Drivers Of Flood Trends In The United States

Matthias Kemter Bruno Merz, Norbert Marwan, Gabriele Villarini

kemter@uni-potsdam.de @MatthiasKemter

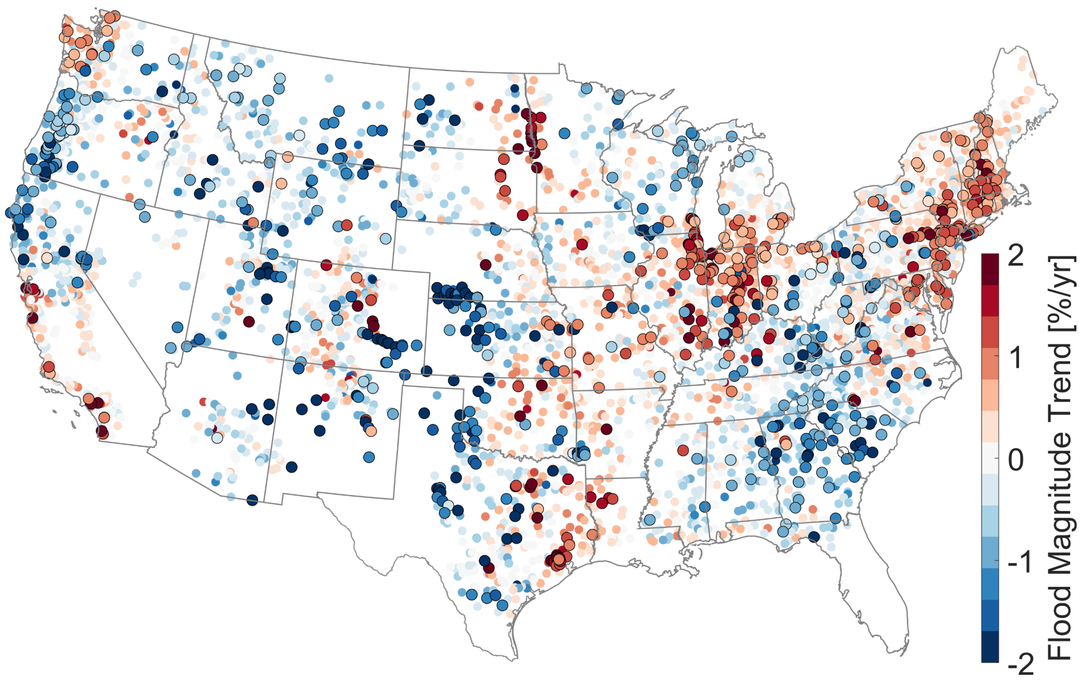
Precipitation Trends Are The Main Drivers, But Land Use Matters.

DATA

- 4347 hydrometric stations with annual maximum streamflow from 1960-2010
- Climate variable time series for each catchment
- 33 catchment variables (e.g. annual rainfall, elevation, flood timing, etc.)

