Title:	Cloud resolving simulation of extremely heavy rainfall event over Kerala in August 2018 – Sensitivity to microphysics and aerosol feedback
Authors:	Attada, Raju (/jspui/browse?type=author&value=Attada%2C+Raju)
Keywords:	Heavy rainfall events Kerala Cloud Microphysics WRF model
Issue Date:	2021
Publisher:	Elsevier
Citation:	Atmospheric Research, 258, 105613.
Abstract:	The state of Kerala located in the southwestern part of India experienced heavy to extremely heavy rainfall events from 07 to 17 August 2018 during the southwest monsoon, leading to a devastating flood and extensive infrastructure damage. Rainfall analysis suggests that the prolonged heavy rainfall event between 14 and 17 August 2018, was responsible for the major devastation. In this work, the sensitivity of prediction of heavy rainfall during 14–17 August 2018 to cloud microphysics parameterization (CMP) is investigated using the Weather Research and Forecasting (WRF) model. High resolution (1-km) cloud resolving simulations are conducted to study the sensitivity of rainfall to the cloud microphysics schemes and cloud-aerosol interactions. The model results are compared with observations such as Automatic Weather Station, Tropical Rainfall Measuring Mission, radiosonde, Global Precipitation Mission precipitation estimates and Doppler weather radar products. Comparisons of simulated hydrometeor structure with DWR estimates and thermodynamic stability indices with radiosonde reveal that the differences in microphysics formulations play a vital role on the thermodynamic profile that in turn influence the intensity of convection and hydrometeor structure responsible for the extremely heavy rainfall. Comparison of simulated rainfall with IMD observational estimates suggests that the Thomson aerosol aware scheme, followed by Goddard microphysics captured the spatial and temporal distributions of observed heavy rainfall. The Thomson aerosol aware scheme followed by Goddard produced strong convective instability conditions for heavy rainfall due to the simulation of a strong westerly jet and the formation of an offshore vortex.
Description:	Only IISER Mohali authors are available in the record.
URI:	https://doi.org/10.1016/j.atmosres.2021.105613 (https://doi.org/10.1016/j.atmosres.2021.105613) http://hdl.handle.net/123456789/4348 (http://hdl.handle.net/123456789/4348)
Appears in Collections:	Research Articles (/jspui/handle/123456789/9)

Need To Add…Full Text_PDF..pdf (/jspui/bitstream/123456789/4348/1/Need%20To%20Add%e2%80%a6Full%20Text_PDF..pdf)	Only IISER Mohali authors are available in the record.	15.36 kB	Adobe PDF	View/Open (/jspu

Show full item record (/jspui/handle/123456789/4348?mode=full)

(/jspui/handle/123456789/4348/statistics)