Japan's Insurance Market 2020

The Toa Reinsurance Company, Limited

Japan's Insurance Market 2020

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To Our Clients

It gives me great pleasure to have the opportunity to welcome you to our brochure, 'Japan's Insurance Market 2020.' It is encouraging to know that over the years our brochures have been well received even beyond our own industry's boundaries as a source of useful, up-to-date information about Japan's insurance market, as well as contributing to a wider interest in and understanding of our domestic market.

During fiscal 2019, the year ended March 31, 2020, despite a moderate recovery trend in the first half, uncertainties concerning the world economy surged toward the end of the fiscal year, affected by the spread of COVID-19.

In Japan, significant impacts on inbound demand, exports and production, and personal consumption became evident once the spread of COVID-19 gained traction, posing a challenge to the Japanese economy.

In the reinsurance industry, whereas the trend toward softening of reinsurance premium rates and conditions has continued in recent years, reinsurance premium rates showed an upward trend for lines of business for which large amounts of reinsurance claims were paid, such as for contracts covering large-scale natural disasters, which are occurring frequently in Japan and overseas.

Going forward, it will be necessary to respond appropriately to various impacts of the spread of the infectious disease on the reinsurance business. We also need to prevail in fierce competition to win contracts amid changes in the business environment, such as the frequent occurrence of natural disasters and the increasing complexity of risks. We forecast that the business environment will remain challenging.

In accordance with the "Mission 2020" medium-term management plan, the Group will provide clients with higher quality reinsurance solutions and value-added services while further strengthening the management foundation to deal with future issues, in order to achieve sustainable growth.

Everyone at the Toa Re Group will do their utmost so that the Group can fulfill its mission as a reinsurance company "Providing Peace of Mind," as articulated in the Toa Re Mission Statement.

In conclusion, I hope that our brochure will provide a greater insight into the Japanese insurance market and I would like to express my gratitude to all who kindly contributed so much time and effort towards its making.

Masaaki Matsunaga
President and Chief Executive
The Toa Reinsurance Company, Limited

1. The Risks of Increasingly Severe Typhoons

How Can We Effectively Handle Typhoons?

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Typhoon Faxai, also known as Reiwa 1 Boso Peninsula Typhoon, made landfall in the Kanto region in September 2019. It was the strongest typhoon to make landfall in the region since 1991, the year the Japan Meteorological Agency (JMA) began to keep such records. The extreme winds of this typhoon left scars that exposed the vulnerabilities of the metropolitan area in Japan. A year earlier, the extremely powerful Typhoon Jebi in 2018 passed through western Japan, causing devastation to the Kinki area. According to the General Insurance Association of Japan (GIAJ), the damage caused by Typhoon Jebi resulted in the highest claims ever paid for wind and flooding damage in Japan. Typhoons remain a serious threat despite recent advances in science and technology.

Typhoons Faxai and Jebi share several characteristics. Both made landfall in Japan without weakening, both featured powerful winds that set records in various places, and both caused severe damage to large cities. We meteorologists are working on the new challenges highlighted by typhoons in recent years. This paper introduces the latest research results while elucidating three themes: (1) whether typhoons have intensified in recent years; (2) how risks related to typhoons are changing; and (3) new tools for handling typhoons.

1. Are Typhoons Becoming More Devastating?

Observation data based on historical records has enabled insights into the characteristics of typhoons in recent years. However, the typhoon data available from JMA is from 1951 onward, so we can only track trends for about half a century. Therefore, we reconstructed available typhoon data by aggregating past observation data with a focus on only typhoons that made landfall in Japan islands (Reference 1). Figure 1 shows the number of typhoons that have made landfall in Japan since 1900. The number of landfalls varies from year to year, but there doesn't appear to be a long-term trend indicating an increase or decrease in number. On the other hand, a trend in the intensity of typhoons at landfall is evident. Figure 2 shows intensity distribution in five-year averages, classified by typhoon central atmospheric pressure at landfall. The proportion of strong typhoons below 970 hPa at landfall has increased sharply since the year 2000. The average for these typhoons in all analyzed periods is about 30%, but the average is about 50% since the year 2000. The data indicates that the proportion of typhoons having that strength at landfall has trended upward in that period.

Observation data over the ocean from 100 years ago is not available, so whether typhoons have gained strength over the ocean or whether they have come north without weakening until landfall in Japan is not clear. However, Typhoon Faxai in 2019 was at the peak of its strength at landfall, so the research available on it is

relevant here. On September 5, 2019, Typhoon Faxai formed offshore of Minamitorishima (Figure 3). It then proceeded northwest and approached the main islands of Japan, and on September 8 grew into a very strong typhoon over the ocean near Kozushima with a central pressure of 955 hPa and a maximum wind speed of 45 m/s. Typhoons usually weaken as they approach the Japanese islands, but Typhoon Faxai passed over the Miura Peninsula in the early hours of September 9 without weakening, then passed over the narrow Tokyo Bay and made landfall in Chiba City, Chiba Prefecture before 5:00 AM JST (Japan Standard Time).

Atmospheric and oceanic environmental factors led to Typhoon Faxai making landfall at full strength. Figure 4 shows a statistical prediction of the intensity, meaning central pressure, of Typhoon Faxai six hours ahead by JMA and the actual central atmospheric pressure at the actual time. The predicted central atmospheric pressure is in alignment with the actual central atmospheric pressure, indicating the high accuracy of this statistical method. Figure 4 also shows the environmental factors helping the storm strengthen that were used to predict intensity. Ocean surface temperature (effect: -2.8 hPa/6hr), ocean temperature (effect: -2.7 hPa/6hr), and upper-level wind (effect: -2.2 hPa/6hr) as the storm developed helped the typhoon intensify (negative numbers indicate intensification). The actual ocean surface temperature distribution is as high as 28°C to 30°C in the ocean offshore southern Japan, which on average is 2°C higher than in usual years. Statistically, 2°C difference exceeds two standard deviations, or 95%, of past data. Looking at environmental factors prior to landfall in Chiba, upper-level wind (effect: -2.7 hPa/6hr) more than offset the weakening influence of ocean surface temperature (effect: +0.7 hPa/6hr) and ocean temperature (effect: +0.8 hPa/6hr). In other words, proximity to land mitigated the effect of the ocean, but abnormally weak upper-level wind kept the typhoon from weakening at landfall.

Figure 1: Typhoons Making Landfall Annually – 1900 to 2014

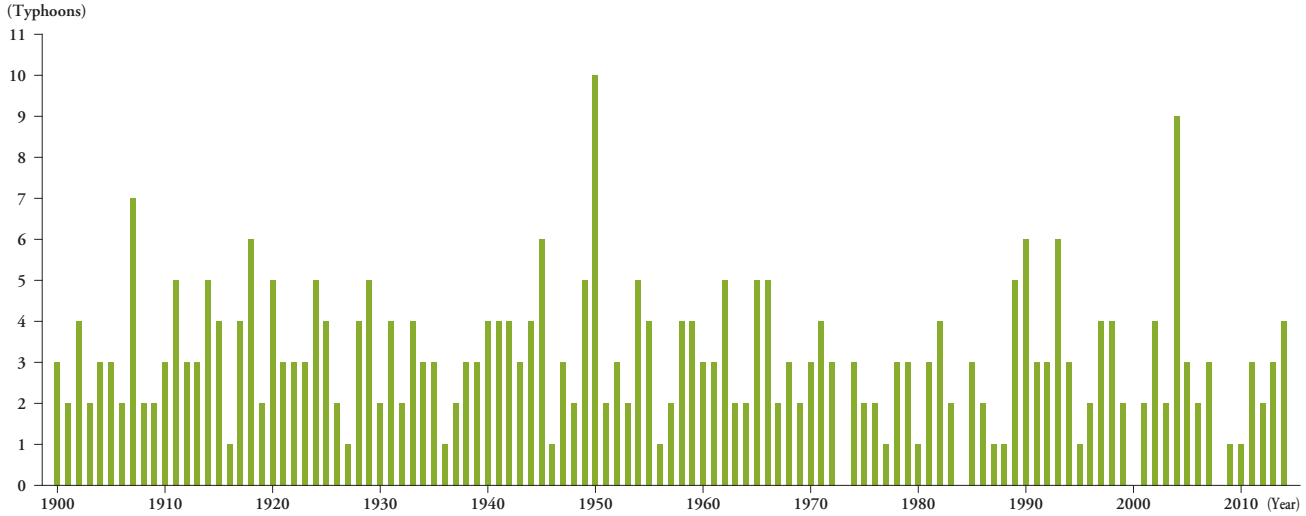
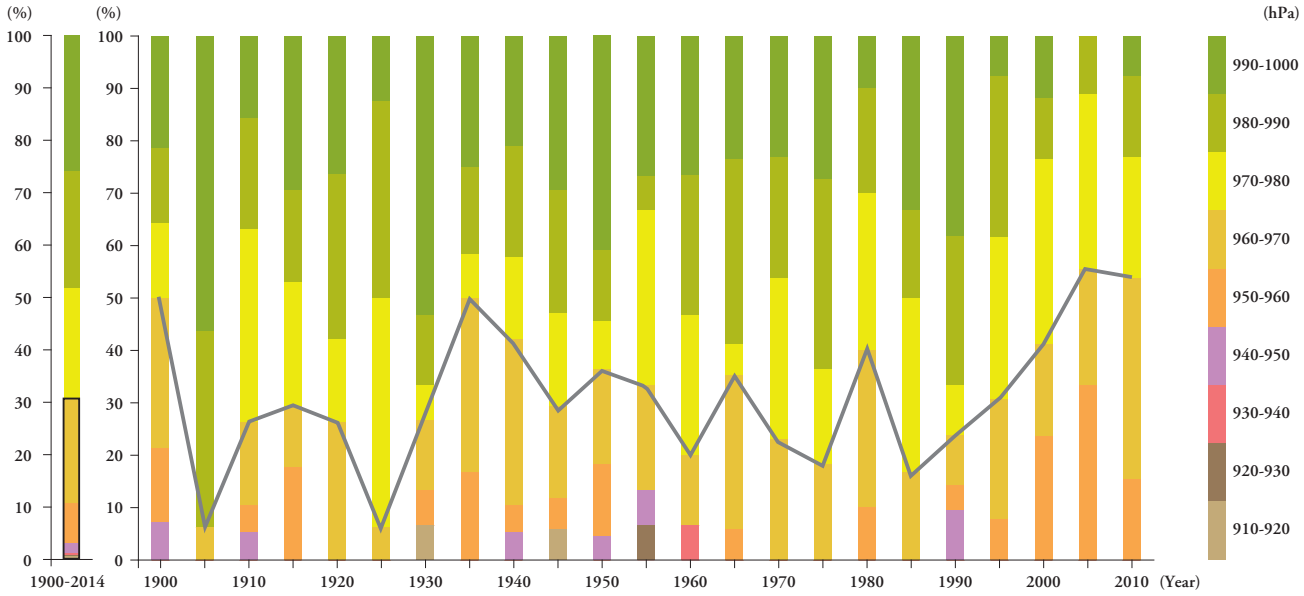
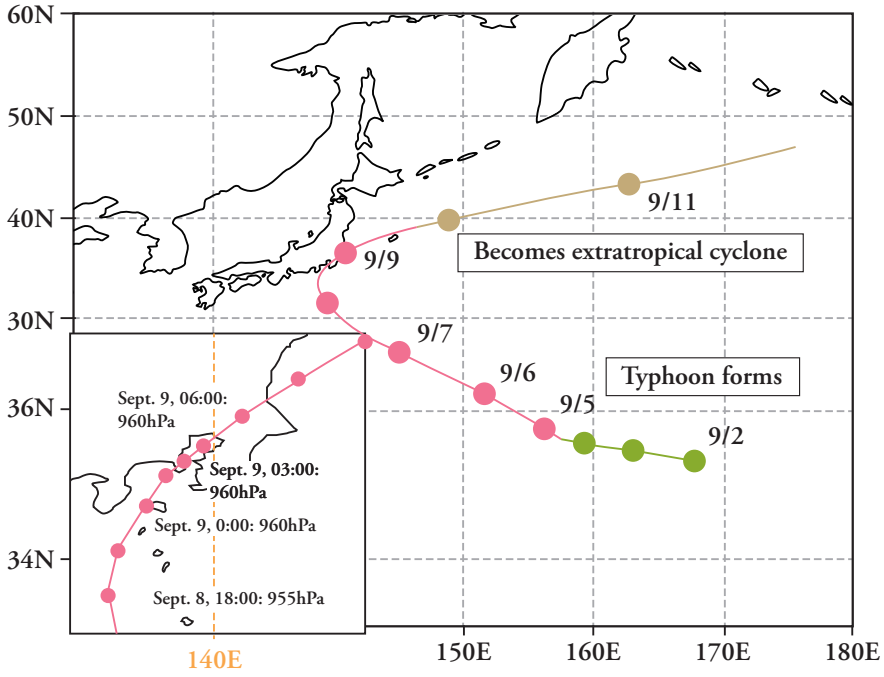


Figure 2: Distribution of Typhoon Central Atmospheric Pressure at Landfall – 1900 to 2014



