

# TRANSFORMATIVE

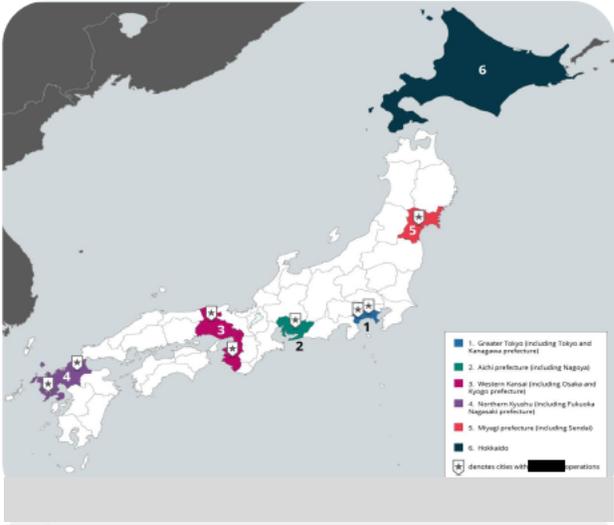
**JAPAN DISASTER SCENARIOS for business continuity planning**  
**(Delivered to Large Tokyo-based multinational, Q3 2018)**



September 9, 2018

## ▶ Sub-regions and their demarcations

Figure 2: Sub-regions for business continuity assessment



- ▶ **Sub-region 1: Greater Tokyo**  
(including Tokyo and Kanagawa prefecture)
- ▶ **Sub-region 2: Aichi prefecture**  
(including Nagoya)
- ▶ **Sub-region 3: Western Kansai**  
(including Osaka and Hyogo prefectures)
- ▶ **Sub-region 4: Northern Kyushu**  
(including Fukuoka and Nagasaki prefectures)
- ▶ **Sub-region 5: Miyagi prefecture**  
(including Sendai)
- ▶ **Sub-region 6: Hokkaido**

## Scenario 1: Mt. Fuji Eruption Destroyed Infrastructure, Disrupts Communications and Transport

### Affected Areas: Sub-Region 1 (Greater Tokyo)

**10:01 am Tokyo Time:** Japan’s tallest and iconic volcano, Mt. Fuji, erupts for the first time since 1707. Having been considering dormant for decades, pressure in the huge volcano’s magma chambers began rising after the 2014 magnitude 9 Tohoku quake. The eruption tears a massive hole in the south face of the peak, sending a pyroclastic flow of steam and debris crashing into the city of Fuji just to its south. All



communications with the city fails and ballistic debris and ash begin to stress and collapse some bridges, railways, roads and other infrastructure as far as 80 km. from the eruption.

**10:15 am:** Japan's cabinet declares a state of national emergency, mobilizing the Japan Defense Forces (JDF) and civil defense to help institute evacuation and rescue plans. Trading is halted on the Tokyo stock exchange and some companies in the Greater Tokyo area begin letting staff leave to check on loved ones.

**11:00 am:** Evacuation plans calling for the evacuation of over 550,000 people in Shizuoka, Yamanashi and Kanagawa prefectures are hampered by the continuing rain of ash and debris emanating from the shattered mountain. Tokyo's northern precincts, lying just 77 kilometers from the mountain, have ground to a halt.

**11:22 am:** Ash has forced the closure of Narita and Haneda airports and the country's Fire and Disaster Management Agency (FDMA) warns the rest of the country's airports will soon follow suit as thick ash cloud is posing a stall danger to aircraft engines. With trains also hampered by debris, including the country's Shinkansen high speed service. THE FDMA asks residents and office workers in the Greater Tokyo region to stay indoors and off of streets clogged with gridlocked traffic and still being bombarded with rocks and other ballistic projectiles from the eruption.

**11:30 am:** The US naval and air facilities at Yokosuka and Yokota shut down air operations and issue a recall to all personnel. The US Secretary of Defense offers the assistance of the over 50,000 US personnel based in the country for disaster relief.

**Noon:** The economy and government functions of the Tokyo region have effectively come to a standstill as tons of ash and debris continue to accumulate across the region. The region's hotels report no vacancies as emergency crews and corporate clients quickly move to house critical staff. All air traffic has been suspended and railways and major highways have been shut by order of the central government. Power stations have also begun to fail as powerlines collapse under the weight of viscous ash.

