



[https://de.wikipedia.org/wiki/Datei:Bhutan_on_the_globe_\(Asia_centered\).svg](https://de.wikipedia.org/wiki/Datei:Bhutan_on_the_globe_(Asia_centered).svg)



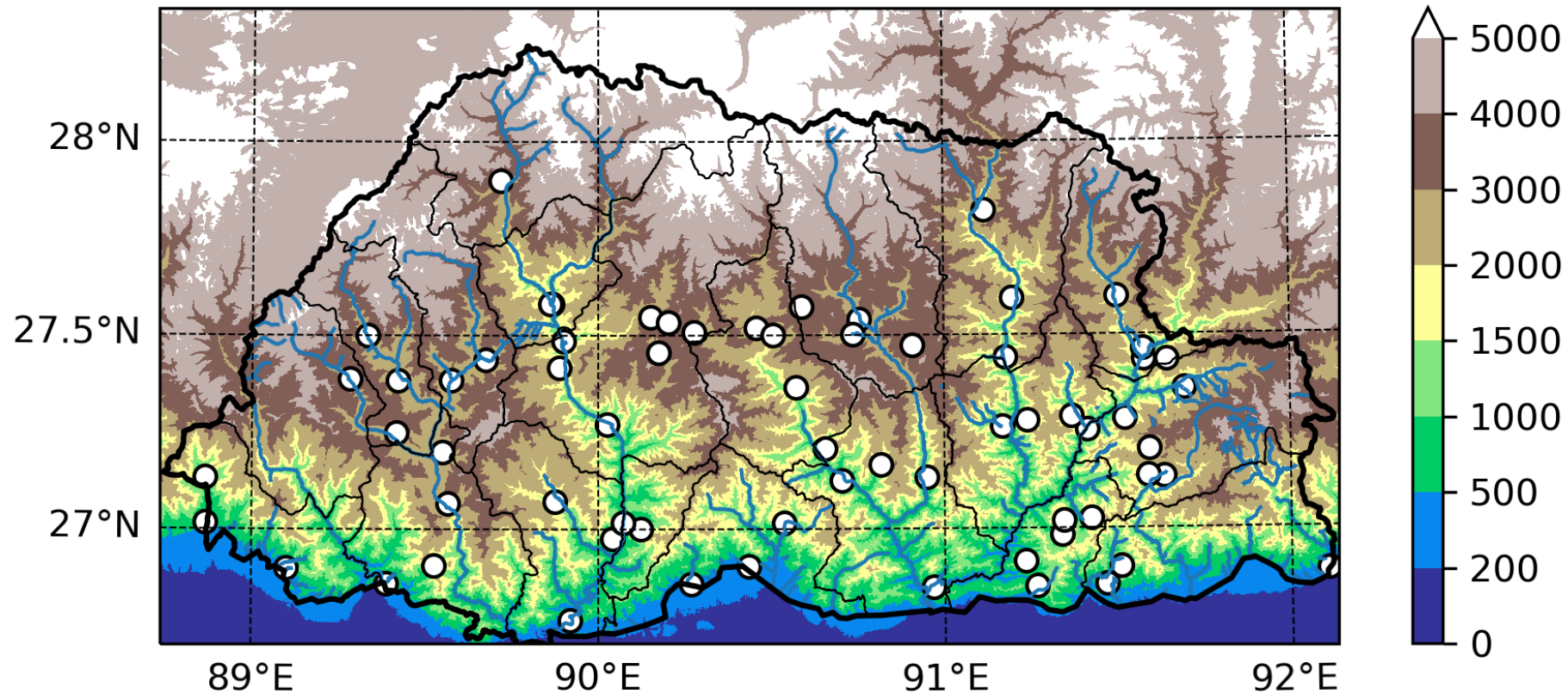
Daily 1 km gridded temperature and precipitation in Bhutan using station data (BhutanClim)

