



# Wiltshire Climate Change Adaptation Action Plan

**Level 1 report**

**Appendix 4: Likely climate changes in Wiltshire**

April 2010



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## Glossary

The definitions of the main climate variables discussed in this report are provided below. These definitions are taken from the 2009 UK Climate Projections (UKCP09); User Interface, Guidance: Glossary and the Climate Change Projections Report.

**Mean temperature:** 30-year average of annual/seasonal average air temperature at 1.5 metres. The projections present mean daily temperature, which is the average of the daily maximum and daily minimum temperatures. The mean daily temperature is referred to simply as mean temperature.

**Precipitation:** Annual/seasonal average precipitation rate. Precipitation is water falling in some form, and includes rain, snow, sleet and hail.

**Mean daily maximum temperature:** 30-year average of annual/seasonal average of daily maximum air temperature at 1.5 metres.

**Temperature of the warmest day:** 99<sup>th</sup> percentile of 30 years daily maximum air temperature at 1.5 metres.

**Total cloud cover:** Annual/seasonal average total cloud cover.

**Relative humidity:** Annual/seasonal average relative humidity at 1.5 metres. Relative humidity is the ratio of the amount of water vapour in the air to that which would be needed to saturate it at the same temperature. It is usually expressed as a percentage, so saturated air has a relative humidity of 100%.

**Total downward surface shortwave flux:** 30-year average of annual/seasonal average of total downward surface shortwave flux.

**Precipitation on the wettest day:** 99<sup>th</sup> percentile of 30 years daily precipitation rate.



## 1.0 Introduction

- 1.1 This document summarises likely **climate changes in Wiltshire** over the period up until the end of the century. The findings are based on the 2009 UK Climate Projections (UKCP09) published in June 2009 by the Met Office Hadley Centre. The work meets part of the requirements of National Indicator (NI) 188 “Planning to Adapt to Climate Change”.
- 1.2 Climate change is a global issue but its impacts are felt locally and are affected by physical, social and economic factors specific to a given area.
- 1.3 For the council and partner organisations, climate change adaptation means ensuring we can continue to deliver our services in the future even as the climate changes. Some degree of climate change is now unavoidable even if carbon emissions fall dramatically. Our historic greenhouse gas emissions and the persistence of these gases in the atmosphere, as well as the slowly increasing warming of the oceans, make this inevitable.
- 1.4 It is therefore very important for us to be prepared for the unavoidable consequences of climate change.
- 1.5 Preparing a Climate Change Adaptation Plan will ensure we meet our Local Area Agreement (LAA) target against Performance Indicator NI188. This measures how prepared we are in Wiltshire to continue delivering services under a changing environment. The plan is intended to be developed in partnership, led by the council.
- 1.6 Progress against NI188 is broken down into five Levels, 0 to 4 and these are explained in the Local and Regional Partnership Board (LRAP) 2008 Guidance Notes for NI188. There are a number of specific requirements for each level and this document sets out the findings for **Level 1.3 - Identifying Some Significant Potential Impacts from Future Weather and Climate**.
- 1.7 This document sets out the **projected changes in Wiltshire’s climate** based on the UKCP09 projections. The report includes summaries of the predicted changes to both temperature and precipitation in summer and winter for the 2020s, 2050s and 2080s. These projections will help inform the completion of the requirements of **Level 2 of NI188 – Comprehensive Risk Assessment**.

## 2.0 Background and context

- 2.1 Progress against National Indicator (NI) 188 is broken down into five Levels, 0 to 4. There are a number of specific requirements for each level and we will need to demonstrate that these levels have been fully met.
- 2.2 One of the important requirements of NI188 Level 1: Public Commitment and Impacts Assessment – Assembling an Evidence Base is to **'Identify Some Significant Potential Impacts from Future Weather and Climate'**.
- 2.3 The Local and Regional Partnership Board (LRAP) 2008 Guidance Notes for NI188 suggests that this work should include "interpreting the UKCP09 projections to "provide appropriate information for the locality on appropriate timescales, relevant weather and climate variables".
- 2.4 This document will also form part of the evidence base for the emerging Wiltshire Local Development Framework (LDF).

### The UKCP09 climate projections

- 2.5 The UKCP09 projections are the fifth set of climate projections produced for the UK, with the most recent previous projections being published in 2002. The UKCP09 projections offer a number of improvements over the 2002 work, including the availability of projections at a finer spatial resolution.
- 2.6 There are a number of choices of variables when presenting findings from the UKCP09 work and these are explained below.

### Time periods

- 2.7 The projections are available for seven overlapping 30 year time periods, ranging from 2010 up until the end of the century (Table 2.1). The time periods are each referred to by their central decade. It is important to note that the projections for each time period relate to the average climate over the 30 year period.
- 2.8 This report presents projections for the 2020s, 2050s, and 2080s. These time periods have been chosen to assist short, medium and long term planning and to inform the completion of the requirements of **Level 2 of NI188 – Comprehensive Risk Assessment**.
- 2.9 In all cases, the projections relate to climate changes relative to the 1961 to 1990 baseline period. It should be noted that the gap between the end of the baseline period (1990) and the beginning of the first time period for projections (2010) means that the UKCP09 work does not provide projections for current and near-term (next 5-10 years) climate.

**Table 2.1: Time periods covered by the UKCP09 projections**

Time period	Central decade
2010 – 2039	2020s
2020 – 2049	2030s
2030 – 2059	2040s
2040 – 2069	2050s
2050 – 2079	2060s
2060 – 2089	2070s
2070 – 2099	2080s

Source: UKCP09 Guidance: Glossary

### **Spatial resolution**

- 2.10 The projections set out within UKCP09 are available for administrative regions, river basins, and for 25km grid squares. As Wiltshire is covered by six of these 25km grid squares these have been used to prepare this report. It should be noted however, that these do not correspond exactly to the local authority boundary. Further information about the 25km grid squares used is set out in **Appendix 4.1**.

### **Emissions scenarios**

- 2.11 The extent to which the climate changes in the future will relate to how much greenhouse gas is emitted into the atmosphere. For this reason the UKCP09 projections are available for three emissions scenarios: low, medium, and high. This report presents projections for all three of these emissions scenarios and gives an indication of the possible variation in future climate change.
- 2.12 There is generally little variation between the emissions scenarios for projections covering the earlier time periods (2020s, 2030s, and 2040s). This is because the climate change experienced during these earlier periods will largely be determined by emissions which are already in the atmosphere. Most greenhouse gases persist in the atmosphere for many decades and so we are already locked into a certain amount of climate change.
- 2.13 The emissions scenarios are explained in more detail in **Appendix 4.2**.