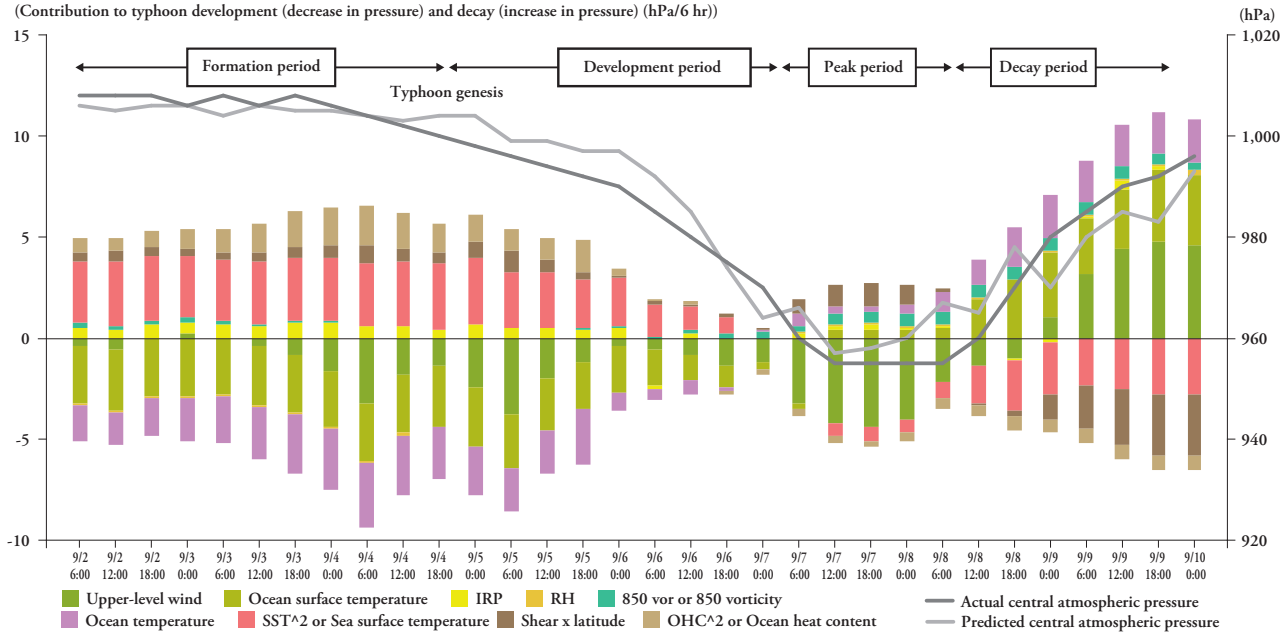
Note: Shows the mean percentage over a 115-year period and its transition in 5-year intervals.
The solid line indicates percentage of typhoons below 970 hPa.

Figure 3: The Path of Typhoon Faxai



Note: Passage over a wide area marked every 9 hours.
All notations are in Japan time.

Figure 4: JMA Statistical Mechanical Strength Prediction for Central Pressure of Typhoon Faxai in 6-hour Change in Contributing Factors over Time



2. Recent Changes in Typhoon Risk

Statistics indicate that typhoons making landfall in Japan are getting stronger, which has also influenced recent changes in typhoon risk. The damage that typhoons inflict directly on people has decreased markedly compared to the mid twentieth century, when single typhoons inflicted damage affecting up to several thousand people (Table 1). Reasons include improved public infrastructure such as flood control, or more resilient housing. In fact, no typhoon has resulted in more than 100 dead or missing since the 1980s. However, damage inflicted on people has increased since the 2000s. Typhoon Tokage in 2004 resulted in 98 dead or missing, Typhoon Talas in 2011 resulted in 98 dead or missing, and Typhoon Hagibis, also known as Reiwa 1 East Japan Typhoon, in 2019 finally resulted in 107 dead or missing (as of April 2020).

Regarding economic damage, recent typhoons dominate in terms of insurance claims paid from wind and flooding (Table 2). Claims paid due to Typhoon Jebi in 2018 topped 1 trillion yen, and the claims paid for two typhoons in 2019 were also very large. These amounts cannot be ignored when compared with the finances of national and local governments. As such, the economic impact of typhoon damage is increasing.

Typhoon Faxai in 2019 is representative of the damage caused when a typhoon hits a city. Experts conduct a comprehensive survey whenever a typhoon causes serious damage to elucidate its mechanisms and analyze the human and physical damage. According to the report prepared for Typhoon Faxai (Reference 2), Faxai resulted in

various kinds of damage to a large number of structures. Partial damage included damage to tiled roofs, while other kinds of damage included damage to houses caused by the collapse of steel poles from a golf driving range and solar panel fires that started when solar panels were blown away in the typhoon. Building damage included 391 houses completely destroyed, 4,204 partially destroyed, and 72,279 partially damaged, with inundation above floor level at 121 properties and inundation below floor level at 109 properties. In essential infrastructure, electric power facilities suffered the greatest damage. A large-scale power outage affecting approximately 930,000 homes occurred mainly in Chiba Prefecture, and this extraordinary long-term outage took half a month to resolve. In addition, downed trees and landslides cut off roads and transportation facilities in various places, which hindered a broad range of household, industrial and economic activities. An ancillary problem involved approximately 10,000 passengers stranded at Narita Airport, which was isolated due to the planned suspension of many railway lines in preparation for the approaching typhoon. The fact that a single typhoon could cause these critical situations revealed the vulnerability of the metropolitan area to typhoons.

Table 1: Typhoons with a Large Number of Dead or Missing

Rank	Year	Typhoon Name	Dead or Missing
1	1959	Isewan Typhoon	5,098
2	1945	Makurazaki Typhoon	3,756
3	1934	Muroto Typhoon	3,036
4	1947	Typhoon Kathleen	1,930
5	1954	Toya Maru Typhoon	1,761
6	1958	Kanogawa Typhoon	1,296
7	1942	Suonada Typhoon	1,162
8	1951	Typhoon Louise	943
9	1948	Typhoon Ione	838
10	1950	Typhoon Jane	539

Table 2: Major Claims Paid Due to Wind and Flooding Damage

Rank	Disaster Name	Region	Date	Claims Paid (Billion yen)			
				Fire	Motor	Marine	Total
1	Typhoon No. 21, 2018 (Typhoon Jebi)	Osaka, Kyoto, Hyogo and elsewhere	September 3-5, 2018	936.3	78.0	53.5	1,067.8
2	Typhoon No. 19, 2019 (Typhoon Hagibis)	East Japan	October 6-13, 2019	518.1	64.5	–	582.6
3	Typhoon No. 19, 1991 (Typhoon Mireille)	Nationwide	September 26-28, 1991	522.5	26.9	18.5	568.0
4	Typhoon No. 15, 2019 (Typhoon Faxai)	Kanto	September 5-10, 2019	439.8	25.8	–	465.6
5	Typhoon No. 18, 2004 (Typhoon Songda)	Nationwide	September 4-8, 2004	356.4	25.9	5.1	387.4
6	Heavy Snowfall, February 2014	Mainly Kanto	February, 2014	298.4	24.1	–	322.4
7	Typhoon No. 18, 1999 (Typhoon Bart)	Kumamoto, Yamaguchi, Fukuoka and elsewhere	September 21-25, 1999	284.7	21.2	8.8	314.7
8	Typhoon No. 24, 2018 (Typhoon Trami)	Tokyo, Kanagawa and elsewhere	September 28-October 1, 2018	294.6	11.5	–	306.1
9	Heavy Rain, July 2018	Okayama, Hiroshima, Ehime and elsewhere	June 28-July 8, 2018	167.3	28.3	–	195.6
10	Typhoon No. 15, 2015 (Typhoon Goni)	Nationwide	August 24-26, 2015	156.1	8.1	–	164.2

Note: Figures after 2016 are in red.
Source: GIAJ website; as of March 31, 2020; includes predictions

3. New Tools for Predicting Typhoon Threats

In a few days before Typhoon Faxai made landfall in Japan, JMA's predictions regarding its course and strength had proven accurate, and as a result JMA called for the highest-level precautions by various parties. While there is more time to prepare for typhoons than earthquakes and volcanoes, complacency and inadequate countermeasures can still result in enormous damage. In that regard, the provision of information that creates a critical sense of urgency among the populace is essential, but so too is robust urban development. Leading-edge applied research has given society the following two new tools to help prevent disasters.

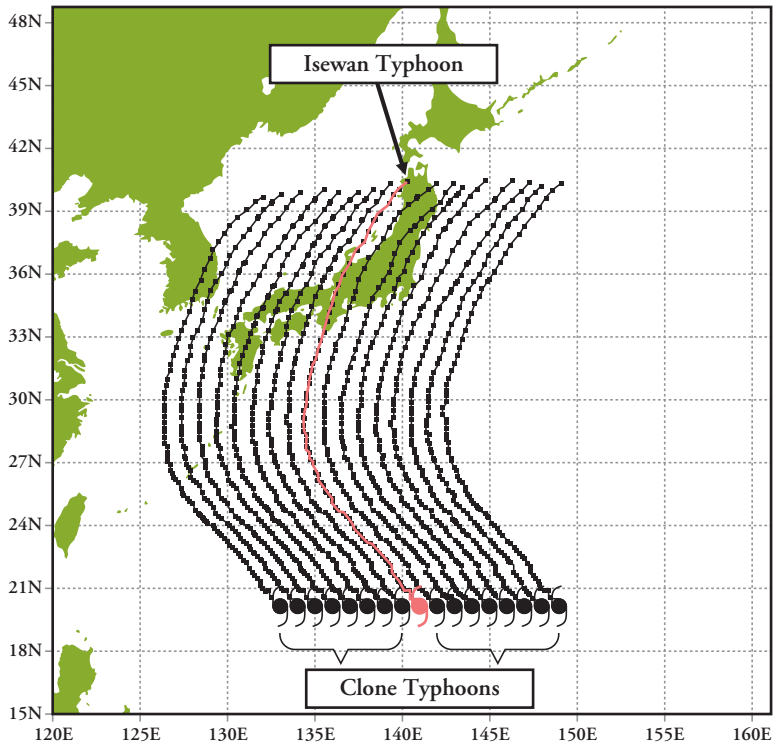
(1) Typhoon Soragram: Which Typhoon Path is Most Dangerous to Your City?

Both Typhoon Jebi in 2018 and Typhoon Faxai in 2019 caused severe damage in many locales due to violent wind. However, a survey of the damage (Reference 2) reveals a clear contrast between areas where damage was significant and areas where damage was relatively limited. The strong winds that typhoons generate are heavily influenced by surrounding landforms, particularly mountains. As a result, typhoon

paths that may cause a dangerous typhoon in a particular area vary regionally.

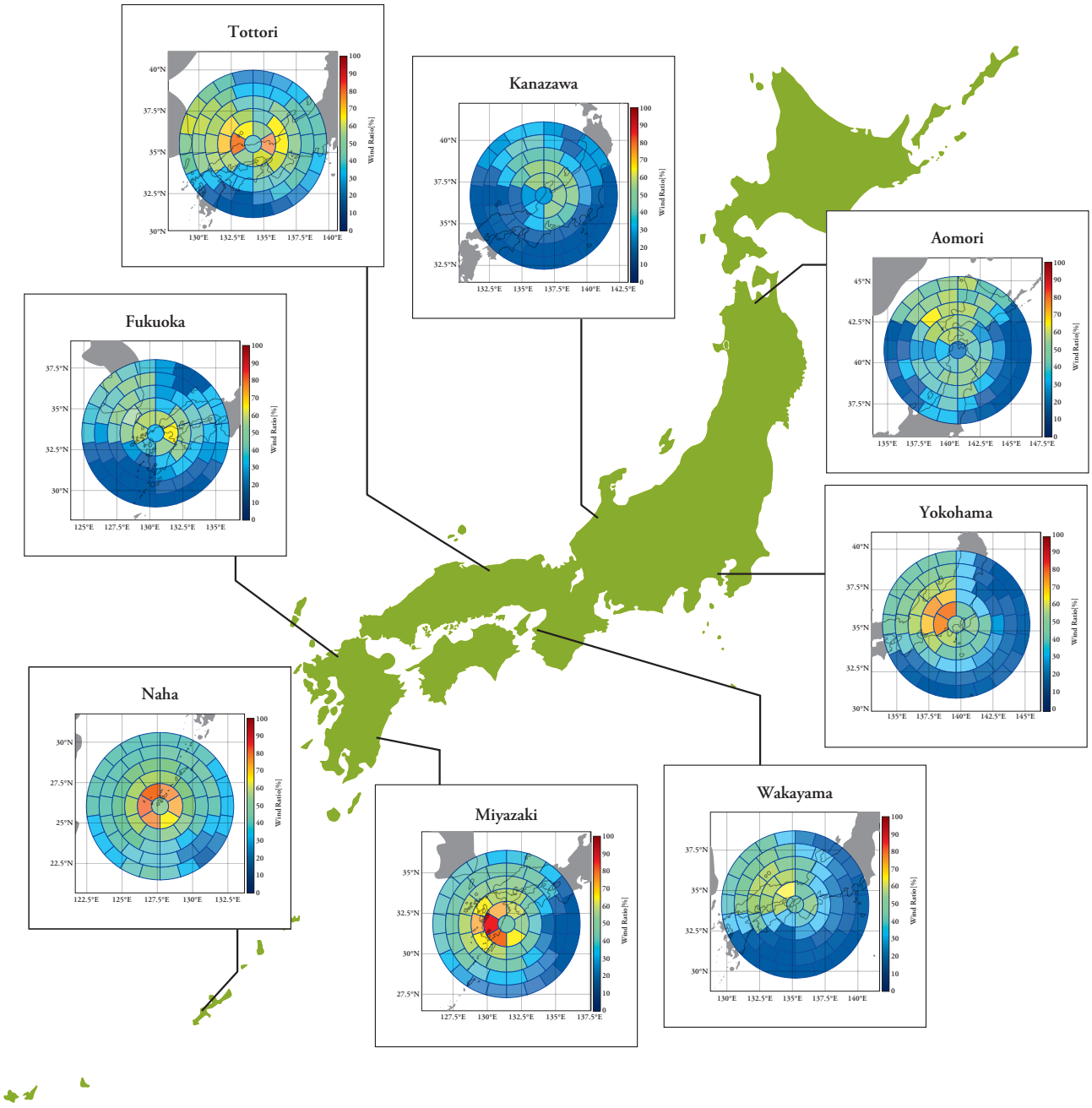
In your city, which path will cause a dangerous typhoon? Answering that question requires data for the various paths a typhoon may take, but past observation data is insufficient. We have therefore created Typhoon-Path Ensemble Simulation (Reference 3). We incrementally shifted the positional relationship between atmospheric phenomena – including typhoons – and the Japanese islands from east to west in a computer-based virtual world to generate any number of typhoon paths. This approach creates many clones of a typhoon striking the Japanese islands. Figure 5 shows the path of Typhoon Vera in 1959, and clones of that typhoon created using Typhoon-Path Ensemble Simulation. Also known as the Isewan Typhoon, it was the most damaging typhoon in the modern history of Japan. The clone typhoons move along routes just like the real typhoon, so many courses are parallel from east to west against the original path. The simulation can generate virtual scenarios, such as having the typhoon hit Tokyo instead of making landfall in Wakayama Prefecture as it actually did. Thus we have been able to simulate the landfall of more than 1,000 typhoon clones in Japan and successfully obtain extensive wind data from all over the country. The amount of data we have obtained is equivalent to about 300 years of real-world typhoon observation.