Fabian Lehner, Herbert Formayer
May 27, 2022

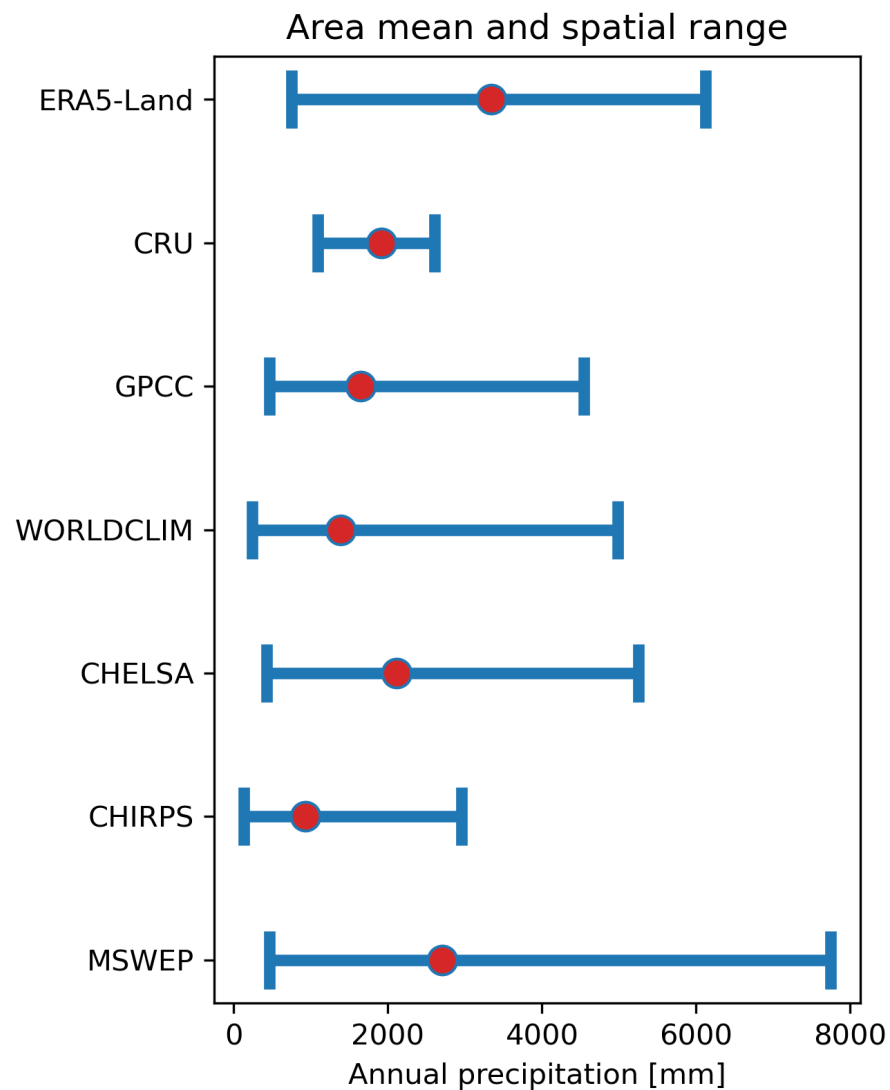
University of Natural Resources and Life Sciences Vienna, Austria

Bhutan: extremely mountainous terrain

Up to 67 available weather stations



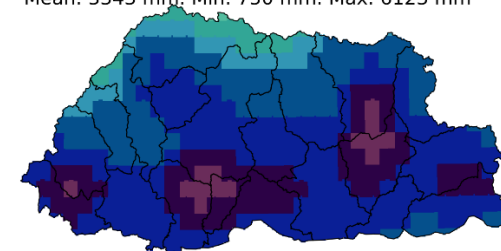
Average annual precipitation (1996-2019)



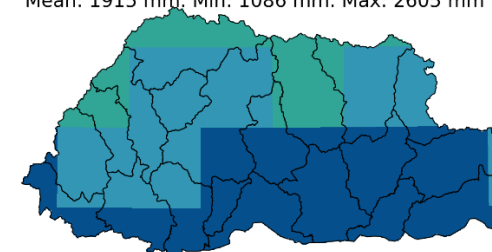
a BhutanClim



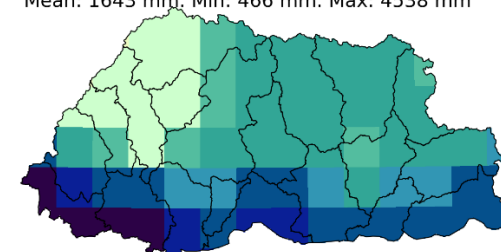
b ERA5-Land
Mean: 3343 mm, Min: 750 mm, Max: 6123 mm