### **Probability levels**

- 2.14 The UKCP09 work includes probabilistic climate projections. Each projection is accompanied by a 'probability level' which indicates the degree of certainty associated with that projection. Table 2.2 illustrates the meaning of the most frequently used probability levels referred to in UKCP09.
- 2.15 Further information about the probability levels set out in UKCP09 is provided by **Appendix 4.3**.

**Table 2.2: Probability levels covered by the UKCP09 projections.**

<b>Probability Level</b>	<b>Explanation</b>
10%	Climate change is <b>very unlikely to be less than</b> the projected value
33%	Climate change is <b>unlikely to be less than</b> the projected value
50%	Climate change is <b>equally likely to be less than or greater than</b> the projected value
67%	Climate change is <b>unlikely to be more than</b> the projected value
90%	Climate change is <b>very unlikely to be more than</b> the projected value

Source: Adapted from Gloucestershire County Council, 2010

2.16 Each of the different probability levels can be referred to as follows:

50% probability level = 'central estimate'

10% to 90% range = 'very likely range'

33% to 67% range = 'likely range'

2.17 This report uses the '**Likely Range**' and the '**Central Estimate**' to illustrate climate change in Wiltshire. Values for the 10% and 90% probability levels for the main climate variables are also presented for reference in **Appendix 4.4**.

### **Climate variables**

2.18 This report focuses on the climate variables of temperature and precipitation. Other variables of cloud cover, humidity and shortwave radiation are also briefly covered. The definitions for each of these climate variables are provided in the **Glossary** at the front of this document.

### 3.0 Likely climate change in Wiltshire

3.1 The likely climate change trends in Wiltshire over the period up until the end of the century are summarised in Table 3.1. These trends are derived from detailed projections for annual, summer and winter changes, as set out below.

**Table 3.1: Summary of climate change in Wiltshire**

Long-term/seasonal changes	Extreme events
<ul style="list-style-type: none"> <li>• Increase in annual average temperature</li> <li>• Hotter, drier summers</li> <li>• Milder, wetter winters</li> </ul>	<ul style="list-style-type: none"> <li>• More hot days</li> <li>• Fewer frost days</li> <li>• More dry spells</li> <li>• Increase in temperature of warmest day</li> <li>• Increase in precipitation on wettest day</li> </ul>

#### Projected annual changes

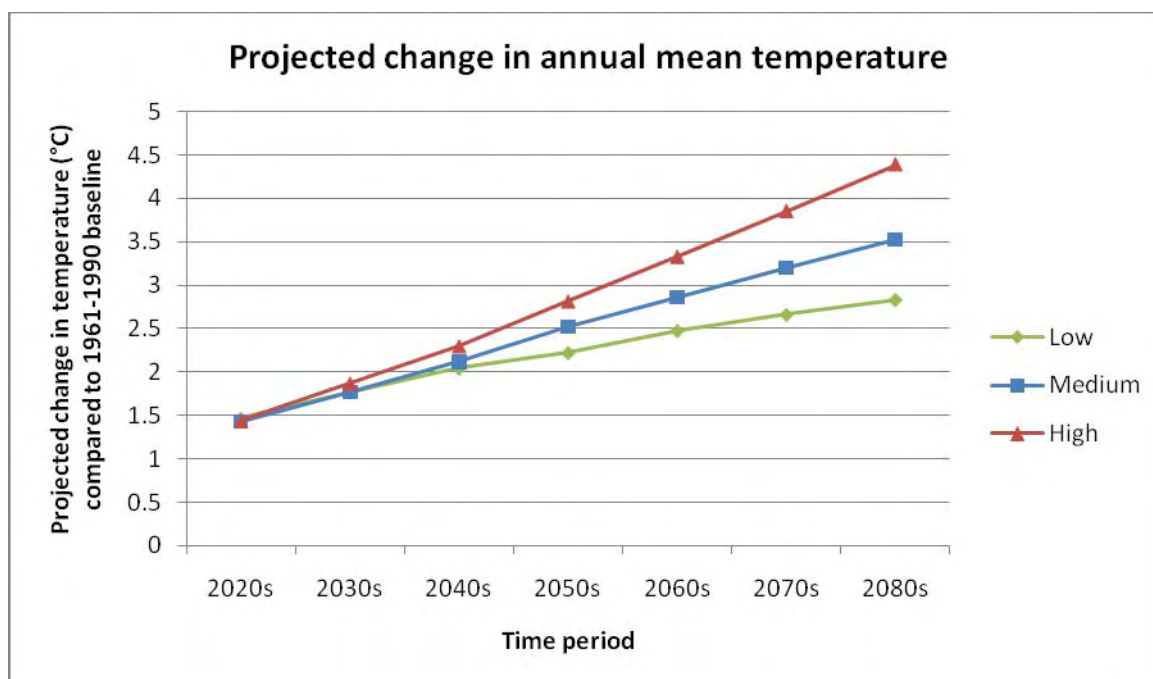
- 3.2 Annual mean temperature in Wiltshire is likely to increase compared to the 1961 to 1990 baseline (Table 3.2 and Figure 3.1).
- 3.3 Annual precipitation in Wiltshire is likely to change by a few percent compared to the 1961 to 1990 baseline (Table 3.3). However, precipitation is predicted to decrease in the summer months, with a corresponding increase during winter.

**Table 3.2: Projected changes in annual mean temperature in Wiltshire (figures show the likely range, 33% to 67% probability levels).**

Time period	Low emissions scenario (°C)	Medium emissions scenario (°C)	High emissions scenario (°C)
2020s	1.2 to 1.7	1.2 to 1.7	1.2 to 1.7
2050s	1.9 to 2.6	2.2 to 2.9	2.4 to 3.2
2080s	2.4 to 3.3	3.1 to 4.1	3.8 to 5.1

Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

**Figure 3.1: Projected changes in annual mean temperature in Wiltshire over the period up until the end of the century (central estimate, 50% probability level).**



Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

**Table 3.3: Projected changes in annual mean precipitation in Wiltshire (figures show the likely range, 33% to 67% probability levels).**

Time period	Low emissions scenario (%)	Medium emissions scenario (%)	High emissions scenario (%)
2020s	-1 to 3	-2 to 2	-2 to 3
2050s	-1 to 2	-2 to 2	-2 to 2
2080s	0 to 4	-2 to 3	-2 to 4

Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

### Projected changes in summer: temperature and precipitation

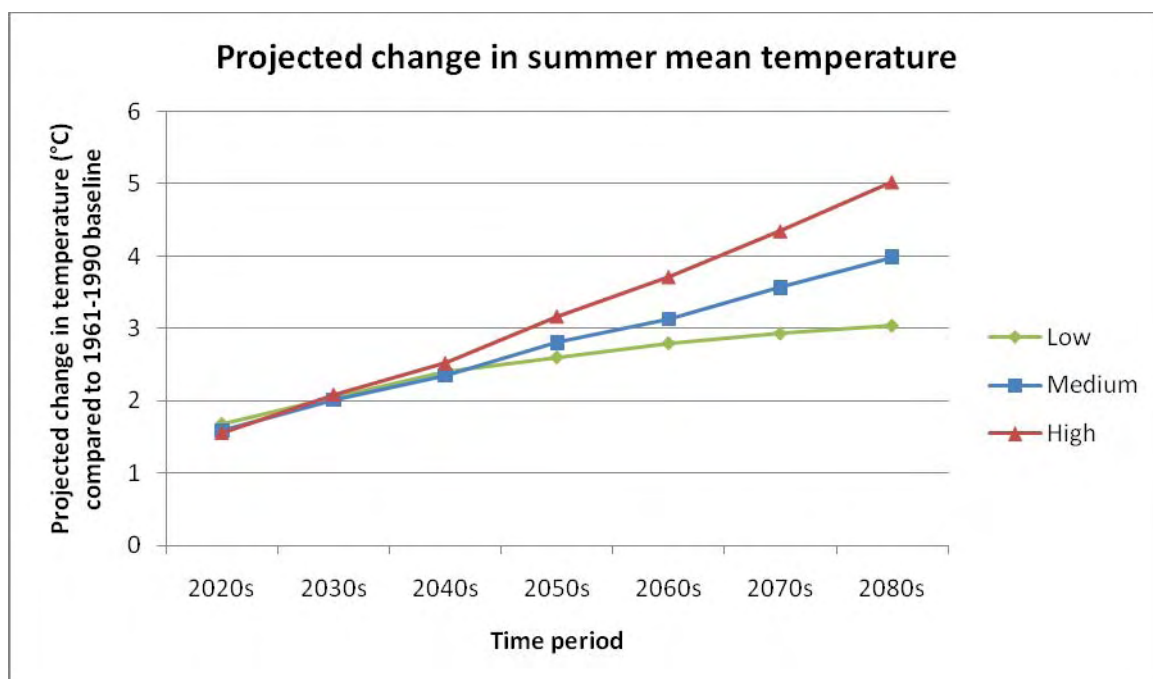
- 3.4 Summers are likely to become hotter, with higher mean temperatures (Table 3.4 and Figure 3.2), higher daily maximum temperatures (Table 3.5), and higher temperatures on the warmest day (Table 3.6).

**Table 3.4: Projected changes in summer mean temperature in Wiltshire (figures show the likely range, 33% to 67% probability levels).**

Time period	Low emissions scenario (°C)	Medium emissions scenario (°C)	High emissions scenario (°C)
2020s	1.3 to 2.1	1.2 to 2.0	1.2 to 2.0
2050s	2.0 to 3.2	2.3 to 3.5	2.5 to 3.9
2080s	2.4 to 3.8	3.3 to 4.9	4.1 to 6.2

Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

**Figure 3.2: Projected changes in summer mean temperature in Wiltshire over the period up until the end of the century (central estimate, 50% probability level).**



Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

**Table 3.5: Projected changes in mean daily maximum temperature in summer in Wiltshire (likely range, 33% to 67% probability levels).**

Time period	Low emissions scenario (°C)	Medium emissions scenario (°C)	High emissions scenario (°C)
2020s	1.6 to 2.7	1.5 to 2.7	1.5 to 2.6
2050s	2.5 to 4.2	2.8 to 4.7	3.2 to 5.3
2080s	3.0 to 5.1	4.0 to 6.7	5.2 to 8.3

Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

**Table 3.6: Projected changes in the temperature of the warmest summer day in Wiltshire (likely range, 33% to 67% probability levels).**

Time period	Low emissions scenario (°C)	Medium emissions scenario (°C)	High emissions scenario (°C)
2020s	0 to 2.7	0 to 2.7	0.3 to 2.9
2050s	1.0 to 4.3	0.9 to 4.4	1.0 to 5.4
2080s	0.7 to 4.6	1.2 to 5.8	1.7 to 7.3

Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

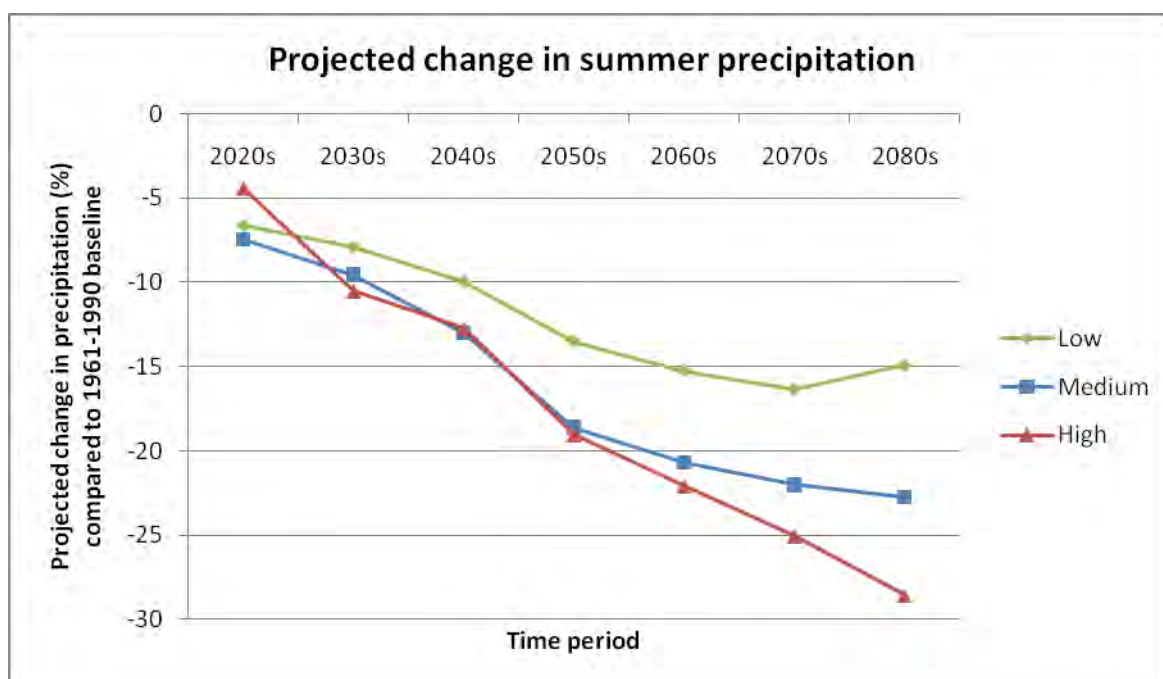
3.5 Summer precipitation is predicted to decrease (Table 3.7 and Figure 3.3).

