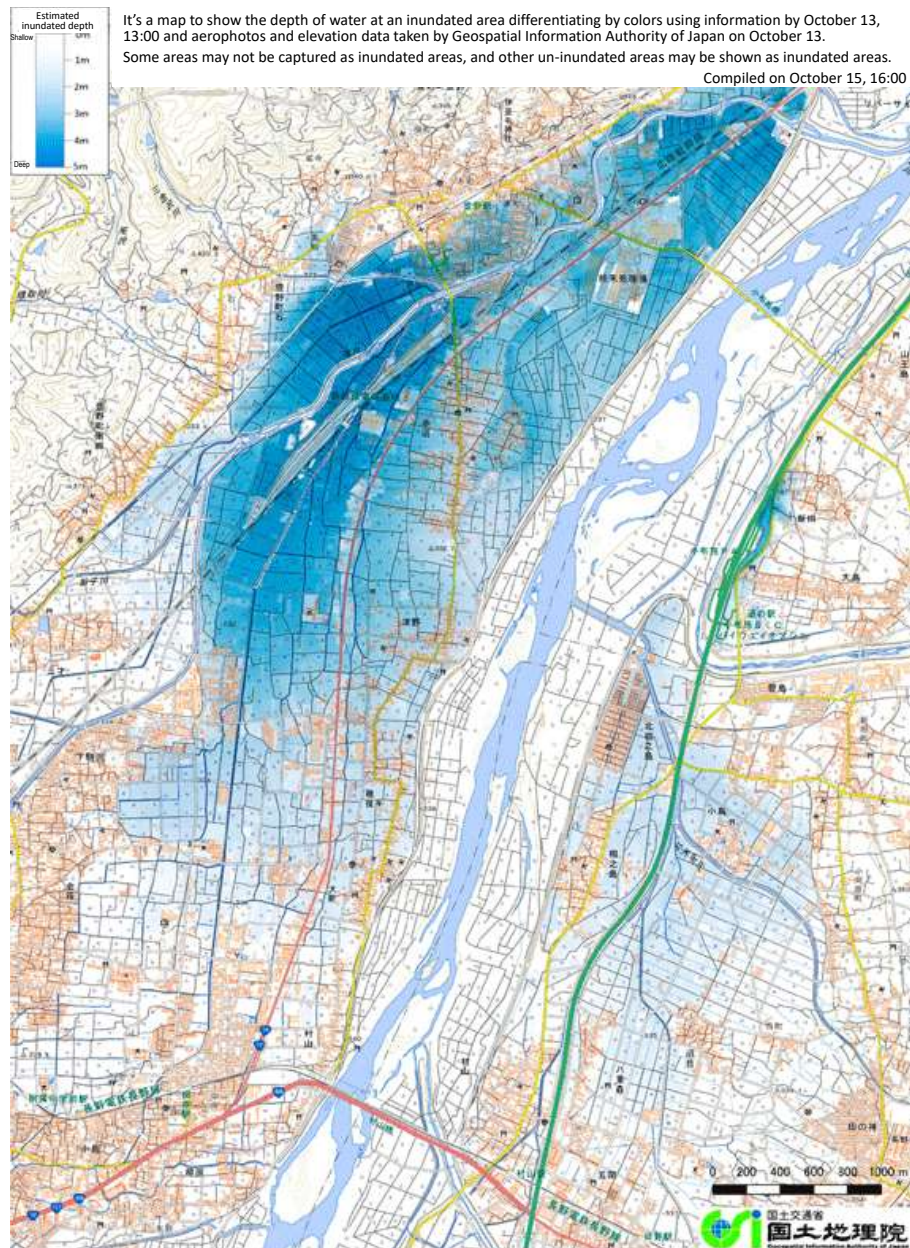
	Maximum number of households affected	Recovery
Power	Approx. 521,540	Recovered on November 7
Water	Approx. 167,986	Recovered on November 15

Source: Cabinet Office Note: Excludes damage of the heavy rain from October 25.