**Aftermath:** The Japan Meteorological Agency warns that its calculations suggest the eruption would continue for another several days and continue to spew ash and debris skyward. It adds that the ash cloud and grounding of air traffic could last as much as three weeks. Over 213,000 people lose their lives, most of them in Fuji City and other villages near the volcano. Tens of thousands are left homeless. The costs of physical damage and economic disruption is put by the Central Bank of Japan at US\$189bn.

## Scenario 2: Typhoon Causes Extensive Damage, Death on Coastlines of Kinki, Shikoku, Kyushu

### Affected Areas: Sub Regions 2, 3, 4.

**Tuesday Morning, Sept. 23, 2019:** The Japan Meteorological Agency announces that a storm it has been tracking between Guam and Luzon had turned westward overnight and strengthened significantly before settling on a northerly course putting it on a track to make landfall in south and central Honshu sometime in the next two days. The Fire and Disaster Management Agency (FDMA) advises residents of coastal regions of Aichi, Kyushu, and Kansai to take precautionary steps in case an evacuation is ordered and to monitor local weather reports.

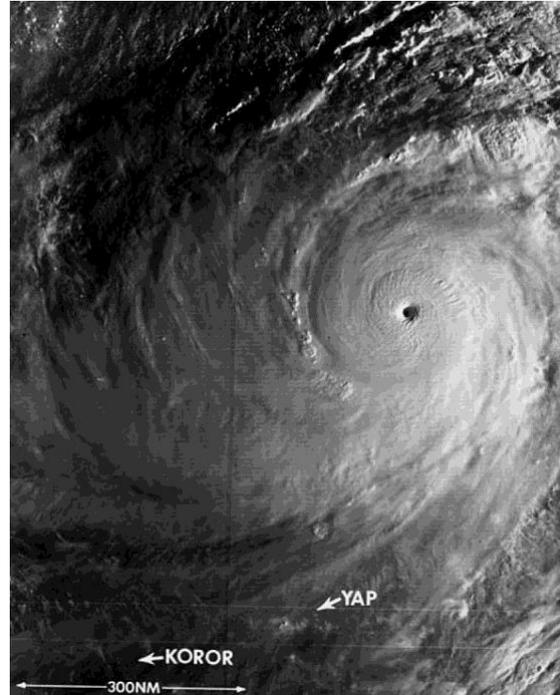
**Wednesday Morning Sept 24, 2019:** The storm, now dubbed Typhoon Aiko, continues on its northerly track toward the Japanese main island. Japan Coast Guard and US Navy monitoring flights confirm that winds have reached a sustained level of 192 mph, making Aiko the most powerful Typhoon on record.

**18:00 pm:** On word from Japan's cabinet, FDMA orders coastal regions of southern and central Honshu, as well as the Izu Islands, be evacuated to higher ground and pre-positioning of rescue, fire, and water filtration resources. Due to the uncertain path of the storm, the Greater Tokyo region is issued an alert, and precautionary measures urged for, Tohoku region, Okinawa and the southern islands. The late hour of the warning leads to severe crowding on Honshu roadways that continues into the night and affects regions beyond the area of most likely landfall, including the Greater Tokyo region.

### Thursday, Sept. 15, 2019

**05:00 am Tokyo Time:** Wave and wind monitors on tiny Mikurajima Island, about 150 km south of Yokohama in the Pacific Ocean, register 193 mph winds and waves in excess of 30 meters. The Japan Meteorological Agency estimates landfall at Tokushima, just south of Osaka's Kii shipping channel, at 7:33 am. The Japanese Coast Guard's 8<sup>th</sup> Regional HQ in Maizuru issues a rare navigational ban for inland waters from Kyushu to Hokkaido.

**07:35 am:** Typhoon Aiko makes landfall at the spa town of Kirahama, just west of the JPA's predicted site. Aiko pushes a considerable storm surge of up to 9 feet ahead of its high winds and up the Kii channel, where the confined waters of Osaka Bay create tsunami-like conditions. Caught by surprise, a tsunami alert is issued for Osaka at 7:41 am. Thousands of residents of high rises – many of whom ignored orders to evacuate thinking themselves safely above any storm surge – now take to the streets and become embroiled in slow-moving, stop-and-start traffic.