**Table 3.7: Projected changes in summer mean precipitation in Wiltshire (likely range, 33% to 67% probability levels).**

Time period	Low emissions scenario (%)	Medium emissions scenario (%)	High emissions scenario (%)
2020s	-14 to 0	-15 to -1	-12 to 3
2050s	-23 to -4	-28 to -10	-29 to -10
2080s	-25 to -6	-34 to -13	-41 to -18

Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

**Figure 3.3: Projected changes in summer mean precipitation in Wiltshire over the period up until the end of the century (central estimate, 50% probability level).**



Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

**Projected changes in summer: cloud cover, humidity and shortwave radiation**

- 3.6 The UKCP09 projections indicate that total cloud cover is likely to decrease in summer. Under the medium emissions scenario summer cloud cover in Wiltshire is likely to decrease by between 7% and 15% by the 2050s, compared to the 1961-1990 baseline (the central estimate is a decrease of 11%).
- 3.7 The projections indicate that relative humidity is likely to decrease in summer. Relative humidity in the summer in Wiltshire is likely to decrease by between 4% and 10% by the 2050s under the medium emissions scenario.
- 3.8 Shortwave radiation is likely to increase in summer. Under the medium emissions scenario, total downward surface shortwave flux in summer in Wiltshire is likely to increase by between 6% and 19% by the 2050s.

### Projected changes in winter: temperature and precipitation

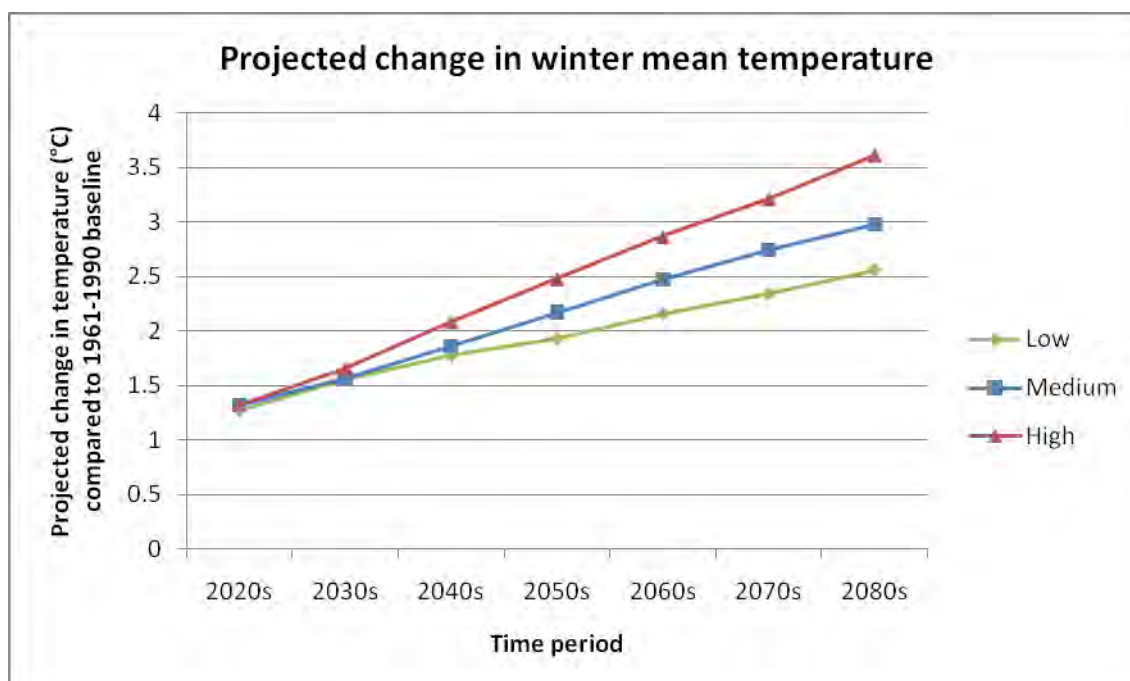
3.9 Winters are likely to become warmer (Table 3.8 and Figure 3.4). The increases in winter temperature are likely to be smaller than those for summer temperature. As an example, winter temperatures are likely to increase by between 1.8°C and 2.6°C by the 2050s under the medium emissions scenario, whilst summer temperatures are predicted to increase by between 2.3°C and 3.5°C.

**Table 3.8: Projected changes in winter mean temperature in Wiltshire (likely range, 33% to 67% probability range).**

Time period	Low emissions scenario (°C)	Medium emissions scenario (°C)	High emissions scenario (°C)
2020s	1.0 to 1.5	1.0 to 1.6	1.0 to 1.6
2050s	1.5 to 2.3	1.8 to 2.6	2.0 to 2.9
2080s	2.1 to 3.0	2.4 to 3.5	2.9 to 4.2

Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

**Figure 3.4: Projected changes in winter mean temperature in Wiltshire over the period up until the end of the century (central estimate, 50% probability level).**



Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

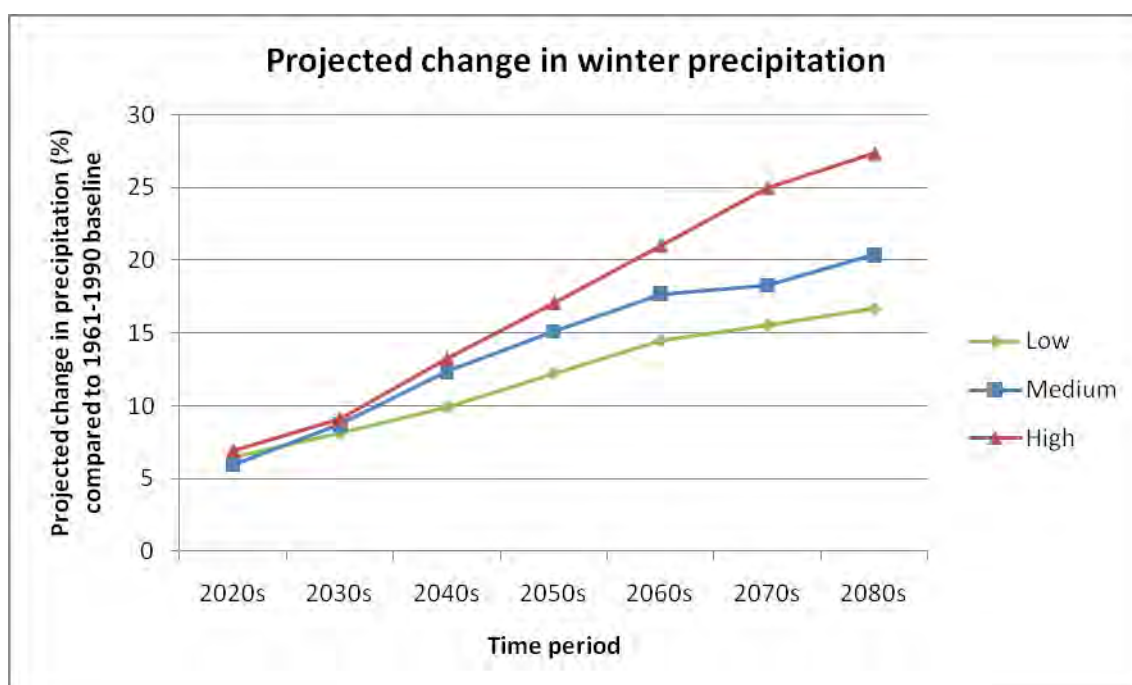
3.10 Winters are also predicted to become wetter, with projected increases in both mean precipitation (Table 3.9 and Figure 3.5) and precipitation on the wettest day (Table 3.10).