Figure 5: Paths of Multiple Isewan Typhoon Clones Created Using Typhoon Path Ensemble Simulation



Note: Selected data indicating the actual path of the Isewan Typhoon with the red line in the center and black lines to the east and west showing clones of that typhoon. This figure shows limited results only.

Figure 6: Typhoon Nomograms of Various Regions in Japan



We made a typhoon nomogram, which is a type of typhoon hazard map, at each location, using results of Typhoon-Path Ensemble Simulation. Figure 6 shows typhoon nomograms at various locations in Japan. Consider the typhoon nomogram of Yokohama City (middle right of Figure 6) as an example of how to read a typhoon nomogram. A circle with a radius of 500 km around Yokohama, represented by the small circle in the center, is divided into 71 segments. Each segment has a color-coded value from the Wind Ratio scale on the right, indicating wind strength. A typhoon center entering the segments with red colors indicates stronger wind. A typhoon path that passes through a segment with a high wind ratio is a dangerous path because it means strong winds will be generated. In the typhoon nomogram of Yokohama, compared to a typhoon with a path to the east through Chiba or over the Pacific Ocean, a typhoon with a path to the west or northwest through Shizuoka or Yamanashi will cause stronger winds in Yokohama. Even a typhoon passing through more distant places to the west or northwest such as Gifu and Toyama will increase wind impact in Yokohama. A multiregional comparison of typhoon nomograms clearly shows that dangerous typhoon paths vary by region.

The typhoon hazard maps we developed are distributed for free under the brand name "Typhoon Soragram" as part of the comprehensive weather service, Liferanger (Note 1). Users can select their city to see which path increases typhoon risk where they live. Knowledge of the risk for the city in which a person lives is a very important typhoon countermeasure.

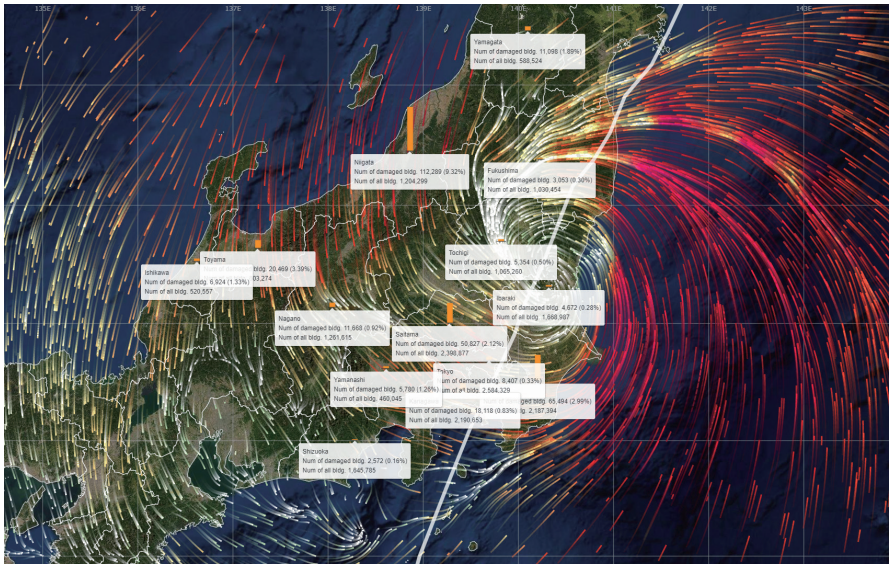
(2) CMAP: A Hazard Map That Predicts the Number of Damaged Buildings

CMAP real-time damage prediction is available at the website, cmap.dev (Note 2). It predicts the number of buildings that heavy rainfall and winds, or an earthquake will damage in a given municipality and discloses predictive data in real time should the disaster strike. This building damage prediction is an area-specific function of the number of buildings and a building damage rate derived from past damage data (Reference 4). When Typhoon Faxai passed through Japan, CMAP predicted and published the number of damaged buildings in real time (Figure 7). CMAP predicted damage to approximately 220,000 buildings in Chiba Prefecture from this typhoon, which was almost three times the 80,000 damaged residential properties reported by a survey after the typhoon (Reference 2). However, CMAP's prediction aligned closely with the roughly 220,000 aggregate claims received for property damage reported by GIAJ (Note 3) (Reference 5). Moreover, the correlation coefficient between the number of damaged buildings in 54 municipalities in Chiba Prefecture reported by the survey after the typhoon (Reference 2) and CMAP's predicted number was 0.68, indicating a strongly positive relationship with damage distribution (Figure 8). CMAP provides specific damage prediction information relevant to users; for example predicting a thousand buildings will be damaged in the town in which they live. Hopefully, this tool will help in the evacuation of overly optimistic people who would like to regard natural disaster prediction information as having nothing to do with themselves, and encourage them to think

more critically about impending disasters.

CMAP also has a simulation function that predicts building damage for past typhoons with hypothetical scenarios (Note 4). For example, it can use the Typhoon Path Ensemble Simulation results discussed earlier to look at outcomes if the Isewan Typhoon of the past were to strike today, or if it were to directly hit other areas such as Kanto or Kyushu today. Global warming virtually ensures that typhoons with the intensity of the Isewan Typhoon will strike in the future. Advance knowledge of the extent of damage has many uses, such as for disaster prevention measures by local residents, evacuation information and shelters prepared by local governments, and national disaster prevention plans for flood control by the government.

Figure 7: CMAP Building Damage Prediction for September 9, 2019, at 03:00



Yamagata
Num of damaged bldg. 11,098 (1.89%)
Num of all bldg. 588,524

Fukushima
Num of damaged bldg. 3,053 (0.30%)
Num of all bldg. 1,030,454

Tochigi
Num of damaged bldg. 5,354 (0.50%)
Num of all bldg. 1,065,260

Ibaraki
Num of damaged bldg. 4,672 (0.28%)
Num of all bldg. 1,668,987

Saitama
Num of damaged bldg. 50,827 (2.12%)
Num of all bldg. 2,398,877

Chiba
Num of damaged bldg. 65,494 (2.99%)
Num of all bldg. 2,187,394

Tokyo
Num of damaged bldg. 8,407 (0.33%)
Num of all bldg. 2,584,329

Kanagawa
Num of damaged bldg. 18,118 (0.83%)
Num of all bldg. 2,190,653

Shizuoka
Num of damaged bldg. 2,572 (0.16%)
Num of all bldg. 1,645,785

Yamanashi
Num of damaged bldg. 5,780 (1.26%)
Num of all bldg. 460,045

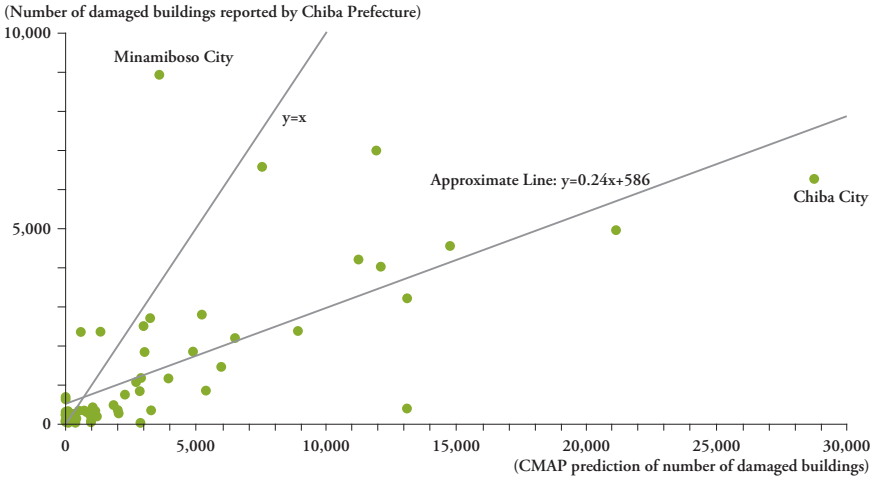
Nagano
Num of damaged bldg. 11,668 (0.92%)
Num of all bldg. 1,261,615

Ishikawa
Num of damaged bldg. 6,924 (1.33%)
Num of all bldg. 520,557

Toyama
Num of damaged bldg. 20,469 (3.39%)
Num of all bldg. 603,274

Niigata
Num of damaged bldg. 112,289 (9.32%)
Num of all bldg. 1,204,299

Figure 8: Correlation between CMAP Prediction of the Number of Buildings Damaged in Real Time and Damaged Buildings Reported by the Chiba Prefecture Disaster Risk Management Department on May 14, 2020



4. Conclusion

Although the number of typhoons that have made landfall in Japan has not changed significantly during the past 100 years, the intensity of the typhoons at the time of landfall in Japan has increased in recent years. Consequently, the risks associated with such typhoons have changed. As in the case of Typhoon Faxai, typhoons that hit a vulnerable city throw societal functions into crisis. Society has an urgent need to help make cities resilient to natural disasters by fully deploying modern science and technology to evolve information and new tools for disaster prevention and mitigation.

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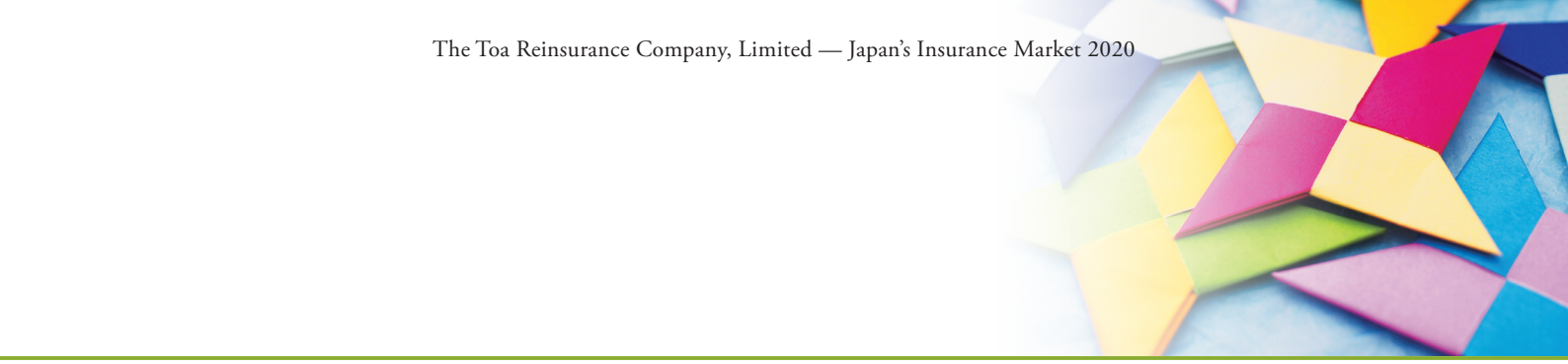

Notes

1. MTI Ltd. distributes Liferanger and other lifestyle information to mobile phones. Liferanger Typhoon Soragrams are available to users in Japan for their area via smartphone and are color coded for easy understanding. Access Liferanger as follows: 1) Search for Liferanger Tenki on smartphone; 2) Select Typhoon Soragram under Disaster Preparedness from the Menu icon in the upper left corner. Select the city to check from Other Locations in the center of the screen to display the local Typhoon Soragram.