**07:50 am:** A storm surge that effectively mimics a tsunami devastates Osaka's waterfront, Japan's most important container port, and causes severe damage in nearby Kobe. The surge tears into the low-lying Osaka neighborhoods of Minami and streams up the Yodogawa River to briefly inundate the higher ground northern district of Kita, as well.

Meanwhile, the storm's broad shoulders pound communities in Aichi and Shizuoka prefectures, and halt all but emergency travel as far south as Kyushu. Tens of millions are without power. The storm spares the Greater Tokyo region but plays havoc with the national cell phone grid as toppled towers and a system overload hamper communications.

**Aftermath:** Damage totals from Aiko reached US200bn. The number of fatalities caused by Aiko is less than the 4,000 killed by the previous record holding Pacific storm, Typhoon Tim in 1979, which claimed 4,000 lives. But Aiko caused more damage in monetary and infrastructure terms, with damages and in particular the loss of Kyoto's port shaving .09% of Japan's GDP in 2019 and .05% in 2020. In all, 589 people perished.

## Scenario 3: Japan-China Clash in East China Sea Freezes Sea Lanes, Supply Chains

### Affected Areas: All

**19:15 pm Toyko Time:** In the East China Sea, an errant 'warning shot' fired by a Chinese fisheries protection vessel slams into the helicopter deck of the Japanese Navy frigate JS Yuguri, immediately killing 5 sailors and destroying the vessel's SH-60 Sea King helicopter. The frigate returns fire, making quick work of the smaller Chinese warship, which sinks with a loss of its entire crew of 29.

**19:23 pm:** The Japan Air Self-Defense Forces (JASDF) scrambles 30 F-15 Kai interceptors, ordering them to take up stations over the Japanese fishing fleet and other vessels currently in the East Sea, including the frigate Yuguri. Almost simultaneous to this order, a sea-skimming Chinese *Shang Yu* Silk Worm missile hits the Yuguri broadside, tearing an enormous hole in its hull and forcing its surviving crew into life rafts. Twenty-two of the Yuguri's 220 crew go down with the vessel, the rest picked up by retreating trawlers.

**19:30 pm:** Japan's Prime Minister Shinzo Abe receives a verbal confirmation from the commander of the US Seventh Fleet that the terms of the US-Japan Self-Defense Treaty are fully in force. Abe later talks with President Donald Trump, who says the "Chinese deserved a bloody nose" and notes that US carrier



strike forces would now enter the East and South China seas to reaffirm their status as international waters.

**19:31 pm:** Lloyd's of London, the world's largest insurer of shipping, declares the South and East China seas as a war zone that will require commensurate rises in maritime coverage premiums. Within the hour, Hapag Lloyd, AP Moeller-Maersk, Evergreen Marine, Mitsui Lines, Hyundai, and scores of smaller shippers announce they will cease transiting routes involving waters claimed by China and any other regional nation.

**19:32 pm:** Share prices of some of the world's largest corporations enter a tailspin on the Frankfurt and London stock exchanges. Traders in New York, whose markets will open in a few short hours, begin buying puts on shares of Apple, Samsung, Google, automakers with US manufacturing plans, and a host of other industrials dependent on raw materials or components whose supply chain traverses the war zone. Commodities trading is mixed as the price of some (rare earths, palm oil, bauxite, and gold) soar and oil and perishables (wheat, meat, fish) suffer major declines.

**20:00 pm:** Prime Minister Abe addresses the Japanese nation and offers to parley with China's President Xi Jinping. He proposes that "in the interest of global stability" the two meet the following day in the South Korean capital, Seoul.

**Midnight:** The day expires without a response from Beijing, and with markets in a free fall in New York. Neither side has taken new military steps, though US warships are heading into Chinese-claimed waters.

