Lessons learned

About a year after Hato, Typhoon Mangkhut hit Macau hard. This time, however, a study revealed an improvement in the authorities' disaster response and management perceived by 88 per cent of respondents

In the weeks following the Hato event, it seemed Macau suddenly had thousands of meteorologists, all weighing in on exactly when – in hindsight – the typhoon signals should have been hoisted.

The complexity of the situation – and the controversy – increased, when it came to light that Hong Kong had been quicker to raise Signal 10.

One year later, three researchers from the Tokyo Institute of Technology (Hiroshi Takagi, Yi Xiong and Fumitaka Furukawa) published a paper on the subject titled Track analysis and storm surge of 2017 Typhoon Hato: were the warning signals issued in Macau and Hong Kong timed appropriately? In the study they concluded that "decisions regarding signal issuance were made reasonably in both regions, based upon wind speed clarification, especially given how rapidly Hato moved and intensified. Storm signal levels were not raised quickly enough (at least in Macau) prior to Hato's landfall."

In other words, the situation was far more complicated than a response to one or another simple mechanism: was the reaction time late, or the best that could have been expected under the circumstances?

Repercussions around the issue extended to the courts and the trial of then director of the Meteorological and Geophysics Bureau (SMG), Fong Soi Kun. [A year before Hato, Kun had already come under fire when tropical cyclone signal 3, rather than 8, was raised on the approach of Typhoon Nida].

A Commission Against Corruption (CCAC) report released just two months after Hato found that the decisions taken on 23 August by the SMG Board were arbitrary and revealed a lack of coordination.

According to the CCAC, "the forecast of typhoons and decision-making regarding the hoisting of typhoon signals relied on the judgment and individual choices of the former director of the SMG, conducted without any prior discussion or subsequent review".

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– Hirogi Takagi

But the Government also realized it had become necessary to enhance the signals... and did so in the middle of 2018 with five new levels of "storm surge warning", to be issued at least three hours in advance.

At the same time, two new tropical storm designations (strong typhoon and super typhoon) were created, for higher maximum windspeeds exceeding 150 and 180 km/h.

This change was already in effect when in September 2018 another major typhoon, Mangkhut, hit Macau.

Professor Takagi's team then analysed the Public perception of typhoon signals and response in Macau, asking: did "disaster response improve between the 2017 Hato and 2018 Mangkhut typhoons?"

Given "the typhoons were of similar intensity and followed similar paths", Takagi and colleagues noted that "the most notable difference between the two disasters was the fact that Signal 8 was triggered seven hours earlier for Mangkhut than Hato, demonstrating a remarkable difference in the precaution and response taken by the authority."

Two years later, in September 2020, the SMG presented a new system of (three) heavy rainfall alerts "to respond to the new needs of social development and climate change and to reduce the impacts caused by natural disasters.

"The objective is to improve processes and forecasting and reduce the impacts of natural disasters," SMG director Leong Weng Kun explained.

"Since 2017, the SMG has carried out a number of optimizations and improvements to better cope with the impact that tropical cyclones and other severe weather events have on Macau," the SMG told Macau Business.

The main thrust of the work has also included the installation of "a number of automatic weather stations and water level monitoring stations. Backup instruments were added in some of the important monitoring stations to reduce the impact of instrument maintenance and instrument failure on data services." A mechanism for invoking tropical cyclone crisis meetings was also established. "Whenever it is expected that a tropical cyclone may affect Macau, the directors, chiefs and forecasters at the SMG are called upon to participate in regular discussion meetings to assess the development and impact of the tropical cyclone comprehensively and objectively," both among themselves and in quadrilateral discussions with the China Meteorological Administration, the Guangdong Meteorological Service and the Hong Kong Observatory.