**Table 3.9: Projected changes in winter mean precipitation in Wiltshire (likely range, 33% to 67% probability levels).**

Time period	Low emissions scenario (%)	Medium emissions scenario (%)	High emissions scenario (%)
2020s	3 to 11	2 to 10	3 to 11
2050s	7 to 18	9 to 22	10 to 24
2080s	10 to 24	12 to 29	17 to 39

Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

**Figure 3.5: Projected changes in winter mean precipitation in Wiltshire over the period up until the end of the century (central estimate, 50% probability level).**



Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

**Table 3.10: Projected changes in precipitation on the wettest day in winter in Wiltshire (likely range, 33% to 67% probability levels).**

Time period	Low emissions scenario (%)	Medium emissions scenario (%)	High emissions scenario (%)
2020s	2 to 13	2 to 11	-2 to 13
2050s	5 to 17	6 to 21	7 to 23
2080s	9 to 23	11 to 29	14 to 37

Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

### **Projected changes in winter: cloud cover and shortwave radiation**

- 3.11 The projections indicate that total cloud cover is likely to change by only a few percent in winter. As an example, winter cloud cover in Wiltshire is likely to change be between -1% and 1% by the 2050s under the medium emissions scenario. Changes in shortwave radiation in winter are also predicted to be small.

## 4.0 Summary of Climate Changes for the 2020s, 2050s, and 2080s

4.1 Summaries are provided below which show the likely changes in temperature and precipitation in Wiltshire for the 2020s, 2050s, and 2080s under the medium emissions scenario. In each case, the figures given represent the 'likely range' (probability levels of 33 to 67%), and changes are relative to the 1961-1990 baseline.

### Likely changes in temperature and precipitation in Wiltshire for the **2020s** under medium emissions scenario

#### Temperature

- Increase in annual mean temperature by between 1.2 and 1.7°C
- Increase in summer mean temperature by between 1.2 and 2.0°C
- Increase in winter mean temperature by between 1.0 and 1.6°C
- Increase in temperature of warmest summer day by between 0 and 2.7°C

#### Precipitation

- Annual precipitation stays roughly the same
- Decrease in summer mean precipitation by between 1 and 15%
- Increase in winter mean precipitation by between 2 and 10%
- Increase in precipitation on the wettest winter day by between 2 and 11%

### Likely changes in temperature and precipitation in Wiltshire for the **2050s** under medium emissions scenario

#### Temperature

- Increase in annual mean temperature likely to be between 2.2 and 2.9°C
- Increase in summer mean temperature by between 2.3 and 3.5°C
- Increase in winter mean temperature by between 1.8 and 2.6°C
- Increase in temperature of warmest summer day by between 0.9 and 4.4°C

#### Precipitation

- Annual precipitation stays roughly the same
- Decrease in summer mean precipitation by between 10 and 28%
- Increase in winter mean precipitation by between 9 and 22%
- Increase in precipitation on the wettest winter day by between 6 and 21%

**Likely changes in temperature and precipitation in Wiltshire for the 2080s under medium emissions scenario**

**Temperature**

- Increase in annual mean temperature likely to be between 3.1 and 4.1°C
- Increase in summer mean temperature by between 3.3 and 4.9°C
- Increase in winter mean temperature by between 2.4 and 3.5°C
- Increase in temperature of warmest summer day by between 1.2 and 5.8°C

**Precipitation**

- Annual precipitation stays roughly the same
- Decrease in summer mean precipitation by between 13 and 34%
- Increase in winter mean precipitation by between 12 and 29%
- Increase in precipitation on the wettest winter day by between 11 and 29%

## 5.0 **Possible climate change impacts in Wiltshire**

- 5.1 This report has summarised likely climate change in Wiltshire up until the end of this century. It is important however to consider what impacts these projected changes will have on council activity or on Wiltshire as a whole.
- 5.2 The Met Office has produced a table showing some of the likely impacts for the energy, water, agriculture, built environment and transport sectors across the UK as a whole. This table is reproduced below to give an indication of likely future impacts (Table 3.11).
- 5.3 Clearly the severity of any impacts will depend upon local circumstances and vulnerabilities. Further work is needed to ascertain the particular nature of vulnerabilities or opportunities associated with climate change in Wiltshire in more detail.

**Table 3.11: Likely impacts of climate change for the energy, water, agriculture, built environment and transport sectors.**

Sector/Impact	Energy	Water	Agriculture	Built environment	Transport
<b>Extreme weather</b>	The UK's energy infrastructure is at risk from extreme weather, such as flooding and heat waves.	Wetter winters and storm surges, combined with sea-level rise will increase flood risk in the UK.	Extreme weather, such as storms or heat waves, can cause major damage to crop yields.	Buildings in the UK will have to withstand more extreme weather — increased temperatures and rain.	Increased temperatures and rain will have a big effect on road and rail networks in the UK.
<b>High temperatures</b>	Hotter UK summers will increase the demand for air conditioning; less heating will be needed in winter. Power cables under perform when it is hot.	Higher temperatures could cause water demand to rise.	Higher year-round temperatures could allow new crops to flourish in the UK. Diseases and pests could survive milder UK winters.	People will be more vulnerable to heat stress caused by increased temperatures and humidity.	Road surfacing will melt unless replaced with different materials.
<b>Drought</b>	Many power stations use water from rivers to cool their turbines — less water will be available, increasing competition with other water users.	Droughts will increase current pressure on water demand, supply and quality — including in the UK.	Droughts could reduce UK crop yield or increase demand for irrigation. Many UK potato varieties are not drought tolerant.	Drier soils lead to subsidence — foundations may have to be very deep to reach more secure soil.	Subsidence caused by changes in soil-moisture content may lead to more frequent and expensive repair of infrastructure.
<b>Floods</b>	In the UK, many power stations are situated on the coast, and so future planning will need to account for predicted sea-level rise.	Sewage flooding could increase due to more heavy rainfall.	More heavy rain will lead to increased risk of flooding. This will wash out nutrients and lead to water logging of fields.	The location of building projects, drainage and flood-resilient construction will be increasingly important in the UK.	Coastal roads and railways are threatened with wetter UK winters, intense rainfall, coastal erosion and sea-level rise.