**AFTERMATH:** While the two Asian rivals find it difficult to compromise on the core territorial issues, a strange calm that the media equates to the "Phony War" of late 1939 in Europe prevails. Meanwhile, however, absent progress on the diplomatic front, western and other non-Chinese shipping concerns continue to steer clear of the region's waters, though China's large state-owned shippers (COSCO, Yang Ming, others) ply the routes with Chinese Navy escorts and absorb huge market shares in global shipping they will never quite relinquish. Meanwhile, the economic slowdown hurts both and causes a global recession. But Japan is disproportionately disadvantaged, responding with a new round of stimulus and a doubling of defense spending. Tokyo's status as a leading Asian financial center takes a hit from which it never recovers.

## Scenario 4: Cyber Attack, Traced to North Korea, Disables Japanese Power Grid for Four Days

Affected Areas: ALL



**1830 Tokyo Time, May 2, 2018:** Just after sunset on the eve of Japan's Constitution Day national holiday, an aggressive and coordinated cyber-attack on the Japanese electrical grid causes small explosions and fires at electrical substations around the nation, plunging 80 percent of Japan into darkness. Generators kick in to keep hospitals, security facilities, and key public infrastructure functioning. However, tens of millions are trapped in office dark buildings, on roads without traffic lights, trains without power, and in homes blacked out by the attack. All flights from all airports on Honshu are delayed and international flights are diverted to Sapporo, which is unaffected, and to airports on Kyushu where sunset is still 30 minutes away.

**20:02 pm:** As fire services and utilities workers struggle to contain the damage to the national grid, Japan's Public Security Intelligence Agency (PSIA) informs the cabinet that early evidence in the cyberattack points to the General Staff Department (GSD) of the North Korean People's Army, the unit though responsible for the 2017 hack of Sony Corp. and January's infiltration of the Tokyo-based cyber currency Coinbase. PSIA says it has reached out to allied agencies, including the US National Security Agency (NSA), for support.

**20:10 pm:** Japan's Fire and Disaster Management Agency informs the Cabinet that the heat wave currently in its fourth day in Honshu had already weakened the national grid and that the cyberattack appears to have inserted a worm or virus in national grid control systems that are preventing the safe restarting of generating plants and substations. The agency also reports that follow on attacks appear to have disabled substations serving major transit systems, including the Kobe Municipal Subway, the Tokyo Metro, the Osaka-Kobe-Kyoto, the Sanyo Electric Railway, and Nagoya's Kintetsu Line. On the

other hand, FDMA reports that the effects have been less severe in Kyushu since sunset occurred later there and many were able to react in daylight hours to the blackout.

**20:15:** Signs of panic begin to appear in older districts of Tokyo, Kyoto, Osaka, and Nagoya as small fires rage in these darkened cities. The average temperature outside even at 20:15 is 31 degrees (87.8F). People trapped in the largest office buildings, with generators supplying power and environmental controls, mostly calmly await instructions. But in some areas the unusual heat is causing dangerous conditions and risk to human life.

**20:30:** After consultations with private sector contractors and the US NSA that confirm North Korea as the likely source of the hack, Japan's Foreign Ministry issues a public demarche. The Japan Self-Defense Forces (JSDF) are placed on alert, but no military action is immediately taken.

**23:00:** With no sign that power will be restored to major metropolitan areas anytime soon, Japan's cabinet orders the JSDF to bring trucks, water purification systems, and other relief resources into the heart of Honshu's largest cities. In spite of generator power keeping Japan's air traffic control system functioning, all inbound air traffic is diverted to Singapore, Seoul, and Hong Kong until further notice.

**AFTERMATH:** The damage done to Japan's electrical grid and other power nodes takes 10 days to bring under control. And early effort to restart the system three days after the attack results in further damage and the discovery of 'sleeper worms' inserted during the initial attack as preparation for future malevolence. It takes Japanese and international cyber experts a full week to remove these ticking time bombs and fully restart the national grid. A spate of heart attacks, fire deaths, and other accidents blamed on the kills 34 people nationwide. However, economic damage is massive: \$344 billion in lost activity, remediation, reconstruction, and basic damages. FDMA estimates another \$3 billion will be required to upgrade cyber defenses, with no guarantee that the next attack looks anything like this one. In spite of strong evidence of North Korean complicity, Japan neither strikes military nor 'in kind' with cyber weapons, fearing the reaction of the irrational regime in Pyongyang.

## **ABOUT TRANSFORMATIVE**

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