UKCP Case Study: The Bristol City Council Factsheets

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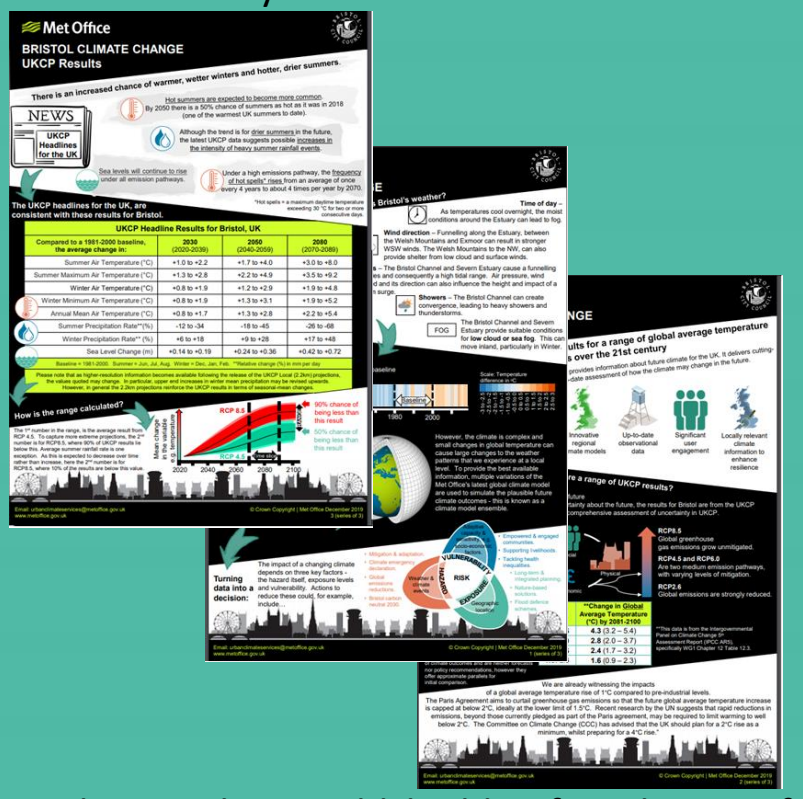
Year of Production: 2020
Target Audience: City Councillors, City Planners, General Public



Executive Summary

- Three non-technical factsheets were produced to explain how the climate of Bristol has changed and will continue to change in the 21st Century.
- A wide-ranging approach was taken looking at changes in seasonal temperature, precipitation and annual sea level changes.
- The Factsheets provide local detail on these messages across the 21st Century.

Introduction

Bristol City Council needed an overview of Bristol's past and future climate that could build a foundation of collective understanding within the council. The factsheets were then used to engage with a range of stakeholders to inform conversations and decision-making around planning and resilience/climate strategies. Three Factsheets were produced using historical weather data for Bristol and the UKCP Probabilistic Projections to investigate future changes in the climate of Bristol. Due to its coastal location, the UKCP Marine projections were also included. The Factsheets were funded as part of the UK Government Strategic Priorities Fund programme on UK Climate Resilience.

The Factsheets

Bristol Climate Change: The Science highlights the different factors influencing the weather of Bristol, for example both wind and rain are dominated by the interaction between the weather and the local landscape (Exmoor, the Welsh Mountains and the Severn Estuary). Additionally, it displays the Bristol "Climate Stripes", highlighting the change in annual temperature for Bristol between 1887 and 2018.

Bristol Climate Change: The Results Explained introduces the UKCP tools that are used to project future changes in Bristol's climate. It describes the new emissions scenarios (representative concentration pathways), outlining their different projected changes in global temperature and setting this in the context of the 2015 Paris Agreement.

Bristol Climate Change: UKCP Results provides a UK climate overview followed by Bristol-specific future changes in summer, winter and annual air temperature; winter and summer precipitation and annual sea level changes for three periods, the 2030s, 2050s and 2080s.

Feedback

The Factsheets have been well received by Bristol City Council and have been used to inform the Bristol City Council climate resilience strategy. The Factsheets have resonated with Bristolians due to the local focus of the information. They enabled an improved understanding of the impact of changes in the local climate providing the basis for the need to take action on climate change. The success of the Bristol City Council Factsheets has resulted in them being replicated in other cities.