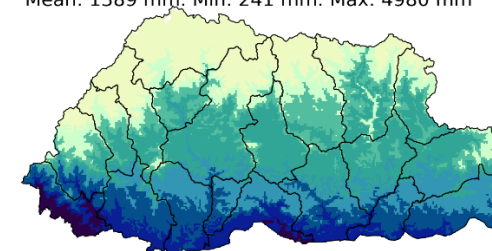
c CRU
Mean: 1915 mm, Min: 1086 mm, Max: 2605 mm



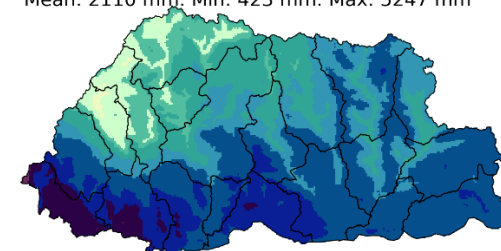
d GPCC
Mean: 1643 mm, Min: 466 mm, Max: 4538 mm



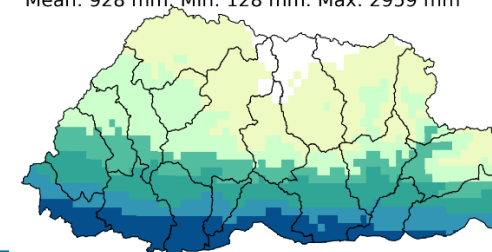
e WORLDCLIM
Mean: 1389 mm, Min: 241 mm, Max: 4980 mm



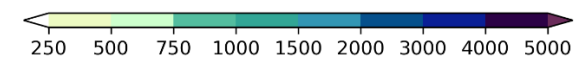
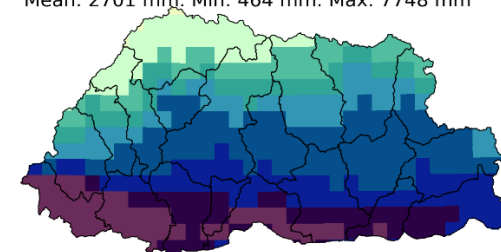
f CHELSA
Mean: 2110 mm, Min: 423 mm, Max: 5247 mm