This typhoon caused a breach along many rivers. At 14 points in seven government-administered rivers of 6 riverine systems and at 128 points in 67 prefectural government-administered rivers of 20 riverine systems, breaches occurred, with inundation and muddy streams over a wide area. In Nagano City, Nagano Prefecture, severe damage occurred when levees along Chikuma River of Shinano Riverine Systems were breached. Widespread damage included the bridge abutment of the left bank of Chikuma River Bridge for Ueda Railways Besho Line over Chikuma River collapsing, sediment disaster and flooding along the Uchi River of Abukuma riverine systems and sediments buried in the river in bulk in branch rivers such as the Gofukutani River. Moreover, disaster waste and debris accumulated in bulk and was highly problematic to residents' lives.

Inundation forecasting chart by heavy rain caused Typhoon Hagibis Chikuma River (Around Hoyasu, Nagano City, Nagano Prefecture)

[Draft] <News>Elevation Tinted Hillshade on forecasting inundation by heavy rain caused Typhoon Hagibis (Chikuma River 3)



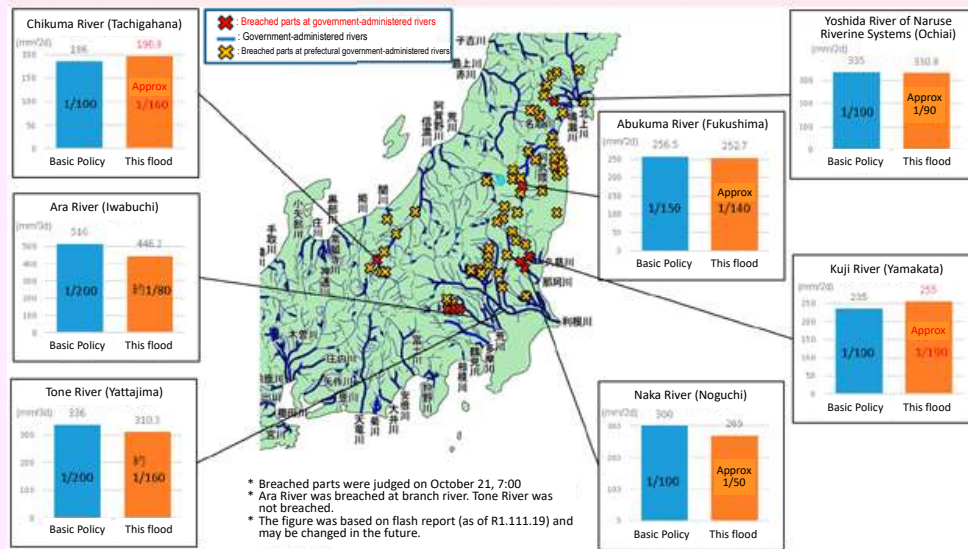
Source: Material from Geospatial Information Authority of Japan

[Column]

The breach of levees and sediment disasters by Typhoon Hagibis

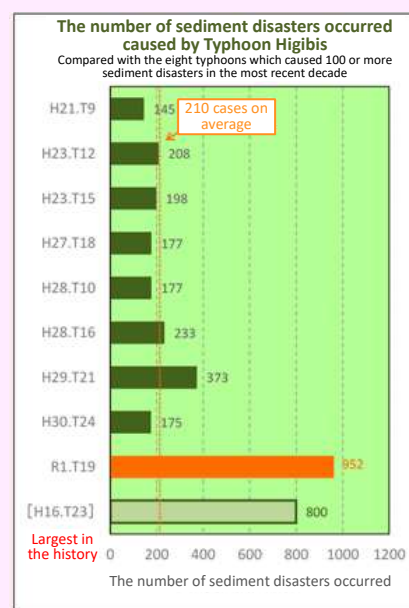
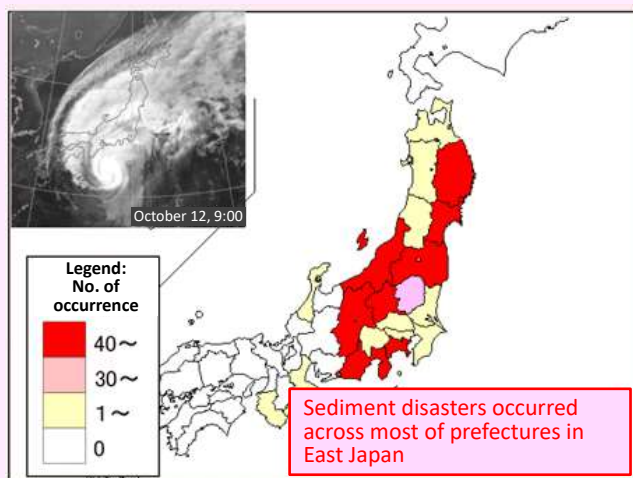
During the approach and passage of the Typhoon Hagibis for a half day to about one day from October 12 to October 13, the total precipitation in each area exceeded 40% of the normal annual level. Looking at each river, at Chikuma River of Shinano Riverine Systems and Kuji River, the rainfall exceeded the planned amount and at Abukuma and Yoshida River of Naruse riverine systems and Tone River, the rainfall was almost the same as planned, which is why the levees were breached along many large rivers in many regions.

