EGU22-8358
https://doi.org/10.5194/egusphere-egu22-8358
EGU General Assembly 2022

Unprecedented stormy seasons and their associated precipitation and wind extremes over Europe

Laura Owen, Jennifer Catto, David Stephenson, and Nick Dunstone
The University of Exeter, Engineering, Mathematics and Physical sciences, Mathematics, Exeter, UK (lb663@exeter.ac.uk)

Extratropical cyclones and their associated extreme precipitation and winds can have a severe impact on society. These extremes can cause even greater risk when they occur at the same place and time. Studies have investigated stormy seasons and their associated precipitation and wind extremes using observational data. Although these results are limited when looking at the risk of very extreme events, since a large number of samples is needed to get robust estimates. Additionally, it is very difficult for estimates based on observations alone to help us understand the risk of future rare or unprecedented stormy seasons and associated events. Using the UNSEEN method (UNprecedented Simulated Extremes using ENsembles) this risk can be estimated from large ensembles of climate simulations. The Met Office's Global Seasonal forecast system version 5 (GloSea5) model ensembles are evaluated against ERA5 reanalysis data to find out how well they represent storm tracks along with their associated precipitation, wind and compound extremes over Europe. This model has not been evaluated in such a way before and this is needed before the model can be used to estimate the likelihood of unprecedented stormy seasons and associated extremes using the UNSEEN method. We find that although GloSea5 underestimates the numbers of storms over Europe, particularly over the Mediterranean, seasons are found with larger numbers of storms than seen historically. Cyclone composites of precipitation, wind and compound extremes are also compared between ERA5 and GloSea5 ensembles. GloSea5 estimates the spatial pattern and frequency of wind, precipitation and compound extremes around cyclones averaged over their whole lifecycle well. The spatial pattern of extremes around cyclones at maximum intensity is also estimated well but the frequency is underestimated. Given this GloSea5 can be used to investigate the spatial pattern of larger extremes as well as extremes from the most intense storms.