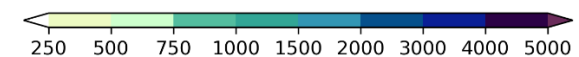
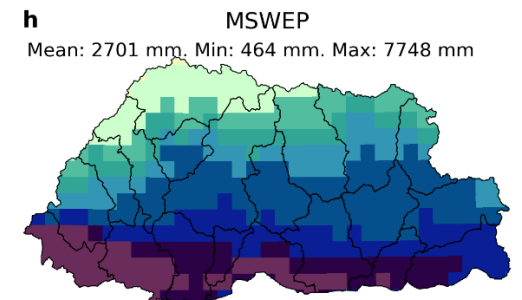
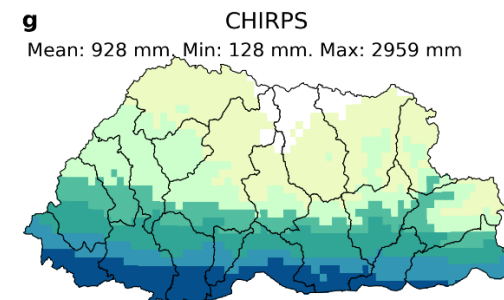
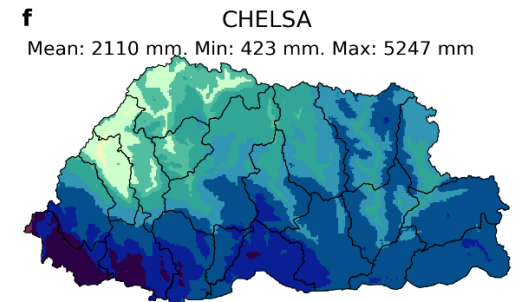
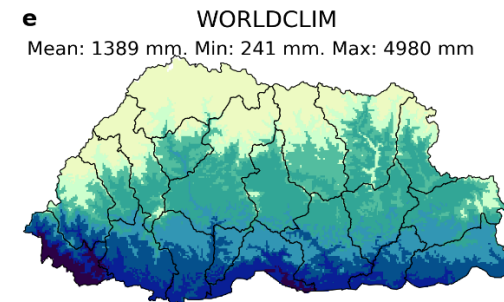
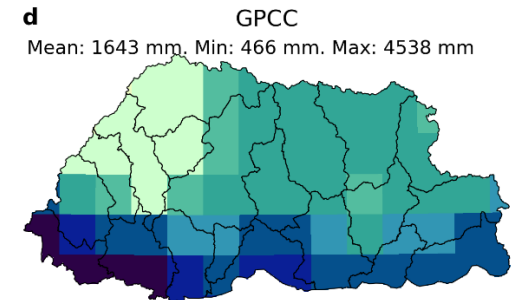
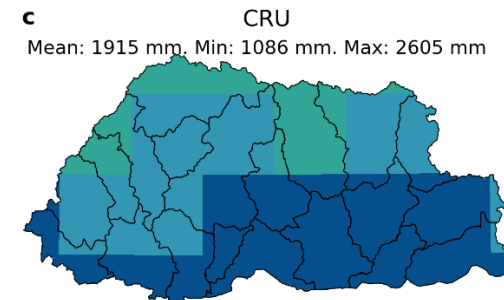
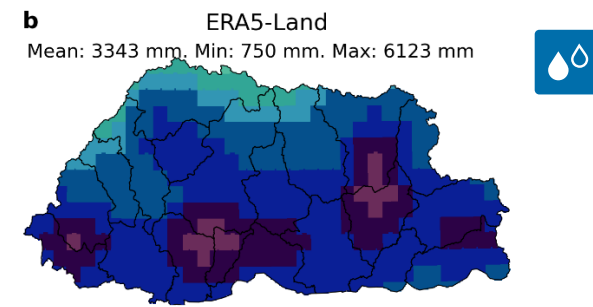
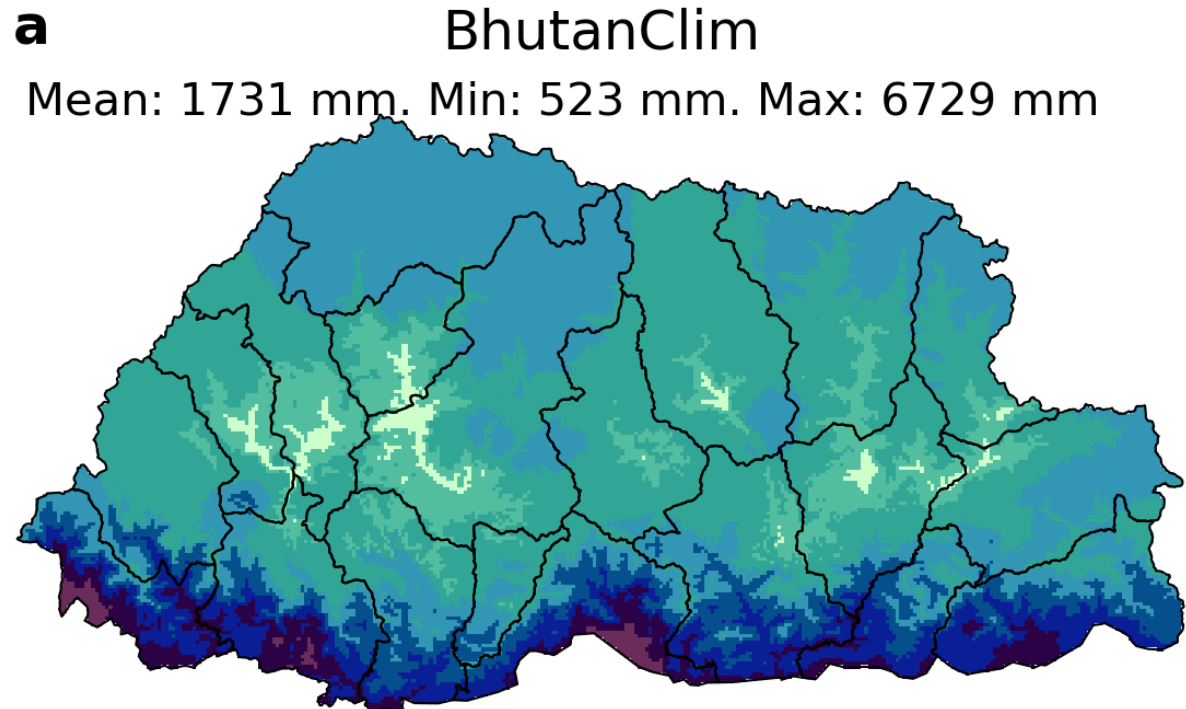
g CHIRPS
Mean: 928 mm, Min: 128 mm, Max: 2959 mm