2. CMAP is the world's first website for predicting the number of buildings affected by a natural disaster in real time for a given location by municipality, and is the product of industry-academia joint research among Aioi Nissay Dowa Insurance Co., Ltd., Aon Benfield Japan Ltd. (currently Aon Group Japan Ltd.), and Yokohama National University. Available at https://cmap.dev/, it was released in June 2019 and received the grand prize at the 29th Global Environment Award in February 2020.

3. In terms of the number of buildings damaged in natural disasters other than typhoons, there is significant difference between reports prepared by the Fire and Disaster Management Agency and the number of claims paid reported by GIAJ members. CMAP was developed using the number of claims paid, so it is consistent with the number of claims submitted to GIAJ member companies.

4. CMAP can simulate the number of buildings affected in a hypothetical scenario. 1) Click Past on the right panel; 2) Select "Vera in 1959" (Isewan Typhoon) from the paths of typhoons; 3) Click "Shift the Track" at the bottom right and select the path to simulate.

2. Modeling the Insights from the 2018 and 2019 Climatological Perils in Japan

Margaret Joseph
Model Product Manager, RMS

1. Foreword

In 2018 and 2019 Japan experienced record high insurance losses from typhoons. However, losses were not caused solely by typhoons in these years; there were also high losses from non-typhoon climate catastrophes. These two years of losses underline the risk that Japan faces from typhoon and non-typhoon catastrophes alike. This article reviews the risk modeling work that RMS undertook in response to events during 2018 and 2019 and discusses how we are incorporating what we learned into our view of risk for Japan.

2. Twenty-Five Years of Modeling Typhoons, and the 2018 and 2019 Events

RMS has been modeling typhoon risks in Japan for over 25 years.

In the autumn of 2016, RMS released an updated model for typhoon risk in Japan – the RMS® Japan Typhoon HD Model. This represented a complete model rebuild, with significant updates to all aspects of typhoon modeling: from the stochastic track model through to hazard and vulnerability, as well as exposure and financial modeling. The update incorporated newly available data, scientific advancements, and innovative modeling advances – leading to a superior modeled representation of typhoons over Japan and how they affect insured assets.

Since 2016, and most notably in the last couple of years, Japan has been impacted by typhoons that resulted in significant insured losses. Table 1 shows the paid claims as reported by the General Insurance Association of Japan (GIAJ) for Typhoons Jebi and Trami in 2018 and Typhoons Faxai and Hagibis in 2019. However, market estimates for global insured losses from the typhoons in Japan approach 20 billion U.S. dollars for both 2018 and 2019. In the immediate weeks after landfall, RMS released global industry loss estimates for Typhoon Faxai of 5 billion to 9 billion U.S. dollars and for Typhoon Hagibis of 7 billion to 11 billion U.S. dollars.

Table 1: GIAJ Total Claims, including Fire, Automobile, and Miscellaneous, and for Jebi includes Marine (yen to U.S. dollar exchange rate at time of GIAJ release)

JMA Event – Year	Number ID	Paid Claims (Billion U.S. dollars)
Typhoon Jebi (2018)	1821	9.8
Typhoon Trami (2018)	1824	2.8
Typhoon Faxai (2019)	1915	4.1
Typhoon Hagibis (2019)	1919	5.1

High insurance loss in Japan in 2018 also resulted from a non-typhoon event: flooding caused by a stationary frontal system over the southwest of the country in July. The GIAJ reported 1.8 billion U.S. dollars in paid claims from this event, with the insurance market indicating total insured losses could approach 3 billion U.S. dollars.

Following these events, RMS modelers comprehensively reviewed all components of the Japan Typhoon HD Model. As part of the review, RMS received

a significant body of Typhoon Jebi claims from the primary market in Japan that were used for a detailed claims analysis, working with companies that provided the data to aid in the analysis and interpretation. In addition to claims, other key data sources included insights from multiple field reconnaissance in the affected regions after the events and work undertaken with academics and engineers in Japan. Separately, RMS also received claims from the flooding in July 2018, within a dataset of non-typhoon flood events in Japan since 2000.

RMS has incorporated the insights from the 2018 and 2019 events into an update to the 2016 Japan Typhoon HD Model. So, what did we learn?

3. A Complete View of Flood Risk

In July 2018, a stationary front over southwestern Japan, within an atmospheric setup that drew in moisture-laden air masses, brought multiple rounds of heavy precipitation. The widespread and severe flooding caused by this event led to significant insured loss. As a consequence, the risk from non-typhoon precipitation flooding in Japan was brought to the forefront. Furthermore, since the event, an increase in flood coverage has been offered in insurance policies in Japan, which increases the importance of understanding the future loss potential from such events.

Figure 1 shows what RMS reconnaissance teams saw in the immediate aftermath of the flooding.

RMS includes probabilistic non-typhoon loss modeling in 2020 offerings for Japan to provide a complete view of flood risk, both typhoon and non-typhoon. Together with the existing wind component of the typhoon model, this constitutes our Japan Typhoon and Flood HD Model.

Based on our latest modeling of typhoons and of non-typhoon flooding in Japan, flood contributes around 30% of the total loss at the nationwide perspective. When looking at the local level, particularly for certain lines of business, flood can be a higher proportion of the loss or, indeed, the driver of the loss, and flood losses can also be significant for individual events, as seen in recent years.

Figure 1: RMS Field Reconnaissance following Non-Typhoon Flooding in July 2018

4. Learning from Recent Typhoons

The typhoon events of 2018 and 2019 were a reminder that typhoon risk is not confined to wind, with storm surge-driven coastal flood impacts observed in Jebi and Faxai and significant precipitation-driven inland flooding in Hagibis. In 2018, Typhoon Jebi brought coastal flooding to property lines in Osaka Bay, impacted marine cargo in the ports of Kobe and Osaka, and inundated Kansai International Airport. Notably, observed coastal flooding was in advance of the significant "mainland" coastal defenses that exist in Osaka Bay (in Ise Bay and in Tokyo Bay); it highlighted the vulnerability of exposures in advance of these defenses, including exposures on reclaimed land.

Tokyo Bay is the only other area of reclaimed land with higher exposure than Osaka Bay – within a year, Typhoon Faxai was tracking over Tokyo Bay. Faxai made landfall during a receding tide, which served to limit coastal flooding. Where coastal flooding did occur, however, RMS reconnaissance teams deemed the defense breaching likely to have been caused by wind-induced waves riding on top of the storm surge. Similarly, in Typhoon Jebi, at Kansai International Airport (situated on reclaimed land in the center of Osaka Bay) the coastal flooding was predominantly a result of waves on top of storm surge. Waves increase the energy of the storm surge and its height, and they can significantly increase the damage at an affected location. Waves are important to consider for coastal defense failure in Japan as they present a significant factor for defense performance where deep water abuts defenses, as seen during Typhoon Jebi at Kansai International Airport in Osaka Bay and during Typhoon Faxai in the southwest of Tokyo Bay in Kanagawa Prefecture.

In 2019, Typhoon Hagibis brought heavy precipitation over central and eastern Japan for several days that resulted in widespread flooding, which consisted of many individual areas of flooding across a large swath of Japan. The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) reported more than 100 levee breaks along 64 rivers and almost 200 separate instances of rivers overtopping their levees or banks. Looking at the extensive levee system in Japan, RMS reconnaissance noted that most instances of flooding were from levee breaches rather than overtopping. This reflected what RMS modelers observed in the field in the immediate days after the July 2018 flooding. Levee breaches are typically accompanied by high-velocity flows that contribute to increased structural damage from foundation scour, even at low flood depths. RMS observed significant structural damage in areas close to the levees where levees had failed in both Typhoon Hagibis and the non-typhoon flooding in July 2018.

In the flooding associated with Typhoon Hagibis, RMS also observed instances where the levee systems built to protect property were found to exacerbate flooding. In a few locations visited in field reconnaissance, water from an upstream levee failure was prevented from draining into the river by the levee, and accumulated behind the levee structure.

The high precipitation levels from Hagibis that fell over Japan are, in part, explained by the storm's asymmetrical pattern development as it approached Japan. This pattern displaced precipitation to the north of the storm's center, leading to

the occurrence of precipitation days in advance of landfall. Another factor was the sheer size of the system. Hagibis was a typhoon with very large atmospheric circulation; its wind field at landfall was three times that of Faxai (the typhoon that had made landfall the month previous). A large geographic area was therefore under the wind field and the precipitation extent.

Both these factors were influenced by the fact that Hagibis was undergoing extratropical transitioning at landfall. This is a process that alters the shape of the typhoon wind field, the precipitation field, and the storm surge and wave fields (Bruneau et al., 2017), and therefore has profound impacts on the loss potential from such storms. A significant number of typhoons that impact Japan do so undergoing or having undergone extratropical transitioning. Typhoon Jebi began this process as it tracked over the Sea of Japan, off the coast of northern Japan. For Jebi, this meant that its wind field extended to the east to the extent that its winds impacted northern Honshu and Hokkaido, even when tracking up to 80 miles offshore.

The RMS Japan Typhoon HD Model explicitly models the flood component from typhoons, and does so through a sophisticated methodology that enables capturing flood inundation both in the model and when the model is used in event response, as in Typhoon Hagibis. The model includes defense failure from both overtopping and breaching of defenses, and it captures high-velocity flows and movement of water across the landscape to include accumulating behind levees – features observed in 2018 and 2019 events. The RMS model physically models the impact of waves and, following what was observed at Kansai International Airport in Typhoon Jebi, has been updated to allow for wave attack at more angles from the north. Further, the RMS model well replicates the extratropical transitioning process using the most advanced transitioning model on the market (Loridan et al., 2014; Loridan et al., 2015), the importance of which has been seen in recent events.

RMS analysis of recent events also informed the vulnerability component of the model. RMS conducted an extensive review to ensure the model is well calibrated and continues to reflect both the latest market conditions and local building performance typhoon hazards. Typhoon Jebi claims provided additional data for specific regions and wind speed ranges to the claims pool used by RMS in the 2016 model development. In addition to claims, RMS used insights from field reconnaissance along with extensive analytical modeling to recalibrate wind and flood vulnerability functions across Japan for all lines of business.

Field reconnaissance provided clear examples of the unique characteristics and difference in performance of traditional and western-style wood frame structures in Japan. RMS modelers were able to validate major damage mechanisms based on field observations, including extensive damage to tiled roofs on traditional buildings. Clean-up and repair operations, with restoration practices and redundancies unique to Japan, also aided in updating facility and lifeline business interruption functions.

RMS has also updated the post-event loss amplification (PLA) module based on insights from recent events, both in Japan and globally. PLA updates in the 2020

model consider recent changes in the Japanese insurance market – mandatory training of loss adjusters as stipulated by government regulations after the 2018 events, and GIAJ initiatives to improve fraud detection and the claims settlement process following Faxai and Hagibis in 2019. The unique elements of Japanese societal and systemic resilience in reconstruction and disaster preparedness were also considered.

The Japan Typhoon HD Model also benefits from extensive research conducted by RMS and our understanding of PLA impacts observed after intense losses in specific regions, such as the recent California (U.S.) wildfires, major Atlantic hurricanes (including Harvey, Irma, and Michael), the Elbe (central Europe) and Louisiana (U.S.) floods, and the New Zealand Earthquake Sequence. As in the New Zealand Earthquake Sequence, in recent years in Japan the impacts of overlapping events has been seen, most notably in 2019 when Typhoon Hagibis tracked over Tokyo Bay just over a month after Typhoon Faxai. The compounding impacts of these events on PLA was considered in the recent model update.

5. Commitment to Field Learning

Field reconnaissance in the immediate aftermath of an event can be challenging, but RMS modelers in the field provide details about the peril hazard that cannot solely be ascertained from media photographs of the severest damage. Modelers are able to view first hand the type, extent, and severity of damage to property and infrastructure and then review these details in the context of learning about the event. RMS invested significantly in reconnaissance in the immediate days after the 2018 and 2019 events in Japan – particularly for Typhoon Hagibis given its complexity, which included flooding across large areas of Japan and overlapping impacts from the previous typhoon. Figure 2 shows what RMS reconnaissance teams saw following Hagibis.

Figure 2: RMS Field Reconnaissance following Typhoon Hagibis in 2019

Not only does RMS conduct field reconnaissance immediately after the event, modelers often revisit the impacted areas in the months and years following events to evaluate repair and restoration efforts. This was the case with Faxai and Hagibis, when RMS modelers from our Tokyo office revisited areas around Tokyo Bay following the initial reconnaissance. Similarly, RMS modelers returned to the Osaka region a year after Jebi. In addition to field surveys, they spoke to claims adjusters and met with local engineers and academics to gather information on the various nuances of the event and details on model development.

The RMS commitment to ground truth – not just in the immediate aftermath but over time to evaluate repairs and rebuilding – is important in evaluating and modeling typhoon and flood risk in Japan.

6. Summary

The events in 2018 and 2019 highlighted features that are important to risk modeling, and RMS is committed to incorporating insights and learning into our view of risk, thereby ensuring the models continue to represent the state of the science in understanding the risk to insured assets in Japan.

The RMS Japan Typhoon and Flood HD Model was released this year on Risk Modeler™ (the modeling application on the RMS platform Risk Intelligence™) and incorporates lessons learned from recent typhoon events, and includes explicit coverage of non-typhoon flood losses.

After the last two significant loss years for typhoon and flood in Japan, 2020 will give the catastrophe modeling community and (re)insurance markets a lot to consider.