<p><b>Urban heat island</b></p>	<p>Cities tend to be much warmer than their surroundings. Peaks in electricity demand due to air-conditioning occur during summer heat waves.</p>	<p>Higher urban temperatures will increase water consumption, including demand associated with cooling buildings and watering gardens and parks.</p>	<p>Higher winter temperatures in cities can support the life cycle of some non-native agricultural pests which can spread into rural areas.</p>	<p>Reflective roof coverings and light-coloured building materials can help combat over-heating in cities.</p>	<p>Summer temperatures, which can already reach uncomfortable levels on public transport systems in UK cities, are set to increase.</p>
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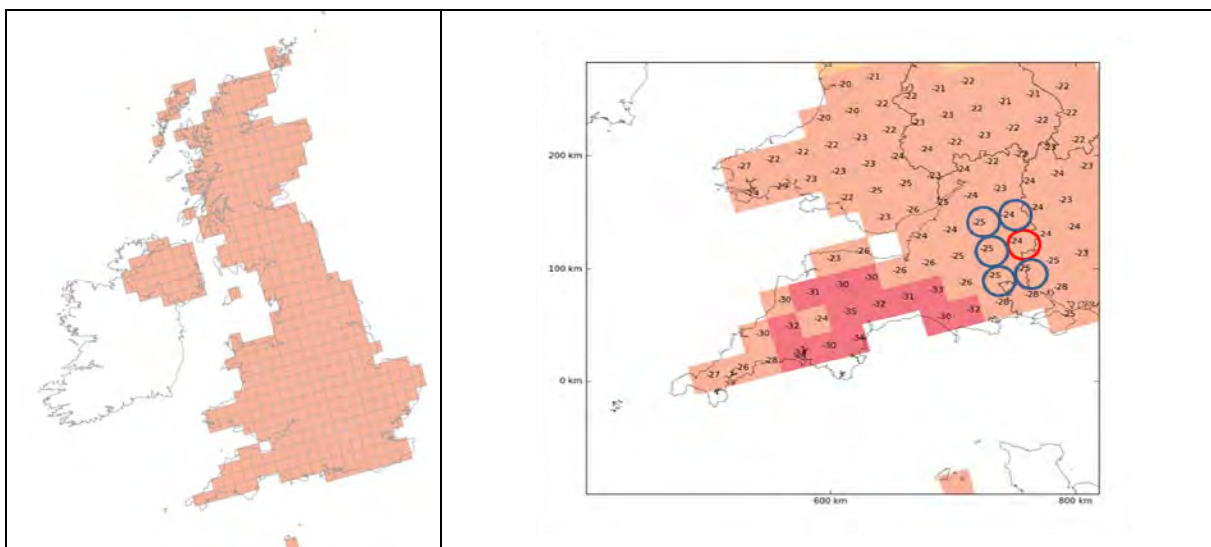
<http://ukclimateprojections-ui.defra.gov.uk/ui/admin/login.php>

### Appendix 4.1: Spatial resolution

The UKCP09 projections are available for 25 km grid squares across the UK. The grid squares do not correspond exactly to local authority boundaries, but Wiltshire is covered by approximately six grid squares, as shown below.

It is not possible to average the projections across the grid squares due to the way in which the models were developed. Where a range of values is given in this report, this represents the range across the six grid squares. The graphs showing the change over time in projections at the 50% probability level relate to the single grid square highlighted in red.

#### Grid squares covering Wiltshire



Source: UKCP09 User Interface (© UK Climate Projections 2009)

## Appendix 4.2: Emissions scenarios

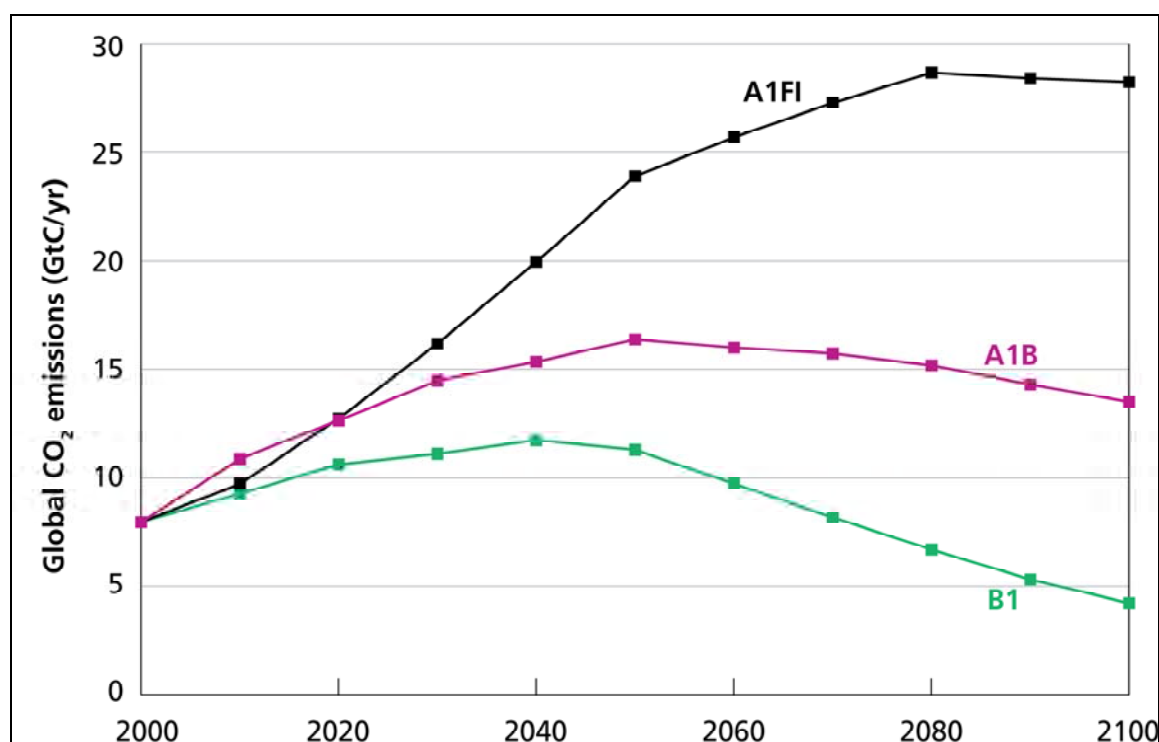
The UKCP09 projections are available for three different emissions scenarios. The three scenarios are based on socio-economic scenarios, following a Scenario Research (SRES) method developed by the Intergovernmental Panel on Climate Change (IPCC). The scenarios do not take account of policies which may arise in response to concerns over climate change. The three scenarios used for the UKCP09 projections are illustrated below.

