If a Typhoon Hits Your Town

The Real Risk of Typhoons Unveiled by One Thousand Typhoon Simulations

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Violent typhoons hitting various areas of Japan

When a typhoon approaches Japan, severe winds blow in various regions, and heavy rain and high waves hit towns. Although the weather forecast technology has advanced significantly in recent years, the threat of typhoons still remains. To reduce damages caused by typhoons as much as possible, routine preparation and knowledge are essential.

Damage caused by Typhoon Shanshan (2006) Based on the observation by Fudeyasu's research group, the isotope of water vapor in the eye of the typhoon was successfully measured for the first time in the world.

Cutting-edge typhoon research

Fudeyasu's research group collaborates with universities and research institutions, to carry out research implementing numerical simulations, weather observations, and machine learning, aiming to unravel the mechanism of typhoons.
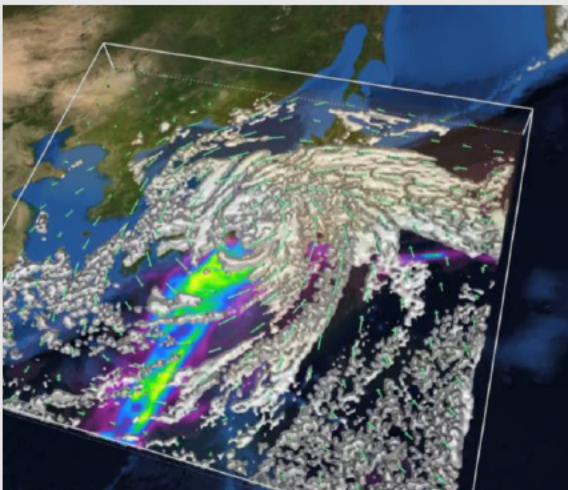
Typhoon simulated using numerical simulations

With "numerical simulation" method, we can create a real-world simulation model in the computer and study the typhoons generated in the virtual atmosphere. Our group uses supercomputers in our efforts to simulate the structure of typhoons. The key to our research is achieving detailed simulations and creating a virtual typhoon that is as similar to a real typhoon as possible.

Using machine learning such as deep learning, we are developing a method to automatically detect typhoons from weather satellite cloud imagery. As a result of the research, the location and strength of typhoons at sea that had been difficult to observe can now be accurately detected.
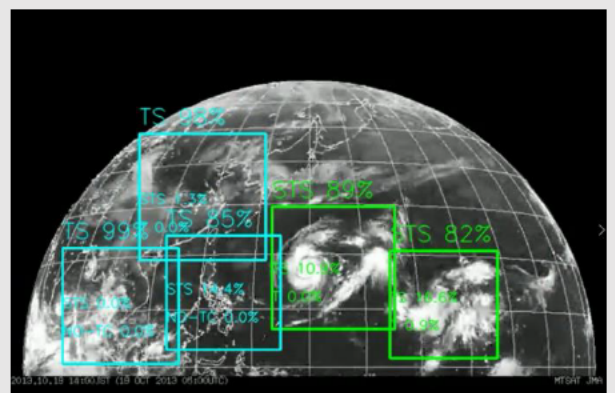
Typhoon detected with machine learning

2

"Typhoon Soragram" displayed on a smartphone

World's first typhoon hazard map

Specific prediction information on typhoon damage by region can be utilized for local disaster prevention. Thus, we simulated approximately one thousand typhoon cases with numerical simulation method, statistically calculating the paths of typhoons which increase the risk at each city in Japan, respectively. This successfully resulted in the world's first typhoon hazard map!

The typhoon hazard map is delivered free of charge as "Typhoon Soragram" in the smartphone everyday life information site "Life Ranger by MTI Ltd. "

Numerical simulations and machine learning will continue to be used for our further research on the truth of typhoons.

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Completed the Doctoral Program from the Graduate School of Science, Kyoto University. Started current post after working with the National Research Institute for Earth Science and Disaster Resilience, Japan Agency for Marine-Earth Science and Technology, and the University of Hawaii. A certified weather forecaster and disaster preventionist. Loves to look at the sky at the rooftop and cannot contain his excitement when typhoons approach.

http://www.fudeyasu.ynu.ac.jp