EMS Annual Meeting Abstracts
Vol. 16, EMS2019-144, 2019

A pseudo-warming study of a deep moist convection: the Copenhagen case of July 2011

Dominic Matte (1,2), Jens H. Christensen (1), Rasmus Anker Pedersen (2), Henrik Vedel (2), and Henrik Feddersen (2)

(1) Copenhagen University, Neils Bohr Institute, Climate and Geophysics, Copenhagen, Denmark (dominic.matte@nbi.ku.dk), (2) Danish Meteorological Institute, Copenhagen, Denmark.

On the evening on July 2 (2011), a severe cloud burst occurred in the Copenhagen area. During the late afternoon deep moist convection (DMC) developed over Skåne (the southernmost part of Sweden) in an air stream from east-northeast. In the early evening the DMC passed over Øresund to Copenhagen, where it created a severe flash flood. Between 90 and 135 mm of precipitation in less than 2 hours was recorded flooding cellars, streets, and key roads. The deluge caused 6 billion Danish kroner in damage. Although that such extreme event is rare, its impacts on society is important and should be understood under a warmer climate. Although that regional climate models have recently reached the convection permitting resolution, reproducing such events is still challenging and should be better understood.

Several studies suggested that extreme precipitations will increase under a future warmer climate using transient simulation or a pseudo-warming approach. However, it is still unclear how such event would behave under warmer or colder synoptic conditions. Using a forecast-ensemble method, but keeping a climate perspective, this study assess the risk of such event under warmer (1°C, 2°C and 3°C) or colder conditions (-1°C and -2°C) and compares it with the present-day case. Such study sheds light on the potential risk of such event under warmer or colder present-day conditions. This enhances our physical comprehension of how climate models simulate these type of events and how the risk of having such devastating events might evolve under the future warmer climate.