The status of breach of levees, etc. caused by Typhoon Hagibis



Source: Materials from the 1st Working Group on evacuation of disasters caused by Typhoon Hagibis (1919)
(Reference: <http://www.bousai.go.jp/fusuigai/typhoonworking/index.html>)

A total of 952 sediment disasters were caused by Typhoon Hagibis in 2019 across 20 prefectures and centered on East Japan (Source: Ministry of Land, Infrastructure, Transport and Tourism) which was a record-breaking number of sediment disasters caused by a single typhoon since statistics began in 1982. Compared with the eight typhoons which caused 100 or more sediment disasters in the most recent decade, the number far exceeded their average (210) and the disasters occurred over large areas; 40 or more sediment disasters in eight prefectures.



Source: Ministry of Land, Infrastructure, Transport and Tourism

The impact of this typhoon meant evacuation instructions (emergency) and recommendations were issued in many municipalities, leading to a maximum of over 237,000 people evacuating. The Disaster Relief Act was invoked with for 390 municipalities in 14 prefectures, which reflects the very extensive damage over a relatively wide area.

Damage of Typhoon Hagibis



Inundation in Fukushima Prefecture (Koriyama City)
(Source: Cabinet Office)



Sediment disaster in Nagano Prefecture (Nagano City)
(Source: Cabinet Office)



Sediment disaster in Miyagi Prefecture (Marumori Town)
(Source: Cabinet Office)



Inundation in Ibaraki Prefecture (Hitachioomiya City)
(Source: Cabinet Office)



Oblique photograph from an Airplane
(Fukushima Prefecture, Motomiya City)
(Source: Geospatial Information Authority of Japan)



A Photograph from UAV
(Nagano Prefecture, Nagano City)
(Source: Geospatial Information Authority of Japan)

(3) Response of Government Ministries and Agencies

On October 8, 2019, before the typhoon approached and on October 11, before the typhoon made landfall, the government held a series of Inter-Agency Disaster Alert Meetings to prepare for emergencies. Mr. Takeda, Minister of State for Disaster Management also called for early evacuation and efforts to secure safety. On October 11, at a Cabinet Meeting, Mr. Abe, Prime Minister said that careful precautions would have to be taken, including collecting information and taking all possible measures to ensure people's safety and security.

On October 13, 2019, immediately after the typhoon passed, the Major Disaster Management Headquarters of Typhoon Hagibis (1919) was established and met a total of 18 times (Reference: <http://www.bousai.go.jp/updates/r1typhoon19/r1typhoon19/taisakukaigi.html>). A governmental investigation team led by Mr. Takeda, Minister of State for Disaster Management, was deployed (to Fukushima Prefecture on October 14). Mr. Abe, Prime Minister and Mr. Takeda, Minister of State for Disaster Management, visited some of the affected areas (Fukushima and Miyagi Prefectures on October 17 and Nagano Prefecture on October 20), Mr. Takeda, then

Minister of State for Disaster, also visited some of the affected areas (Nagano Prefecture on October 13, Ibaraki, Tochigi and Fukushima Prefectures on October 21, Kanagawa Prefecture on October 24, Chiba Prefecture on October 26, Iwate Prefecture on October 28 and Shizuoka Prefecture on November 9) and Ms. Imai, Parliamentary Vice-Minister of Cabinet Office, visited some of the affected areas (Chiba Prefecture on October 13, Chiba Prefecture on October 14, Nagano Prefecture on October 20, Ibaraki, Tochigi and Fukushima Prefectures on October 21 and Chiba Prefecture on October 26).