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3. Life Insurance Underwriting Trends in Japan

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1. Foreword

The term "life insurance" is generally associated with benefits paid due to the death of a person, but in fact life insurance also provides benefits for living needs including health insurance, long-term care, critical illness, disability income, and total permanent disability. Medicine, healthcare technology, information technology, socioeconomics, lifestyles, life insurance products, and many other issues are now very different from when I became involved in life insurance underwriting in 1998. This paper covers the transition of life insurance in general, from a product that covers the death of a person to a product for living needs, as well as underwriting trends in Japan.

2. The Origins of Life Insurance Medicine

In 1706, the Amicable Society was established in England as the world's first life insurance company. Moreover, in 1762 the Equitable Life Assurance Society ("Equitable Life") laid the foundation for modern life insurance companies because it was the first to employ a scientific approach to underwriting: setting base premiums by age, identifying risk on the basis of age and medical underwriting, and setting premiums based on mortality tables. Equitable Life also employed actuaries, set maximum sum assurance, and paid cash surrender value and policyholder dividends.

Risk selection is at the very heart of life insurance, and Oscar H. Rogers played an important part in its history and evolution. Known as the father of life insurance medicine, he served as Medical Director of New York Life Insurance Company at the end of the nineteenth century and worked with fellow actuary Arthur Hunter on impairment studies using a life table methodology. They published a paper titled *The Scientific Valuation of Human Lives for Insurance*, which presented a revolutionary numerical rating system that is now commonly used worldwide. In the twentieth century, U.S. life insurance companies collaborated in intercompany impairment studies that involved medico-actuarial studies using large groups of insured persons. This methodology is still used today. Subsequently, Richard D. Singer worked with The Association of Life Insurance Medical Directors of America (ALIMDA) and the Society of Actuaries (SOA) to recalculate mortality ratios and extra mortality ratios with clinical data categorized by age and time elapsed as a method for risk selection. They presented *Medical Risks: Patterns of Mortality and Survival* in 1976, launching a new approach to life insurance medicine. This study was then revised in *Medical Risks: Trends in Mortality by Age and Time Elapsed. Volume 1 and 2.*

3. The History of Underwriting Requirements

The history of the life insurance industry and risk selection in Japan began with Meiji Life Insurance Company, which was founded in 1881. Life insurance companies handled risk selection at that time by employing full-time doctors (company doctors) to examine applicants. The first medical examination in Japan took place on July 9, 1881, the day Meiji Life was established. Life insurance companies subsequently contracted with clinical doctors so that professionals other than company doctors could provide applicants with medical examinations. Medical examinations at that time checked height, weight, chest measurement, auscultation,

palpation, and vital capacity of the lungs.

Urinalysis was then introduced in 1889, blood pressure measurement in 1891, and chest X-rays and electrocardiograms in the 1930s. A rise in deaths from tuberculosis likely led to the pronounced increase in the use of chest X-rays, which many life insurance companies no longer require due to the sharp decrease in the tuberculosis mortality rate. On the other hand, electrocardiograms, which have become lighter, more compact and more accurate to the extent that they can be used when a doctor makes a home visit, have become more important in line with increased emphasis on cardiovascular diseases. In Japan, company doctors and doctors under contract visit the homes of people applying for life insurance policies, which is not common practice in other countries.

Blood glucose tests were introduced in the 1960s, and blood tests including complete blood counts and biochemical examinations became widespread in the 1980s. Blood tests are now fundamental components of health examinations, and with their introduction the foundation of current underwriting requirements was firmly established. Current common blood tests are AST, ALT, GGT, TB, TP, HDL, LDL, TG, FBS, HbA1c, Cre, BUN, UA, WBC, RBC, Hb, Ht, and platelet count.

Some companies have included tumor markers such as CEA and PSA in their medical examinations since the 1990s, but few life insurance companies make tumor marker testing mandatory due to issues with sensitivity, specificity, costs, and explaining these tests to applicants. Questionnaires and or testing for HIV and recreational drug use are included in some countries, but are not currently used in health examinations in Japan because these issues have not reached high levels.

In Japan, medical examinations, which are not necessarily conducted by a doctor, include an applicant's declaration (non-medical), data collected by health interviewers, and the results of health checkups. The latter originated when the employers of applicants replaced actual medical examinations with a certification of examination results, due to the shortage of doctors in Japan following World War II. This system is not common internationally and is also increasingly less common in Japan, where applicants now typically submit the results of medical examinations to life insurers. Health checkups are advantageous for risk selection because they cover more issues than medical examinations. They also cost less, do not require the labor of a medical examination, and incur no risk of legal liability for medical examination mishaps. Moreover, more than 60% of people in Japan receive routine health checkups, so it has become common since the late 1990s for Japanese life insurance companies to only use the results of health checkups.

Health checkups can identify an applicant to be sub-standard because they check for a large number of issues and may therefore uncover disorders that the medical examination process does not. Insurance salespeople and agents therefore tend to prefer medical examinations over health checkups, so to cover themselves life insurance companies have in place measures such as paying higher sales fees (an incentive) to salespeople and adopting lower mortality ratios for health checkups. They typically credit the mortality ratio for health checkups by 25 to 50 points or by multiplying it by 0.85 to 0.95.

Consequently, policies underwritten through health checkups have achieved a good record for several reasons. One, applicants who have routine health checkups are generally more aware of their health, which supports the early detection of illness and outcomes that are better than for other groups in terms of clinical and preventive medicine. Two, health checkups can identify sub-standard risk because they cover a large number of issues, which can lead sub-standard applicants to gravitate to other companies, resulting in established pools of policyholders that tend to be completely standard risk. However, accurate health checkup data for applicants with illnesses enables more accurate underwriting, leading in many cases to policy conditions that are favorable rather than conservative. More favorable conditions, such as lower insurance premiums, are key for selling policies, and the ability to offer favorable conditions to applicants even if they are sub-standard risks keeps those applicants from taking their business to other companies.

Doctor shortages and medical examination issues after wars were similar outside Japan. Canada began issuing insurance based on non-medical examinations (a declaration only) rather than a medical examination in 1921 in response to the shortage of doctors because of their deployment during World War I, and non-medical examinations subsequently became a common means for risk selection in industrial insurance in the United States. Non-medical examinations first came into use in Japan in 1943 during World War II.

The use of health interviewers has evolved as a unique Japanese risk selection method. Inspired by exams for paramedics in the United States, health interviewers came into use in 1973. Health interviewers do not need nursing qualifications and are certified as health interviewers if they pass a test conducted by the Life Insurance Association of Japan. They do not measure blood pressure or perform urinalysis, but they do obtain a declaration from applicants and confirm abnormalities in appearance. However, many life insurance companies have discontinued the use of health interviewers due to limited risk selection, cost and efficiency issues including the time and effort required to educate them. Conversely, the life insurance companies that still employ health interviewers make sure interviewers are highly educated and have positive cost benefits.

4. Product Evolution and Underwriting

Whole life insurance was the primary product during the early years of the life insurance industry in Japan. However, endowment insurance subsequently became the primary product as the need for savings increased. Life insurance initially only handled standard risks, but began handling sub-standard risks in 1953. Initially, life insurance companies generally used the lien method for sub-standard risks, but increasingly employed the extra premium method and the exclusion of total permanent disability method as their understanding of sub-standard risks increased. The lien method for handling sub-standard risk is unique to Japan. Life insurance companies use this approach for diseases including malignant neoplasms for which the risk of death gradually decreases with the passage of time because this method reduces the sum insured should an insured event occur within a specified period

after the policy goes into force. As high-risk applicants are treated as postponed groups, who cannot purchase life insurance until they meet certain conditions, the lien method is only applicable to them after the specified period to meet such conditions has passed. The lien method is more attractive to Japanese people as they prefer a reduced sum insured over a short period to the burden of higher insurance premiums because few applicants think they will die during the lien period specified by the life insurance company. Postponed groups with high-risk of death are already excluded from such applicants. The table below details the lien method. Figures refer to the percentage of sum insured paid under the lien method.

Table 1: The Lien Method

Lien Period	1st Policy Year	2nd Policy Year	3rd Policy Year	4th Policy Year	5th Policy Year
1 year	50%	100%	100%	100%	100%
2 years	30%	60%	100%	100%	100%
3 years	25%	50%	75%	100%	100%
4 years	20%	40%	60%	80%	100%
5 years	15%	30%	45%	60%	80%

The development of various riders subsequently accompanied the development of death benefits, including term riders, hospital indemnity riders, lifestyle disease riders, nursing care riders, specified disease riders, and living needs riders. Eliminating anti-selection is especially important for life insurance with living benefits, and the 90-day waiting period for breast cancer in critical illness insurance is the result of extensive experiential data. (Insurance for all types of cancer now has a 90-day waiting period.)

Insurance products featured various riders providing generous benefits in the early 1990s, but consumer needs shifted to less expensive products during the subsequent economic crisis. These products included preferred insurance, non-participating insurance without policyholder dividends and insurance with no cash value at surrender. In particular, preferred insurance outside Japan requires that various criteria be met including a cotinine test, body mass index (BMI), blood pressure, lipid levels, medical history (including that of the family), hobbies, occupation, and driving history. In Japan, companies require that comparatively fewer criteria be met: a satisfactory cotinine test, BMI, blood pressure, and medical history, with some companies requiring driving history. In the latter half of the 1990s, the aging of society shifted the need for life insurance from death to living needs. Simple health insurance plans became popular and companies developed riders that excluded certain body parts or specific diseases in accordance with the medical history of applicants.

Competition among life insurance companies has intensified since the beginning of the 2000s. Companies have developed simplified issue products and guaranteed issue products to incorporate high-risk applicant groups such as sub-standard risk and postponed risk, but have focused greatest attention on competitive underwriting.

With investment yield margins and administrative expense margins under pressure, companies needed to generate mortality rate margins and increase earnings. Facultative reinsurance for life insurance became popular during this time, and the Underwriters Association of Japan (UWAJ) was established in 2006 as the importance of underwriting increased and became more apparent. That was more than 10 years after the Operation Management Committee of the Life Insurance Association of Japan visited Europe and the United States as a team to research underwriting overseas in 1987.

In the 2010s, product development for living needs rather than death benefits accelerated. Products included long-term care insurance, disability income insurance and health promotion insurance. Companies used experiential data for this kind of insurance with living benefits, even though there was little relevance to the situation they faced at that time. Analysis using big data also became an option, in some cases with the cooperation of reinsurance companies, but companies without experiential data could also develop similar products, and competition increased in conditions for coverage and premium rates. Such insurance products with living benefits also pose new challenges for underwriting life insurance based on experiential data, big data and clinical data. Japan has an aging society with increasingly healthy longevity, so Japanese underwriters must take on additional challenges. Notably, underwriting in Japan currently does not employ genetic testing due to issues including ethics and privacy.

At the same time, traditional underwriting is rapidly being deregulated. This includes major revisions to the proprietary underwriting guidelines companies use due to the accumulation of experiential data, simpler declaration forms, major revisions to medical examination standards, the incorporation of applicants in automated underwriting systems, and a reduction in the number of requisite tests due to fingertip blood sampling. The wave of unprecedented deregulation of underwriting standards will continue, and competition is likely to intensify further. Accurate estimation of protective value and the rapid introduction of accurate clinical data in addition to experiential data into underwriting are important. Cooperation among sections of underwriting and actuary, claims, marketing and risk management will also become more important.

5. Conclusion

As of this writing, COVID-19 is raging worldwide. The life insurance environment may change due to the economic crisis caused by COVID-19. However, humanity has overcome many major economic crises throughout history, including the Wall Street crash. We will certainly be able to overcome the current crisis, and underwriting will play its part. Insurance companies will need to continuously look for opportunities to provide insurance coverage to customers who have given up on insurance, and will need to remain cognizant of the need for low-cost premiums. Moreover, with a commitment to fair treatment of policyholders, companies will update underwriting and provide relief to people facing difficulties. The night may seem long, but dawn always comes.

4. Trends in Japan's Non-Life Insurance Industry

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1. The Operating Environment of the Non-Life Insurance Industry

The GDP of Japan ranks third in the world and its economy has continued to grow moderately in recent years. However, Japan's population has been declining since 2008, and its low birthrate and aging population are expected to continue.

Looking at the Japanese non-life insurance market, automobile insurance currently accounts for about half of net premium income of direct non-life insurance companies. Factors including new advances in automated driving technology are projected to change the structure of the industry.

Non-life insurance companies in Japan are targeting further growth by accelerating overseas business, developing new markets by providing new products and services, and implementing initiatives to increase operating efficiency.

2. Overview of the Non-Life Insurance Industry

(1) Status of Non-Life Insurance Companies and Cooperatives

Japan's non-life insurance industry comprises 28 Japanese non-life insurance companies that are members of the General Insurance Association of Japan (GIAJ) and 19 companies that are members of the Foreign Non-Life Insurance Association of Japan, Inc. (FNLIA). Japan's non-life insurance market is an oligopoly in which the three largest non-life insurance groups (in alphabetical order; MS&AD Insurance Group Holdings, Inc., Sompo Holdings, Inc. and Tokio Marine Holdings, Inc.) account for 7,524 billion yen, or 87%, of net premium income, 8,609 billion yen, written by the 28 GIAJ members as a whole.

