

[EE] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-AS Atmospheric Sciences, Meteorology & Atmospheric Environment

[A-AS03]Advances in Tropical Cyclone Research: Past, Present, and Future

convener: Masuo Nakano (JAMSTEC Japan Agency for Marine-Earth Science and Technology), Akiyoshi Wada (Typhoon Research Department Meteorological Research Institute), Sachie Kanada (名古屋大学宇宙地球環境研究所, 共同), Kosuke Ito (University of the Ryukyus)

Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

Tropical cyclones (TCs) often bring torrential rainfall, gale, storm surge, and high surf that sometimes cause tremendous disasters. Therefore, understanding such phenomena associated with translation, intensity change, and precipitation of TCs and their accurate forecasts are important in the earth and planetary science. In addition, changes in the number and intensity of TCs due to global climate changes have been extensively studied by various approaches such as data rescue, data analyses, and climate modelling. Especially in 2017, Typhoon Talim made landfall on all of four major islands of Japan first ever since 1951 and Typhoon Noru had a strange track. In the Northern Atlantic, Hurricanes Harvey, Irma and Maria caused tremendous damage in U.S.

Advances in innovative observations such as Himawari-8,9, unmanned drone, meteorological aircraft reconnaissance and supercomputers such as the earth simulator and K-computer have led to novel development of numerical weather forecasting and understanding of the phenomena due to the improvement of numerical modelling.

In this session, we welcome papers on various aspects of TC studies. We hope that the session will provide new direction for future TC research activity.

[AAS03-P02] Climatic properties of typhoons deduced from Monte Carlo simulation with a data-driven stochastic model

★ Invited Papers

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Keywords: typhoon, inter-annual variation, decadal variation

Typhoons are one of major causes of serious natural disasters in the East Asia region. It is thus important to evaluate the statistical (climatic) properties of typhoon and to assess the risks of typhoon hazards. Since the effect of the climate change during the last several decades is emerging, climatic variations of typhoons would also be important issue. However, since the number of typhoons in each year is small, it is difficult to distinguish between climatic variations and random properties of typhoons.

In order to enable us to evaluate climatic variations of typhoons, we are developing an experimental framework based on a data-driven stochastic simulator. This stochastic simulator is obtained by statistical analysis of the data of past typhoon trajectories for more than sixty years, and it can generate various possible typhoon scenarios under a given condition.

This approach does not consider physical mechanisms of typhoons. Moreover, at present, the behaviors of the artificial typhoons

generated from our stochastic model have some biases probably because of the limitation of the statistical model. Nonetheless, this approach provides a means of examining qualitative characteristics of the climatic variations of typhoons.

Our stochastic model consists of three modules which describe the three processes: genesis, transition, and dissipation. Since each of the three modules of our model considers inter-annual variations, we can discuss the effects of each of the three processes on climatic variations of typhoons. In this study, we examine the effects on the frequency of approaching the main islands of Japan.