Individual government ministries and agencies also carried out on-site investigations, coordinated directly with chiefs and executives of local municipalities to accelerate decision-making and provided support across ministries and agencies. Immediately after the disaster, the police, the Fire and Disaster Management Agency, the SDF, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) and the Japan Coast Guard dispatched rescue units from across Japan to the affected areas to conduct rescue and search operations as well as working to prevent secondary damage and support lives (About 4,400 from the Police Emergency Force, about 3,000 from the Fire and Disaster Management Agency, about 79,000 from the SDF, about 31,000 from the Technical Emergency Control Force (TEC-FORCE) and 751 patrol vessels and craft and 197 aircraft from the Japan Coast Guard were dispatched.)

On October 14, a team to Support the Daily Lives of Affected People was established, comprising Vice-Ministers from individual government ministries and agencies. Its remit included determining the extent of the damage, the overall coordination of response measures, life support activities based on the challenges and needs of affected areas and other measures promptly and vigorously, whereupon on November 7, a package for the restoration of Lives and Livelihoods of the Affected was developed (Reference: Special Feature, Chapter 1, Section 2, Support Package for the Affected). On October 18, Typhoon Hagibis was designated a specified disaster and an integrated government team took emergency disaster control measures.

On October 18 and 21 and November 19, 2019, it was announced that this disaster could be designated as a Disaster of Extreme Severity as part of a series of major disasters caused by rain storms and heavy seasonal rain from October 11-26, 2019, including Typhoons Hagibis (1919), Neoguri (1920) and Bualoi (1921). On October 29, the Cabinet issued a Cabinet Order to collectively designate said set of disasters as a Disaster of Extreme Severity and on November 29, a Cabinet Order to amend it partially. (See Appendix 14-4 “Typhoon Hagibis (1919)” (A-35 to 39).)

Meanwhile, under the staff allocation system to support local governments in affected areas, government staff were deployed to the affected cities and towns. To support the disaster management of the ten affected cities and towns, a General Advisor Team with a total of about 570 employees from ten prefectures was deployed and supported to direct the National On-Site Disaster Management Office, etc. Supporting counterparts were also allocated to the affected 27 cities and towns and a total of around 9,300 employees from 34 prefectures were deployed to help the issuance of Disaster Affected Certificates, the management of shelters and other administrative tasks.



Mr. Abe, Prime Minister, Mr. Takeda, Minister of State for Disaster Management, Ms. Imai, Parliamentary Vice-Minister of Cabinet Office visiting the affected areas

1-4 Support Activities by Volunteers and NPOs

(1) Support Activities by Volunteers for Major Disasters occurred in 2019

In recent years, in addition to the response of government Ministries and Agencies after disasters, various groups like NPOs or individual volunteers go to affected areas and conduct support activities which the government cannot reach or detailed support activities for affected people to meet local needs. While various needs emerge in affected areas and for affected people, expectations of activities by NPOs and volunteers have increased. During the Heavy Rain Event of August 2019 related to the rain front, Typhoon Faxai (1915) in September 2019 and Typhoon Hagibis (1919) in October 2019, many volunteers from all over the country came to disaster volunteer centers (disaster VCs) established by the Social Welfare Councils in affected areas.

During the Heavy Rain Event of August 2019 related to the rain front, a total of approximately 11,000 volunteers (as of November 7, 2019) mainly worked through VCs in Saga Prefecture. A NPO set up a satellite base in an area affected by serious oil damage because plenty of oil leaked from a steel company in Imari City in Saga Prefecture and accepted volunteers.

During Typhoon Faxai (1915), VCs in Chiba Prefecture accepted volunteers and a total of approximately 23,000 volunteers (as of October 30, 2019) mainly worked. In affected areas, the storm winds of this typhoon damaged roofs of many houses, which needed to be sealed with blue tarps, but not enough companies were capable of setting it up. Subsequently, an NPO with techniques of sealing with blue tarps and others supported these efforts in line with local needs.

During Typhoon Hagibis (1919), VCs in 110 municipalities of 14 prefectures accepted volunteers and a total of approximately 197,000 volunteers (as of January 26, 2020) worked. Immediately after the disaster, they mainly worked to remove mud from houses and tidy up rooms and furniture. During the recovery period, the focus of volunteer activities shifted to community support coordinated by life support coordinators (e.g. dealing with various issues including, for example, monitoring the elderly and disabled, holding social events and opening a children's playground). As of April 1, 2020, the disaster VC in Marumori-cho, Miyagi Prefecture, Sano City, Tochigi Prefecture and Higashimatsuyama, Saitama Prefecture are still accepting volunteers.

