ITT7: Attribution of changes in river flows in the UK

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Detection vs. Attribution

- **Detection** is the process of showing that some climate change indicator of choice has changed in a statistical sense, but without giving reasons for this change.
- When such a change has been detected, **attribution** is the process of linking these changes to a probable cause.

Aim

To both detect *and* attribute changes in peak river flows in the UK.

This week: impact of urbanisation on peak flows

Data:

- Daily flow data for 5 "urbanised" catchments with 4-5 decades of urbanisation extent levels.
- Daily flow data for 10 paired catchments with similarity based on SDM.
- Rainfall data for each catchment.

Plan

- Investigate whether there are differences between urbanised and rural catchments when it comes to the relationship between flows and rainfall.
- Preliminary checks: can we detect expected changes in the river flows using a **changepoint analysis**?
- Construct a series of peaks over threshold for each catchment to investigate a point process approach (station-by-station).

Urbanisation data

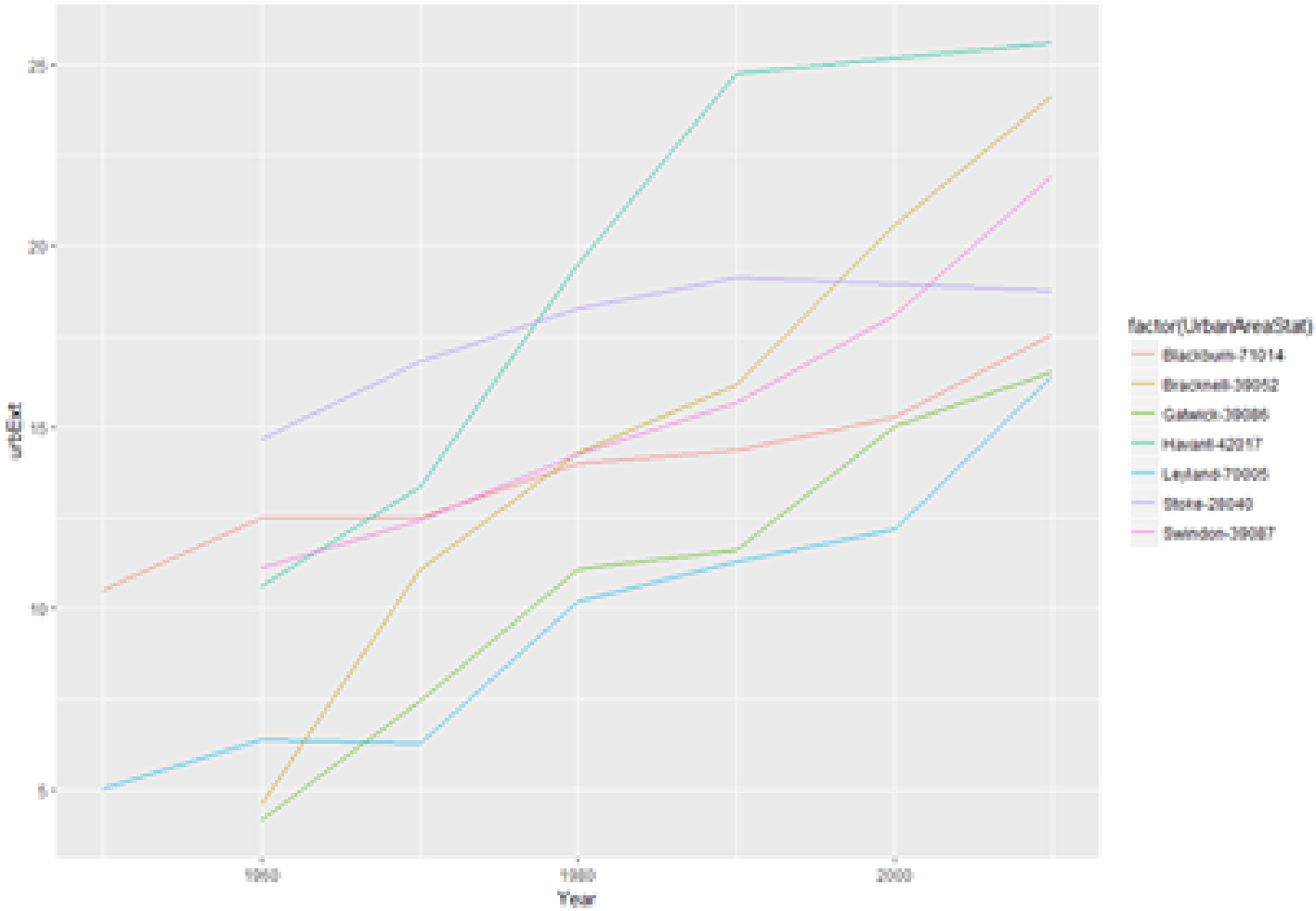

Figure: Changes in urbanisation in time

Looking further ahead...

Pooling of information/hierarchical model:

- At-site trend tests aren't very powerful - can we do better when looking countrywide?
- Hierarchical model approach to borrow information. One for benchmark catchments, one for the rest of the country & compare posteriors to see if there is a difference.

Climate drivers

- May wish to investigate the effect of other climate drivers on flows.
- **Lamb weather types** could be investigated - a method of classifying synoptic weather, based on variations in surface pressure values around the UK.
- More global climate drivers - East Atlantic & North Atlantic Oscillation indices.