EGU23-1365, updated on 24 Apr 2024
https://doi.org/10.5194/egusphere-egu23-1365
EGU General Assembly 2023

Improving post-processing of East African precipitation forecasts using a generative machine learning model

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Existing weather models are known to have poor skill over Africa, where there are regular threats of drought and floods that present significant risks to people's lives and livelihoods. Improved precipitation forecasts could help mitigate the negative effects of these extreme weather events, as well as providing significant financial benefits to the region. Building on work that successfully applied a state-of-the-art machine learning method (a conditional Generative Adversarial Network, cGAN) to postprocess precipitation forecasts in the UK, we present a novel way to improve precipitation forecasts in East Africa. We address the challenge of realistically representing tropical convective rainfall in this region, which is poorly simulated in conventional forecast models. We use a cGAN to postprocess ECMWF high resolution forecasts at 0.1 degree resolution and 6-18h lead times, using the iMERG dataset as ground truth, and investigate how well this model can correct bias, produce reliable probability distributions and create samples of rainfall with realistic spatial structure. We will also present performance in extreme rainfall events. This has the potential to enable cost effective improvements to early warning systems in the affected areas.