As well as supports through VCs, specialist NPOs and other organizations carried out wide-ranging support activities, including technical support for affected housing, such as removal of sediment and debris, shelter management, support for affected people living in each house, support for temporary housing and support for rebuilding livelihoods.

The activity status of volunteers and Information Sharing Meeting

	The Heavy Rain Event of August 2019 associated with the rain front	Typhoon Faxi	Typhoon Hagibis
The number of disaster volunteer centers *Note1	6	27	110
The number of volunteer (cumulative total) *Note 2	11,387 (As of November 7)	23,361 (As of October 30)	196,740 (As of January 26)
The number of volunteer activities groups such as NPO *Note 3	121	48	487

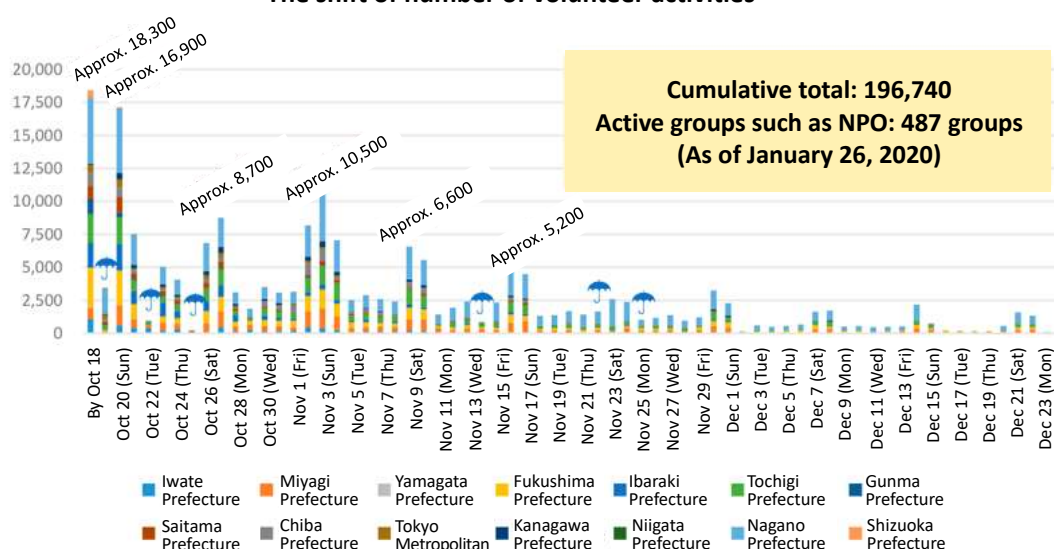
Note 1: Included the number of regular volunteer center which accepted disaster volunteers.

Note 2: The number of volunteers who are accepted through disaster volunteer center

Note 3: The number of participant groups in information sharing meetings joined by the Government, NPOs and Volunteers

Source: Cabinet Office

The shift of number of volunteer activities



Source: Cabinet Office

Volunteer activities following Typhoon Hagibis



(Volunteer activities in affected areas)

(2) Progress of Collaboration among the Government, NPOs and Volunteers

After the Kumamoto Earthquake in 2016, information-sharing meetings are usually held among local governments, NPOs and volunteers to coordinate support activities among supporters with the support of the Japan Voluntary Organizations Active in Disaster (JVOAD) and local NPOs that provided intermediary support in the affected areas. During 2019 disasters, this meeting aimed to ensure seamless and smooth support activities and share information on the status of volunteer resources, support for home evacuees and support for shelters, while coordinating their support activities.