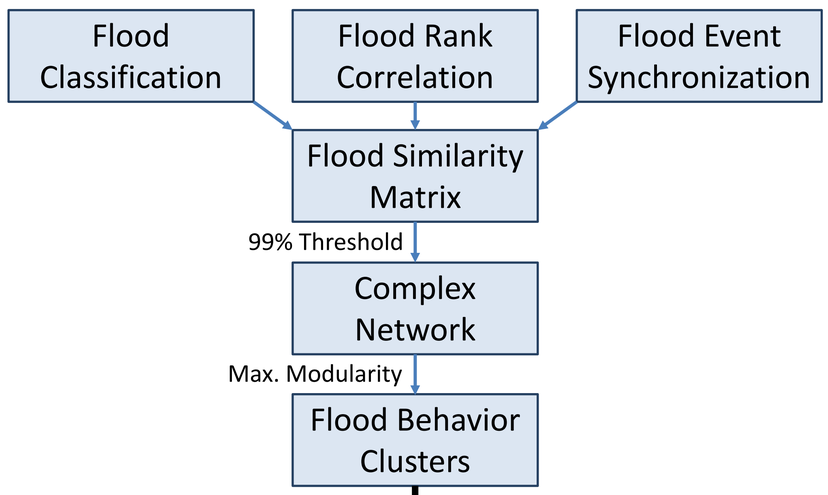
RESEARCH QUESTION

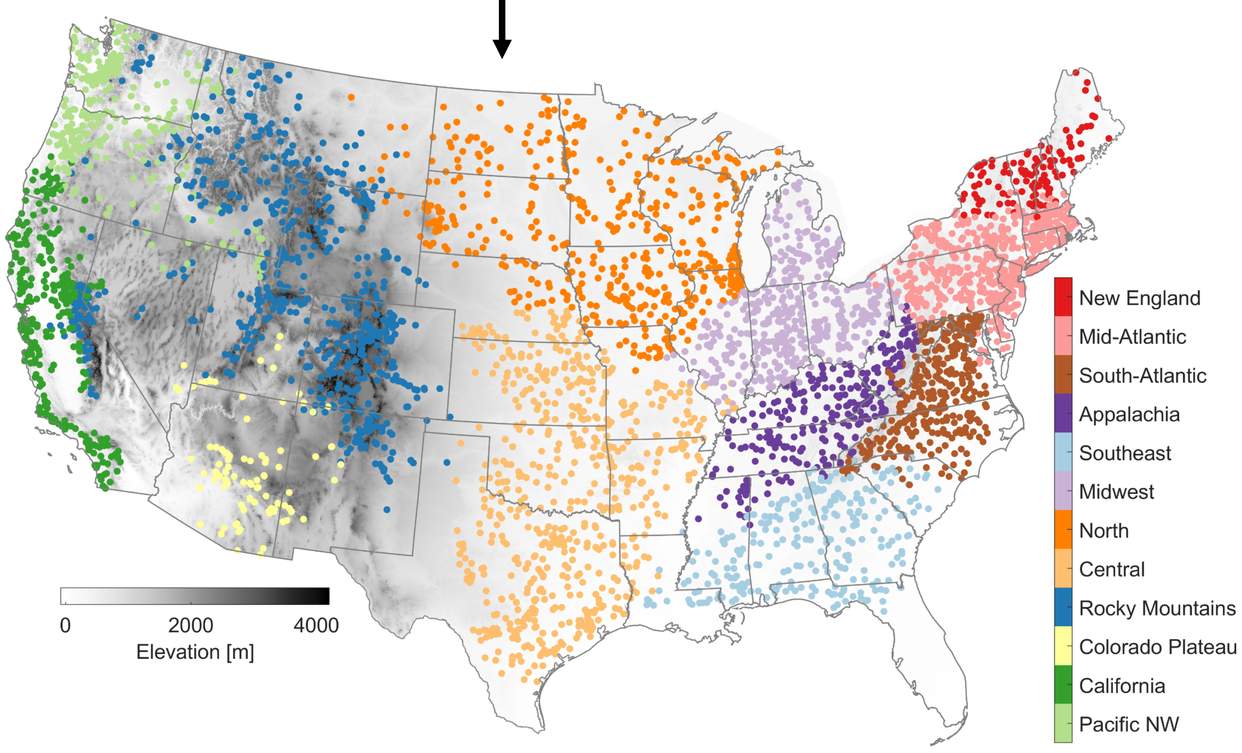
- What drives magnitude trends in the US?



CLUSTERING

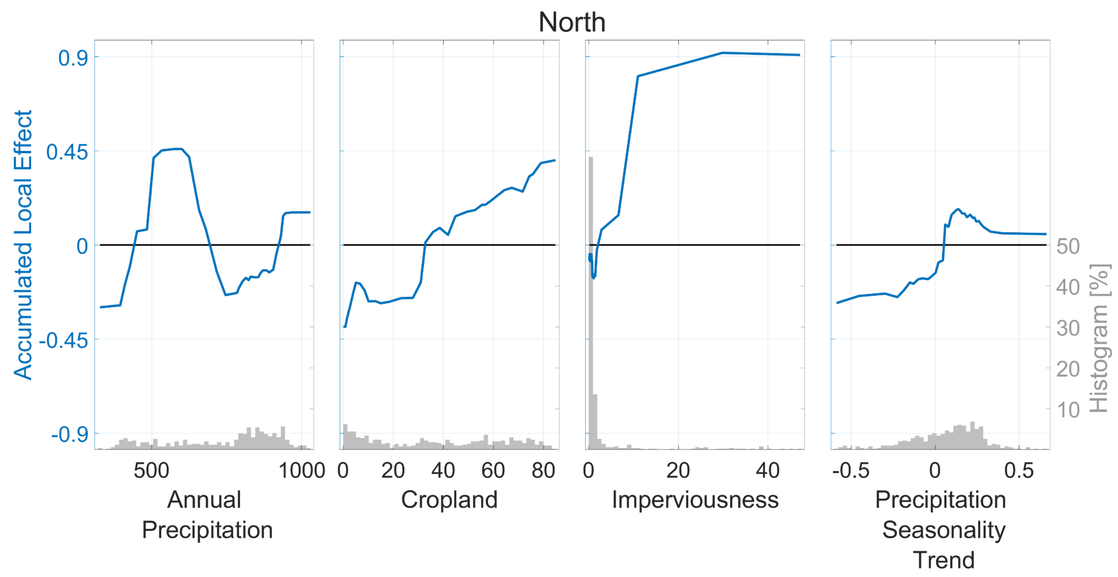
- Cluster catchments with similar flood behavior:

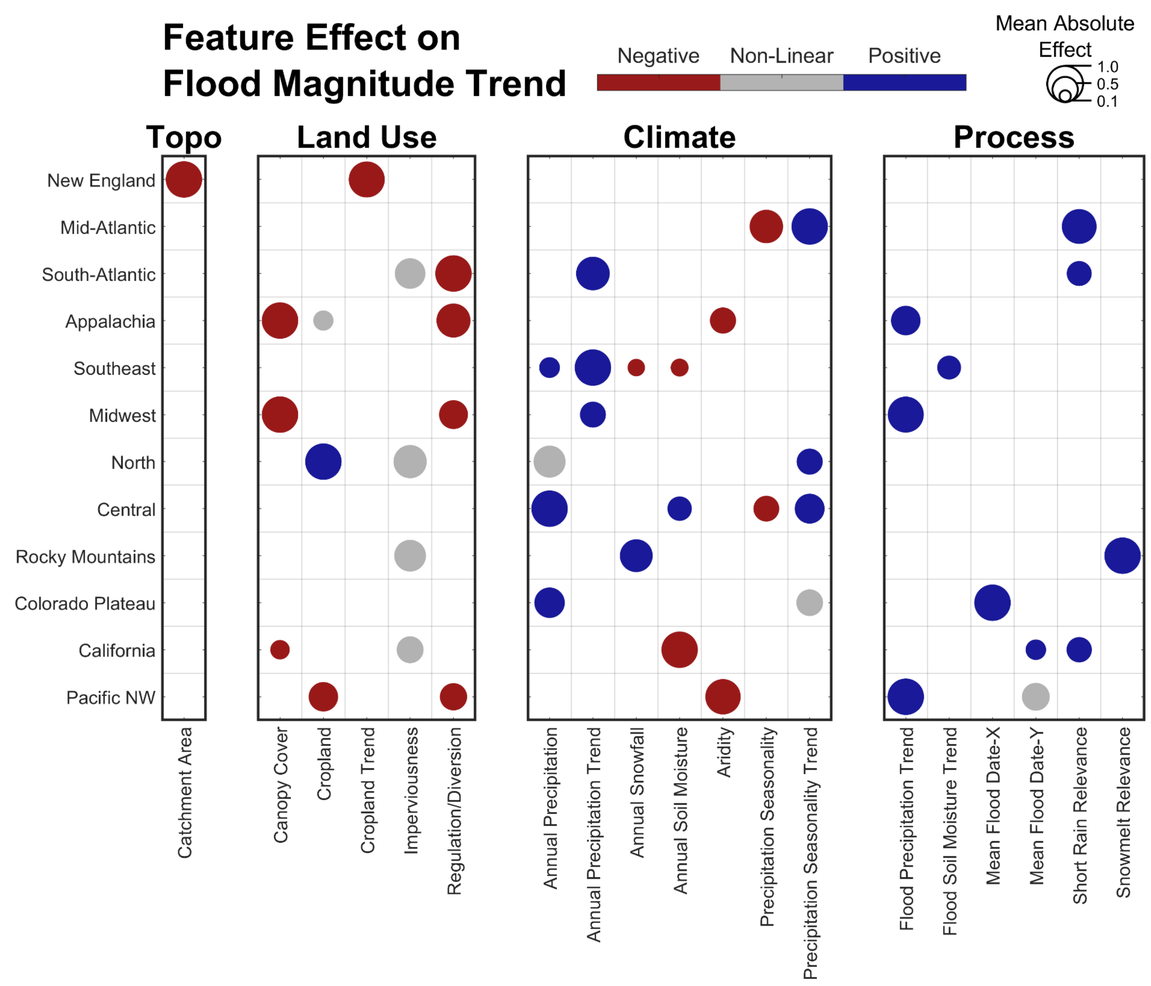




RANDOM FORESTS

- One Random Forest per cluster trained to predict magnitude trends
- Accumulated Local Effect plots reveal variable impact on magnitude trends





MAIN RESULTS

- Rainfall magnitude and seasonality trends defined flood magnitude trends in most clusters
- Static land use variables have mitigated (forests and reservoirs) or amplified (impervious surfaces) climate change effects

Universität Potsdam GFZ Helmholtz-Zentrum Potsdam PIK DFG Deutsche Forschungsgemeinschaft