### Summary of UKCP09 emissions scenarios

UKCP09 emissions scenario	Corresponding IPCC SRES scenario	Summary
High	A1F1	High reliance on fossil fuels
Medium	A1B	Mixed reliance on fossil fuels and new technologies
Low	B1	Increased use of new technologies

Source: Gloucestershire County Council, 2010

### Carbon Dioxide emissions under the three IPCC SRES scenarios used in UKCP09

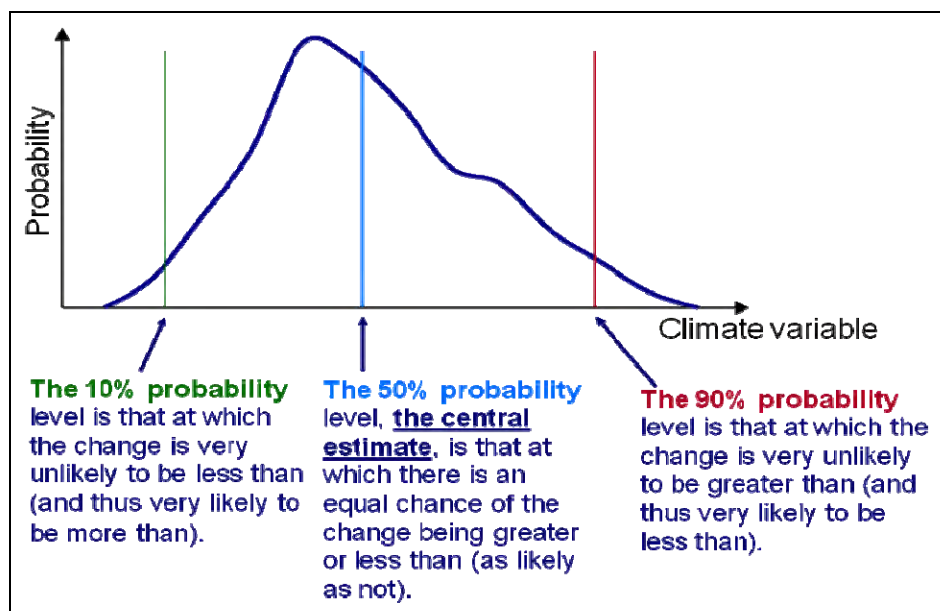


Source: IPCC 2007, reproduced in UKCP09 Briefing report

### Appendix 4.3: Probability levels

The UKCP09 work provides probabilistic projections of future climate change. Each projection has an associated 'probability level'. The meanings of the 10%, 50% and 90% probability levels are illustrated below.

#### UKCP09 probability levels



Source: Gloucestershire County Council, 2010

#### Appendix 4.4: Detailed projections for Wiltshire

##### Winter mean temperature

Projected changes in winter mean temperature (°C) in Wiltshire (covered by six grid squares) compared to the 1961-1990 baseline across a range of probability levels, and for the 2020s, 2050s and 2080s time periods.

Period/ Probability	Low emissions scenario	Medium emissions scenario	High emissions scenario
2020s/ 10%	0.5	0.6	0.5
2020s/ 33%	1.0	1.0 to 1.1	1.0 to 1.1
2020s/ 50%	1.2 to 1.3	1.3	1.2 to 1.3
2020s/ 67%	1.5	1.5 to 1.6	1.5 to 1.6
2020s/ 90%	2.0 to 2.1	2.1	2.1 to 2.2
2050s/ 10%	0.9	1.1 to 1.2	1.3 to 1.4
2050s/ 33%	1.5 to 1.6	1.8	2.0 to 2.1
2050s/ 50%	1.8 to 1.9	2.1 to 2.2	2.3 to 2.5
2050s/ 67%	2.2 to 2.3	2.5 to 2.6	2.7 to 2.9
2050s/ 90%	2.9 to 3.1	3.2 to 3.4	3.5 to 3.8
2080s/ 10%	1.4	1.6 to 1.7	2.0 to 2.1
2080s/ 33%	2.1 to 2.2	2.4 to 2.5	2.9 to 3.1
2080s/ 50%	2.5 to 2.6	2.9 to 3.0	3.4 to 3.6
2080s/ 67%	2.9 to 3.0	3.3 to 3.5	4.0 to 4.2
2080s/ 90%	3.7 to 3.9	4.4 to 4.6	5.2 to 5.6

Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

##### Summer mean temperature

Projected changes in summer mean temperature (°C) in Wiltshire (covered by six grid squares) compared to the 1961-1990 baseline across a range of probability levels, and for the 2020s, 2050s and 2080s time periods.

Period/ Probability	Low emissions scenario	Medium emissions scenario	High emissions scenario
2020s/ 10%	0.7	0.5 to 0.6	0.5
2020s/ 33%	1.3 to 1.4	1.2 to 1.3	1.2
2020s/ 50%	1.7	1.6	1.5 to 1.6
2020s/ 67%	2.0 to 2.1	2.0	1.9 to 2.0
2020s/ 90%	2.8 to 2.9	2.8 to 2.9	2.7 to 2.8
2050s/ 10%	1.1 to 1.2	1.3 to 1.4	1.5
2050s/ 33%	2.0 to 2.1	2.3	2.5 to 2.6
2050s/ 50%	2.5 to 2.6	2.8 to 2.9	3.2
2050s/ 67%	3.1 to 3.2	3.4 to 3.5	3.8 to 3.9
2050s/ 90%	4.2 to 4.5	4.7 to 4.8	5.2 to 5.4
2080s/ 10%	1.4	2.1 to 2.2	2.7 to 2.8
2080s/ 33%	2.4 to 2.5	3.3 to 3.4	4.1 to 4.3
2080s/ 50%	3.0 to 3.1	4.0 to 4.1	5.0 to 5.2
2080s/ 67%	3.7 to 3.8	4.8 to 4.9	6.0 to 6.2
2080s/ 90%	5.1 to 5.3	6.6 to 6.7	8.2 to 8.4

Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

**Winter mean precipitation (% change)**

Projected percentage change in winter mean precipitation in Wiltshire (covered by six grid squares) compared to the 1961-1990 baseline across a range of probability levels, and for the 2020s, 2050s and 2080s time periods.

<b>Period/ Probability</b>	<b>Low emissions scenario</b>	<b>Medium emissions scenario</b>	<b>High emissions scenario</b>
2020s/ 10%	-3 to -4	-4	-2 to -3
2020s/ 33%	3	2 to 3	3 to 4
2020s/ 50%	6 to 7	5 to 6	6 to 7
2020s/ 67%	9 to 11	9 to 10	9 to 11
2020s/ 90%	16 to 19	17 to 19	17 to 19
2050s/ 10%	0 to 1	2	2 to 3
2050s/ 33%	7 to 8	9 to 11	10 to 12
2050s/ 50%	11 to 13	14 to 16	15 to 18
2050s/ 67%	15 to 18	18 to 22	21 to 24
2050s/ 90%	25 to 29	29 to 35	33 to 39
2080s/ 10%	3 to 4	3 to 4	6 to 7
2080s/ 33%	10 to 12	12 to 15	17 to 20
2080s/ 50%	15 to 18	18 to 22	24 to 29
2080s/ 67%	20 to 24	25 to 29	33 to 39
2080s/ 90%	32 to 38	41 to 49	53 to 64

Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

**Summer mean precipitation (% change)**

Projected percentage change in summer mean precipitation in Wiltshire (covered by six grid squares) compared to the 1961-1990 baseline across a range of probability levels, and for the 2020s, 2050s and 2080s time periods.