Japan's non-life insurance companies have increased operating efficiency since liberalization of the insurance industry in 1996, and have conducted mergers and business integrations since 2000. As a result, for all non-life companies, the underwriting expense ratio (other than commission and brokerage) in fiscal 2019 decreased to 15%, compared with 21% for all non-life insurance companies in the industry for fiscal 1995, prior to liberalization.

One recent development among major Japanese insurance companies is that Sompo Japan Nipponkoa Insurance Inc. changed its name to Sompo Japan Insurance Inc. on April 1, 2020.

The cooperative market is another area of note, as it has a presence that is second only to the non-life insurance market in terms of premium volume. Even if we look only at the main cooperatives that make up the Japan Cooperative Insurance Association Incorporated, they alone had premium income of 2,959 billion yen in fiscal 2018 (excluding life cooperatives and pension cooperatives).

Furthermore, Small Amount, Short Term Insurance ("SASTI") business was introduced in Japan following an amendment to the Insurance Business Act in April 2006 and SASTI companies are now providing customers with non-life insurance cover. As the name implies, this business is limited mainly to selling insurance in small amounts with limited terms. On the other hand, regulations now make it possible for companies that are not insurance companies to enter this business much more easily than in the case of establishing a new insurance company. For example, companies need only to register and need not to be licensed by the FSA to operate, the minimum capital required is 10 million yen compared to 1 billion yen for an

insurance company, and participants may sell both life and non-life insurance. The number of member companies of The Small Amount & Short Term Insurance Association of Japan continues to grow and the scale of the market by premium volume has expanded to approximately 91.4 billion yen. Non-life insurance products sold in this market are mainly renters insurance, including fire insurance for the home contents of renters and rental housing liability insurance sold through the real estate agent channel, pet insurance and pecuniary insurance.

The Small Amount & Short Term Insurance Market Data

Figure 1: Member Companies

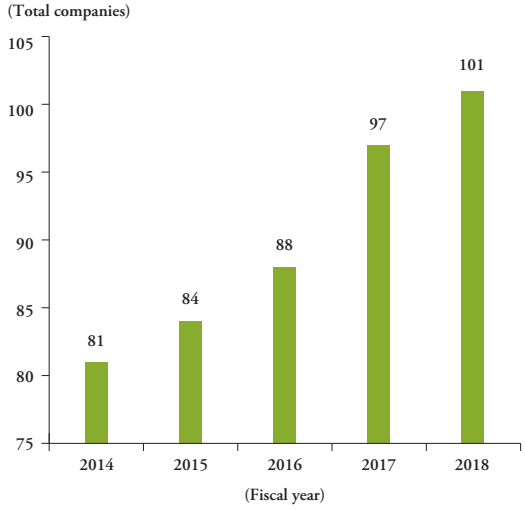
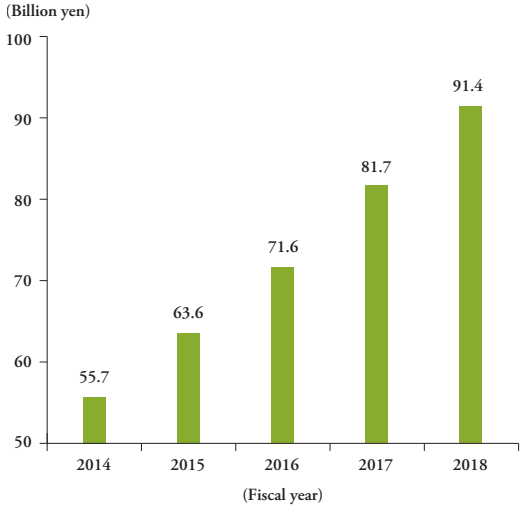


Figure 2: Premium Income (excl. Life and Medical Insurance)



Source: The Small Amount & Short Term Insurance Association of Japan

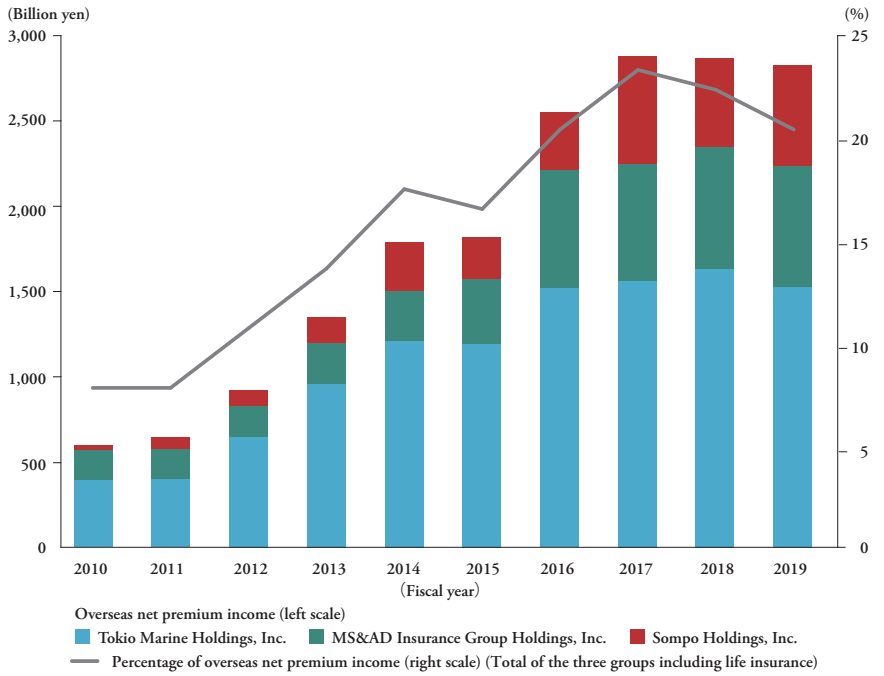
(2) Overseas Business Trends

The three largest non-life insurance groups have all positioned overseas business as a growth driver, and have aggressively implemented initiatives such as forming business alliances with local insurance companies and engaging in M&A.

Figure 3 shows overseas net premium income* for the three largest non-life insurance groups. It decreased year on year in fiscal 2019 because Tokio Marine Holdings sold reinsurance subsidiaries, as described later, but overall has been trending upward. Overseas net premium income for these insurance groups in fiscal 2019 was about 5 times that of fiscal 2010, and overseas business accounted for approximately 21% of net premium income for the three largest non-life insurance groups.

* In this section, "overseas net premium income" shows the total of net premium income from non-life insurance and life insurance premiums.

Figure 3: Trends in Overseas Net Premium Income for the Three Largest Non-Life Insurance Groups



The three largest non-life insurance groups have adopted similar strategies in targeting growth opportunities in emerging markets and expanding specialty lines in developed markets. Key overseas business developments of the three largest non-life insurance groups and recent trends are as follows:

MS&AD Holdings is particularly focused on business in Asia. Mitsui Sumitomo Insurance acquired the Asian general insurance operations of U.K. company Aviva plc in 2004, and is using its non-life insurance businesses in Asia as its base for advancing into the ASEAN region. It also enhanced its Asian presence by acquiring Singapore insurer First Capital Insurance Limited in December 2017. In other markets, it strengthened its reinsurance business and specialty lines by completing the acquisition of Amlin plc of the United Kingdom in 2016.

Sompo Holdings acquired leading U.K. specialty (re)insurer Canopius Group Limited in 2014. In addition, it significantly expanded its overseas business in 2017 by completing the acquisition of Endurance Specialty Holdings Ltd. (now called Sompo International). Also in 2017, Sompo Holdings restructured its overseas business, making Sompo International the core overseas insurance business of the group, and selling all Canopius shares to a private equity investor.

Tokio Marine Holdings has pursued growth opportunities in its overseas business by acquiring businesses in emerging countries, as well as insurance companies with strong specialty lines in developed countries, particularly in Europe and the United States, such as Kiln Ltd. of Lloyd's in the U.K., Philadelphia Consolidated Holding Corp. of the U.S. in 2008, Delphi Financial Group, Inc. of the U.S. in 2012 and specialty insurance group HCC Insurance Holdings, Inc. of the U.S. in October 2015. Further, in February 2020 it completed the acquisition of

Privilege Underwriters, Inc., which specializes in the U.S. market for personal insurance and risk management services for high net worth individuals and families. At the same time, Tokio Marine Holdings sold its reinsurance subsidiaries, Tokio Millennium Re AG and Tokio Millennium Re (UK) Limited in 2018 and reviewed its business portfolio.

(3) Trends in Business Results of Non-Life Insurance Companies for Fiscal 2019

Earnings decreased in fiscal 2019 for Japan's non-life insurance companies because of additional provision for catastrophe loss reserves even as the amount of natural disasters decreased year on year. The following is a summary of the main financial results (total) of the 28 non-life GIAJ members in fiscal 2019.

Net premium income in all lines of business increased by 216 billion yen from the previous fiscal year to 8,609 billion yen.

Net claims paid (paid basis) decreased by 297 billion yen to 5,026 billion yen because claims of typhoons and other natural disasters that impacted Japan decreased. As a result, the loss ratio for fiscal 2019 decreased by 5.2 percentage points to 63.9%.

Expenses increased by 82 billion yen to 2,807 billion yen because of higher earnings and an increase in Japan's consumption tax. The net expense ratio increased by 0.1 percentage points to 32.6%.

Underwriting profit (earned/incurred basis) decreased by 98 billion yen to 94 billion yen year on year because of additional provision for catastrophe loss reserves despite the positive factors above.

Ordinary profits, calculated as the sum of underwriting profit and investment profit, decreased by 267 billion yen to 596 billion yen. The decrease reflected the downward trend of the sale of subsidiaries and strategic equity holdings by several insurance companies in the previous year, along with the decrease in share prices related to COVID-19. After deducting tax expense, net income decreased by 218 billion yen to 457 billion yen.

Consolidated results for the three largest non-life insurance groups benefited from the strong performance of overseas subsidiaries. However, ordinary profits decreased year on year because of the decrease in net income of main non-life insurance companies of each group in Japan discussed above.

3. Recent Non-Life Insurance Industry Trends

(1) Natural Disasters in Fiscal 2018 and 2019

As in fiscal 2018, Japan suffered from many wind and flooding disasters in fiscal 2019. Wind and flooding claims paid in one year were the highest ever in fiscal 2018 and the second highest ever in fiscal 2019. Details of the major wind and flooding disasters in Japan in fiscal 2018 and fiscal 2019 are as follows:

Table 1: Major Wind and Flooding Disasters in Japan in Fiscal 2018 and Fiscal 2019

	2018			2019		
Name of Loss	Heavy Rain in Western Japan (Typhoon No. 7)	Typhoon No. 21 (Jebi)	Typhoon No. 24 (Trami)	Typhoon No.15 (Faxai)	Typhoon No.19 (Hagibis)	Heavy Rain in Chiba
Number of claim payments	Total 55,320	Total 857,284	Total 412,707	Total 383,585	Total 295,186	Total 11,283
	Motor 25,110	Motor 113,915	Motor 29,322	Motor 36,879	Motor 48,038	Motor 5,766
	Fire 24,146	Fire 718,862	Fire 370,968	Fire 337,065	Fire 230,439	Fire 4,921
	Misc. 6,064	Misc. 20,811	Misc. 12,417	Misc. 9,641	Misc. 16,709	Misc. 596
	Marine —	Marine 3,696	Marine —	Marine —	Marine —	Marine —
Total amount of claims paid (Million yen)	Total 195,595	Total 1,067,806	Total 306,091	Total 465,612	Total 582,604	Total 23,853
	Motor 28,307	Motor 77,981	Motor 11,459	Motor 25,818	Motor 64,519	Motor 7,707
	Fire 151,991	Fire 920,227	Fire 285,595	Fire 424,426	Fire 475,058	Fire 15,451
	Misc. 15,297	Misc. 16,069	Misc. 9,037	Misc. 15,367	Misc. 43,025	Misc. 694
	Marine —	Marine 53,528	Marine —	Marine —	Marine —	Marine —

Note: Numbers and amount of Miscellaneous Casualty Loss include those of Accident.
Source: GIAJ (The General Insurance Association of Japan)

The damage caused by Typhoon No. 15 (Faxai) in 2019 was mainly due to strong wind. Faxai made landfall in Chiba Prefecture (a prefecture to the east of Tokyo) with maximum instantaneous wind velocity recorded at multiple points that was the highest since the start of statistical recording. Consequently, the number of residential claims paid reached 330,000. While large, this figure was lower than for Typhoon No. 21 (Jebi), which caused a great deal of damage to Kansai in 2018.

Typhoon No. 19 (Hagibis) was very large and powerful. Damage from river flooding caused by heavy rain was a standout feature of this typhoon. Consequently, as shown in the table above, insurance claims paid per policy was higher than Jebi in 2018.

Thus Japan suffered large-scale wind and flooding disasters for the second consecutive year. Factors such as rising seawater temperatures near Japan may be increasing typhoon intensity and tail risk.

The reference loss cost rate of residential fire insurance was raised in Japan in October 2019 by 4.9% on a national average because of the recent major natural disasters. Direct non-life insurance companies revised their premium rates for residential and commercial fire insurance accordingly. Additional premium rate revisions are expected to take effect in January 2021, so fire insurance results should therefore improve in Japan.

Japan's direct non-life insurance companies have dealt with this series of natural disasters by improving their organizational system for claims handling, and introducing new rapid response initiatives including the use of smartphones and tablets for remote assessment of claims, the use of drones to survey damage and the use of robotic process automation (RPA) for handling accident claims and operations processing.

