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# Urban Impact on a strong precipitation episode in Zhengzhou, central China

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## Résumé

The heavy storm event that occurred from 18 to 22 July 2021 in Henan province (Central China) caused severe floods and casualties, especially in the provincial capital city, Zhengzhou. The role of urbanization is investigated here with the WRF model, used in two numerical experiments which are differentiated by the presence of urban land cover. Urbanization increases precipitation in the major urban area of Zhengzhou and its south, where the largest increases reach from 188.2 to 304.4 mm. Further investigation into Zhengzhou city reveals that urbanization leads to shifted precipitation centre and stagnation in the major urban area, resulting in earlier peak rainfall time and more concentrated precipitation. Elevated surface temperature and sensible heat are identified before the peak rainfall arrives, which leads to increased planet boundary layer height, suggesting the contribution of the urban heat island effect. Thermal perturbation and increased surface roughness over urban areas promote vertical uplift and moisture convergence, increasing water vapor and forming storm system drags during the peak precipitation time, thus bringing earlier and higher amounts of precipitation to the major urban area and its south. The study calls for the consideration of the urban effect of extreme storm events and the precaution against waterlogging over urban areas in rapid-developing cities.

Huang et al., 2022: Modeling urban impact on Zhengzhou storm on July 20, 2021. *JGR-Atmospheres* 127 (22), e2022JD037387. <https://doi.org/10.1029/2022JD037387>

**Mots-Clés:** Heavy rainfall, Urban impact, Modelling

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