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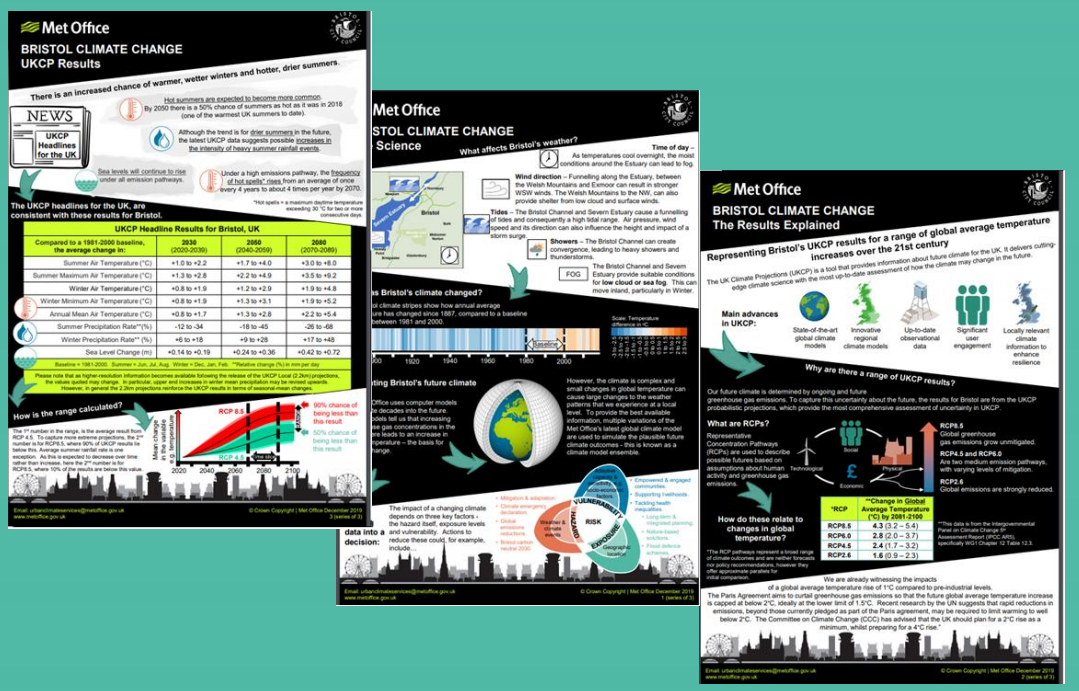
Methodology

The following sets out the options selected to extract data from the UKCP User Interface (UI) to develop city specific climate projections. This was informed by stakeholder engagement in terms of required climate variables, representative concentration pathways (RCPs) and probability levels that would be useful for decision making.



Future Climate in Bristol using the Land Projections

The **25km Probabilistic Land Projections** were used as they provide the most comprehensive assessment of uncertainty in UKCP. Selecting the 25 km grid box position over Bristol, **Cumulative Distribution Function (CDF) Plots** were used as they provide the associated probability of climate change being less than that value, represented as a percentile. Two variables were assessed, 1.5 m air temperature anomalies (measured in °C), and mean precipitation anomalies (measured in % relative change), with anomalies calculated against a **baseline** period of 1981-2000 (the same used in the UKCP headline findings, science reports and guidance). Results are presented for three time periods: 2030s (2020-2039 average), 2050s (2040-2059 average) and 2080s (2070-2089 average) with results calculated on annual timescales for temperature and seasonal (winter & summer) timescales for temperature and precipitation.

These results are presented as a range of change, between a medium scenario to a more extreme scenario. The medium scenario was calculated using the 50th percentile from the RCP 4.5 scenario. The more extreme scenario was calculated using the RCP 8.5 scenario, with the 90th percentile value used for temperature and winter precipitation. As summer precipitation is expected to decrease, the 10th percentile used for the more extreme scenario, representing drought conditions. These values were chosen through stakeholder discussion to represent a sensible reflection of the range of potential possible outcomes or scenarios.

Future Sea level rise using the Marine Projections:

Bristol, as a coastal city, therefore required the inclusion of projections of sea level rise, which is available from UKCP. A timeseries plot **of sea level anomalies** (to the same **baseline** period of 1981-2000 used for the Land Projections) from 2007 to 2100 for the grid box representative of Bristol's location. The changes in sea level were reported for the same periods as the Land Projections (2030s, 2050s and 2080s).
Time Period: 2007-2100 selected for export but sea level anomaly reported in results for 2030, 2050, 2080.

The results were also presented as a range of change from a low value to a high value. As for the Land Projections, the 50th percentile for the RCP 4.5 scenario was used for the low value, with the 90th percentile value from the RCP 8.5 scenario. Again, these values were chosen through stakeholder discussion to represent a sensible reflection of the range of potential possible outcomes or scenarios.

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