<b>Period/ Probability</b>	<b>Low emissions scenario</b>	<b>Medium emissions scenario</b>	<b>High emissions scenario</b>
2020s/ 10%	-24 to -25	-26 to -27	-23 to -25
2020s/ 33%	-13 to -14	-14 to -15	-11 to -12
2020s/ 50%	-7	-7 to -8	-4 to -5
2020s/ 67%	0	-1	3
2020s/ 90%	13 to 14	14 to 15	17 to 19
2050s/ 10%	-37 to -39	-40 to -43	-42 to -45
2050s/ 33%	-22 to -23	-26 to -28	-27 to -29
2050s/ 50%	-14	-19 to -20	-19 to -20
2050s/ 67%	-4 to -5	-10 to -11	-10 to -11
2050s/ 90%	16 to 17	7 to 8	8 to 9
2080s/ 10%	-39 to -41	-48 to -50	-56 to -59
2080s/ 33%	-23 to -25	-32 to -34	-38 to -41
2080s/ 50%	-15 to -16	-23 to -24	-29 to -30
2080s/ 67%	-6 to -7	-13 to -14	-18 to -19
2080s/ 90%	13 to 14	7	5

Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

### Temperature of warmest summer day

Projected change in temperature (°C) of the warmest summer day in Wiltshire (covered by six grid squares) compared to the 1961-1990 baseline across a range of probability levels, and for the 2020s, 2050s and 2080s time periods.

Period/ Probability	Low emissions scenario	Medium emissions scenario	High emissions scenario
2020s/ 10%	-1.7 to -2.3	-1.6 to -2.2	-1.8 to -2.0
2020s/ 3%	0 to 0.4	0 to 0.4	0.3 to 0.4
2020s/ 50%	1.2 to 1.5	1.2 to 1.5	1.5 to 1.7
2020s/ 67%	2.4 to 2.7	2.4 to 2.7	2.7 to 2.9
2020s/ 90%	4.8 to 5.1	4.8 to 5.1	5.2 to 5.5
2050s/ 10%	-1.5 to -1.8	-1.3 to -1.9	-1.3 to -2.3
2050s/ 33%	1.0 to 1.2	0.9 to 1.3	1.0 to 1.8
2050s/ 50%	2.5 to 2.7	2.4 to 2.7	2.9 to 3.5
2050s/ 67%	4.1 to 4.3	4.0 to 4.4	4.8 to 5.4
2050s/ 90%	7.4 to 7.8	7.6 to 7.9	8.8 to 9.5
2080s/ 10%	-1.8 to -2.6	-1.7 to -2.4	-1.3 to -2.5
2080s/ 33%	0.7 to 1.1	1.2 to 1.7	1.7 to 2.4
2080s/ 50%	2.5 to 2.7	3.1 to 3.6	4.1 to 4.7
2080s/ 67%	4.4 to 4.6	5.3 to 5.8	6.8 to 7.3
2080s/ 90%	8.4 to 8.7	10.1 to 10.8	12.5 to 13.4

Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

### Precipitation on wettest winter day

Projected percentage change in precipitation on the wettest winter day in Wiltshire (covered by six grid squares) compared to the 1961-1990 baseline across a range of probability levels, and for the 2020s, 2050s and 2080s time periods.

Period/ Probability	Low emissions scenario	Medium emissions scenario	High emissions scenario
2020s/ 10%	-5 to -7	-4 to -6	-3 to -10
2020s/ 3%	2	2	-2 to 4
2020s/ 50%	5 to 7	5 to 6	3 to 8
2020s/ 67%	9 to 13	9 to 11	8 to 13
2020s/ 90%	18 to 24	16 to 20	19 to 22
2050s/ 10%	0 to -5	-4 to 3	-4 to 3
2050s/ 33%	5 to 8	6 to 11	7 to 11
2050s/ 50%	10 to 12	12 to 15	13 to 17
2050s/ 67%	15 to 17	18 to 21	20 to 23
2050s/ 90%	25 to 29	28 to 32	31 to 36
2080s/ 10%	-1 to 3	0 to 6	0 to 8
2080s/ 33%	9 to 11	11 to 16	14 to 21
2080s/ 50%	15 to 17	17 to 22	22 to 28
2080s/ 67%	20 to 23	24 to 29	32 to 37
2080s/ 90%	31 to 37	38 to 44	50 to 58

Data source: UKCP09 User Interface (© UK Climate Projections, 2009)

**Mean daily maximum temperature (summer)**

Projected change in summer mean daily maximum temperature (°C) in Wiltshire (covered by six grid squares) compared to the 1961-1990 baseline across a range of probability levels, and for the 2020s, 2050s and 2080s time periods.

<b>Period/ Probability</b>	<b>Low emissions scenario</b>	<b>Medium emissions scenario</b>	<b>High emissions scenario</b>
2020s/ 10%	0.7 to 0.8	0.5 to 0.6	0.6
2020s/ 33%	1.6 to 1.7	1.5 to 1.6	1.5
2020s/ 50%	2.1 to 2.2	2.0 to 2.1	2.0
2020s/ 67%	2.6 to 2.7	2.5 to 2.7	2.5 to 2.6
2020s/ 90%	3.6 to 3.9	3.6 to 3.9	3.5 to 3.7
2050s/ 10%	1.2	1.4	1.7
2050s/ 33%	2.5 to 2.6	2.8 to 2.9	3.2 to 3.4
2050s/ 50%	3.3 to 3.4	3.6 to 3.8	4.1 to 4.3
2050s/ 67%	4.1 to 4.2	4.4 to 4.7	5.0 to 5.3
2050s/ 90%	5.9 to 6.1	6.3 to 6.7	7.1 to 7.5
2080s/ 10%	1.3 to 1.4	2.1 to 2.2	3.0
2080s/ 33%	3.0 to 3.1	4.0 to 4.2	5.2 to 5.4
2080s/ 50%	3.9 to 4.1	5.1 to 5.4	6.5 to 6.8
2080s/ 67%	4.9 to 5.1	6.2 to 6.7	7.9 to 8.3
2080s/ 90%	7.1 to 7.5	8.8 to 9.5	11.1 to 11.7

Data source: UKCP09 User Interface (© UK Climate Projections, 2009)