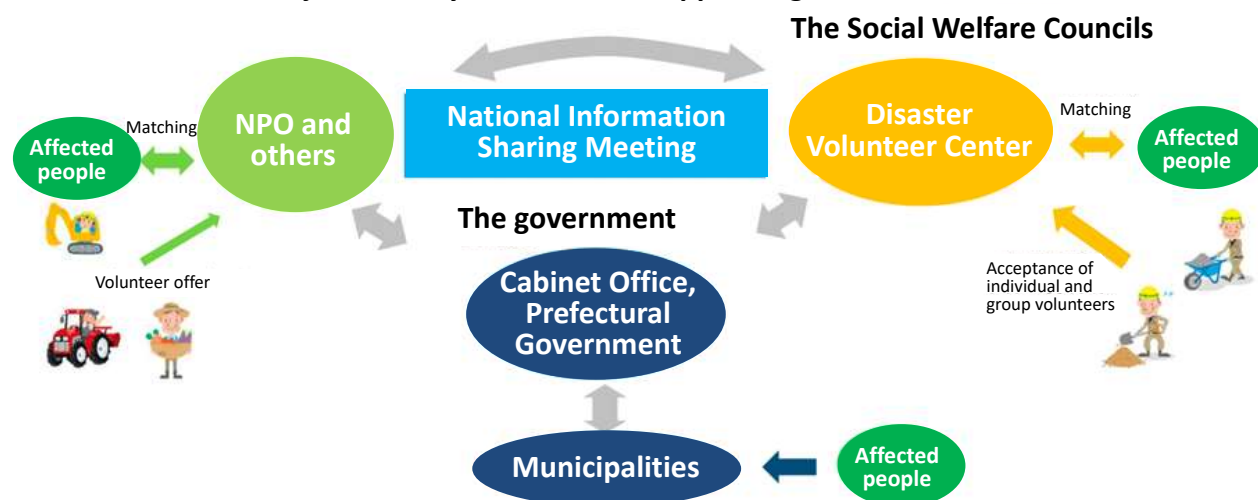
During the Heavy Rain Event of August 2019 related to the rain front, an NPO in Saga Prefecture – the Saga Disaster Assistance Platform - held regular information-sharing meetings to coordinate support activities in the area.

During Typhoon Faxai (1915), given that the roofs of many houses were damaged by storm winds in Chiba Prefecture, measures to prevent leaking of rain such as sealing damaged roofs with blue tarps were taken. An NPO with experience of handling similar tasks during the Kumamoto Earthquake in 2016 lectured on the construction technique to minimize deterioration to local fire personnel with no experience of providing collaborative support to affected people.

During Typhoon Hagibis (1919), after October 14, 2019, information-sharing meetings were held on a regular basis among local governments, social welfare corporations and NPOs in each affected areas (Miyagi, Fukushima, Ibaraki, Tochigi, Saitama, Tokyo, Nagano and Shizuoka Prefectures) to coordinate support activities among the government, volunteers and NPOs.

Tripartite collaboration among the Government, NPOs and Volunteers

Adjustment by intermediate support organization



Information Sharing Meetings in affected prefectures

Prefecture	Meeting name	Organizer	The number of meeting
Miyagi	Disaster VC Support Liaison Meeting	Prefectural Social Welfare Councils	30 or more
Fukushima	Information Sharing Meeting	Fukushima Collaborative Recovery Center	3
Ibaraki	Disaster Support Ibraki Networking Meeting	Ibraki NPO Center, Commons	9
Tochigi	Ganbarou Tochigi! Information Sharing Meeting	Tochigi Prefecture	5
Saitama	Sainokuni Meeting	Sainokuni Meeting	4
Chiba	Information Sharing Meeting	Chiba Prefecture	2
Tokyo	Information Sharing Meeting	Tokyo Disaster Volunteer Center	6
Nagano	Information Sharing Meeting	Nagano Prefecture	23
Shizuoka	Typhoon Hagibis Shizuoka Prefecture Information Sharing Meeting	Shizuoka Prefecture Disaster Volunteer Headquarters, Information Center	1
Saga	SPF Information Sharing Meeting	Saga Disaster Assistance Platform	15

Source: Cabinet Office

National Information Sharing Meeting



(The meeting in Tokyo Metropolitan)



(The meeting in Chiba Prefecture)

Given the fact that Typhoon Hagibis in 2019 affected wide areas across Japan, National Information-Sharing Meetings were held on October 29 and December 3; coordinated with prefectural information-sharing meetings (organized by the Cabinet Office, JVOAD and Shien-P) to discuss challenges common to prefectures (for example, role sharing among administration, NPOs and volunteers) and messages that needed to be communicated to the public nationwide. In addition, concerned Ministries and Agencies from the Ministry of the Environment and the Ministry of Health, Labour and Welfare participated and discussed support activities such as housing demolition by public funds and removal of disaster waste. Based on the discussion during the meetings, messages were issued on November 8, 2019 concerning the recruitment of volunteers and safety measures based on the responses during Typhoon Hagibis.