h MSWEP
Mean: 2701 mm, Min: 464 mm, Max: 7748 mm



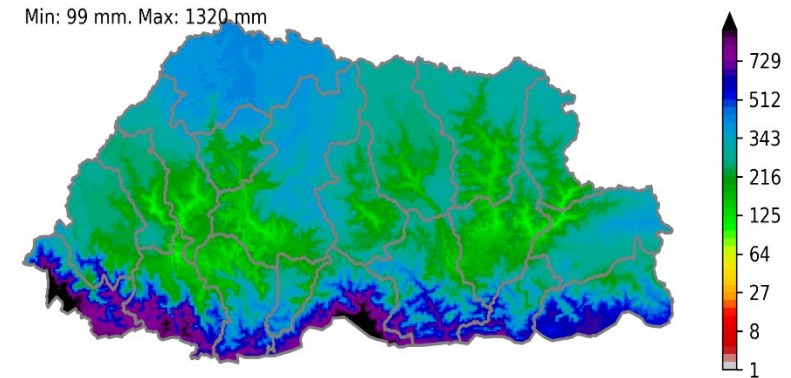
Average annual precipitation (1996-2019)



2-step statistical approach

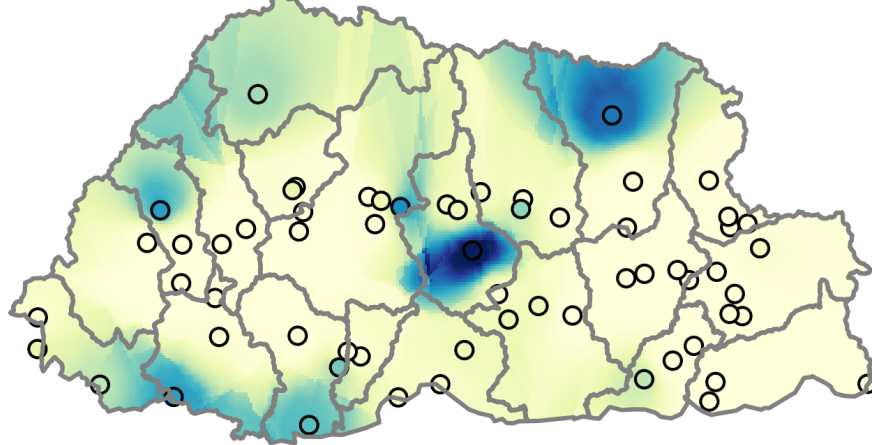
1. Climatological **monthly** precipitation
2. Interpolation of **daily** anomalies

