

Agenda (draft):
Toward the Establishment of Disaster Mitigation Strategy
for Extreme Severe Storms over the Asian Countries

International Workshop on Extreme Severe Storms and Disaster Mitigation Strategies
24-26 Dec. 2018, at Central University of Rajasthan

As we experienced in Uttarakhand (India) in 2013 and in West Japan in 2018, Extreme Severe Storms (ESS) ~~take place~~ occur almost over all regions in the monsoon Asia. These ESS bring torrential rainfall, extreme winds and lightning strikes in different time scales. Devastating disasters tend to occur associated with record breaking rainfall amount in certain evaluation period ranging from an hour to several days. In such cases, various critical situations are created, and they are beyond people's experience.

Now, one of our deep concerns is the impact of global warming on the occurrence of extreme weather events, including ESS. Generally, it is very likely that the extreme weather events will increase in number and intensity under the warmer climate. Above mentioned cases may be manifestations of this climate change. However, our knowledge of recent trend and future projection of extreme weather in Asian countries is far from enough. Even for total rainfall variability, there is large inconsistency among climate model projections, though some detectable impact of direct and indirect effects of aerosols are already pointed out. We should extend our meteorological and climatological research on the occurrence of ESS.

However, on the other hand, understanding of the meteorological disturbances and development of reliable prediction system are not enough for the disaster mitigation. In many cases, even though ESS are correctly predicted, people cannot adapt the situation, since their levels are far beyond their experience. Thus, social aspects of the ESS impact is critical for the mitigation of disaster. We should take attention to recent drastic changes in the pattern of human life due to rapid urbanization, modernization and globalization. Behind most of disaster cases, social factor like this can be found. In this regard, experiences in Japan that underwent societal changes almost half a century in advance should be transferred to South Asian countries. Our India-Japan collaboration has another advantage in this point.

Recently, new prospective Regional Hydroclimatological Project (RHP) focusing on the monsoon Asia and post MAHASRI, have been launched under GEWEX/GHP framework as a collaborative effort of Asian monsoon researchers

(<http://iced.s.c.kagawa-u.ac.jp/pmp/>). Post MAHASRI declared “extremes” as one of overarching questions that should be solved within its 10-year project period. This new research project will foster suitable international collaborative platform, since our target ESS is associated with a rainfall extreme event.

Under these perspectives, we may define research topics that should be developed under our new research collaboration on “Extreme Severe Storms and Disaster Mitigation Strategy in Asian Countries” [as follows](#).

[1] Understanding of Extreme Severe Storms:

1. Observation and analysis to detect extreme storms
2. Close observation of meso-scale structures of extreme storms
3. New coordinated field experiments and intensive observations of extreme storms.
4. Premonsoon-monsoon seasonal march and extreme storms
5. Understanding of extreme storms embedded in intra-seasonal and synoptic disturbance.
6. [Chasing extreme storms for in-situ observations and understanding](#)

[2] Understanding of Climate Change Impact on Extreme Severe Storms:

1. Detection of past trends and long-term variability of extreme storms
2. Downscaling of climate models to understand and resolving extreme storms
3. Future projection of extreme storms

[3] Toward the Advanced Numerical Modelling of Extreme Severe Storms:

1. Modeling of extreme storms at cloud resolving and large eddy scale.
2. Convective scale data assimilation based on high resolution observations including radar and satellites
3. Assimilation of lightning observations
4. Ensemble based forecasting of extreme wind storms, rain storms, lightning strikes

[4] Mitigation strategy for Extreme Severe Storms:

1. Development of early warning systems of extreme storms for disaster mitigation.
2. Building of strong human resources for resilience against extreme storms in the changing climate scenarios.