Mr. Taira, a Vice-Minister speaking at the National Information-Sharing Meeting



National Information Sharing Meeting



Leaflet on the call for volunteers published on November 8

被災地では、ボランティアの力を必要としています。

全国の被災地でボランティアの力を必要としています。

台風19号で被害が大きかった宮城・福島・栃木・長野県で、特に多くのボランティアの協力を呼び掛けています。なお、被災地の状況は日々変化しますので、以下の最新の情報をご参考ください。

全社協 被災地支援・災害ボランティア情報

<https://www.saigaivc.com/>

※ボランティア活動保険への加入や高速道路無料化措置についての情報も掲載されています。
 ※ボランティア保険は必ず加入していきましょう(webからも加入できるようになりました)。

作業をするときの服装

濡れる作業が多くなるため、カッパや着替えの用意を

[Column]

**Collaboration among Stakeholders on the Removal of Disaster Waste
(Efforts by NPOs and others in One NAGANO Operation)**

Responses to disaster waste are common issues in many affected areas, since accumulated disaster waste in affected areas can hinder residents' lifestyles and delay prompt recovery.

During Typhoon Hagibis, in Nagano City where the dike of the Chikuma River broke, a huge volume of disaster waste and mud flowed into various places such as houses, farms, roads and open spaces and hindered recovery activities. Accordingly, to restore day to day life in affected areas as soon as possible, citizens, volunteers, national, prefectural and local governments and the SDF collaborated and conducted the OneNAGAO operation to remove the bulk of the disaster waste and mud from the affected areas.

The ISUT (Information Support Team), which started full-scale nationwide operation from 2019 by Cabinet Office, received information on the accumulated disaster waste status in each area from volunteers, then visualized it on a map. Based on this map, stakeholders met daily, whereby in daytime, citizens and volunteers moved scattered waste and sediments to collection spaces from where, overnight, they were removed by the SDF and governments to dumping sites outside. Given narrow roads in the area, the police officers controlled traffic to prevent trucks from causing a traffic jam. That's how various stakeholders supported the One NAGANO operation.

Nagano Prefecture has promoted tripartite collaboration, even in ordinary times. The Nagano Prefecture Disaster Management Plan, which was revised in March 2017, stipulated that Prefectures (Crisis Control Department and Health and Welfare Department) and municipalities should collaborate with main disaster volunteer groups and volunteer groups and local NPOs that provided intermediary support and set up coordination meetings to deepen the level of collaboration among each volunteer group and try to implement drill and training sessions for the disasters and stipulated timetables of activities when coordinating volunteers and NPOs of the wide-area receiving support plan.

Based on such a plan, from 4 years ago, drills and training sessions were conducted and the Nagano Support Network for Disaster was established. Usual face-to-face sharing information enabled OneNAGANO operation during the actual disaster.

At the Nagano Prefecture Emergency Response Headquarters, departments of disaster volunteers were set up, also including Prefectural Social Welfare Councils and NPOs, which meant they could all work together as a team from the day of disaster and underpinned the operation.

Based on the efforts in OneNAGANO, the government arranges regular efforts for collaborative measures among the SDF, Ministry of Defense and the Ministry of the Environment to remove disaster waste and publicizes efforts by stakeholders to promote disaster waste control.

Responses to accumulated disaster waste is an urgent issue in affected areas by Typhoon Hagibis. Volunteers, please assist us.

This joint activity by citizens, volunteers, national, prefectural and local governments and the SDF was named the OneNAGAO operation.



What is One NAGANO...?

- In daytime, citizens, volunteers and national, prefectural and local governments moved waste from scattered collection points in Toyono District, Nagano City, etc. to Akanuma Park & Oomachi Junction.
- From around Akanuma Park & Oomachi Junction, they were removed by the SDF and governments to dumping sites outside.

Let's work together for affected people jointly by citizens, volunteers, national, prefectural and local governments and the SDF!

[Photo on October 22: Akanuma Park]
Accumulated disaster waste is still around...



Legend:

- One-way traffic route
- Route to collection points
- Large-sized furniture collection points
- Medium-sized furniture collection points
- Small-sized furniture collection points

Source: Cabinet Office