August

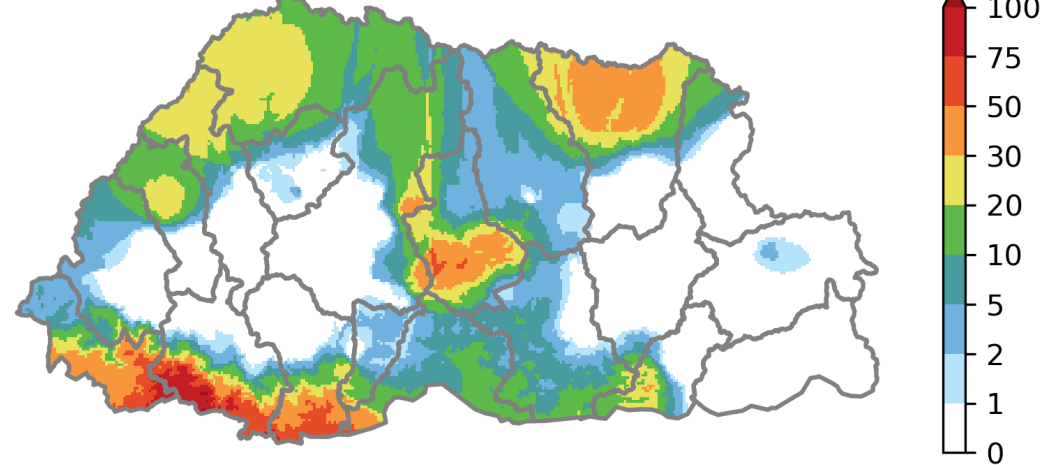


Example: 1st of August, 2009

Residual to monthly prec. (%)
Min: 0 %. Max: 22 %

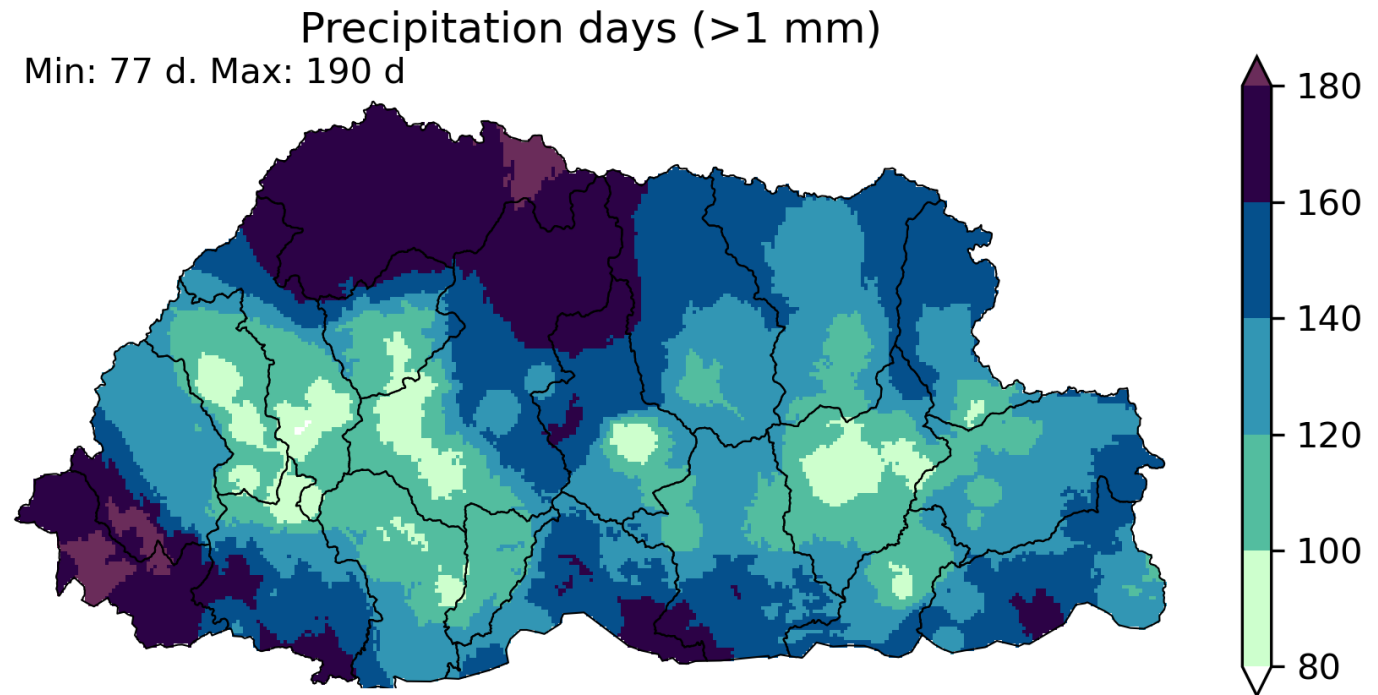


Final analysis (mm)
Min: 0 mm. Max: 104 mm



Challenges

- Overestimation of precipitation days?



Insights on the climate of Bhutan from a new
daily 1 km gridded data set for temperature
and precipitation

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Bhutan