(2) Innovation

The insurance industry has embraced the term "InsurTech" to refer to the fusion of insurance and information technology. Japan's direct non-life insurance companies are

encouraging innovation in non-life insurance products and their operations processes.

Artificial intelligence (AI) has been used to help address customer inquiries at call centers, and other initiatives to use AI with greater sophistication have been implemented in recent years. Damage assessment is one example. Initiatives are underway to automate insurance claim calculation and for the allocation of fault for automobile accidents through AI analysis of images taken with smartphones and drive cams. AI is also being used in insurance underwriting to automate screening. Progress among non-life insurance companies in deploying AI in their operations will support improved customer satisfaction by increasing speed and efficiency, and enhancing objectivity and rationality in customer services.

Companies are also applying blockchain (distributed ledger) technology to insurance policies. Several non-life insurance companies got together in a consortium to apply blockchain technology to trade operations in 2017, and some companies conducted demonstration tests independently. The actual application of blockchain technology to insurance policies is expected to optimize business processes, which will dramatically accelerate procedures and improve the quality of the services that non-life insurance companies provide, in addition to enhancing security.

In addition to automobile manufacturers, non-life insurance companies are also participating in the development of vehicles with automated driving technology. Insurance companies are selling insurance that covers risks related to automated driving demonstration tests, and are providing driving data collected using the Internet of Things (IoT) and their historical claims records of past accidents, along with expertise in accident risk prevention and damage mitigation enabled by these data. In addition, they are providing insurance products for risks associated with automated driving technology, including riders for accident victims of automated driving in cases where the driver responsibility of the automated vehicle cannot be verified immediately. In this way, non-life insurance companies are contributing to the development of automated driving technology, while working to ensure that society is secure and safe by developing insurance products that support the increasing prevalence of automated driving.

Other non-life insurance company initiatives include investment in and alliances with technology startup companies and the creation of a framework for promoting open innovation.

(3) Impact of the Revision of Japan's Statutory Interest Rate

Revisions to the Civil Code that came into effect on April 1, 2020 reduced the statutory interest rate to 3% from 5% per annum in light of the low interest rate environment associated with Japan's negative interest rate policy in recent years.

This has led to the reduction of the discount rate for calculating the present value of lost future profits, which causes concern about higher insurance payouts, mainly for automobile and accident insurance. Consider the example of an insured with an annual income of 5 million yen whose permanent condition after an accident causes him/her to lose 100% of his/her ability to work at the age of 32. The personal injury insurance payout would be about 80 million yen with a

statutory interest rate of 5%, but would be about 110 million yen with a statutory interest rate of 3%.

The reduction of the statutory interest rate coupled with the increase in the consumption tax rate from 8% to 10% on October 1, 2019 led some direct non-life insurance companies to revise premium rates because of their concern about increased insurance payouts.

(4) Impact of COVID-19 on Japan's Non-Life Insurance Industry

COVID-19 has also affected Japan's non-life insurance industry.

Casualty insurance products with riders providing coverage for infectious diseases incurred claim payments, and insurance companies also recognized impairment and valuation losses on shareholdings and other assets in investment side. These factors impacted earnings of non-life insurance companies in fiscal 2019.

Net premium income from accident and marine insurance may decrease because people and insured assets are moving less than in average years.

In addition, the United States and Europe may have the potential to implement regulatory revisions that require payment of business interruption claims that are not the result of property damage, which could particularly affect companies that are part of Japan's three largest non-life insurance groups.

(5) Trends in Regulation by Regulatory Agencies

Given changes in the financial environment and priorities, over the past several years the Financial Services Agency (FSA) has recognized the importance of broadening its view of financial administration from "*the Form*" to "*the Substance*," from "*the Past*" to "*the Future*," and from "*Element by element analysis*" to "*Holistic analysis*" to achieve the goals of financial administration. Moreover, the FSA's program to achieve its goals involves inculcating principles-based inspection and supervision that emphasizes dialogue with financial institutions, and executing various initiatives that add to the requisite quality and depth. Specifically, the FSA has foregone universal, generalized monitoring of financial institutions in favor of dialogue-based monitoring that focuses on priority themes and issues at each financial institution. The FSA then obtains feedback to make improvements based on monitoring results. The FSA has also announced several case studies of financial institution initiatives and issues elucidated by this approach to monitoring.

In Japan, the FSA is examining evaluation and supervisory methods based on economic value in parallel with the introduction of the Insurance Capital Standard (ICS) by the International Association of Insurance Supervisors (IAIS). Solvency assessment based on economic value is central to this regime, and will likely come into force in line with the ICS application schedule (to be introduced in fiscal 2025 as a full-fledged regulation after a five-year monitoring period).

The FSA has noted that introducing the economic solvency ratio into the regulatory regime may bring unexpected consequences, such as excessively risk-averse behavior among insurance companies. Therefore, it is investigating possible unintended consequences and international trends while continuing its examination with emphasis on dialogue with relevant parties.

5. Trends in Japan's Life Insurance Industry

Life Underwriting & Planning Department
The Toa Reinsurance Company, Limited

1. Overview of Business Results for Fiscal 2019

The fiscal 2019 business results for 42 life insurance companies are as follows:

(1) Total Amount of New Business

During the fiscal year ended March 31, 2020 (fiscal 2019), the total insured amount of new business for individual life decreased by 25.5% to 49.7 trillion yen. The total insured amount of new business for individual annuity insurance decreased by 0.9% to 5.3 trillion yen. The total insured amount of new business for group insurance decreased by 3.5% to 4.6 trillion yen.

(2) Total Amount of In-force Business

The total insured amount of in-force business for individual life decreased by 2.2% year-on-year to 829.9 trillion yen, which was essentially unchanged from the previous fiscal year despite a decrease in the total insured amount of new business. Similar to the trend of total insured amount of new business for individual insurance, the total insured amount of in-force business for individual annuity insurance decreased by 1.8% to 102.5 trillion yen. On the other hand, the total insured amount of in-force business for group insurance increased by 1.6% to 398.1 trillion yen.

(3) Premium Revenues and Total Assets

Total premium revenues decreased by 6.4% year-on-year to 33 trillion yen. Total assets increased by 1.3% to 392.7 trillion yen due to the increase in government bonds.

2. Trends in the Life Insurance Industry Brought on by COVID-19

(1) How Life Insurance Companies in Japan Have Addressed the Spread of COVID-19

Life insurance companies in Japan have addressed the spread of COVID-19 with some unconventional measures. For one, many life insurance companies have decided to cover deaths due to COVID-19 under accidental death benefit riders as an additional benefit, in addition to ordinary death benefit cover, to meet societal demands.

Furthermore, in some areas of Japan the number of available hospital beds has decreased in line with the rapid increase in the number of people infected with COVID-19, so based on the doctor's discretion patients with mild cases of COVID-19 have been treated at home or at hotels. At the urging of the government, life insurance companies have adopted various measures to deal with this situation. One example is the payment of hospital benefits for the insured receiving medical treatment, not only at a hospital but also at home or at hotels, on condition that they submit a doctor's medical certificate or something similar. Furthermore, life insurance companies have taken steps to expand payment of outpatient benefits for online medical treatment, which has come into broad use to reduce contact among people. In a related initiative, Tokio Marine & Nichido Life Insurance Co., Ltd. has begun to offer its policyholders and the insured free online medical consultation services for a limited time with strategic alliance partner MedicalNote, Inc. This initiative helps to

relieve anxiety about health and reduce the risk of infection.

In addition to expanding insurance benefit coverage, life insurance companies have decided to extend the grace period for premium payments for up to six months. This decision was driven by the fact that the widening impact of COVID-19 has made it very difficult for policyholders and insurance companies to adopt a 'business-as-usual' approach. Some insurance companies have also temporarily reduced interest rates on policyholder loans to support the cash flow of corporations whose business is affected by COVID-19. The rationale was that, with the suspension of operations of certain businesses such as restaurants in line with local government directives once the national government declared a state of emergency, demand for cash flow support would likely increase further for corporations in such industries.

Life insurance companies must continue to contribute to the stability of society by responding flexibly and promptly to the growing impact of COVID-19 and the resulting anxiety it has caused among people in Japan.

(2) Impact of the Spread of COVID-19 on Life Insurance Companies

COVID-19 cases in Japan numbered 14,000 by the end of April 2020, and deaths totaled more than 430. However, the number of deaths due to COVID-19 per 100,000 people in Japan is still one-tenth the rate in Europe and the United States. While the situation requires careful attention as the infection rate may yet again trend upward, the impact of payment of death and hospital benefits due to COVID-19 on life insurance companies would appear to be limited.

On the other hand, the negative impact of COVID-19 on financial markets is having a significant impact on the life insurance industry. The decline in interest rates and stock prices overseas led Dai-ichi Life Holdings, Inc. to revise its initial 226 billion yen forecast for consolidated net income downward to 17 billion yen, before settling on 32 billion yen. The impact on life insurance products is also evident. An increasing number of insurance companies have suspended sales of popular foreign currency-denominated insurance products because the sharp decline in long-term interest rates overseas means that product yields can no longer be expected.

COVID-19 has also begun to affect insurance sales. In recent times, life insurance sales channels in Japan have become more diverse and the number of inquiries and sales via the Internet has been increasing, but sales representatives at insurance companies are still the main source of sales. A recent survey indicated that sales representatives account for 53.7% of sales in all channels. However, in the current environment life insurance companies have no choice but to refrain from face-to-face sales in order to prevent the spread of COVID-19. This may negatively affect sales of life insurance policies.

The impact of COVID-19 will be prolonged, as will interest in the strategies life insurance companies employ in this challenging environment.

3. Trends in the Life Insurance Industry

(1) Stronger Supervision to Protect Consumers

In recent years, the Financial Services Agency (FSA) has strengthened supervision of insurance companies to protect consumers. One reason is that consumers may be having difficulty selecting the most appropriate insurance product due to the increasing complexity of insurance products and diversity of sales methods. Moreover, consumers risk being disadvantaged by the excessive focus on sales that has resulted from intensifying competition.

Most recently, the FSA strengthened supervision over the sale of foreign currency-denominated products in order to protect consumers. This move was driven by an increase in problems, mainly between elderly consumers and life insurance companies, that resulted from insufficient explanation of product risks. Marketing materials were often vague or misleading, making it easy to confuse the interest rate on the cash value portion of the policy with the policy's real rate of return in a series of cases. This led the FSA to force insurance companies to make improvements. For example, the FSA provided guidance that pointed out that the marketing materials used in sales almost never clearly defined the interest rate on policy cash value, and that regional banks may be selling such policies without clearly explaining their risks.

Against a background of assiduously promoting consumer protection, in 2019 inappropriate sales by Japan Post Insurance came to light. Improper tactics for selling new policies based on conversions from existing policies was the issue. Some Japan Post Insurance salespeople were providing misleading explanations about the period in which a policyholder can cancel an existing policy. The explanations were factually inaccurate. Some customers who adopted conversion of their policies were therefore disadvantaged through double premium payment or periods during which they did not have coverage. The FSA took this situation very seriously, and imposed administrative actions on Japan Post Insurance on December 27, 2019. The actions involved a three-month business suspension order and a business improvement order, and were the most stringent ever imposed on a major life insurance company. The FSA indicated that a sales structure that excessively emphasized sales results and dysfunctional governance at Japan Post Insurance were the cause of the inappropriate sales.

Amid this challenging and rapidly changing business environment, some tactics for selling insurance neglect consumer protection. In selling insurance products, insurance companies must take actions after reaffirming their social responsibilities.

(2) Insurance Products

In January 2020, justInCase, Inc. launched Japan's first peer-to-peer (P2P) cancer insurance product, Warikan Hoken. P2P, a term related to networks, originated as a communication method through which users do not access a server as in the usual client-server method. Instead, users communicate directly with one another in P2P, thus forming a network more like a spider's web. The product name "*Warikan*" is a Japanese expression that basically suggests that all members of a group will share the expense of a drinking session equally ("*Hoken*" means insurance).

Warikan Hoken collects money using a method similar to P2P. For most insurance products, policyholders typically obtain insurance coverage by paying an actuarially calculated premium. The premium for Warikan Hoken, however, is not determined using an actuarial model, but by multiplying claims paid for the entire portfolio by an administrative cost coefficient and dividing that total by the number of policyholders. For example, the insurance premium is zero in any given month with no claims paid, and in fact, the premium from February 2020 to April 2020 was 0 yen. In addition, the maximum monthly premium paid by each policyholder is capped even if insured events occur frequently in that month, so policyholders do not bear unexpectedly large expenses. With Warikan Hoken it is possible to set lower premiums because policyholders are themselves responsible for the risk buffer insurance companies usually incorporate into insurance premiums of typical insurance products.

However, the design of this product has given rise to concerns about its resilience to moral risk and significant stress. CEO Kazuo Hata of justInCase addressed these concerns by commenting to the media that the potential for fraudulent claims is low because they are particularly difficult for cancer insurance products. He also indicated that justInCase will negotiate with the authorities about funding reserves to withstand stress.

Warikan Hoken has been receiving extensive media attention since before its launch because it is a system in which policyholders directly fund claims paid, and also because of its unique name and ability to offer premiums that are lower than for typical insurance. This product is currently in a trial period, but it has the potential to change the Japanese market if it demonstrates utility. Its performance and sales trends will therefore remain of great interest.

(3) Sales Channels

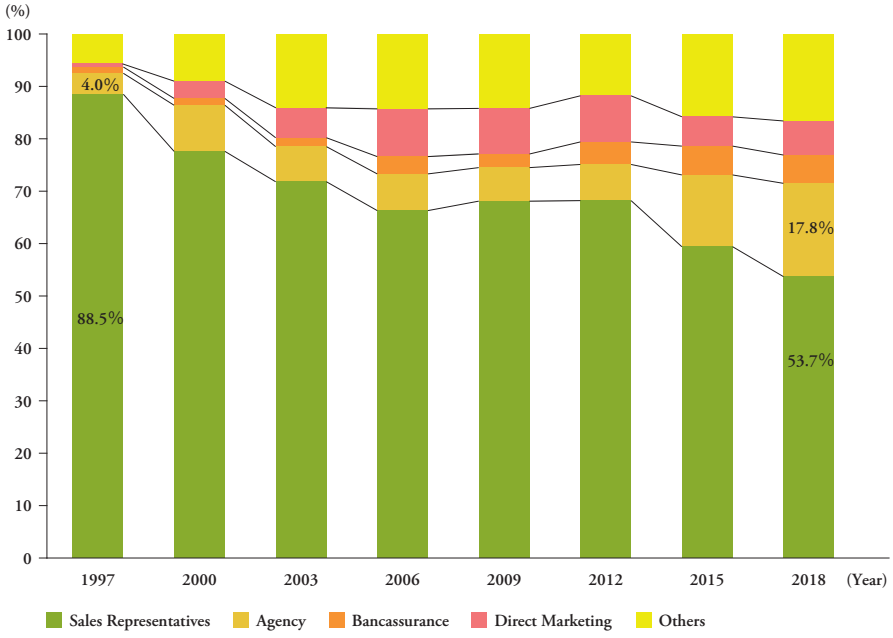
In Japan, sales representatives have traditionally been the primary sales channel of life insurance, and accounted for more than 85% of sales in all channels until 1997. However, sales channels are becoming more diverse in line with diversifying insurance products and consumer needs, with particular growth in the share of agency sales in recent years. A 1997 survey indicated that the agency sales channel accounted for 4.0% of total sales, but a 2018 survey showed that share had jumped to 17.8%. This was the largest share gain among all sales channels.

Given these circumstances, even major life insurance companies that have relied on their own sales representatives as their primary sales channel are strengthening their structures for agency sales by launching group companies to handle products suitable for the agency channel. In 2009, Sumitomo Life Insurance Company established subsidiary Medicare Life Insurance Co., Ltd., and in 2015, Dai-ichi Life Group launched subsidiary The NeoFirst Life Insurance Company, Limited. More recently, in 2019 Nippon Life Insurance Company launched subsidiary Hanasaku Life Insurance Co., Ltd. Major life insurance companies that have relied on sales by their own sales representatives have differentiated their own products and the products for the agency channel that their subsidiaries handle to expand agency channel sales, which are in

increasing demand. Such subsidiaries handle products that feature comparatively lower prices, have a simple design, and are easy to combine.

Sales representatives are still the mainstream sales channel of life insurance in Japan, but sales channels are changing as insurance products and customer needs diversify. Japanese society has been slow to embrace online lifestyles such as working from home remotely, but the spread of COVID-19 may drive a rapid move to such online lifestyles and further transform the social environment. Actually, Meiji Yasuda Life Insurance Company has decided to start selling insurance products online in April 2021. This will be the first instance of online sales for major life insurance companies in Japan. The background of this decision to open an online sales channel was the concern about a second wave of COVID-19. Given this situation, the life insurance industry is accelerating the shift from the traditional business model of face-to-face sales by sales representatives, and multichannel sales are likely to gain momentum.

Figure 1: Diversification of Sales Channels



Note: The graph shows the breakdown of the number of new policies.

Company Overview

Profile

The Toa Reinsurance Company, Limited (Toa Re), was established in 1940. With the reinsurance market evolving and clients' needs expanding, we have recognized the importance of being able to provide a diverse line of life and non-life reinsurance products to lead the market as Japan's primary professional reinsurer. Toa Re is based in Tokyo with subsidiaries in New Jersey (U.S.A.), Zürich (Switzerland) and London (U.K.). Increasing demand for reinsurance products in Asian countries prompted us to expand our operations in those regions and establish branch offices in Singapore, Kuala Lumpur and Hong Kong.

In acknowledgment of Toa Re's outstanding financial profile, credit rating agencies, Standard & Poor's Financial Services LLC, A.M. Best Company, Inc. and Japan Credit Rating Agency, Ltd., have assigned Toa Re ratings of A+, A and AA+, respectively. As of March 31, 2020, the Toa Re Group boasted total assets of 711.6 billion yen. Net premiums written during the fiscal year ended March 31, 2020 totaled 270.2 billion yen.

Mission Statement

ToaRe Mission Statement

Providing Peace of Mind

Toa Re aims to realize its mission by

working with society and applying the principles of fairness and integrity to all aspects of our business

offering long-term, solid support to our clients by supplying reinsurance products and services that enable them to maintain stable operations

striving to further the interests of our shareholders and keeping them fully informed at all times

respecting the creativity of our employees and valuing their contributions

conserving the environment and contributing to the community

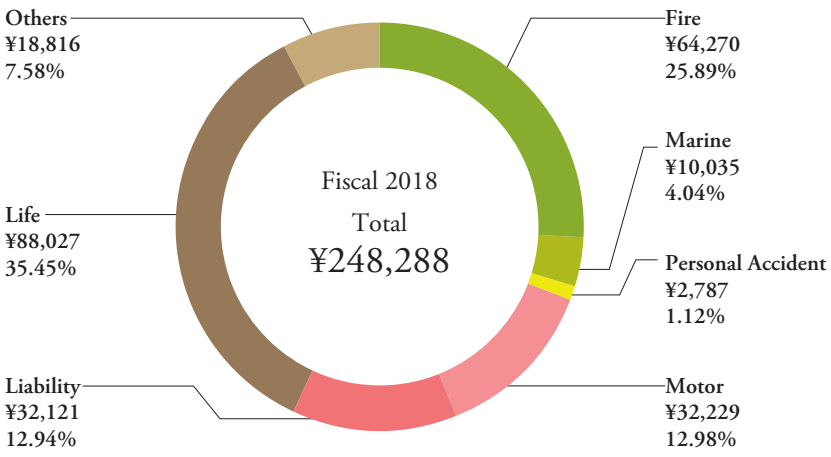
Consolidated Financial Highlights

	Million yen					Thousand U.S. dollars
	2020	2019	2018	2017	2016	**2020**
For the year ended March 31						
Ordinary income	**¥297,757**	¥266,625	¥254,934	¥251,462	¥245,114	**$2,735,982**
Net premiums written	**270,252**	248,288	237,911	223,749	223,786	**2,483,249**
Ordinary profit (loss)	**88**	(7,390)	9,857	14,022	9,655	**808**
Net income (loss) attributable to owners of the parent	**(2,141)**	(7,150)	9,191	10,512	5,674	**(19,672)**
As of March 31						
Total net assets	**167,141**	179,944	200,550	191,907	180,826	**1,535,798**
Total assets	**711,690**	694,088	687,950	698,418	688,242	**6,539,465**

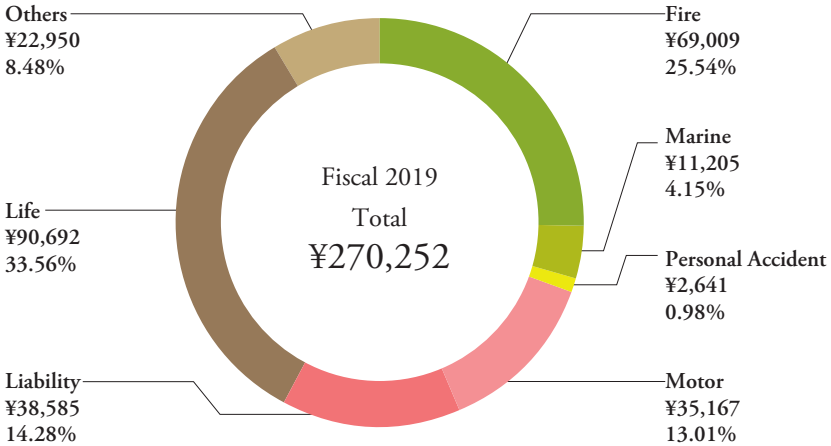
(Rate: ¥108.83 = US$1)

Net Premiums Written by Class (Consolidated Basis)

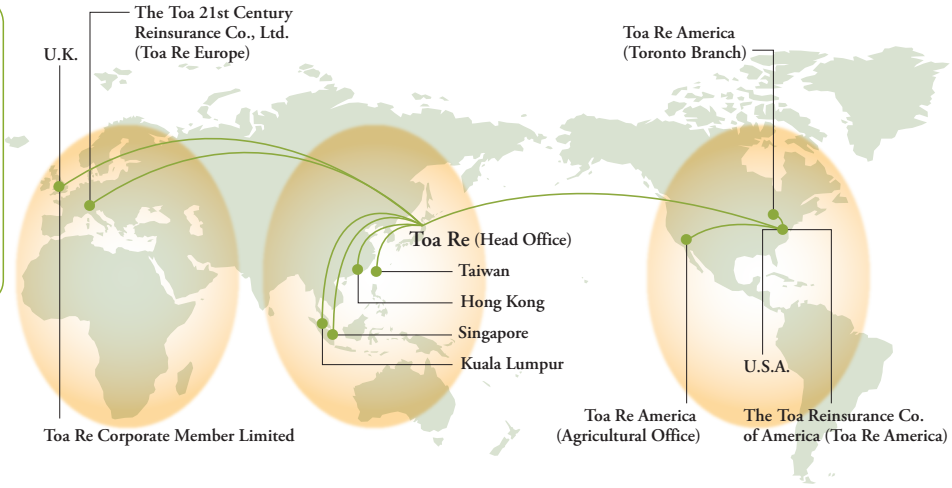
(Million yen)



(Million yen)



Overseas Network



Locations

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Supplemental Data: Results of Japanese Major Non-Life Insurance Companies for Fiscal 2019, Ended March 31, 2020 (Non-Consolidated Basis)

(Unit: Million yen, %)

		MS&AD Holdings		Tokio Marine Holdings		Sompo Holdings	Toa Re
		Mitsui Sumitomo	Aioi Nissay Dowa	Tokio Marine & Nichido	Nisshin	Sompo Japan	
Net Premiums Written	**Fiscal 2019**	**1,547,930**	**1,276,770**	**2,247,508**	**148,850**	**2,184,750**	**208,029**
	Fiscal 2018	1,512,449	1,233,581	2,166,627	143,798	2,148,632	194,952
Net Claims Paid	**Fiscal 2019**	**888,652**	**724,662**	**1,353,232**	**86,704**	**1,301,872**	**150,083**
	Fiscal 2018	910,965	770,582	1,379,707	90,161	1,377,796	143,824
Underwriting Profit (Loss)	**Fiscal 2019**	**7,351**	**1,126**	**38,490**	**2,789**	**43,113**	**(4,320)**
	Fiscal 2018	47,335	15,555	89,199	1,509	41,990	(1,215)
Ordinary Profit (Loss)	**Fiscal 2019**	**89,113**	**58,615**	**223,945**	**5,785**	**182,387**	**4,486**
	Fiscal 2018	226,476	61,382	315,370	5,069	215,537	4,088
Net Profit (Loss) for the Year	**Fiscal 2019**	**94,079**	**44,784**	**169,966**	**3,757**	**130,579**	**1,466**
	Fiscal 2018	171,102	37,307	261,384	4,403	175,708	1,686
Total Assets	**Fiscal 2019**	**6,686,089**	**3,420,733**	**9,192,693**	**381,758**	**7,166,057**	**492,360**
	Fiscal 2018	6,977,145	3,410,989	9,393,039	396,474	7,515,887	505,486
Ratio 1 Loss Ratio (%)	**Fiscal 2019**	**63.3**	**62.0**	**65.2**	**64.8**	**64.9**	**72.2**
	Fiscal 2018	66.3	67.8	68.8	69.5	69.8	73.8
Ratio 2 Expense Ratio (%)	**Fiscal 2019**	**32.0**	**34.5**	**30.8**	**33.4**	**32.4**	**24.8**
	Fiscal 2018	31.6	33.8	30.6	34.2	32.1	25.2
Ratio 3 Yield on Investments (Income) (%)	**Fiscal 2019**	**1.94**	**2.36**	**2.78**	**1.57**	**2.50**	**1.89**
	Fiscal 2018	2.18	2.22	3.35	1.48	2.45	1.88
Ratio 4 Yield on Investments (Realized Gains/Losses) (%)	**Fiscal 2019**	**2.53**	**3.06**	**3.81**	**1.89**	**3.39**	**2.84**
	Fiscal 2018	4.34	2.60	4.45	2.02	4.13	1.70
Ratio 5 Solvency Margin Ratio (%)	**Fiscal 2019**	**701.3**	**702.3**	**815.2**	**1,115.3**	**717.3**	**707.0**
	Fiscal 2018	723.2	688.2	825.4	1,219.9	722.2	812.8

Sources: Each company's financial statements of fiscal 2019

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